OECD Rural Studies

Delivering Quality Education and Health Care to All

PREPARING REGIONS FOR DEMOGRAPHIC CHANGE

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Preface

Across OECD regions, populations are ageing and in some cases beginning to decline. This demographic megatrend presents new development challenges but also opportunities, especially for rural areas. To help policymakers navigate these changes the OECD has launched a new sub-series of work: *Preparing Regions for Demographic Change*. This report – *Delivering Quality Education and Health Care to All* – is the first in that sub-series.

This publication could not be timelier, coming as it does when governments across the globe are working under unprecedented pressure to manage the sanitary, social and economic crisis of the COVID-19 pandemic, while also maintaining key services for all their people, wherever they live. However, the pandemic has reinforced the need to act on existing gaps across places, for example in levels of staffing and skills and, indeed, infrastructure, both physical and digital. In the areas of health and education, for example, the pandemic has heavily increased demand for care and lockdowns have forced children to study online from home. These demands have exacerbated long-standing place-based disparities in access to medical resources, the incidence of comorbidities, environmental health risks, school quality, income disparities and digital divides, among others. The prospect of population decline and ageing puts many rural communities at risk of even higher unmet needs.

While the delivery of education and health services are nationally co-ordinated and funded in many countries, the financial costs of dealing with the crisis will be severe, putting increasing pressure on the public purse and constraints on governments, bolstered by the rollout of vaccines, to accelerate the recovery. This report highlights the critical role that subnational governments and local organisations can play in that process and their ability, by tailoring delivery models to leverage local strengths, to generate and drive efficiencies in the delivery of key services. The report also identifies a number of place-based recommendations to better design and deliver education and health services in rural regions that can help mitigate existing inequalities and support communities facing ageing and depopulation.

While the challenges of societal ageing and population decline are significant, they are, to some extent, a consequence of past successes. Today, OECD member populations are living longer, healthier lives and they are better educated and more prosperous than ever before. However, whilst this is true at the national level, it is also true that these gains have not always been spread equally within countries and challenges remain. This year, as the OECD celebrates its 60th anniversary, the publication series *Preparing Regions for Demographic Change* aims to help overcome those place-based challenges and support even better lives for all in the years to come.

Lamia Kamal-Chaoui

Director, OECD Centre for Entrepreneurship, SMEs, Regions and Cities

Foreword

The importance of effective delivery of education and health services requires little justification but across OECD countries and indeed within OECD countries, there exist significant gaps in access and quality of these services. Without action, shrinking and ageing populations in many rural communities are likely to see not only fewer hospital beds per head of population, higher rates of morbidity, different skill-levels of, and higher demands on, local teachers and medical staff, but also differences in enabling infrastructures such as transport networks and digital connectivity, among many others. Through its disproportionate impact on senior citizens and in the heightened role that digital tools have played in mitigating the impacts of social distancing and in ensuring service delivery, the COVID-19 pandemic has reinforced the need for action.

This report, through its compilation of good policy practices and innovations to deliver education and health care services to citizens living in different geographies, especially in remote rural places, responds to that call. The report highlights the decisive role geography plays in determining access to these services and, in turn, the need for a spatial lens in developing policies that address inequalities in their provision and access. The report provides guidance for governments seeking to design sustainable and equitable long-term strategies for service delivery, with a focus on two key areas: digital connectivity and governance.

This report, the first of a new sub-series of reports (*Preparing Regions for Demographic Change*) was carried out as part of the OECD's Regional Development Policy Committee (RDPC) Programme of Work on OECD Rural Studies. The RDPC provides a unique forum for international exchange and debate on regional economies, policies and governance. It was discussed in the 24th meeting of the Working Party on Rural Policy and was approved by the RDPC [CFE/RDPC/RUR(2020)6/REV2] via written procedure on December 15 2020.

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Abbreviations and acronyms

ABI	American Broadband Initiative (US)
ACARA	Australian Curriculum, Assessment and Reporting
ACCESS	Accelerating Connected Care and Education Support Services on the Internet (US)
ADSL	Asymmetric Digital Subscriber Line
B4RN	Broadband for the Rural North (UK)
BCPs	Broadband connection points
BTOP	Broadband Technology Opportunities Programme (US)
CARES	Coronavirus Aid, Relief and Economic Security (US)
CENETEC	*Centro Nacional de Excelencia Tecnológica en Salud* (Mexico)
CFP	Community Fibre Partnership (UK)
CHF	Congestive health failure
CIB	Canada Infrastructure Bank (Canada)
CNAM	National Health Insurance Fund / *Caisse nationale de l'Assurance Maladie* (France)
COPD	Chronic obstructive pulmonary disease
COVID-19	Coronavirus disease 2019
CRTC	Canadian Radio-television and Telecommunication Commission (Canada)
DCN	Dakota Carrier Network (US)
DOCSIS	Data Over Cable Service Interface Specification
DRGs	Diagnostic related groups
DSL	Digital Subscriber Line
EC	European Commission
EU	European Union
FCC	Federal Communications Commission (US)
FSOs	Free-space optical
FTTC	Fibre to the Curb
FTTH	Fibre to The Home
FTTN	Fibre to the Node
FTTP	Fibre to the Premises
GBVS	Gigabit Broadband Voucher Scheme (UK)
GDP	Gross domestic product
GG	General government
GP	General practitioner
GVCs	Global value chains

HEIs	Higher education institutions
ICBN	Inter-County Broadband Network (US)
ICT	Information and communication technology
IoT	Internet of Things
IT	Information technology
ISCED	International Standard Classification of Education
ISED	Innovation Science and Economic Development (Canada)
LAI	Local Autonomy Index
LEO	Low Earth Orbit
LTE	Long-Term Evolution
MSP	*Maisons de santé pluriprofessionnelles* (France)
NBI	National Broadband Ireland
NBN	National Broadband Network (Australia)
NGBEP	Next Generation Broadband Expansion Programme
NHS	National Health Service (UK)
PISA	Programme for International Student Assessment
PLATO	Programmed Logic for Automated Teaching Operations (US)
PPP	Public-private partnership
PPP	Purchasing power parity
PRISMA	Program on Research for Integrating Services for the Maintenance of Autonomy (Canada)
RAI	Regional Authority Index
RDOF	Rural Digital Opportunity Fund (US)
RFP	Request for proposals
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SBVS	Scottish Broadband Voucher Scheme (UK)
SDGs	Sustainable Development Goals
SHI	Social health insurance
SMEs	Small-and medium-sized enterprises
TALIS	Teaching and Learning International Survey
TL2 / TL3	Territorial level 2 / Territorial level 3, i.e. large / small regions
UAs	Urbanised Areas
UCs	Urban Clusters
UNESCO	United Nations Educational, Scientific and Cultural Organization
USDA	US Department of Agriculture
VDSL	Very high-speed Digital Subscriber Line
WHO	World Health Organization
WIP	Workforce Incentive Program (Australia)

Executive summary

The COVID-19 global pandemic has intensified the challenges of delivering public services to all citizens, particularly those living in rural regions. Service facilities in remote and lower-density places often have limited scale and struggle to recruit and retain professionals. These places also face lower fertility rates, rapid ageing and depopulation, which can, in turn, create a vicious circle through further pressures on local finances that have already been stretched because of the pandemic. Ensuring efficient use of public resources and delivering sustainable policy responses in the provision of services has never been more important, especially in those regions that have been hardest hit.

However, whilst Covid-19 has exacerbated many pre-existing challenges it has also accelerated progress in the development, scope and awareness of the potential of new technological and organisational possibilities to shrink and overcome place-based challenges and unleash the benefits of networks. Technological innovations such as improved digital skills and digital infrastructure are a critical component but to fully leverage on these, organisational changes are also needed: namely, close co-operation, co-ordination and co-production between national, regional and local governments and communities.

This thematic report identifies good practices in public service provision across territories, including innovations in service delivery and conditions for success to help countries in their efforts to deliver quality health and education services by establishing sustainable long-term strategies.

Rethink the future of rural schools with networks and digital solutions

Many rural schools are facing or will soon face declining student numbers, bringing consequently smaller schools, class sizes and student-teacher ratios. While smaller sizes can present some opportunities such as more teaching time per student, many small rural schools operate in isolation and under capacity with a limited educational offer and their principals and teachers struggle with multiple roles. At the same time, rural schools often benefit from stronger community engagement and are in the best position to benefit from substantial travel savings and increased diversity from digital education.

To prepare rural schools for the future, countries need to rethink traditional approaches to education provision, starting from going beyond relocating rural students to larger, more distant schools. Governments should consider a more flexible approach to class and school size regulation so rural schools can maximise the resources available to them while prioritising investments in the attraction, retention, development and empowerment of teachers in rural communities. School clusters involving formal collaboration between rural schools can also help mitigate size-based challenges, for example through economies of scale in specialised facilities and a better use of scarce educational professionals. Distance learning is a valuable resource for small schools to offer more training opportunities for teachers and support school communities, while service co-location can expand the traditional scope of schools.

Address territorial health care gaps by reinforcing primary and integrated care

The provision of health care is a territorial issue because balancing costs, quality and access necessarily involves factoring in density and distance. Many rural populations face longer travel times to access rural

care facilities, which in turn face the constant threat of declining user numbers and difficulties in recruiting and retaining health care professionals. The supply of health care services in many rural communities, especially after the 2008 financial crisis, has not kept pace with increasing demand from rural dwellers who, compared to urban dwellers, are on average older, have shorter life spans, display worse health outcomes and suffer more from chronic diseases.

To ensure access to quality health care across territories, policies should focus on reinforcing primary and integrated care. Because it is expected to be the first point of contact for the majority of patients' needs, primary care (regular, preventive and person-focused care), is best placed to deal with higher levels of multiple chronic conditions and higher demand for long-term and chronic care in older populations, as it helps to prevent unnecessary hospital admissions in rural areas. More extensive use of tele-medicine and new configurations of care, such as clinical networks, are key to the sustainability of rural health care provision, as well as strategies for workforce attraction that combine financial incentives, multidisciplinary medical homes and sharing of responsibilities.

Tackle skill and Internet access gaps to harness digital provision

Normative, skill and Internet connectivity barriers currently limit the great potential of telemedicine and distance learning to bridge provision gaps in rural areas. However, regulation and funding for digital services are, at present, not sufficiently tailored to the needs of rural areas. Existing digital divides call for revised strategies and investments in the digital skills of rural users and providers. Above all, policies need to address rural Internet connectivity gaps and the often poor quality of broadband connections that disrupt the provision of public services in low-density areas.

Governments can empower communities to solve local connectivity challenges through successful local-level initiatives led by non-profit co-operatives, mutual organisations and local government. National governments can support these efforts by aligning financial support with the development of long-term solutions that go beyond subsidies, coupled with an enabling regulatory environment. Alternative approaches, such as voucher schemes and demand aggregation models accessible to community-led initiatives can support the development of more sustainable market-based solutions. Public-private partnership models that combine public funding with private investment can help in balancing the risks borne by taxpayers with the potential to share in future revenue streams.

Increase the scale and quality of services with decentralisation

Decentralisation of service provision, involving the transfer of powers, responsibilities and resources from central government to subnational governments, can increase efficiency by establishing more user-oriented systems and better information on local needs. Subnational units, however, may not correspond to the appropriate service areas, which can result in unmanaged negative spill-overs and externalities across borders leading to inefficiencies. Earmarked transfers from central to subnational governments, co-operation agreements between subnational governments (including across regional borders) and upscaling responsibility levels have worked to mitigate inefficiencies. To bring back scale in service provision, governments should support municipal mergers and inter-jurisdictional co-operation.

Decentralisation of education and health care systems do not always incorporate the needs of lower-density areas. For instance, penalising small sizes to improve financial performance may work in city schools but may be counterproductive in rural schools experiencing an inevitable decline in student numbers. The increasing efficiency from health care decentralisation can result in higher disparities through poorer health outcomes in regions with lower institutional capacity. Above all, decentralisation requires a clear definition of responsibilities and the alignment between these and funding levels.

1 Assessment and recommendations

Introduction

The global pandemic has intensified the challenges of delivering public services across and within OECD countries. Whether seen through a prism of shortages of equipped and staffed hospitals treating disproportionately high numbers of vulnerable people or the difficulties faced by children accessing online learning when schools are closed, COVID-19 has put renewed focus on the importance of addressing longstanding challenges that OECD governments face in delivering critical services, especially in rural communities.

The challenges are even larger in remote rural regions with low population densities. With fewer people spread over a wider area, economies of scale are difficult to achieve. The physical infrastructure needed to provide good quality education and health services can be more complex and expensive in these areas and attracting highly skilled people poses an additional challenge.

Beyond the immediate crisis, the pressure to drive efficiencies in public spending is expected to last long after the virus has subsided. Public spending has risen in response to the pandemic and fuel recovery, while revenues have fallen, both for national and subnational governments. Looking ahead, a period of fiscal consolidation is likely, reinforcing the importance of efficient use of resources, especially in those regions and subnational governments that have been hit harder, for example, those with high dependencies on tourism.

Furthermore, acute ageing trends in many rural places and, in some cases, a shrinking population will require sustainable policy responses. OECD rural regions are at the forefront of this trend; their populations are older and ageing faster than other regions. Evidence for some OECD countries including Australia and the United States shows that rural residents also tend to have less healthy lifestyles and, in turn, higher incidences of chronic disease, raising pressure on rural health services. In addition, low fertility rates and a dwindling number of pupils are driving down school sizes below viable levels in many rural areas.

Taken together, the challenges of distance, demographic change and fiscal belt-tightening require effective policy responses to deliver services in rural communities. To maintain quality services in rural regions and close gaps further exposed by the pandemic, governments must develop innovative responses tailored to the specificities of rural places and the long-term challenges they face. These responses should identify economies of scale and scope, including synergies across administrative and policy silos and levels of government.

While many countries already have long-term strategies in place for education and health services, this report examines the nuances specific to their delivery in rural regions, offering recommendations on how to better adapt provision to the rural realities of today and the emerging realities of tomorrow. It complements this analysis with an examination of digital connectivity issues in rural regions, recognising the significant scope for digital delivery of services to mitigate challenges related to distance. Finally, the report looks at governance issues, including fiscal issues, through which the delivery of these critical services is administered and paid for.

Assessment

Education

Quality, accessible educational services in rural regions are key to addressing local skills gaps both in the short and long terms. In the short term, good schools are a factor in the attractiveness of a community, one that can help retain and attract young families, including service professionals and supporting “brain circulation” over brain drain. Over the longer term, high-quality education ensures today’s children are ready for the opportunities of tomorrow, while life-long learning helps workers in displaced sectors retrain for the jobs that are available in rural regions.

Though equal access to education exists in the laws and constitutions of several OECD countries, issues relating to scale can impede access in rural areas. Rural schools are facing, or will soon face, declining student numbers, bringing consequently smaller schools and class sizes. While small size can bring opportunities, such as a greater teacher focus for each student, many of these schools are isolated from the wider educational community and are operating under capacity. Smaller schools may also offer a more limited educational curriculum, for example with fewer subjects for students to choose from at the secondary level and fewer specialised teachers. A more limited educational offering is a factor contributing to rural students having lower prospects of continuing education and, consequently, poorer career prospects.

Many principals and teachers need to adopt multiple roles when working in smaller rural schools. Principals in rural schools are often required to engage in direct teaching responsibilities in addition to their leadership role and teachers often have to provide classes to different age groups. In addition to performing multiple roles, more limited collaboration and peer support can weigh down on educational quality, professional learning and staff satisfaction.

Although rural schools typically suffer from a lack of resources, they often benefit from stronger community engagement. Research has shown that rural schools benefit from a larger share of parents participating in extracurricular, voluntary and fundraising activities. One motivation for this increased involvement is the heightened role that schools play in rural life, with the school often playing a central role, at the heart of the community, in social cohesion.

The forced shift to online learning in response to the pandemic has further highlighted inequities faced by rural communities in accessing digital services. Rural areas are less likely to have access to affordable, high-quality broadband connectivity and less likely to have the devices and skills needed to make use of it. For some children this meant being unable to continue lessons during lockdown periods, widening pre-existing inequalities with peers in better-serviced regions.

Health care

Rural dwellers are on average older, have shorter life spans, display worse health outcomes and demand more complex healthcare needs. Rural dwellers in many OECD countries are also more likely to live in poverty and experience unemployment and disruption to their careers, exacerbating challenges related to less healthy lifestyles and, in turn, higher incidence of chronic disease.

Rural areas face higher challenges in recruiting and retaining professionals in the health care system. Lower salaries, unappealing professional prospects, concerns about prestige and urban-centric medical education all make finding qualified staff particularly problematic for rural hospitals, which is likely to create skills mismatches. For example, emergency departments in rural hospitals in the United States are less likely to be staffed by emergency room doctors and more likely to be staffed by family doctors.

Cost reduction strategies following the 2008 financial crisis disproportionally affected the quality of and access to medical professionals and facilities in rural regions. Hospital bed rates have decreased in all

types of rural regions since the 2008 global financial crisis at an average rate of -0.7% per year, while they increased slightly in metropolitan regions. The decrease was largest in rural regions far from large cities (between -1.5% and -2% per year). The gap in access to physicians between metropolitan and rural regions has been persistent since the crisis, especially in countries with significant territorial differences in access. The combination of reduced capacities, higher workloads and saturation of hospitals in several regions during the COVID-19 pandemic, has severely tested the ability of medical services to cope.

The provision of health care has a strong place-based dimension necessitating a balance between costs, quality and access all driven by density and distance. A low volume of patients and long distances between them means that, in order to stay accessible, healthcare facilities in rural areas tend to be small and scattered. Concentrating service provision in larger facilities in more densely populated places may raise the efficiency of the health care system but it also implies longer travel distances. At the same time, the higher quality of some specialised medical services provided at a larger scale can make a difference between life and death. Because of these trade-offs, the loss in accessibility for rural dwellers should be weighed against the quality and efficiency gains of increased scale.

Digital connectivity

Newer technologies and upgrades for broadband provision are more common in urban areas. Broadband technologies are continually improving, with network operators facing a never-ending investment cycle. Given the penalty of distance that exists in low-density areas, new technologies tend to be deployed first in more densely populated urban areas, where the upfront investment costs are more easily recouped. The latest fixed and mobile broadband technologies, like fibre optical cabling and 5G mobile technology, are currently being rolled out in OECD countries but these networks are more common in urban areas, while previous generation, slower, technologies remain dominant in low-density areas.

In 2016, just 56% of rural households had access to fixed broadband with a minimum speed of 30 Mbps, in comparison to over 85% of households in urban and other areas. Commonly used technologies in low-density areas have limitations that reduce the quality of the connection and, in turn, may impact on the ability and scope of services to be delivered. Geostationary satellites are often used in the most remote areas but their altitude in orbit brings a transmission delay (latency) that can create challenges for applications that depend on real-time transmission (such as wearable health care monitoring devices). In addition, both satellite and mobile network subscribers commonly face monthly usage caps, while digital subscriber lines (DSL), the most common technology in low-density regions, usually provide asymmetric connections, i.e. the download speed is much faster than the upload speed. In service delivery applications, for example, a two-way video consultation between a doctor and patient, limited upload speed might mean low-quality video and service provision.

OECD governments have deployed a variety of approaches to increase the availability and quality of broadband in low-density areas. This has included regulatory changes that enhance the efficiency of the market, as well as state support for network development through subsidy programmes. In many cases, local co-operatives and municipally-owned broadband networks have been developed. Each approach involves some trade-offs in terms of the level of public investment required, the timeline, the state's risk exposure and the ownership structure of the networks developed. In some cases, broadband subsidies have flowed to dominant incumbents and have supported only incremental upgrades to existing networks. While these subsidies provide quick fixes for pressing needs, they may not address the underlying market failures that gave rise to the need for subsidies in the first place. Several of the OECD's best-connected low-density areas have achieved successful outcomes through small-scale efforts at the local level and other innovative approaches, such as public-private partnerships, are showing promise at both the local and national scales.

Governance

The provision of health and education services has become increasingly decentralised. In recent decades, there has been a discernible trend towards decentralisation across many OECD countries with subnational governments playing an increasingly critical role in the delivery of many essential public services. This has affected how public services are delivered across different territories. While some view this as the "hollowing out" of the state, others describe it as public management efficiency and necessary reform. Debates about public services are thus fundamentally linked to debates about the role of the government.

Where public services have been decentralised, upper-level governments (national or regional depending on whether it is a unitary or federal state) generally continue to play a role in defining, monitoring and assessing the quality of public services. They are also concerned with addressing equity – this may include equity of access to public services for different populations (e.g. those that are deemed marginalised and at-risk) and equity of access and quality across different territories, where redistributive fiscal policies can play an important role.

Recommendations

Increase the place sensitivity of service delivery: While education and health care policy have never been spatially blind in placing schools, medical centres and hospitals within reasonable reach of populations, there remains scope to finetune these policies. This goes beyond catchment areas and driving radii, for example, and should increasingly consider the economic and social well-being of each community, their demographics, access to digital infrastructure and digital skills.

Tackle demographic challenges through innovation: While some governments are working to address demographic challenges by attracting newcomers to rural communities, for example through special incentives and targeted immigration programmes, for most rural communities the trend of population ageing and decline is likely here to stay. That means new approaches must be found to deliver quality services in a fiscally sustainable way over the long term. These approaches may include co-location, collaboration and co-production efforts across departments and levels of government to increase efficiency and leverage on the latest digital technologies to expand access.

Education

Take a flexible approach when considering class sizes and regulatory matters to benefit rural education: Minimum class sizes and funding rules that penalise small facilities can be counterproductive to schools in rural regions and it is necessary to introduce more flexibility in such cases. Governments can instead incentivise rural schools to actively participate in school network restructuring and to deploy innovative approaches to increase the scale of rural schools, such as multi-grade classrooms, to ensure adequate quality of education is maintained. Greater flexibility is also needed to permit rural schools to leverage the advantages of their close-knit communities, by providing flexibility in health and safety regulations that permit parents to volunteer as canteen staff or as cleaners for example. Policy should empower principals, teachers and local leaders to permit them to make use of the specific assets their community offers.

Place the attraction, retention and empowerment of teachers at the heart of rural service reform: Policies should focus on the development and support of educational professionals in rural communities, especially those that can make the most of local opportunities. Investments should be made in their training to ensure they have the digital skills necessary to facilitate online learning for students and to provide them with the competencies to manage multi-grade classrooms and other new learning environments. Monetary incentives can encourage teachers to take positions in rural and remote communities. Governments can incentivise the geographical mobility for teachers so that the option of teaching in rural schools is attractive

for the career development of young teachers. Exchange programmes between teachers from urban and rural areas can provide rural teachers with a broader professional network, access to peer groups to support their development and help bridge urban-rural cultural divides.

Increase scale through the development of school clusters: School clusters, i.e. structures in which schools formally co-operate under a single leadership to allocate resources more flexibly and efficiently, can help maintain service provision in places that might otherwise be vulnerable to school closure. They can involve both horizontal (i.e. integrating schools with a similar educational offer) and vertical integration (i.e. integrating schools at different levels of education) and may be arranged with a lead or core school with satellite schools in other locations, or might simply mean the creation of schools split across different sites with a single management and budget.

Prepare rural schools for the future by redesigning approaches to education provision: For example, through service co-location, integrating schools with other public services, such as day care centres and kindergartens, to create a community hub, or by adding complementary services such as dormitories so that children from distant communities can attend all or part of the time, whilst also leveraging on digital distance learning.

Expand digital education through a comprehensive approach tailored to specific places: This approach should consider the availability and quality of digital infrastructure in target communities, student access to digital devices and digital literacy among teachers, students and parents. It should also include teachers in the design of the tools used.

Health care

Reinforce primary and integrated care provision in rural areas: Primary care is generally the first point of contact for the majority of patients' needs. Providing regular, person-focused and preventative care, is the best way to deal with the higher levels of multi-morbidity and long-term chronic care in older populations, especially in rural communities. Integrated care, which aims to more comprehensively look after the needs of vulnerable populations, for example by co-ordinating between primary care physicians and social care providers, is an additional tool that can help prevent unnecessary hospital admissions, thereby efficiently improving outcomes. Innovative approaches such as mobile clinic and testing facilities that make scheduled visits to rural and remote communities can help address gaps in the accessibility of these services to relatively immobile populations, including the elderly. Importantly, rural areas need to anticipate and address medical workforce gaps, for instance by expanding the roles of nurses and pharmacists and offering relocation packages that go beyond financial incentives to emphasise career prospects and furthering of skills.

Provide incentives for the establishment of multi-disciplinary health centres: Many OECD countries are reorganising primary care around multi-disciplinary teams. These teams include not only general medical practitioners but also often include family physicians, registered and advanced nurses, community pharmacists, psychologists, nutritionists, health counsellors and non-clinical support staff. This mix of expertise includes access to social services and is particularly important to patients dealing with multi-morbidity. Common elements of these multi-disciplinary teams are the focus on patient engagement in decision-making and the common use of sophisticated IT systems for risk stratification. The approach can deliver significant performance improvements, including economies of scale through shared inputs, such as equipment and human resources, and they can also lower rates of emergency department arrivals and hospitalisations for patients with chronic conditions.

Expand the use of telemedicine to improve the sustainability of rural health care provision: Telemedicine can be used to provide virtual consultations between doctors and patients, which may be useful for specific use cases such as follow-up appointments or mental health consultations but are clearly less useful in cases that benefit from a physical examination. However, other emerging forms of

telemedicine, such as the real-time monitoring of patients' health information through wearable devices may improve prevention and the quality and sustainability of health care as a result. These services are particularly useful for rural residents who may otherwise have limited access to mental health professionals or other specialties and may encounter significant travel costs to attend their nearest primary care clinic for regular monitoring.

Digital connectivity

Empower communities to solve local connectivity challenges: While national governments play an important role, for example in developing the competitive market place and ensuring territorial equity, some successful and complementary examples of broadband connectivity in low-density regions have come from the local level. Local governments are often highly motivated to connect their communities and can help simplify and lower the cost of the process through their oversight of planning permission, construction permits and other regulatory instruments necessary, for example, to dig trenches for fibre. In many OECD regions, locally-led initiatives have both lowered the cost of building networks and helped to achieve higher uptake of service once it is built. Non-profit co-operatives and mutual organisations also have a role to play and national governments can support these efforts by helping reduce regulatory barriers towards small-scale market entry and by offering funding support in ways that encourage local control.

Align financial support with the development of long-term solutions: A subsidy initiative that supports historical incumbents to upgrade existing networks but which does not address the underlying market failures that gave rise to the need for the subsidy in the first place may mean that further rounds of subsidy are needed to help communities keep pace with future improvements in technology. Alternative approaches that foster the development of new networks and the entry of new players to compete with the historical incumbents can lead to a more sustainable market-based solution. Broadband voucher schemes accessible to community-led broadband efforts are one such approach. Another alternative is a public-private partnership model, whereby public funding is combined with private investment to improve connectivity while also fundamentally changing the marketplace in a way that delivers long-term improvements in broadband provision and balancing the risks borne by taxpayers, with the potential to share in future revenue streams. These models have been applied successfully at both the national and local levels in OECD countries.

Governance

Align financial resources with devolved responsibilities: If the central government delegates or devolves education and healthcare responsibilities to subnational governments, the central government should also ensure that such mandates are financed. One of the most frequent challenges of decentralisation is the misalignment between responsibilities allocated to subnational governments and the actual resources available to them. Access to finances should be consistent with the costs associated with delivering the services and these costs should be calculated in a way that reflects the local conditions. Failure to account for these issues could result in an increase in the delivery efficiency of health and education services coming at the expense of higher territorial disparities in health and education outcomes.

Ensure fiscal transfer systems reflect both the local tax bases and delivery costs: A well-designed transfer system ensures that subnational governments can provide a comparable level of public services at comparable tax rates in all subnational units. The incentive to generate efficiencies in local administration is strengthened if a considerable share of local public services is financed with local taxes. However, many local governments in rural areas have small and shrinking tax bases and the delivery costs associated with health and education services in these areas are higher due to the distances involved and the greater service needs that exist in these areas. Transfer systems should especially support local governments with low own-source revenue potential while also taking into account the higher costs that rural areas face.

Maximise efficiency by exploring innovative structures to deliver health and education services across subnational boundaries: While the delivery of education and health services is commonly devolved, the most convenient access may be provided across administrative boundaries. For example, the closest hospital to rural residents living near a region border may be in their neighbouring region. In these cases, achieving economies of scale and consistent delivery of services may require co-operation across administrative boundaries. A variety of arrangements can be used to facilitate access in these cases:

- Central governments can use earmarked transfers to subnational governments to encourage extended service delivery that takes into account non-resident users. For example, if a patient or student from a neighbouring jurisdiction benefits from health and education services paid by a jurisdiction's taxpayers.
- The government may, alternatively, facilitate municipal mergers. Such mergers can increase the scale of provision by augmenting the size of local service areas and reducing fragmentation. They can however be problematic if they create economies of scale for some services but diseconomies of scale in others.
- A third option is to facilitate interjurisdictional co-operation agreements. These can be a more flexible alternative because they enable economies of scale where it is most beneficial and can be selectively applied to the areas of service where they will be most useful.

2 Setting the scene

The global COVID-19 pandemic has intensified already existing challenges of delivering public services across and within OECD countries. This chapter sheds light on megatrends shaping the present and future provision of public services in OECD regions, including demographic changes leading to depopulation, digital transition, structural change and, more recently, the COVID-19 pandemic. It provides a working definition of public services and looks at governments' responsibilities when delivering quality and accessible services. The chapter also outlines public management reforms involving the level of responsibility by levels of government in the delivery of services, highlighting recent trends in spending in public services. Finally, the chapter summarises recent innovative service provision model alternatives offering increased flexibility based on co-location, cooperation and co-production.

Introduction

Delivering health, education and other services of general interest to inhabitants of rural and urban areas is a mandate for governments around the world. Many OECD countries have an explicit constitutional commitment to maintain equitable living standards across their territories, thus making this issue a priority. However, meeting this mandate is becoming more challenging for many countries in recent years because of tight fiscal budgets in the aftermath of the 2008 financial crisis, demographic pressures of ageing societies and rising public spending on both social services and healthcare.

The costs of providing services in places with smaller and more dispersed populations are higher due to lower economies of scale and scope, higher transportation costs and potential financial incentives for service professionals. Service provision across territories involves an unavoidable trade-off between facility size and proximity to users. A low number of users and long distances between them means that, in order to stay accessible, service facilities in rural areas tend to be small and scattered. Concentrating service provision in larger facilities in more densely populated places results in longer travel distances for users in sparsely populated areas. This trade-off implies that the benefits in terms of scale and scope should be weighed against the loss in accessibility for users in less accessible areas. The access costs to rural services are usually borne by both users who have to travel further in order to access services and by service professionals such as teachers and doctors who have further to travel to meet the population they serve (Wiggins and Proctor, 2001[1]).

Previous OECD studies put forward the idea that rural service provision is best planned when seen from the perspective of functional service areas with networked villages, towns and more dispersed areas. Early OECD research on service delivery examined the question of how to ensure access to services in a cost-effective manner while maintaining quality in rural areas and profiled key trends affecting service delivery in rural areas, describing various service models (OECD, 2010[2]). Previous OECD rural studies on Japan, Poland, Sweden and Northern Sparsely Populated Areas provided insights into the associated challenges and importance of foresight, spatial planning and innovation to address these issues (OECD, 2017[3]; 2017[4]; 2016[5]; 2018[6]). These studies revealed the importance of the relative distribution of rural settlements (e.g. how dispersed they are) on the costs of service provision and therefore stressed the need for forward-looking planning in view of fast demographic change.

Since then, technological advances have continued to produce new ways of providing quality services and substituting physical forms of delivery with virtual ones. Many governments increasingly pursue integrated and flexible approaches to the provision of services in rural areas as a way of maintaining quality and access. Integration involves the co-ordination of public services across a range of sectors – from health to education and eldercare/continuing support services. Flexible service provision models include mobile health services such as blood clinics or doctors' visits, and replacing public transportation in rural areas with sharing mobility services based on mobile applications (Velaga et al., 2012[7]).

While these strategies can help maintain and even improve service delivery in rural areas, they require infrastructure and human capital investments and the right cultural and institutional environment. Digital services require the availability of reliable and good quality Internet access which currently varies and lags in rural and remote areas in most OECD countries. While potential future cost savings of digital service provision add to the return on investment of expanding broadband networks, an increase in the uptake of digital services also requires investments in the varying needs of users and service professionals across territories. Decisions on changing service provision models not only involve service location but settlement patterns, availability and skills of the local labour force, organisational and cultural change, demographic change and transportation and infrastructure planning.

Rural areas need to ensure the provision of public services while facing multiple and complex megatrends, including demographic change, digital transition, structural change and, more recently, the COVID-19 pandemic (OECD, 2020[8]; 2020[9]). There are examples of success and innovation where communities

have been resilient, adopting new and emerging models such as co-production. In other cases, pressure to rationalise and regionalise services has cemented community decline. Public services are the lifeblood of communities – attracting others and mediating the booms and busts inherent to places with more resource-dependent economies.

Key considerations include thinking about the mix of sectoral policies that impact public services in communities in "place", the infrastructure they need to thrive (including digital infrastructure), the capacities of communities to self-organise and take a long-term view of a community's development. Currently, the strenuous pressure of the COVID-19 pandemic has forced governments to continue the provision of healthcare and education under extreme uncertainty. The responsibility of subnational governments – regions and municipalities – for critical aspects of containment measures as well as for the provision of many public services has come to the forefront. The pandemic crisis has emphasised the need for well-implemented multi-level governance, which gives considerable degrees of decision-making freedom to subnational governments. It has also highlighted the importance of local measures and decisions based on local expertise and conditions and, at the same time, the need for co-ordination across all actors involved.

This thematic report aims to:

1. Inform national and subnational governments, and non-governmental organisations about approaches to the delivery of public services in rural areas, particularly those that are remote and facing population ageing and outmigration. The report outlines strategies to enhance education and healthcare delivery in rural communities and regions.
2. Identify good practices in terms of rural public service provision, including highlighting innovations in education and health care delivery (new approaches, partnerships and digital technologies) and conditions for success.
3. Help countries in their tasks to deliver healthcare and education services by better understanding the present and future cost drivers and establishing long-term strategies that can be sustainable given population trends and innovative solutions.

After this introduction, the second section that follows outlines the megatrends shaping the present and future provision of public services in rural areas. The third section presents a working definition of public services and discusses the evolution of the state's responsibilities in the delivery of services. The fourth introduces the relevant governance debates in relation to the provision of public services. The fifth discusses current trends in service provision models. The last section concludes.

Megatrends that shape the future of service provision

Rural places in OECD countries face a number of megatrends that will shape the availability and quality of public services (OECD, 2020[8]). These megatrends include demographic changes leading to depopulation, an ageing population, the COVID-19 pandemic, changes in economic structure and digitalisation. This section discusses each megatrend in turn.

Depopulation is at the doorstep of many rural communities

Demographic trends in rural areas are key to understand the present and future challenges and opportunities for public service delivery in rural areas. These challenges concern an important part of the population across OECD countries, as about 30% of people in OECD countries live in rural regions (OECD, 2020[8]) (see Box 2.1 for an overview of the OECD territorial typology). Over 2001-19, remote rural regions showed the slowest population growth rates in the majority of OECD countries while metropolitan regions displayed the highest rates. Population projections available for Europe show that half of Europe's regions are projected to face absolute population decline by 2060 (OECD, 2020[8]).

The population in many rural and remote regions is not only falling in absolute terms but its relative composition is also changing. With mostly younger inhabitants following the call of cities, rural places that lack access to cities tend to see their elderly dependency rate go up, with fewer working-age inhabitants staying. In addition, many OECD countries face a larger trend of low fertility rate and population ageing. This means that the number of school-age children decreases even faster than the total population, reducing the critical mass for operating nearby schools at an efficient scale. All of this makes it challenging to organise the school network in rural and remote areas (OECD, 2018, p. 56[10]). Chapter 3 explores the policy options available to governments and rural communities to ensure continued access to quality education for children and young adults.

Box 2.1. Classification of TL3 regions based on their level of access to cities

Recent work on OECD regional statistics establishes a new typology addressing the diversity within the category of "rural regions". Small regions (at territorial level 3 – TL3) are categorised based on the share of the small region's population living in a functional urban area (FUA) of a certain size and the population's access to such an area if they live elsewhere. The new methodology classifies TL3 regions into metropolitan and non-metropolitan according to the following criteria:

- ***Metropolitan TL3 region***, if more than 50% of its population live in an FUA of at least 250 000 inhabitants. Metropolitan regions (MRs) are further classified into:
  - **Large TL3 MRs**: if more than 50% of their population live in an FUA of at least 1.5 million inhabitants.
  - **TL3 MRs**: if the TL3 region is not a large MR and 50% of its population live in an FUA of at least 250 000 inhabitants.
- ***Non-metropolitan TL3 region***, if less than 50% of its population live in an FUA. Such regions are further classified according to their level of access to FUAs of different sizes into:
  - **With access to (near) a TL3 MR**: if more than 50% of its population live within a 60-minute drive from an FUA with more than 250 000 people; or if the TL3 region contains more than 80% of the area of an FUA of at least 250 000 inhabitants.
  - **With access to (near) a small/medium city TL3 region**: if the TL3 region does not have access to a metropolitan area and 50% of its population have access to an FUA of more than 50 000 and less than 250 000 inhabitants within a 60-minute drive; or if the TL3 region contains more than 80% of the area of a small or medium city.
  - **Remote TL3 region**, if 50% of the region's population do not have access to any FUA within a 60-minute drive.

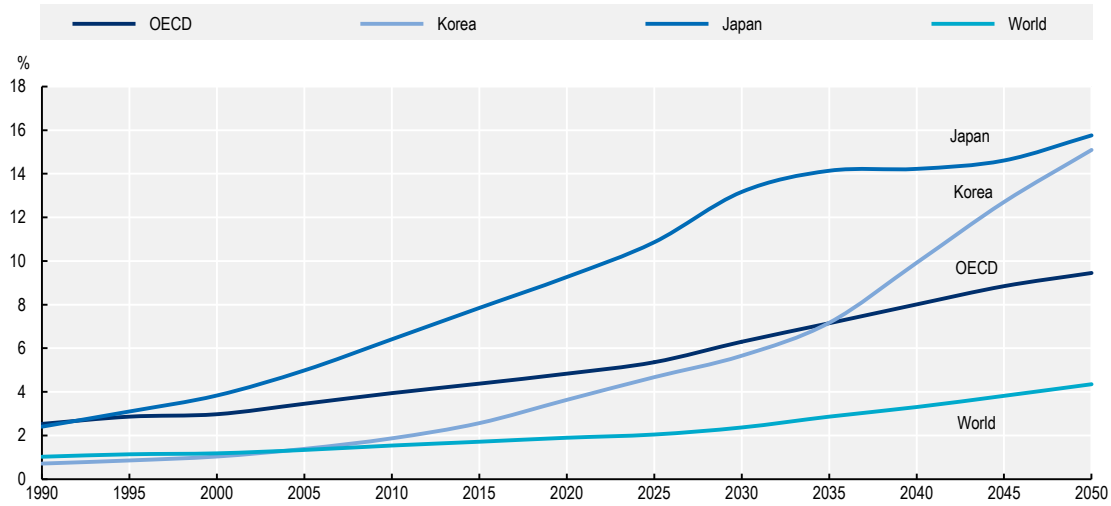
Source: Fadic, M. et al. (2019[11]), "Classifying small (TL3) regions based on metropolitan population, low density and remoteness", https://doi.org/10.1787/b902cc00-en.

Healthier and longer lives mean more ageing in rural areas

People in OECD countries today are on average living healthier, longer lives than before. Life expectancy has increased by more than ten years on average across OECD countries thanks to rising incomes, better education, improved living environments and stronger health systems. This means that across countries, the proportion of elderly with respect to the total population has increased and will continue increasing in the future if the current trends hold. Available population projections show that between 2017 and 2050, the proportion of the population over 80 years old will more than double on average in OECD countries, from 4.6% to 10.1% (Figure 2.1).

Figure 2.1. Future trends in the share of the population aged over 80 years

1990-2050



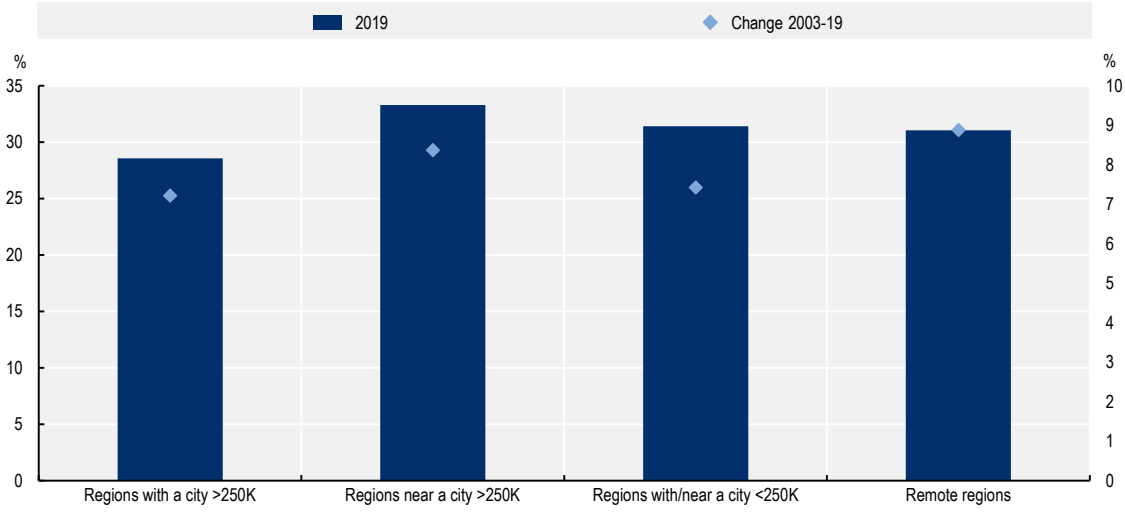
Source: OECD (2019[12]), *Historical Population Data and Projections*, https://stats.oecd.org/Index.aspx?DataSetCode=POP_PROJ.

StatLink https://doi.org/10.1787/491ff5f0-en

Population ageing will not happen uniformly within countries. The proportion of elderly to the working population is higher and has increased faster in the last decade in rural versus metropolitan OECD regions (Figure 2.2) (OECD, 2020[8]). The percentage of elderly among the population in Europe in regions far from large cities (i.e. regions near small/medium-sized cities and remote regions) that already have significantly larger elderly populations are projected to continue increasing by 2050 (Figure 2.4) (OECD, 2019[13]). Chapter 4 analyses the implications of these population trends on health provision in rural areas.

Figure 2.2. Old-age dependency ratio by type of TL3 region

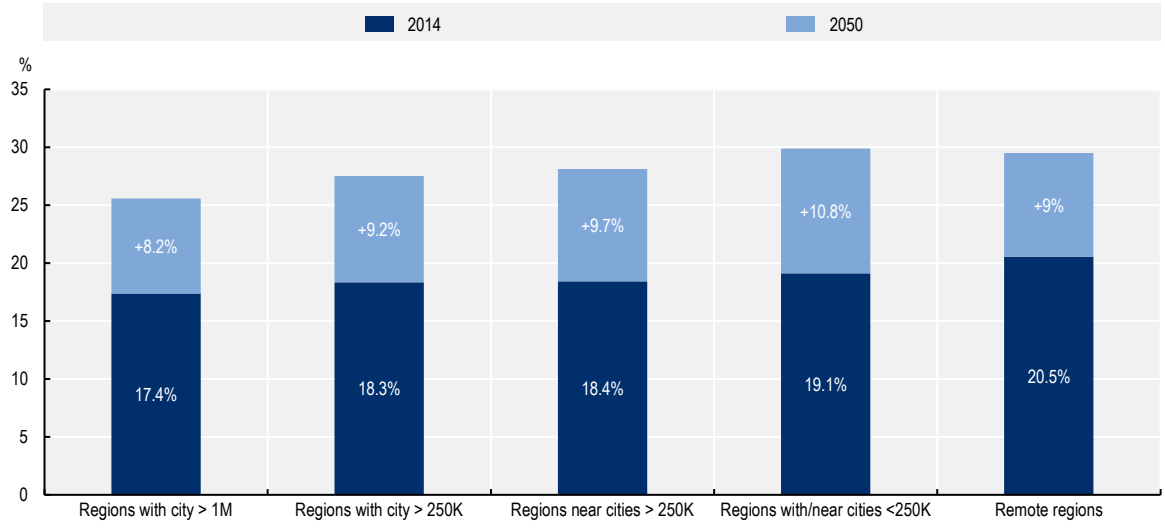
2003-2019



Note: Old-age dependency ratio is the average share of +65 population with respect to working-age population (15-64 years old).
Source: OECD (2020[8]), *Rural Well-being: Geography of Opportunities*, https://doi.org/10.1787/d25cef80-en.

StatLink https://doi.org/10.1787/82810688-en

Figure 2.3. Projection of the percentage of elderly (65 years of age and more) population in European TL3 regions



Note: Population projections based on "Europop 2013 scenario" of (EUROSTAT, 2013[14]) Statistics on regional population projections, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Statistics_on_regional_population_projections
Source: OECD (2019[13]), *OECD Regional Outlook 2019: Leveraging Megatrends for Cities and Rural Areas*, https://dx.doi.org/10.1787/9789264312838-en.

StatLink https://doi.org/10.1787/305ba731-en

The COVID-19 pandemic has revolutionised service provision

The COVID-19 has had deep direct and indirect impacts on the provision of services in OECD countries. The most direct effect of the pandemic are deaths from the virus that have pushed mortality rates well past historical levels in some areas (OECD, 2020[15]). In addition, health outcomes for particular groups may worsen as many patients, especially those facing financial distress in rural areas, have put off necessary care. The economic impacts of the pandemic may be also connected to poorer health and higher mortality that health systems will have to face under increased financial pressure. Chapter 4 explores the current challenges faced by health systems and the strategies to ensure quality healthcare provision in rural areas.

The effects of the COVID-19 crisis and recovery trends differ considerably within countries. Recent research for Europe shows that population structure alone can explain up to fourfold differences in average regional infection-fatality ratios of COVID-19, with remote regions suffering a disproportionate effect due to higher elderly shares (Kashnitsky and Aburto, 2020[16]). In terms of recovery, the exposure to tradeable sectors and global value chains could be linked to the magnitude of impacts and speed of recovery. Local economies that are heavily dependent on the tourism industry are more affected by COVID-19 than other regions (OECD, 2020[17]). Metropolitan regions show a relatively higher risk of job disruption than other regions, given the weight of personal services in employment. These unequal territorial impacts require tailored regional policy approaches (OECD, 2020[18]) (see Box 2.2). Chapter 6 explores the current governance debates in relation to public service provision and highlights the urgent need to accelerate institutional reforms to ensure access to quality services for all.

The increasing demand to adapt and provide public service will happen in a context of fiscal austerity in the next years. Even before the COVID-19 pandemic, public social expenditures as a percentage of gross domestic product (GDP) had been already increasing by around 3.4 percentage points on average across the OECD between 1990 and 2018. Japan, Portugal and Turkey have seen the greatest increases over

this time period (Figure 2.4). Beyond immediate emergency fiscal measures, the COVID-19 pandemic is expected to deeply affect the availability of public resources for social spending in the next years (OECD, 2020[18]). Chapter 4 argues that future public healthcare expenditures will largely depend on the combined effects of technology, the prices paid by governments for healthcare services, products, and institutions and policies. In contrast, pure demographic and income effects are anticipated to play only a minor role, assuming that healthy ageing will remain a predominant trend. The long-term healthcare effects of COVID-19 will likely add up to increases in demand for certain types of services from an ageing population, such as long-term care.

Box 2.2. Initial territorial impacts and policy responses of COVID-19

COVID-19 has a spatial dimension that needs to be managed. As of mid-2020, it is clear that the impact of the COVID-19 crisis may differ markedly not only across countries but also across regions and municipalities within countries, both in terms of declared cases and related deaths. In the People's Republic of China, 83% of confirmed cases were concentrated in Hubei Province as of June 2020. In Italy, the country's north was hardest hit and one of the wealthiest regions in Europe, Lombardy, registered the highest number of cases (38% as of 10 June 2020). In France, the regions of Île-de-France and Grand Est were the most affected. In the United States, the concentration in the state of New York decreased as the virus spread in other states but it was still 29% as of 12 June 2020.

Given the territorial dimension of the initial shock, both national and subnational government need coordinate an effective response to the COVID-19 public health and economic crisis. The crisis has emphasised the need for national governments' role in co-ordinating the measures to tackle the challenges. Subnational governments have also been undertaking a wide range of actions to manage its public health and economic impact. The OECD has identified nine categories of measures undertaken by national and subnational governments that help ensure effective co-ordination and support regions and cities in managing the crisis:

1. Reinforcing vertical co-ordination among national and subnational governments.
2. Supporting cross-jurisdiction co-operation.
3. Managing exit strategies from containment: testing, social distancing.
4. Strengthening data collection and digital governance at the local and regional levels.
5. Managing the impact on local finance.
6. Supporting vulnerable populations by all levels of government.
7. Introducing more flexibility in administrative procedures at the subnational level.
8. Supporting small- and medium-sized enterprises (SMEs) and the self-employed.
9. Promoting public investment as part of crisis exit and recovery.

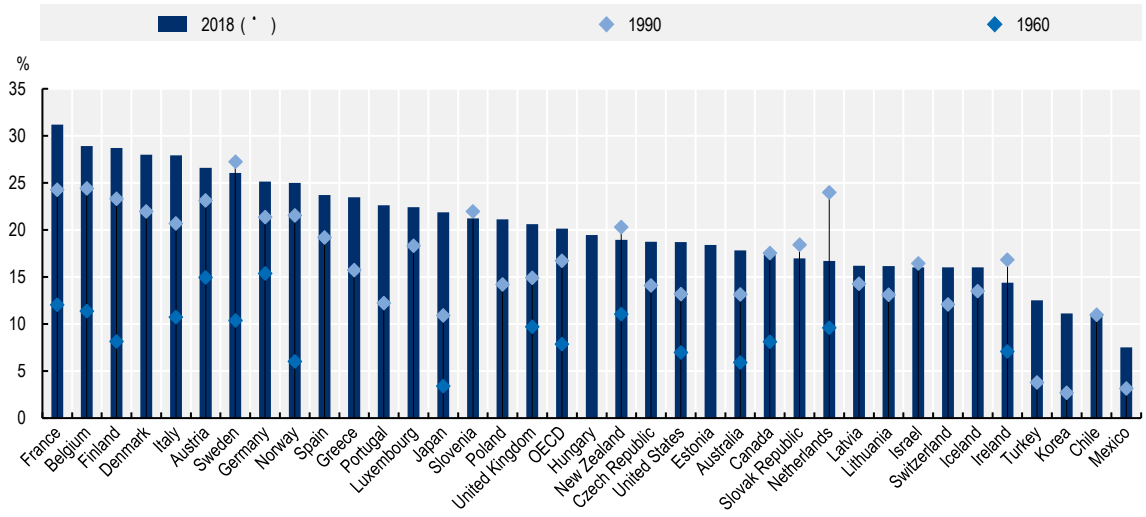
Source: OECD (2020[18]), "The territorial impact of COVID-19: Managing the crisis across levels of government", http://www.oecd.org/coronavirus/policy-responses/the-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government-d3e314e1/.

Besides these negative impacts, the COVID-19 crisis has also revealed the huge potential of digitalisation as a way to deliver education and healthcare services, especially in rural areas. The COVID-19 pandemic took almost 1.6 billion children out of school in more than 190 countries worldwide, which affected over 94% of the world's student population (UN, 2020[19]). While distance learning has come to the rescue following mandatory school closures in most countries, it has also highlighted inequalities in access to broadband and information and communication technology (ICT) equipment across income levels and

between rural and urban areas (The New York Times, 2020[20]). Moreover, after a slow start in implementation despite its huge potential (Oliveira Hashiguchi, 2020[21]), telemedicine filled gaps in provision resulting from COVID-19 restrictions, demonstrating that telemedicine is likely to revolutionise health provision in areas with low accessibility (OECD, 2020[9]). Chapter 5 gives an overview of the potential of distance learning and telemedicine to fill provision gaps in rural areas and outlines the challenges to realise this potential in rural areas.

Figure 2.4. Public social spending is worth 20% of GDP on average across the OECD

Public social expenditure as a percentage of GDP, 1960, 1990 and 2018



Note: See OECD Social Expenditure Database (SOCX) for clarification notes. Data accessible at: https://www.oecd.org/social/soc/OECD2019-Social-Expenditure-Figures-Data.xlsx.
Source: OECD (2020[22]), *Social Expenditure Database (SOCX)*, https://www.oecd.org/social/expenditure.htm.

Rural regions face teacher and care worker shortages even if specialised in services

Rural economies are actively transforming in line with technological change and higher market integration. Services concentrate the largest employment share in rural economies and yet many rural regions continue to be specialised in traditional primary activities that yield little value-added. Rural regions struggle more to reap the benefits from specialisation in high-value-added services than metropolitan regions and tend to be less specialised in this sector (OECD, 2020[8]). Large cities with access to specialised labour and knowledge networks tend to achieve higher productivity of services and service-oriented businesses are in many cases less at risk to face off-shoring and pressures from international competition (OECD, 2020[8]; 2020[23]; OECD/European Commission, 2020[24]).

In rural labour markets, women are disproportionally represented in lower-wage service sector jobs (e.g. health and social care services) while men are more likely to work in higher-wage primary sectors and associated manufacturing (e.g. agriculture, forestry and mining). The ongoing structural change in primary sectors and rural manufacturing have contributed to a widening differentiation of male and female employment rates in regions with limited access to large cities (OECD, 2020[8]).

As agricultural and traditional primary and manufacturing industries are declining, rural economies seek to reap new opportunities and diversify their economic base, for instance by attracting tourists. New opportunities also put new demands on rural populations' skills, to start businesses and innovate for instance, which implies a changing role for education and training (OECD, 2019, p. 46[25]). Human capital

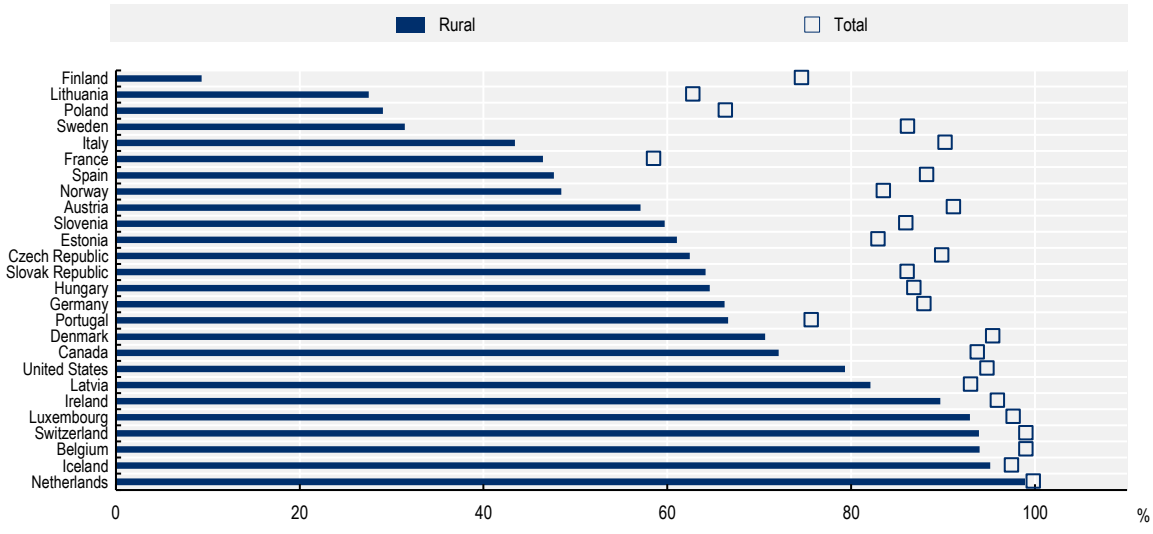
and the transition towards higher returns to employment can support regional growth and the provision of quality services. This is easier to do for cities and large metropolitan areas that tend to be more attractive for trained service professionals (OECD, 2012[26]; 2020[8]). Chapters 3 and 4 discuss the challenges to attract a diverse pool of teachers and medical workers to rural areas and policy strategies to combat skill shortages.

Digital skills and connectivity gaps limit switch to digital provision

Digitalisation promises to bring enormous benefits in terms of access to services but these benefits will not reach rural areas facing connectivity gaps. In recent years, broadband has become an increasingly essential driver, with the COVID-19 crisis acting as a catalyser for much-needed progress. Gaps in broadband provision have closed in many countries, although significant rural-urban gaps remain in many cases (Figure 2.5). As detailed in Chapter 5, today, rural areas across the OECD remain more likely to encounter: lower Internet speeds and older technologies; fewer options and less value from providers; data caps; higher latency times; and more issues related to speed asymmetry. Generally, the broadband provision in lower-density areas has improved in the past decade and will continue to do so thanks to innovation in connectivity technologies. However, the same market forces that have delivered improvements in the past decade will also likely result in sustained geographical inequities. As Chapter 5 argues, these inequities may even widen, at least initially, with the arrival of next-generation connectivity.

Figure 2.5. Households in areas where access to fixed broadband technologies with a download speed greater than 30Mbit/s more is available, total and rural

As a percentage of households in each category, 2019 values or earliest year available



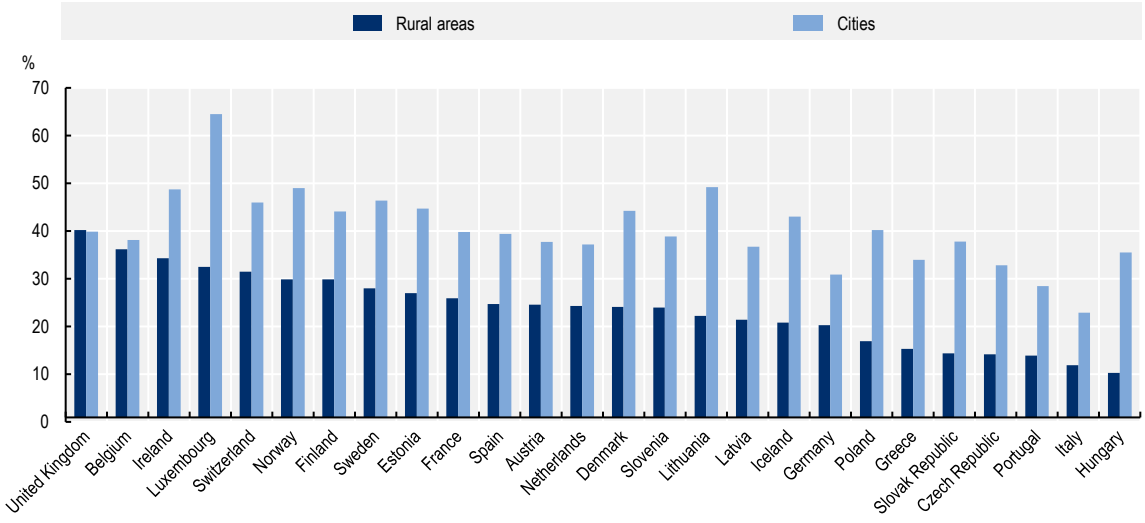
Note: Internet access is expressed as the percentage of households (population, for the United States [US]) with access to fixed broadband technologies with a download speed greater than 30Mbit/s (next generation access [NGA] technologies for the European Union [EU]). For EU countries, rural areas are those with a population density lower than 100 inhabitants per square kilometre. For Canada, rural areas are those with a population density less than 400 per square kilometre. For the US, rural areas are those with a population density less than 1 000 per square mile or 386 people per square kilometre.
Source: OECD (2020[15]), *OECD Regions and Cities at a Glance 2020*, https://doi.org/10.1787/959d5ba0-en.

StatLink https://doi.org/10.1787/f80a0d5a-en

Education and skills are fundamental for benefitting from digitalisation opportunities and yet this is an area where rural areas face large gaps. Rural areas face skill gaps that are as important to overcome as physical infrastructure gaps. In 2018, just over one-quarter (27.9 %) of the rural population (aged 30 to 34 years) had tertiary-level (ISCED 2011 levels 5–8)[1] educational attainment across Europe. This figure was 33.4 % for people living in towns and suburbs and almost half (48.1 %) of city-dwellers. Education attainment is also uneven across high- and low-density regions, reflecting the rural-urban skill gap (Eurostat/Eurydice, 2012[27]). The share of workers with tertiary education, i.e. a university degree, is lower in regions characterised by low-density economies in almost all OECD countries (Figure 2.6), while the share of workers that have only completed primary education tends to be higher in these regions (OECD, 2016[28]). Across European countries, individuals living in rural areas strongly lag behind their city peers with regard to their level of digital skills, paramount for many modern workplaces (Figure 2.7). In 24 out of 31 Euro area countries, the percentage of individuals with digital skills living in cities is twice as large as the percentage of individuals living in rural areas.

Figure 2.6. Share of the population with tertiary education by rural areas and cities in European countries

Percentage of 15-64 year-olds with a degree at ISCED level 5, 6 or 7, 2018 values



Note: Not all OECD countries are covered by the data source. For further information on the Eurostat classification of areas by degree of urbanisation, see https://ec.europa.eu/eurostat/web/degree-of-urbanisation/background.
Source: Eurostat (2020[29]), *European Union Labour Force Survey*, https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226500

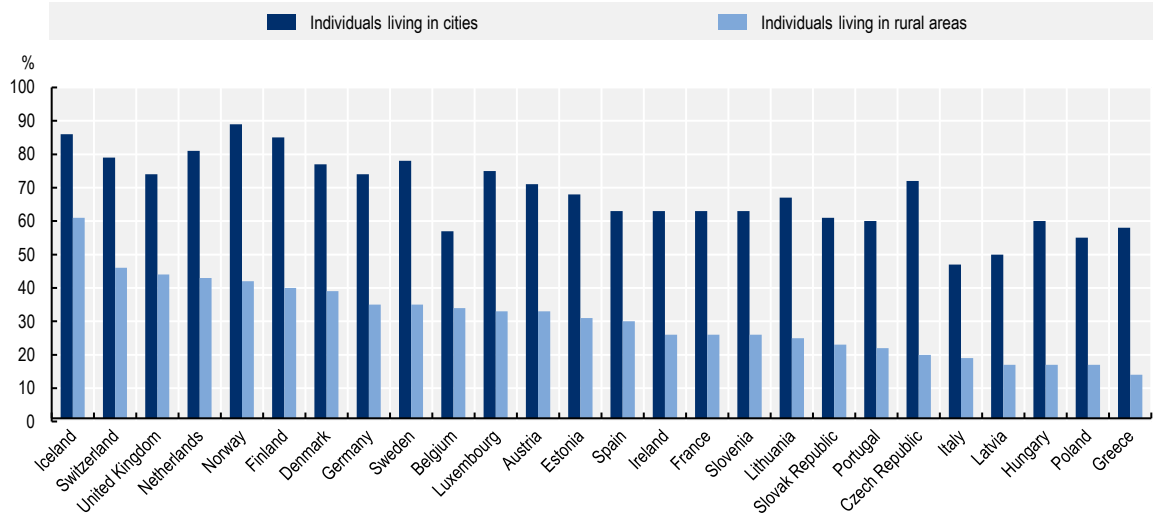
What are public services and who pays for them?

Using a broad definition, public services are all services rendered in the public interest. They are based on the notion that there is a social consensus that some services should be available to all and that – due to a lack of or inadequate market-based provision – it is the public sector that should be involved in the provision of those services in some way. This general definition conceals a great deal of choice in terms of what those services are, how they are delivered and by whom. This section outlines some the main

ways in which public services can be classified: according to function, provider (public/private), cost (free versus fee-based), who benefits and where the service is consumed geographically.

Figure 2.7. Share of individuals living in rural areas and cities in Europe with basic or above digital skills

2019 values



Note: Not all OECD countries are covered by the data source. For further information on the Eurostat classification of areas by degree of urbanisation, see https://ec.europa.eu/eurostat/web/degree-of-urbanisation/background.
Source: Eurostat (2020[30]), *The European Social Survey*, https://ec.europa.eu/eurostat/cros/content/european-social-survey_en (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226519

Defining public services

The economics definition of public and private goods provides somewhat different criteria. In economics, the so-called pure public goods are both non-rival and non-excludable in consumption. Non-rivalry means that a good or service can be consumed by an individual without reducing the availability to others. Non-excludability requires that consumers cannot be prevented from accessing the good. National defence is one example of pure public service.[2]

According to this typology, a private good exhibits both rivalry and excludability. Most services provided by the public sector are either quasi-public or private in nature. Examples of quasi-public goods include public roads. They are open to all but, since they can get congested, they do not fulfil the non-rivalry criteria. Examples of publicly provided private goods include education and health services. While there can be a number of reasons for publicly provided private goods, one explanation is that education or health include positive externalities, which are big enough for justifying public sector intervention. Another usual explanation is linked with redistribution because tax-financed health and education services contribute to income redistribution.

In previous OECD work, public services have been classified according to their functions and four main types:

1. **Services to guarantee basic physical conditions** and to overcome locational disadvantages, such as telecommunications infrastructure, electricity and waste supply and sewage, waste disposal, roads and transport.
2. **Services to guarantee basic social conditions**, such as social security, employment and training services, social housing, childcare, long-term care and social assistance services.
3. **Services supporting quality of life**, such as sports and cultural facilities.
4. **Services to enterprises related to administration** (business registries) or direct or indirect aid, such as export development services, business grants, etc. (OECD, 2010[2]).

While the public sector (national, regional or local governments) is involved in the design, funding and delivery of public services, the line between what is public and what is private[3] has become blurred with the adoption of new forms of service provision including contracting out and fee-based systems. Those services which are deemed "public" in nature may be delivered by an entity that is fully or partially publicly-owned, private, mixed, an association or a not-for-profit entity. A definition of public services by Wollmann et al. speaks to this spectrum: "a service can be considered public service if a public authority controls the supply of that service to citizens (or legal subjects) in terms of its substance, accessibility and sometimes quality" (Wollmann, 2016[31]).

How states provide public services and to whom

What services should be public, who should deliver them and how? The answers to these questions are not static: norms and expectations have changed over time and differ across OECD countries. In many OECD states, the post-World War II period ushered in Keynesian public policies with their focus on social and economic stimulus. This period saw the expansion of public services including the adoption of universal regimes for health, education and social services in many countries alongside the expansion of key infrastructure and public ownership and the operation of public utilities and transport services. This period of government investment and public sector expansion shifted in the 1980s when neoliberal doctrine spurred new public management reforms; public services were privatised in many countries (e.g. the rail system in the United Kingdom [UK]) and public services were increasingly outsourced to external private and third sector providers (Wollmann, 2018[32]).

These two contrasting models of public welfare and social solidarity have geographic implications. Halseth, Markey and Ryser note that "while 20th-century models of service delivery supported post-war rural and small-town places [...] the social, political and economic restructuring that emerged in the waves after the early 1980s disrupted those earlier models" (Halseth, Markey and Ryser, 2019[33]). A commitment to providing equitable access to services across all territories was eroded and new models of service provision have been slow to respond to rural needs. This broad characterisation of public services expansion and reform over the past century conceals a great deal of nuance across countries. Box 2.3 elaborates on the efforts by Danish sociologist Gøsta Esping-Andersen to classify advanced economies with respect to their welfare regimes.

Box 2.3. Classifying of countries according to their welfare regimes

The debate around Gøsta Esping-Andersen classification

While there is no universal experience, the literature on state welfare regimes offers one way to categorise the role of the state with regards to public services and their underpinning welfare logics. In 1990, the Danish sociologist Gøsta Esping-Andersen sparked a rigorous debate regarding how states can be classified according to their welfare regimes through his work *The Three Worlds of Welfare Capitalism*. In it, Esping-Andersen categorises developed capitalist nations as one of three welfare regime types: liberal, conservative and social democratic (Esping-Andersen, 1990[34]). Their characteristics are as follows:

- **The liberal welfare state** is characterised by means-tested assistance, modest universal transfers or modest social insurance plans. Benefits cater mainly to a clientele of low-income, usually working-class, state dependents. In this model, the progress of social reform has been severely circumscribed by traditional, liberal work-ethic norms: it is one where the limits of welfare equal the marginal propensity to opt for welfare instead of work. Entitlement rules are therefore strict and often associated with stigma. Benefits are typically modest.
- **Conservative and "corporatist" welfare states** are shaped by traditional family values and tend to encourage family-based assistance dynamics. Social insurance in this model tends to excludes non-working spouses and family benefits encourage motherhood. State assistance will typically only step in when the family's capacity to aid its members is exhausted.
- **Social democratic regimes** are based on the principles of universalism and decommodification wherein the welfare state promotes equality of the highest standards, not equality of minimal needs (summarised from Esping-Andersen (1990[34])).

Esping-Andersen's typology of 18 OECD countries is focused on their socio-political origins and the relationship between social rights and market forces in each state, including their ethos towards the types of services that should be provided by the public sector and the extent of their benefits (e.g. universal versus targeted).

Under this typology, it is noted that social democratic states (i.e. Nordic countries) provide the most comprehensive benefits and services to their citizens and that these are under the direct responsibility of central and local public authorities. However, the manner in which these services are delivered may not be uniformly applied across the territory. For example, for the case of Finland, Nousiainen and Pylkkänen argue that the social welfare model is eroded by the idea that public services in rural areas should be voluntarily organised at the community level, involving third sector and private actors (Nousiainen and Pylkkänen, 2013[35]). They argue that the discourse for new partnership and community-driven models of rural service delivery effectively undermines the ideas of equality of access to quality public services which are foundational to the Finnish welfare state. In a similar vein, market-oriented public service reforms have been identified in other social democratic regimes such as healthcare reforms in Sweden (Dahlgren, 2014[36]) and eldercare in Norway (van Riemsdijk, 2010[37]).

In conservative regimes (e.g. France, Germany and the Netherlands), welfare goals are met through transfer payments to families as opposed to direct provision funded out of taxation. The third sector plays an important role in the management and delivery of public services. In these states, access to basic public services is assured throughout the country but the range of options is more limited in peripheral rural areas. In a smaller country like the Netherlands, this lack of access is less problematic due to the small size of the country and relative proximity to service centres. In contrast, liberal regimes (i.e. Australia and the United States) tend to rely more on private sector provision. The UK is a noted exception to the ideal types in that universal citizen entitlements are funded from direct taxation with the central and local governments acting as a "near monopoly" service provider (Hebdon and Kirkpatrick, 2006[38]). Rural communities, which are inherently

smaller, may find it far more challenging to organise and provide public services, whether through their administrations or the third sector. Similarly, reliance on private provision may be biased against rural areas; higher costs of service provision and smaller markets make them less attractive to private models of care.

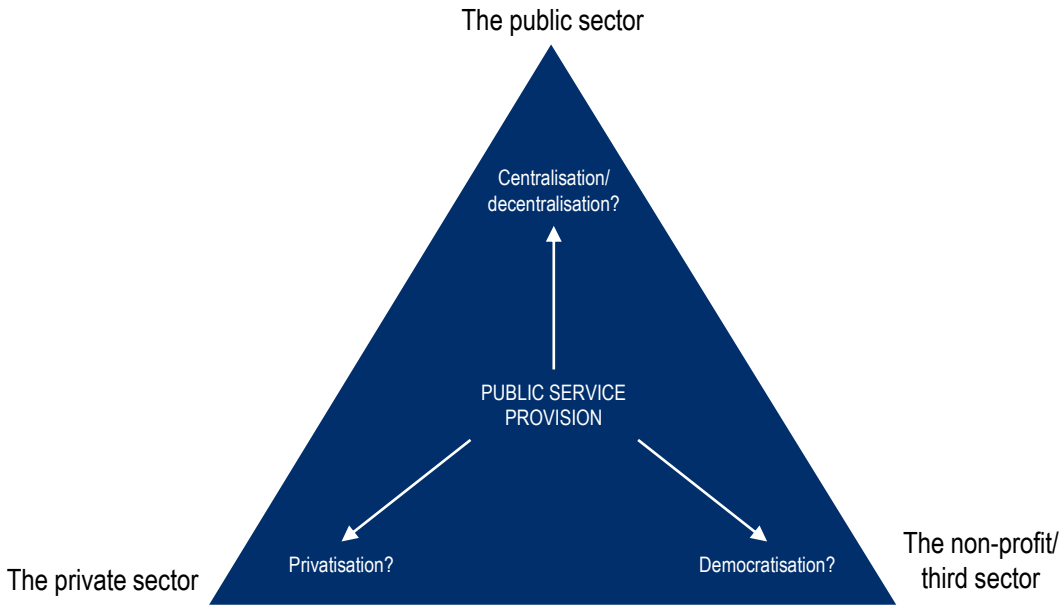
The extent to which these welfare regimes accurately describe countries' social and welfare policies and systems of public service provision is a matter of ongoing debate. While Esping-Andersen's analysis focuses on the study of social transfers such as pensions and unemployment benefits, these are just one aspect of welfare provision; the analysis ignores the provision of public services such as healthcare and education.

Source: Esping-Andersen, G. (1990[34]), *The Three Worlds of Welfare Capitalism*, Princeton University Press; Nousiainen, M. and P. Pylkkänen (2013[35]), "Responsible local communities – A neoliberal regime of solidarity in Finnish rural policy", http://dx.doi.org/10.1016/j.geoforum.2013.04.015; Dahlgren, G. (2014[36]), "Why public health services? Experiences from profit-driven health care reforms in Sweden", http://dx.doi.org/10.2190/hs.44.3.e; van Riemsdijk, M. (2010[37]), "Neoliberal reforms in elder care in Norway: Roles of the state, Norwegian employers, and Polish nurses", http://dx.doi.org/10.1016/j.geoforum.2010.06.008; Hebdon, R. and I. Kirkpatrick (2006[38]), *Changes in the Organization of Public Services and their Effects on Employment Relations*, http://dx.doi.org/10.1093/oxfordhb/9780199299249.003.0027.

Others have sought to expand and refine the typology of welfare regimes to include East Asian and South American countries, finding new criteria and mixed systems in the process (Bambra, 2007[39]). Regime typologies can also be applied to different aspects of service provision. For example, Wendt, Frisina and Rothgang have developed a taxonomy of 27 health systems by looking at indicators across the dimensions of healthcare financing, service provision and regulation alongside the level of involvement by the state, non-governmental actors and the market. Through this work they identify three "ideal types": i) state health systems, in which financing, service provision and regulation are carried out by state actors and institutions; ii) societal health systems, in which societal actors take on the responsibility of healthcare financing, provision and regulation; and iii) private health systems, in which all three dimensions fall under the auspices of market actors (Wendt, Frisina and Rothgang, 2009[40]).

Despite its limitations, the work of Esping-Andersen and others to categorise welfare regimes is useful in describing the logics that underpin how the state provides benefits and to whom. Across the range of typologies that have been developed, there is a commonly uncovered tension between the public, private and third sector dimensions of public services governance (Figure 2.8). In systems which rely more on the delivery of public services by the private and third sectors, the role of the government is focused on regulation and evaluation of services in order to ensure a minimum of access and quality. Countries may have a mix of systems – some reliance on the private sector for healthcare provision for example – but a fully public education system.

Figure 2.8. Dimensions of public service governance



Source: Adapted from Klenk, T. and E. Lieberherr (2015[41]), "Autonomy in public service provision and the challenge of accountability: Insights from German policy fields", https://doi.org/10.3929/ethz-a-010341306.

No literature has offered yet a comprehensive comparative typology of public service provision more generally. Such research is complicated by how services are delivered differently across geographies. For example, core services such as firefighting may be a public service in an urban context but a voluntary service in a rural one; some health services may be delivered by fully public institutions while others are delivered by the public and private sector within one region or country. Characterising states according to how they deliver services is thus extremely complex, including across levels of government. These issues will be discussed in the next section.

How are rights to public services defined within legal frameworks across the OECD?

In the EU, the concept of services of general interest was developed on the basis of French administrative law.[4] The French legal concept of *services public* is informed by administrative case law related to public service contracts provided to local governments. It is also recognised in constitutional law as a legal concept for which legislation must maintain the continuity of public service. Belgium, Greece, Italy, Portugal, Spain and Turkey include the concept of public services in their constitutional laws, as do most Latin American countries (Wollmann, 2016[31]). In contrast, in Denmark, Sweden and the UK, there is no formal legal recognition of public service functions generally.

This report focuses on two of the largest public service expenditures: healthcare and education. The institutionalisation, coverage and access to health and education services vary greatly across OECD member countries, whether universal access is constitutionally-enshrined or not. The majority of OECD countries describe health as a guaranteed right of citizens and less than a third of them recognise universal health access within their constitutions. Not recognising universal healthcare in this way does not imply however that these countries do not provide universal health access – universal health coverage has been achieved in nearly all OECD countries, with a range of benefits covered (Auraaen et al., 2016[42]).[5] In some countries, other institutional mechanisms can be in place to guarantee universal access even if universal access rights are not formally enshrined in a constitutional manner. Australia, for instance, has formally subscribed to and implemented the International Covenant on Economic, Social and Cultural Rights,

including the delivery of universal access to education and health services through fiscal transfer and equalisation mechanisms between the federal and subnational (state and territory) governments.[6]

The provision of education has even greater constitutional recognition among OECD countries: 80% of all OECD countries recognise education as a right within their constitutions and 58% guarantee universal access to education. Constitutions across the OECD describe the role of the state in the provision of healthcare and education in very different ways. For example, some (e.g. Chile and Germany) establish rights to access private systems for health or education while others detail the scope of the medical and health professions and the responsibilities across levels of government (national, regional, local) or describe the system of management and control of health functions (e.g. quality assurance in the case of Mexico and Portugal).

Who pays for public services?

Public services are no longer synonymous with being free to all; they may involve fees. For example, the European Commission distinguishes between public services (or in EU parlance, "services of general interest") based on whether they are fee-based on not, categorising three types: economic, non-economic and social (EC, 2019[43]). Services of general *economic* interest are those basic services that are carried out in return for payment, such as postal services, while *non-economic* services are those for which there are no fees, such as the police, justice and statutory social security schemes. In contrast, *social* services of general interest can be payment/fee-based or not and include social security schemes, employment services and social housing.

Other classifications of public services have focused on who benefits from them. Public services may be delivered with universal access or they may be targeted to certain populations – e.g. access may be determined by income thresholds. Others have made this distinction based on class dimension. For example, Lonsdale and Enyedi distinguish between public services that disproportionally benefit middle- and higher-income groups (e.g. public universities, airports, art galleries) versus those that benefit lower-income ones (e.g. welfare programmes) regardless of whether they are universal or not (Lonsdale and Enyedi, 2019[44]).

Finally, there are classifications that consider public services according to how they are consumed geographically. For example, there are those services for which the consumer travels to the place of use (e.g. airports, libraries, recreation centres, school and medical facilities) as opposed to those which require continuous connections and space (e.g. roads, water mains, power lines). Plotting this geographically, one can view public services as either points (the former) or lines and networks (in the case of the latter) (DeVerteuil, 2000[45]). Some services hold features of both point-specific services and those that are extended to a consumer such as bus lines and the postal service. Digital services defy these categories – they are services delivered at point, requiring no travel on behalf of the consumer and no network beyond digital connectivity.

These classifications are by no means exhaustive – they serve only to illustrate some of the ways in which public services can be categorised. Comparative typologies or classifications of services are challenged by the different nomenclature and public service organisation across countries (Wollmann and Marcou, 2010[46]). Table 2.1 summarises the discussion on this section.

Table 2.1. Classifying public services according to their function, provision, cost, target population and geography of consumption

Function	Provision	Cost	Target population	Geography of consumption
Services to guarantee basic physical conditions and to overcome locational disadvantages	Fully public	No fee – open to access	Universal benefits	Point-specific consumption of public service
Services to guarantee basic social conditions	Association or non-profit	Fee-based (full or partial)	Targeted benefits	Public services requiring continuous connection (line or network)
Services supporting quality of life	Private			Digital consumption
Services to enterprises	Mixed public, private or non-profit			

Source: Own elaboration based on literature.

The governance of public service delivery

If national constitutions recognise health and education provision as core rights, what does this mean in terms of the access of these rights across the territory? In principle, differences in relevant aspects such as population density and demographic structure translate into unavoidable higher costs of service provision for certain local units and regions within countries, implying the need for a transfer of resources across places. Yet, only five OECD countries have constitutionally-enshrined fiscal equalisation mechanisms. This section starts by reviewing recent trends in public spending and public management reforms and their spatial implications, continues with an analysis of fiscal equalisation mechanisms in OECD countries and finishes with a discussion of the roles and responsibilities linked to service provision across levels of government. These governance aspects will be further elaborated and analysed for the cases of education and healthcare in Chapter 6.

The spatial implications of public spending and public management reforms

Many OECD countries have restructured their public services in an effort to control expenditure. There is a large literature on public management reforms across the OECD. Table 2.2 presents a high-level typology of three common reforms types. The traditional model of public administration which is characterised as hierarchal and bureaucratic wherein public services are provided by the public sector organisations and the population is viewed as clients receiving those services (Table 2.2).

Table 2.2. Public management reforms

Public services provision	Traditional model of public administration	New public management model	New governance model
Organisational values	Hierarchy, control and bureaucracy	Market orientation, focus on performance, contracting in-out	Networks, inter-organisational relationship and multi-actor policy processes
Role of the population	Client	Consumer	Co-producer

Source: Adapted from Fugini, M., E. Bracci and M. Sicilia (eds.) (2016[47]), *Co-production in the Public Sector: Experiences and Challenges*, http://dx.doi.org/10.1007/978-3-319-30558-5.

In contrast, the new public management reforms of the 1980s were influenced by private sector management practices. They focus on generating management efficiencies by contracting out and consider public service users as consumers. Finally, more recent new governance models are based on network forms of management and involve multiple kinds of actors spanning public, private and third sectors. Co-production refers to a mix of activities conducted by both public service agents who are professionals (or "regular producers") and through the voluntary efforts of citizen producers to enhance the quality and/or quantity of services they receive (Brandsen and Pestoff, 2006[48]).[7] This can radically alter how services are provided – it may "involve citizens producing their own services, in total or in part or alternative service delivery by citizens, with or without state intervention, but with public funding" (Pstroff, 2011[49]).

These models of public management reform have spatial implications. One of the tenets of the traditional model of public administration is the equity of services, including equity across all territories, whereas the more market-oriented reform of new public management is focused on effectiveness and efficiency. This may include economies of scale in public service provision which lead to the regionalisation of those services. It has also led to a fee-based system for public services; places with lower densities are at an inherent disadvantage for cost recovery services. As such, new public governance models may be better suited to rural areas where rural communities can work to co-produce public services but, at the same time, this can place a lot of pressure on them. The impetus for public management reform does not just come from budgetary pressures and demographic changes, it is also responding to citizen expectations in terms of what types of public services they receive and how they should access them. The new public management and new governance models of reform spread accountability among a larger number of institutional actors, with mixed outcomes for rural areas.

Fiscal equalisation mechanisms

Fiscal equalisation involves the transfer of resources in order to offset differences in revenue-raising capacity and/or the costs of public service provision. These fiscal equalisation mechanisms are described as follows:

- **Canada's Constitution Acts** state that "Parliament and the legislatures, together with the government of Canada and the provincial governments, are committed to: i) promoting equal opportunities for the well-being of Canadians; ii) furthering economic development to reduce disparity in opportunities; and iii) *providing essential public services of reasonable quality to all Canadians*" (Canada Constitution Act 1982, part. 3, s. 36). The principal mechanism by which to ensure the provision of these essential public services is through equalisation payments (transfer from the federal government to provinces and territories) so that they have "sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation" (Canada Constitution Act 1982, part. 3, s. 36).
- **France's constitutional equalisation mechanisms** are intended to promote equality between territorial communities (France 1958, rev. 2008, art. 72-2).
- **Germany's constitution** notes the financial requirements of "the Federation and of the *Länder* shall be co-ordinated in such a way as to establish a fair balance, avoid excessive burdens on taxpayers, and ensure uniformity of living standards throughout the federal territory" (Germany 1949, rev. 2014, art. 106).
- **Italy's constitution** notes that "State legislation shall provide for an equalisation fund with no allocation constraints for the territories having lower per capita taxable capacity. Revenues raised from the above-mentioned sources shall enable municipalities, provinces, metropolitan cities and regions to fully finance the public functions attributed to them" (Italian Constitution 1947, rev. 2012, Art. 119).

- **The Spanish Constitution** notes that "an allocation may be made in the State Budget to the Self-governing Communities in proportion to the number of state services and activities for which they have assumed the responsibility and to guarantee a minimum level of basic public services throughout the Spanish territory." The Spanish Constitution establishes a compensation fund for investment expenditure to be distributed by the *Cortes Generales* among the self-governing communities and provinces with the purpose of "redressing inter-territorial economic imbalances and implementing the principle of solidarity" (Spanish Constitution, 1978, rev. 2011, s. 158).
- **Australia** has a public revenue collection and fiscal transfer system which contributes to a substantial share of the revenue for Australian states and territories. The reasons for these transfers are historical and are based on the constitutional powers and responsibilities of different levels of government in Australia. State and territory governments in Australia, including local governments, which spend more than they raise in revenue, have the difference covered by these fiscal transfers and by other special-purpose grants from the federal government.

The manner in which the principal objectives of equalisation are laid down in these constitutions makes it a central pillar of national fiscal policy. While the constitutions of Canada, France, Germany, Italy and Spain explicitly address the need to transfer funds so that services and quality of life can be equally accessed/provided across the territory, the Chilean constitution speaks of decentralisation and solidarity between territories without specifically addressing fiscal transfers (thus, is it not included in this sample).

While most OECD countries do not have constitutional provisions for fiscal equalisation, implicit or explicit mechanisms to reduce fiscal disparities across jurisdictions are common across the OECD (Blöchliger et al., 2007[50]). However, the vast differences in these systems make them challenging to identify and compare. One key distinction is whether fiscal equalisation transfers are conducted in order to equalise revenues so that subnational governments have the same spending power, or whether these transfers are based on the actual costs of providing public services in different jurisdictions. Costs of service delivery across regions may differ due to greater needs (e.g. related to the demographic profile of the region) or higher costs (e.g. remote rural areas).

While many countries have a mixed system, combining revenue and cost equalisation, others only have one type. For example, Australia uses a cost equalisation system only while Canada and Italy use a revenue equalisation system only (Blöchliger et al., 2007[50]). Countries that only take into account revenue equalisation may not directly address some of the key factors that lead to higher service costs such as population ageing or degree of rurality and remoteness. In some countries, specific transfers for social and health policy may rectify this, beyond the overarching instrument of fiscal equalisation. However, this too depends on how those transfers are structured. In the case of Canada, the federal government's transfers to provincial governments for health and social care are on a per capita basis, as opposed to needs-based allocations that consider demographic characteristics alongside density/remoteness. As such, there are no corrective fiscal mechanisms based on real costs other than per capita estimations.

A further distinction to note is how funds are transferred between levels of government. Some countries such as Australia and Denmark have a horizontal equalisation transfer system wherein funds are transferred from regions with higher fiscal capacity to lower ones based on a benchmark. In contrast, countries such as Canada, Greece and the UK have vertical equalisation systems where the higher level or national government transfers funds to subnational governments based on a benchmark. Sweden's equalisation system – introduced in January 2005 – offers a unique example of how fiscal capacity and remoteness can be addressed within equalisation mechanisms. In Sweden, government transfers to municipalities take five forms:

1. Income equalisation, which compensates for differences in tax power between municipalities and county councils.[8]

2. Horizontal cost equalisation, which compensates for structural cost differences related to either needs (e.g. a high proportion of elderly people requiring more elderly care) or geography (e.g. degree of remoteness).
3. Structural contributions which compensate for regional policy (related to the 2005 change).
4. Time-limited introduction grants which aim to mitigate major changes in the outcome for individual municipalities and county councils.
5. Adjustment grants to ensure that if the sum of all contributions minus the fees paid is lower than the amount decided by the state to the municipalities or county councils, all municipalities or county councils receive a regulatory grant corresponding to the difference (and vice versa).

This comprehensive equalisation system takes into account both need, geography, fiscal capacity and boom-bust scenarios. One novel element of Sweden's transfer system is that funding is based on costs associated with actual settlement patterns as opposed to administrative divisions or fixed capital assets (e.g. existing schools) alongside structural conditions. For example, the model calculates where the municipality's schools should be located based on the actual settlement pattern and a deduction or supplement is calculated accordingly, as opposed to how the municipalities and county councils have chosen to organise their operations (Tillvaxtanalys, 2011[51]).

Beyond fiscal equalisation, other types of government policies can affects service accessibility, including decisions on locating public employment in the capital versus in other regions (Blöchliger et al., 2007[50]).

Roles and responsibilities across levels of government

How are public services delivered across levels of government – national, regional and local? One distinction is between federal, quasi-federal and unitary countries. Regional and local governments are responsible for the bulk of public service delivery in federal states of Australia, Austria, Belgium, Canada, Germany, Switzerland and the US. In most federal countries, national governments have exclusive competencies (e.g. foreign policy, defence, money, criminal justice system) while regional governments have wider responsibilities (e.g. health and education). Some federal countries also have areas of shared responsibility between the federal and regional governments. Even where jurisdiction may not be constitutionally shared, national and regional governments in federal countries may co-ordinate in a number of policy areas. For example, while provincial/territorial governments in Canada are responsible for healthcare provision, the federal government maintains a role in monitoring and addressing public health more generally (e.g. epidemics). At the local level, local government responsibilities are defined by regional level constitutions and/or laws, and they can differ from one region to another. Spain is described as a quasi-federal country because, while unitary, its regions have large autonomy but finances are decided by national laws (OECD, 2017[52]). Table 2.3 summarises these ideas.

In unitary countries, the assignment of responsibilities for public services is generally defined by national laws, referring sometimes to the general clause of competency or "subsidiarity principle" (OECD, 2019[53]). Laws can also define whether a subnational responsibility is an own/exclusive local function, a delegated task on behalf of the central government or a shared responsibility with another institutional government level (OECD, 2019[53]). Note that while Italy, Spain and the UK are unitary states, they display features of "hybrid systems" between federations and unitary states wherein autonomous regions with legislative powers have some influence in the design and reform of local government functions (Newell and Mulvaney, 2013[54]; OECD, 2020[55]).

One trend to note across both federal and unitary states is the growth of intermediary organisations – that is, institutions providing public services that exist between the municipal and regional levels. These intermediary or sub-regional institutions can take many forms. In some places, they span a functionally connected area (e.g. labour market commuting zone) while in others they may only include a subset of connected municipalities. They may be funded by municipal, regional and even national governments

and/or user fees and direct taxation. Such bodies are generally created in order to provide economies of scale for the delivery of a particular service or services. Intermediary or sub-regional institutions may be directly elected or have a board comprised of elected representatives from another level of government. In some cases, they have neither – opting for corporate boards (non-directly or indirectly elected) despite delivering public services. As one example, the United States has over 37 000 special districts of various types: special service districts, special district governments, limited purpose entities or special-purpose districts. The growth of such intermediary organisations can lead to more effective service delivery set at the "right" scale. However, it can also reduce political accountability depending on how bodies are governed.

Table 2.3. Jurisdictional division of responsibilities

Municipal	Intermediary/sub-regional	Regional	National
Range of responsibilities: • General clause of competency • Additional allocations by the law. Community services commonly include services supporting quality of life: local roads, city transport, local economic development, land use regulation/urban planning, administrative and permit services, etc.	Specialised and more limited responsibilities of supra-municipal interest Support to small municipalities and rural communities with smaller administrations May exercise responsibilities delegated by the regions and central government Responsibilities determined by the functional level and the geographic area	Heterogeneous and more or less extensive responsibilities depending on country type: federal, unitary, quasi-federal Services of regional interest commonly include: secondary roads and public transport, waste management, environmental management In federal countries, regional services commonly include healthcare and education and local government supervision	Sets overarching legal frameworks for public service provision in unitary countries In federal and quasi-federal countries, there may be a control and audit role in the delivery of core public services

Source: Adapted from OECD (2019[53]), *Making Decentralisation Work: A Handbook for Policy-Makers*, https://doi.org/10.1787/g2g9faa7-en.

Across both federal and unitary states, there are different approaches to the control of public services. An important consideration for the levels of centralisation and decentralisation across different systems is the proportions and types of decision-making that are taken at each level of government and across different institutions. For example, in an analysis of education systems across the OECD, it is found that on average decisions made in four domains (instruction, personnel, planning/structures and resources) substantively involve schools, the central government and local/municipal governance in the majority of decisions and to a lesser extent involve provinces/state/sub-regions.[9] Among OECD states, Austria, Germany, Japan, and Spain have the most decentralised models in term of the number of institutions involved in educational policy and service provision across the four domains. Japan is a unitary state and as such, this analysis of OECD countries defies the logic that unitary states necessarily have more centralised systems (OECD, 2012[56]). Multiple actors are involved such as those who provide services – in the case of education, teachers and local administrators – are one part of a large complex system of policy and governance with decisions taking place across multiple scales.

Similarly, an analysis of how medical services are delivered across OECD countries found that the majority of countries with residence-based health systems do not explicitly define the range of healthcare services (i.e. with itemised lists) such that local and regional institutions have a decision-making authority. In countries with decentralised systems such as Canada, Italy or Spain, the national government defines the minimum benefits that subnational governments must provide to their residents and these benefits can be expanded at their own expense. In these systems, regions greatly shape the characteristics of health systems.

New and emerging service provision models

Integrated service delivery, flexible approaches, joint management, the colocation of some services and even co-production are some of the approaches that have been adopted in recent years. Despite the challenges facing rural and remote regions, there is a distinctly positive message from the potential of integrated and flexible approaches to public service delivery – that they can positively impact service quality and individual outcomes (Mitton et al., 2011[57]). However, local context and capacity maters to the success of these approaches. Similarly, e-services also have the potential to overcome the challenges of distance in rural communities; however, evidence from the literature on such services as e-health indicate that the right conditions need to be in place and that human resources are still needed in rural areas to support diagnosis and testing.

Colocation, collaboration and co-production

Integrated services entail joining up services for the benefit of service users and to improve efficiency in delivery by providers, including costs, quality and access. Integrated service provision can be defined as: "a coherent set of methods and models on the funding, administrative, organisational, service delivery and clinical levels designed to create connectivity, alignment and collaboration within and between sectors" (Kodner and Spreeuwenberg, 2002[58]). There are several rationales for this approach:

1. **Individuals may have complex needs and require interventions that are mutually reinforcing**. For example, recognition of the social determinants of health has led to a growing awareness of the need for supports and interventions that look at a range of factors – linking, for example, housing, education and health outcomes with accessibility (i.e. complementarity between interventions and programmes).
2. **Co-ordination by service providers – particularly across different levels of government – can improve access to services, reduce the duplication of interventions and lead to more complementary service design (enhance quality)**.
3. **Service integration can be more cost-effective**. However, studies on cost-effectiveness that compare the two approaches – integrated versus not – are scarce and outcomes are mixed (Cameron et al., 2013[59]). This is an area requiring further study.

Service integration can take place either horizontally or vertically. For instance, in healthcare, horizontal integration may entail integrating the hospital and community-based health services to ensure the continuum of care. Another potential area for integration, albeit more demanding, is social and health services. The fact that in elderly care, for example, the benefit of close co-operation with healthcare is often essential, has triggered a discussion on the benefits of integrating health and social services. This is not easy, however, not least because of the different traditions in the two sectors. Integration may also refer to the integration of the hierarchy of governance and finance within multiple service settings in a particular sector or with regards to a specific population. This type of integration serves several functions. It can help to ensure that there are fewer gaps or vulnerabilities in the provision, that resources are used well (and do not overlap) and that access to services is coherent and consistent for the user across various providers. It can also help to ensure that the policies or regulations of upper-level governments enable the local level to deliver place-based solutions. Horizontal integration brings together previously separated policy groups, services, professions and organisations to better serve users – this type of integration can take place across national, regional, local or delivery levels and can help to overcome disciplinary siloes.

Integrated services can be delivered in many forms – entailing joint planning, co-operation or communication among service providers, collaboration among professionals across different sectors, the physical or virtual collocation of complementary services, or a mix thereof. A colocation is a form of (light) integrated service delivery. This practice refers to having some or all services or agencies located in one

building. Doing so can allow residents to access multiple services in one place. It can also reduce administrative and capital costs – e.g. service providers can share one administrator in some cases.

Physical proximity between groups of professionals working in different sectors is also thought to promote collaboration. Colocation is particularly relevant in rural areas experiencing population decline. In such cases, fixed capital assets can become too large to efficiently operate, leading in some cases to rationales for their closure. By collocating services, one is able to make better use of this fixed asset – thus allowing for smaller sized operations to combine. There are many examples of this approach in practice. France has developed one-stop-shops for citizens called *Maisons de services au public* (public service houses) (further discussed in Chapter 4), which offer access to such services as post offices, public transport ticketing, energy utilities, unemployment insurance and welfare services (pensions, family allowances, health insurance, etc.). As another example in the UK, Wales' Community Focused Schools Support Service and England's Extended Schools Remodelling Advisers help link schools with other service providers and community groups in order to develop colocation strategies (Dyson, Kerr and Jones, 2016[60]).

The new approaches to service provision can be summarised in three categories:

- **Collaboration**, which refers to agencies working together through information sharing and training, and creating a network to improve service user experience. This can help to reduce any gaps in service provision for users. Increased professional knowledge about different services can enhance "needs-based" recommendations. In rural areas, collaboration may be more easily achieved due to the smaller number of individuals involved in service provision in the first instance.
- **Co-operation**, which is the highest degree of integration wherein professionals communicate and work together, for example on multi-agency teams. Beyond the practitioner level, this can also entail co-operation across levels of government (vertical or horizontal). Doing so can help to lower the costs of delivering services by reducing duplication and help to better identify and respond to service users' needs. Often such integration requires facilitation at the regulatory and policy levels in order to, for instance, share resources and other information and pursue joined-up strategies. There can be numerous barriers to the uptake of this approach including separate reporting requirements and confidentiality requirements. Italy's Strategy for Inner Areas offers a good example of how to work with municipalities to enhance co-ordination within a multi-level governance framework.
- **Co-production**, which refers to the involvement of community or non-profit groups (i.e. the third sector) in service provision. Some countries have a long history of this tradition – e.g. Germany and the Netherlands where co-production was an essential part of the construction of the post-war welfare state (Brandsen and Pestoff, 2006[48]). In some European countries, the term is used to describe the organised involvement of citizens in their own welfare production. At the policy level, this form of social enterprise is being increasingly promoted in many states as a cost-effective way of providing service in rural areas. With denser social networks, rural areas may have a competitive advantage over urban ones in pursuing this type of service delivery strategy. A comparative study on the success of co-production in different European states by Voorberg et al. suggests the effectiveness of such strategies depends to a large extent on state traditions and governance cultures (Voorberg et al., 2017[61]).

These various approaches to service providers offer the potential to better cater services to rural users' needs and circumstances and in the case of co-production, to leverage local assets to maintain standards. As an example, Australia has created a Multipurpose Services model to integrate a range of health and aged care services including: acute care, subacute care (i.e. respite and palliative care), emergency, allied health, oral health, primary health and community services (NSW Government, 2019[62]). The programme is a joint initiative of the Australian government and state and territory governments and provides integrated health and aged care services for small regional and remote communities which allow services to exist in

regions that could not viably support stand-alone hospitals or aged care homes (Australian Government, 2019[63]). This includes partnering with private and not-for-profit organisations for some health and aged care services. Estonia is maintaining hospitals with very small catchment areas through a networking approach, with regional hospitals taking on a leading role in governing general hospitals (Rechel et al., 2016[64]).

While they have their benefits, integrated approaches are not without controversy. Rural dwellers may feel that they are not receiving the same level of services as their urban counterparts or, in the case of co-production, that they are being required to fill a gap themselves. Such strategies can also encounter constraints. For example, in an analysis of the capacity of rural communities in South Australia to deliver integrated mental health support for older people, it was found that the fragmentation of governmental responsibility, the funding climate, and the centralisation and standardisation of service delivery presented the greatest barriers (Henderson et al., 2017[65]). In the case of co-production, while it flourishes in some places and contributes to the future sustainability of rural communities (Matthies, Kattilakoski and Rantamäki, 2011[66]) in others, the energy for this type of local organising is simply not there and as services are withdrawn, communities decline (Herbert-Cheshire, 2000[67]).

Flexible approaches – Mobile, on-demand and e-services

Flexible service provision is increasingly used as a strategy to fill the gaps where fixed assets or standards forms of provision are not possible and/or to improve accessibility by bringing services to people. It can help to adapt services to different circumstances. Much as in the case of service integration, there can be regulatory or policy barriers to the adoption of flexible service delivery approaches. Facilitating these approaches can require the application of different standards to service provision; e.g. smaller mixed-year classrooms in the case of schools.

The increasing use of flexible approaches to public service provision may entail a range of strategies. For example, mobile health services such as blood clinics or doctors' visits. It can also refer to on-demand transport options – e.g. replacing public transportation in rural areas with a taxi service is often the more affordable option depending on distances/volumes. Outreach models of service delivery are characterised by the periodic supply of services from a location with services to other locations without services through a "hub-and-spoke" arrangement, or some other visiting mechanism. This approach can help to provide some services (most often healthcare) to dispersed and isolated populations.

Flexible approaches can also entail the use of digital technologies to provide services. This is a fast-moving field. For example, early models of telemedicine, where one could access health practitioners over the phone, have now been complemented by videotelephony, advanced diagnostic methods and in-home care support and monitoring. Advanced imaging and health informatics have ballooned the application of these approaches. The uptake of these emerging technologies requires professional training and capacity building. It takes resources to integrate these systems into standard service delivery models and to ensure that such investments are made the most of, none the least of which is high-quality broadband and mobile connections.

While rural areas are increasingly connected to broadband, much of this access is not of adequately high-quality to support service provision. Across the OECD, rural areas lag behind urban and other areas in their access to fixed broadband access with a minimum download speed of 30 Mbps, a speed needed to use advanced connected devices and services (OECD, forthcoming[68]).

Integrated spatial planning

National and regional governments also play an important role in setting the directions for spatial development (depending on the nature of their planning systems) and in establishing the incentives for integrated spatial planning in the first place. For example, Japan's National Spatial Strategy (NSS) has

adopted a vision based on “compact” and “networked” cities and village. At a national scale, the NSS acknowledges that some areas will become effectively depopulated, though it seeks to sustain a broad settlement pattern that throughout the national territory. At smaller scales, the policy addresses the restructuring of urban and rural settlements that will be needed to maintain their cohesion and the efficiency of service delivery. Improved connectivity – transport and communications – among towns and cities, as well as within them, is meant to offset to some extent the loss of agglomeration potential that will occur as a result of a shrinking population (and, even more, as a result of a shrinking workforce).

In Japan, these concepts –– “compact” and “networked” – are to be applied differently at different scales and in different circumstances. In smaller towns and rural areas, the emphasis is on creating basic service delivery hubs that will help sustain rural communities around small, multi-functional cores (the so-called “small stations”). Networking will entail improved connections between very small hamlets and nearby service hubs (small stations). These “small stations” will concentrate basic service delivery, including administrative services, healthcare, shopping and so on, in specific places with transport networks organised so as to make them as accessible as possible to the rural population of the surrounding areas. These, too, are to vary with scale: some will be quite basic and limited to essential functions, while others, where population and resources permit, may come to act as local centres of innovation, playing a role in supporting efforts to bridge primary, secondary and tertiary activities in rural areas and promoting renewable energy generation.

OECD governments increasingly face tough decisions about where to locate or maintain public investments. It is important that service and policy restructuring decisions are reflective of the diversity of needs and circumstances facing rural communities, and not uniformly applied. There is a growing trend towards the regionalisation of services – withdrawing services from smaller communities and concentrating them in larger hubs but also to reassign tasks between government levels. In such instances, ensuring access through transportation systems is critical – particularly for vulnerable populations. Integrated spatial planning can help to guide these decisions. In extreme cases, governments may facilitate community relocation, thus withdrawing all services, including basic infrastructure like road maintenance. For example, the provincial government of Newfoundland and Labrador in Canada has adopted a community relocation policy whereby communities can vote to resettle elsewhere. If a minimum of 90% of community members vote in favour of relocation, up to CAD 270 000 is provided in compensation for residents to do so. Under new criteria, these resettlement payments will only be made if they will cost the province less than the cost of delivering services over the applicable 10-, 15- or 20-year period.

Conclusions

Public services have undergone deep transformations in this and the previous century. The post-war welfare state expanded public services across territories and transformed citizens’ relationships to and expectations of their governments. In many countries, this transformation has continued and new modes of public management have been rolled out. New public management reforms in the 1980s in countries such as Australia, the UK and the US have reoriented public services towards a client-centred experience and have expanded the number of actors involved in service provision across levels of government, including private and non-profit providers. At the same time, the role of regional and local governments in public service provision has also expanded and they are now responsible for a large share of subnational expenditures on a wide range of public services.

The next chapters will propose policy options to improve present and future education provision (Chapter 3) and healthcare (Chapter 4) services in rural areas in the context of evolving megatrends, as well the integration of digital education and health services into service provision models in rural areas (Chapter 5) and governance reforms for education and health system decentralisation (Chapter 6).

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Notes

[1] For more information, see https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:International_standard_classification_of_education_(ISCED).

[2] In the case of national defence, a private provision, although not impossible, would be deemed inefficient because of the free-riding behaviour of consumers. In other words, people could consume the goods without paying for them. Therefore, private provision with voluntary contributions would likely provide a much smaller amount of the service than is socially optimal. Such under-provision of service could be solved with free provision financed by taxes.

[3] In some countries, the public sector remains legally responsible for delivery even though the service production is outsourced to a private producer. In such cases, there is a legal separation between provision and production, to enable private sector participation.

[4] Across Europe, the Lisbon Treaty is the legal underpinning for the European social mode, wherein, together with the EU Charter of Fundamental Rights, there is legal guarantee of non-economic services of general interest. The protocol details the discretion of national regional and local governments to meet the

needs and preferences of users' needs based on "geographic, social and cultural differences" (Wollmann, 2016[31]).

[5] See Auraaen et al. for an analysis of the scope of coverage of health system across the OECD for both medical procedures and pharmaceutical benefits (Auraaen et al., 2016[42]).

[6] In Australia, school attendance is compulsory between the ages of 6 and 16 (primary and secondary education) for all Australian children, whether citizens or residents, and is delivered through state and territory education systems throughout Australia, co-ordinated and co-funded by the federal and subnational governments. This means that in practice, even if not in the constitution, there is de facto universal access.

[7] The term co-production was first developed by Elinor Ostrom and her research team in a series of studies of the Chicago police in the 1970s on polycentricity.

[8] The income equalization allowance is calculated according to the difference between one's own taxable income and a tax equalization allowance, which corresponds to 115% of the average tax power for municipalities and 110% for county councils. Municipalities and county councils whose own tax power exceeds these levels will instead pay a fee to the system. Most of the funding comes from the state (Tillvaxtanalys, 2011[51]).

[9] Sample of 26 OECD countries; data from 2011.

3 Delivering quality education in rural communities

Rural schools in OECD countries are facing smaller schools and class sizes as a result of declining student numbers. This chapter offers policy options for the provision of quality education services in rural communities. It analyses differences in resources in schools in rural areas compared to cities and the financial and quality effect of smaller school sizes in rural areas. It then focuses on educational outcomes in rural schools, disentangling the effect of socio-economic and geographical factors on student and teacher performance and motivation. The chapter suggests two main policy areas for dealing with potential issues in rural schooling provision: first, restructuring school networks with an emphasis on rural school clusters; and second, fomenting new forms of provision including digital approaches in order to bring flexibility to school provision in rural and remote areas.

Introduction

Schools and education more broadly lie at the heart of a people-centred approach to rural policy, as they play an important role for the cohesion of rural communities and are a key pillar of the local provision of public services (OECD, 2020[1]). The quality and accessibility of rural education have a double role to play in addressing gaps in skills: starting from children's early years, high-quality education and care can help raise outcomes in education and the labour market. At the same time, access to public services, such as childcare and schools, is a locational factor shaping the attractiveness of rural areas, including for highly skilled workers.

Access to high-quality education in rural areas can be one of the contributing factors to local economic development and help rural communities adapt to a fast-changing environment, while a lack of access risks widening the rural-urban divide with regard to the level and relevance of skills through multiple channels. The school closures and restrictions of movement that were put in place in response to the COVID-19 health crisis highlighted again how fundamental education services are not only for students' development but also to allow parents to pursue their own employment. They also brought to the fore different levels of digitalisation within and across countries, facilitating or hindering distance learning.

In view of demographic change and dwindling population figures in rural areas across the OECD, the financial viability of providing high-quality education close to people's place of residence is increasingly put into question as economies of scale falter. This challenge is not unique to education: other public services like health care provision also have to explore how to reconcile rural populations' needs with the cost of maintaining hospitals for ever fewer patients and amidst shortages of qualified staff. Countries and regions take different approaches to manage the tensions between constitutional obligations related to service provision and day-to-day challenges in doing so in a feasible way. The question of how to make schools with small and/or decreasing student enrolment ready for the future lies at the heart of the policy debate about education provision in rural and remote areas.

While there are many important policy issues to consider for rural early childhood education, vocational education and training and rural students' later potential higher education pathways, the present chapter focuses on mainstream primary and secondary education. Those levels are compulsory across OECD countries and thus the state has to ensure access to schools for students in a way that is accessible from their homes. As students in primary and most of secondary education are limited in their geographic mobility, especially in remote areas, the school they attend will largely be determined by the location of the home of their parents or guardians. Given the lack of alternatives, rural and remote schools, therefore, have a unique responsibility for the educational opportunities of children and youth in those areas.

How is education provided?

Rural education provision is a key factor both for rural economic development and for the well-being and cohesiveness of rural communities. To better understand countries' policies and practices, this section will: first provide a high-level explanation of different education levels; then explain how those services can be governed and funded; and close with an overview of regulations and quality considerations of particular relevance to rural communities.

Figure 3.1 illustrates some examples of facilitating and impeding factors that shape the provision of education in rural and remote contexts as well as rural outcomes and opportunities.

This chapter seeks to provide an overview of the policy context and policy options related to rural education provision across OECD countries. It draws extensively on analyses and data produced by the OECD Directorate for Education and Skills, in particular on the publications of the OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools and the latest editions of the OECD Programme for International Student Assessment (PISA) and the Teaching and Learning International Survey (TALIS).

Box 3.1. What is "rural" in OECD education data?

International organisations, national administrations and researchers apply a variety of definitions to differentiate between "rural" and "urban" areas, often using criteria such as a community's population size, density and/or distance from other settlements. Within the data produced by the OECD, definitions of different levels of granularity and precision are applied depending on what is relevant and feasible based on the underlying data source.

The OECD Programme for International Student Assessment (PISA) on 15-year-old students' competencies, the Teaching and Learning International Survey (TALIS) on school teachers and principals and its TALIS Starting Strong adaptation to early childhood education and care all define the location of a school or early childhood setting, based on the principals' (centre leaders) characterisation of the community in which their institution is located. The same definition is applied across all participating countries and includes 5 categories that are largely identical across those studies: villages, hamlets or rural areas (fewer than 3 000 people), small towns (3 001 to 15 000 people), towns (15 001 to 100 000 people), cities (100 001 to about 1 000 000 people) and large cities (with over 1 000 000 people). In line with other OECD education reports and unless noted otherwise, this paper uses the term "rural schools" in the PISA and TALIS data to refer to those in communities with fewer than 3 000 people and "urban schools" to refer to those located in any city with more than 100 000 people.

Simplified, standardised definitions, such as those applied by PISA, can facilitate the international comparison of survey results and has enabled the consideration of a spatial perspective at the subnational level when evaluating student outcomes, school policies and practices across countries. Measuring the "rural" or "urban" location at the level of the educational institution, namely through principals' responses to surveys, allows are more granular classification than a categorisation of the entire surrounding region based on population density and other criteria in administrative data sources. At the same time, by reducing the concept of rurality to the above-mentioned options and drawing on self-reports of non-experts, such survey data can also contain errors and does not capture the multi-dimensionality of "rural". In addition, the combination of criteria about size ("fewer than 3 000 people") and type of area ("villages, hamlet or rural area") creates certain ambiguities as there may be very small but administratively autonomous settlements in a highly urbanised environment.

Contrary to the definitions applied in OECD education survey data, this new methodology definition implicitly considers topographic features via the proxy of travel times, which is also relevant for the accessibility of public services like education. However, there is currently no internationally comparative data allowing to link geographic location, accessibility, school characteristics and student outcomes across countries by using this new typology.

While this chapter focuses on the policy issues linked to schools in low-density and remote areas in line with the new typology, it will also draw on the above-mentioned data on rural schools with a lower level of precision for indicative insights.

Source: OECD (2019[2]), *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, https://dx.doi.org/10.1787/acd78851-en; OECD (2018[3]), *Responsive School Systems: Connecting Facilities, Sectors and Programmes for Student Success*, https://dx.doi.org/10.1787/9789264306707-en; OECD (2019[4]), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, https://dx.doi.org/10.1787/1d0bc92a-en; OECD (2019[5]), *Providing Quality Early Childhood Education and Care: Results from the Starting Strong Survey 2018*, https://dx.doi.org/10.1787/301005d1-en; OECD (2020[1]), *Rural Well-being: Geography of Opportunities*, https://doi.org/10.1787/d25cef80-en.

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Figure 3.1. Issues shaping rural skills and the provision of rural education

Education system organisation and governance

Education provision tends to move further away from children's and students' homes as they grow older and make their journey through the different levels of the education system. Oftentimes the change of the physical location is associated with a change in the level or type of education setting attended. Table 3.1. illustrates the education levels and settings typically in place. In practice, the structure of education levels differs significantly across countries. While England (United Kingdom, UK) largely follows the international structure, with primary school starting at age 5, lower secondary school at age 11 and upper secondary at age 14, in Latvia, general basic education starts at age 7 and spans both International Standard Classification of Education (ISCED) levels 1 and 2, followed by upper secondary education starting at age 16 (OECD, 2018[6]).

In most OECD countries, compulsory education starts with the beginning of primary school and ends over the course of upper secondary education (OECD, 2019, p. 148[7]). As mentioned in Chapter 2, 80% of all OECD countries recognise education as a right within their constitutions and 58% provide a constitutional guarantee of universal access to education. Entitlements to (free) education may also be regulated through other laws and several countries have chosen to establish individual legal entitlements to education (and care) provision already well before children start compulsory school, e.g. as early as from age 1 (OECD, 2017[8]).

Catchment areas define which schools by default serve which students based on their place of residence. However, depending on the level of school choice enshrined in a school system, parents can express preferences deviating from such catchment areas or there might even be no catchment areas to start with (OECD, 2018, p. 67[3]). The main rationale for allowing more parental choice is to encourage schools to improve their offer to attract students and better match students' preferences with the institutions in which they enrol (OECD, 2018, p. 68[3]; Burgess, Greaves and Vignoles, 2019[9]).

Table 3.1. Distinction of education levels across countries

Overview of the 2011 International Standard Classification of Education (ISCED) from early childhood to upper secondary education

ISCED level	International name	Examples	Typical age range	Average OECD enrolment rate (2017)
01	Early childhood educational development	Crèche, day care centre, nursery, early childhood development, child-minding services	0-2 years	26% (36% if other registered early childhood education and care included)*
02	Pre-primary education	Pre-primary education, early childhood education, kindergarten, pre-school education	3-5 years	87% (including students already in primary)
1	Primary education	Primary school/education, elementary school, special primary education, basic school, comprehensive school, special primary education	6-11 years	98%
2	Lower secondary education	(Lower) secondary school, (technical and) vocational education, special secondary education	12-14 years	
3	Upper secondary education	General secondary education/school, upper secondary schools, vocational (upper) secondary education, higher technical and vocational college	15-17 years	84% (ages 15 to 19)

Note: The precise age ranges covered by each ISCED level and the delineation of levels differs across countries. Enrolment rates correspond to the indicated typical age ranges unless indicated otherwise.
* Not all registered early childhood education and care provided in OECD countries meets the educational criteria for classification as early childhood educational development within ISCED 2011.
Source: OECD (2019[7]), *Education at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/f8d7880d-en; OECD/Eurostat/UNESCO Institute for Statistics (2015[10]), *ISCED 2011 Operational Manual: Guidelines for Classifying National Education Programmes and Related Qualifications*, https://dx.doi.org/10.1787/9789264228368-en.

While proximity is a key factor for parents when deciding on their children's school, other criteria, such as the school's specialisation, academic performance and (perceived) quality, also come into play. Some parents may be, however, more willing or able to exercise their right to choose or express a preference for a school. Schools' admission criteria affect who is ultimately able to enrol in their institution of choice. For those reasons, there are concerns that market-based approaches emphasising school choice exacerbate inequality due to differentiated access to information and potential biases in admission decisions. At the same time, tying school enrolment strictly to residential catchment areas can amplify sorting according to different population groups in contexts where residential segregation is prevalent. Findings from the OECD PISA study imply that an increase in the isolation of high achievers from other students is associated with lower test scores amongst socio-economically disadvantaged students at age 15, while not showing any significant effect on their advantaged peers (OECD, 2019[11]).

Most OECD countries apply a combination of parental choice and residential catchment areas for the assignment of places in specific primary and secondary schools. According to 2009 data, primary students are initially assigned to a proximate neighbourhood school in 26 of 32 OECD countries with available data, compared to 25 OECD countries at lower secondary and only 14 at the upper secondary level (OECD, 2011, pp. 440, Table D5.12 [web][12]). The same data source shows that in around half of OECD countries, families are given a general right to enrol in any traditional public school they wish. In around a quarter of countries, the choice of other public schools is restricted to the district or municipality in primary and lower secondary education. This share drops to around one in ten countries for upper secondary. Choice restrictions by region apply in ten countries in primary, eight in lower secondary and five in upper secondary education. Data from 2009 also indicates that in primary education, 12 out of 32 OECD countries with available data allow public schools to apply selective admission criteria, which rises to 18 out of 30 countries in lower secondary and 18 out of 29 in upper secondary education (OECD, 2011, pp. 440, Table D5.13 [web][12]).

Even in rather centralised education systems, local authorities or schools themselves can play a role in managing and financing the physical infrastructure or employing support staff (OECD, 2019[13]; 2018[3]). Depending on the funding arrangements across levels of government and potential redistribution mechanisms, municipalities may have far-reaching responsibilities for education funding and can be faced with sharp trade-offs across policy areas (e.g. road infrastructure or cultural and sports offers competing with education provision), especially when a decreasing number of inhabitants and economic decline reduce available funding.

Education resources and quality

Even in cases where broader concerns for the cohesion and attractiveness of communities may trump narrow efficiency arguments concerning rural education provision, a better understanding of the costs and quality of those services is crucial. The education offer in rural and remote areas is very much driven by regulations regarding the size of classes and institutions as well as regarding accessibility. Such regulations are not necessarily specific to those areas; the lower boundaries especially tend to be more salient in more sparsely populated and less connected circumstances. For instance, in areas with fewer school-age children, there will be a trade-off between providing education near students' homes and exploiting economies of scale by establishing larger facilities to which students need to travel for a longer time.

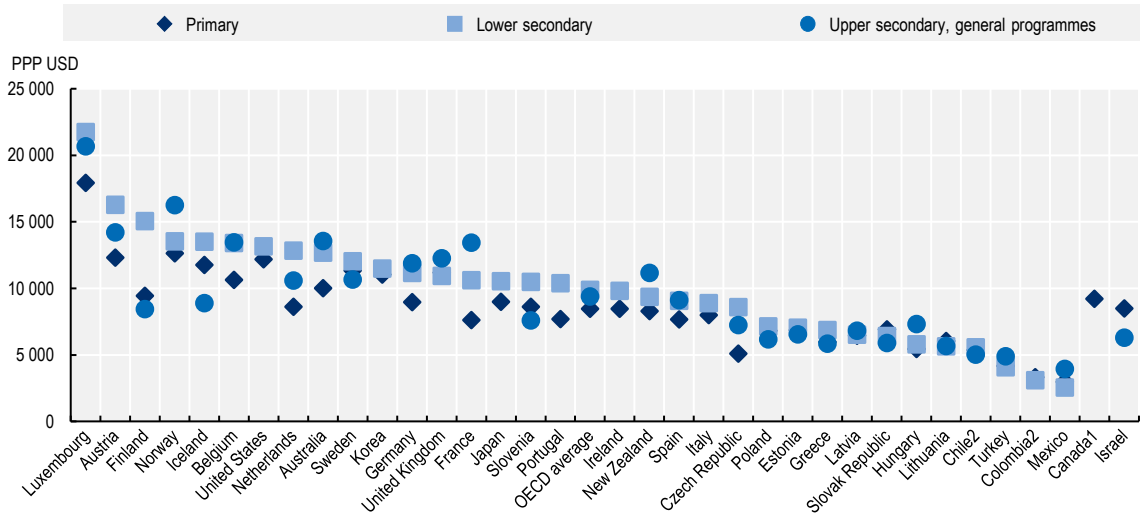
Inputs to providing education

In many European countries, the resources invested in education have come under strain in the aftermath of the global financial crisis (Ivankovic-Tamamovic, 2015, p. 42[14]). Austerity measures in the areas of education include, for instance, school closures and mergers, cuts in teaching staff and an increase of student-to-teacher ratios. Before reviewing the specific resource implications of providing education in rural and remote areas, it is important to consider that educational expenditure and teacher salaries tend to vary depending on the levels of education provided and across countries. In general, per student expenditure depends on several different factors, such as teachers' salaries (see further below), pension systems, instructional and teaching hours, the cost of teaching materials and facilities, the type of programme provided (e.g. general or vocational) and the number of students enrolled in the education system, including the number of students per teacher. Ancillary services like health services, transportation or school meals also add to the bill (OECD, 2019, p. 265[7]). At the OECD average, primary education expenditure per student tends to be lower than secondary education expenditure (Figure 3.2.). Within secondary education, lower secondary education involves a higher per student expenditure than general upper secondary programmes.

Initial analysis on geographical differences in the cost of school provision for England (UK) shows that facility costs per student in rural areas and villages tend to be more expensive than in suburbs and towns (Figure 3.3). There is also clear evidence that higher costs per student are driven by a higher proportion of small schools, defined as schools with an average year group size lower than 21.4 students by national rules.[1] Higher unit costs, which are associated with a lack of scale economies, are a common feature of a range of public services provided in rural areas (Ranasinghe, 2014[15]). A forthcoming analytical report on the present and future costs of service provision will analyse these differences in more depth.

Figure 3.2. Total expenditure on educational institutions per full-time equivalent student

2016 values in equivalent USD converted using purchasing power parity (PPP) for gross domestic product (GDP), direct expenditure within educational institutions, by level of education, based on full-time equivalents

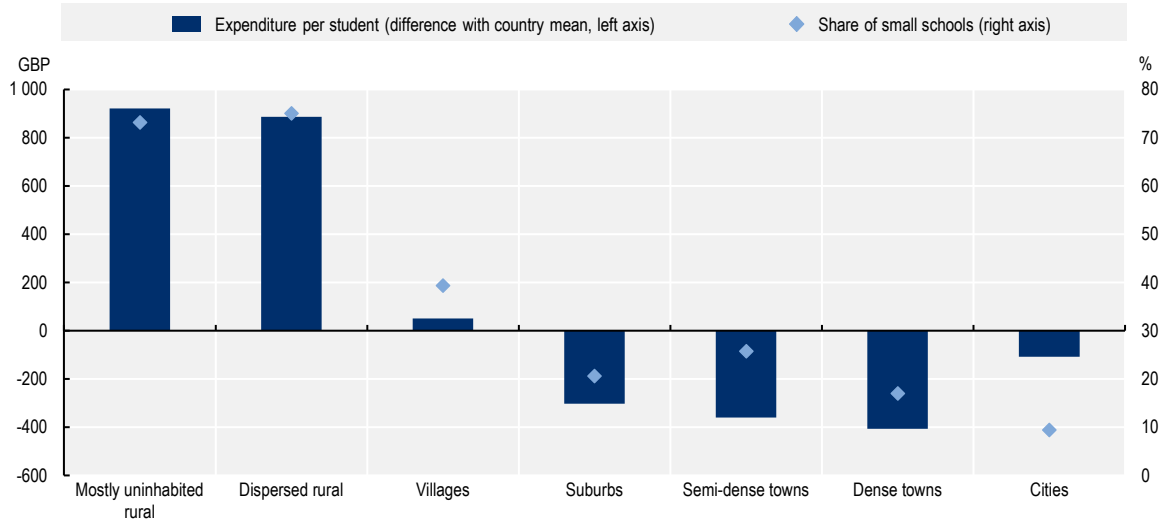


Note: See Education at a Glance 2019 Annex 3 for notes (https://doi.org/10.1787/f8d7880d-en).
1. Primary education includes pre-primary programmes. Post-secondary non-tertiary figures are treated as negligible; 2. Year of reference 2017; 3. Data on expenditure on public vs. private educational institutions are displayed in OECD Education at a Glance 2019, Table C1.5 available on line.
Source: OECD (2019[7]), *Education at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/cb48c119-en

Figure 3.3. Annual expenditure in primary schools and share of small schools by degree of urbanisation (average), England (UK)

2018-19 values, small schools have an average year group size lower than 21.4 students



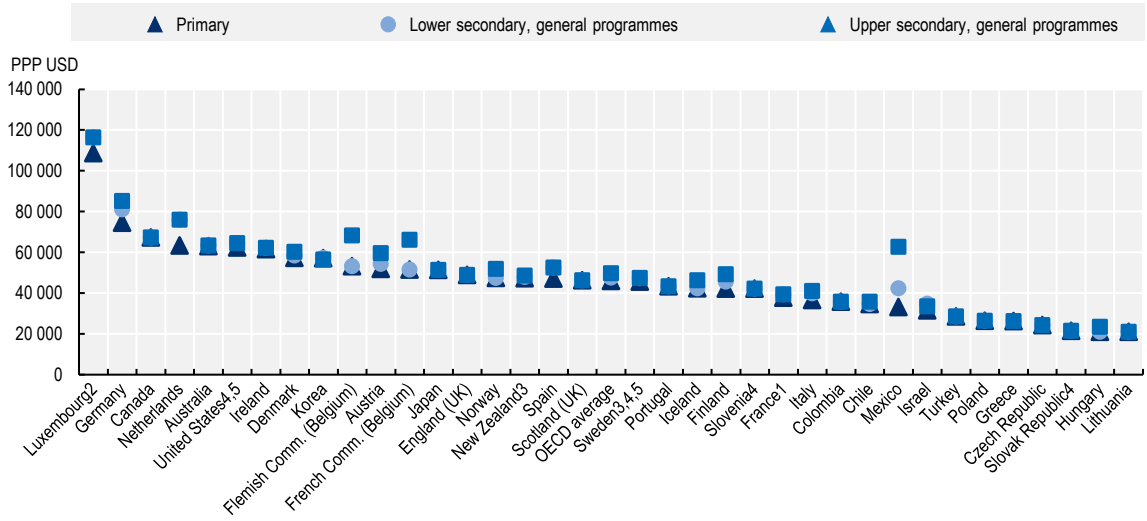
Source: Gov.uk (2020[16]), *UK Schools Financial Benchmarking*, https://schools-financial-benchmarking.service.gov.uk/Help/DataSources (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226538

In 2016, current expenditure accounted on average for 92% of total expenditure on educational institutions from primary to tertiary level in OECD countries (OECD, 2019, p. 334[7]). Across primary, secondary and post-secondary non-tertiary education, the compensation of staff makes up for 80% of current expenditure in public and 72% in private institutions across OECD countries (OECD, 2019, pp. 343, Table C6.3[7]). In line with the variation in per student expenditure, there are marked differences in teacher salaries across OECD countries, with teachers in Luxembourg earning more than twice the OECD average and those in Lithuania less than half when using purchasing power parity (PPP) for comparison (Figure 3.4) (OECD, 2019, pp. 408, Table D3.1c [web][7]). Compared to those cross-country differences, the differences between statutory salaries across primary, lower secondary and upper secondary teachers are relatively small for teachers with 15 years of experience and the most prevalent qualification within the majority of countries. Yet, there is a cross-country trend that primary teachers earn less than lower secondary teachers who in turn earn less than those in upper secondary education.

Figure 3.4. Teachers' statutory salaries after 15 years of experience with the most prevalent qualifications by level of education

Annual teachers' salaries in public institutions in 2018, in equivalent USD, converted using PPP for private consumption



Note: The definition of teachers' most prevalent qualifications is based on a broad concept, including the typical ISCED level of attainment and other criteria. The most prevalent qualification is defined for each of the four career stages included in this table. In many cases, the minimum qualification is the same as the most prevalent qualification, see Table X3.D3.2 in Annex 3. Please see Annex 2 and Definitions and Methodology sections of OECD Education at a Glance 2019 for more information. Data available at http://stats.oecd.org/, Education at a Glance Database. See Education at a Glance 2019 Annex 3 for further notes (https://doi.org/10.1787/f8d7880d-en).

1. Includes the average of fixed bonuses for overtime hours for lower and upper secondary teachers.
2. Includes the social security contributions and pension-scheme contributions paid by the employers.
3. Excludes the social security contributions and pension-scheme contributions paid by the employees.
4. At the upper secondary level includes teachers working in vocational programmes (in Slovenia and Sweden, includes only those teachers teaching general subjects within vocational programmes).
5. Actual base salaries.

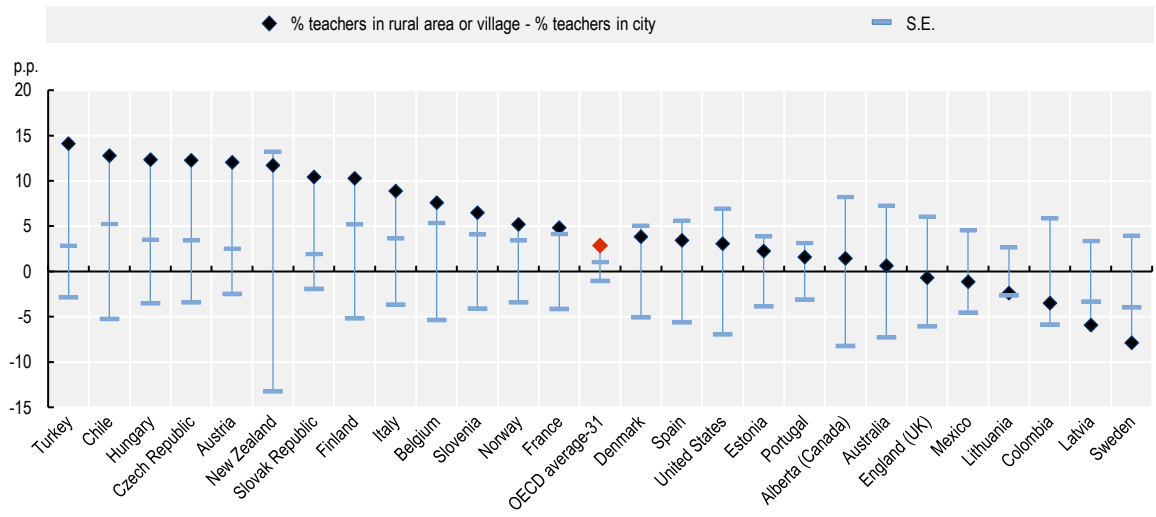
Source: OECD (2019[7]), *Education at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/888933805382

When asked about their satisfaction with their salaries, rural teachers tend to show higher levels of satisfaction as compared to their peers in city schools (OECD, 2020[17]). However, for principals, the responses are the other way around, with rural principals less likely to express satisfaction with their wages (OECD, 2020[17]). The lower alternative earning potential in rural areas in other jobs could be a reason behind rural teacher's satisfaction with their salaries. On the other hand, the dual principal/teacher role for some rural school principals, with the workload that this entails, may explain a feeling of underpayment among principals in rural areas. Principals of rural schools are, on average across OECD countries, more likely than their peers in cities to lament a lack of teaching staff as well as inadequate of poorly qualified teaching staff (Figure 3.5). Moreover, in almost half of OECD countries, teachers receive additional benefits for working in disadvantaged, remote or high-cost areas (OECD, 2019, pp. 408, Table D3.7[7]).

Figure 3.5. Gap in teachers' satisfaction with their salaries in rural and city schools

2018 values



Note: Results based on responses of lower secondary teachers and principals. For Australia, estimates for subgroups and estimated differences between subgroups need to be interpreted with great care. S.E = Standard error.
Source: OECD (2020[17]), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, https://dx.doi.org/10.1787/19cf08df-en, Table II.3.58.

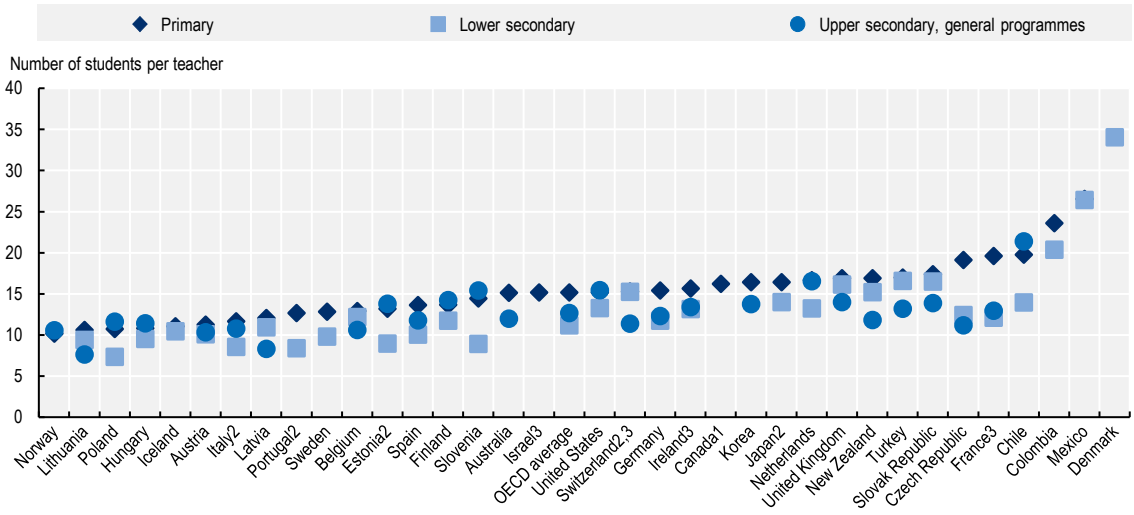
StatLink https://doi.org/10.1787/888934226557

The staffing of rural schools differs from that of urban schools, with rural schools showing a smaller number of teachers per principal. TALIS 2018 data suggests that across the OECD around 15% of teachers and 25% of principals work in rural areas or villages of up to 3 000 people (OECD, 2020, pp. 239, Table A II.B.5[17]). These figures suggest that the cost of principals in rural school is spread over a smaller number of students. In practice, this means that principals in rural schools may be asked also to perform teaching duties and may also have less support from other staff for administrative and managerial tasks compared to schools in cities.

While class size tends to be larger in lower secondary than in primary education, there tend to be fewer students per teacher in primary than in secondary education where students enrol in a greater variety of subjects (Figure 3.6) (OECD, 2019, p. 386; Table D2.1 & Table D2.2[7]). Rural schools in particular show a smaller number of students per teacher and class sizes in both primary and secondary levels in most OECD countries. In fact, both student-teacher ratios and class sizes tend to be smaller in rural as compared to city schools in secondary education across OECD countries, as findings from the PISA study suggest (Figure 3.7).

Figure 3.6. Ratio of students to teaching staff in educational institutions, by level of education

Calculations based on full-time equivalents. 2017 values



Note: See Annex 3 of OECD Education at a Glance 2019 for further notes (https://doi.org/10.1787/f8d7880d-en).
1. Primary includes pre-primary education.
2. Upper secondary includes programmes outside the upper secondary level.
3. For France, public and government-dependent private institutions only for all levels. For Ireland and Switzerland, public institutions only for all levels. For Israel, public institutions only for upper secondary education and all secondary.
Source: OECD (2019[7]), *Education at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/f8d7880d-en

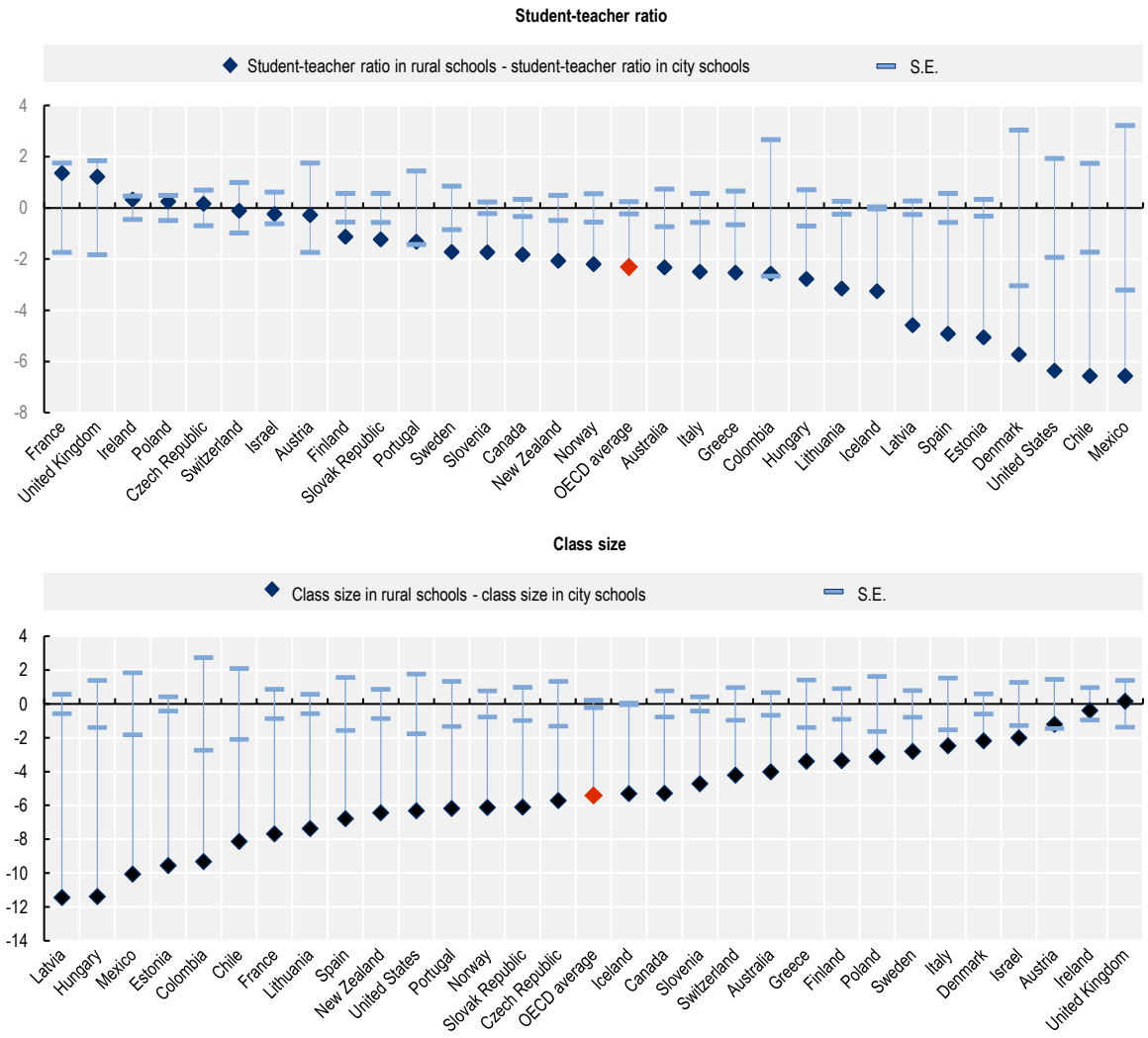
StatLink https://doi.org/10.1787/5235e788-en

A key question for rural schools in connection to resources is how small classes are allowed to get as schools have fewer and fewer pupils. The appropriate size of classes and the ratio between teachers and students are key topics of debate on the quality of education delivery, working conditions for teachers and of course financial viability (Ares Abalde, 2014[18]; OECD, 2019[7]). This debate is dominated by the issue of too-large classes, as very large classes are often opposed by teachers and parents that fear they cannot provide a learning environment that effectively supports all students' learning. However, for rural schools, the opposite question also holds, as too-small schools can also be detrimental to educational quality through a narrower curricula variety and fewer specialist teachers.

School size influences the costs per student as larger schools can more easily fill up classes to the legal maximum, whereas smaller schools risk operating under capacity in view of the human and physical resources that are in place (OECD, 2018, p. 57[3]). As data from England (UK) illustrates, the size of schools tends to vary with the level of education provided. While most English primary schools receive around 300-500 students, the majority of lower secondary schools is larger than 1 000 students (Figure 3.8). Regulations concerning class sizes have an important impact on human resources in a school as they determine above which size a class needs to be split into two – requiring additional teaching staff and physical space. While such regulations can be a way to centrally steer certain quality standards and resources even in decentralised systems, if applied rigidly, they can also have unintended consequences when an unexpected change in enrolment causes a sudden and hard-to-meet demand for additional teachers (OECD, 2019, p. 211[13]).

Figure 3.7. Gap in student-teacher ratio and class size in rural versus city schools

2018 values



Note: Language of instruction class size. S.E = Standard error.
Source: OECD (2018[19]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020); adapted from Echazarra, A. and T. Radinger (2019[20]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://dx.doi.org/10.1787/8b1a5cb9-en.

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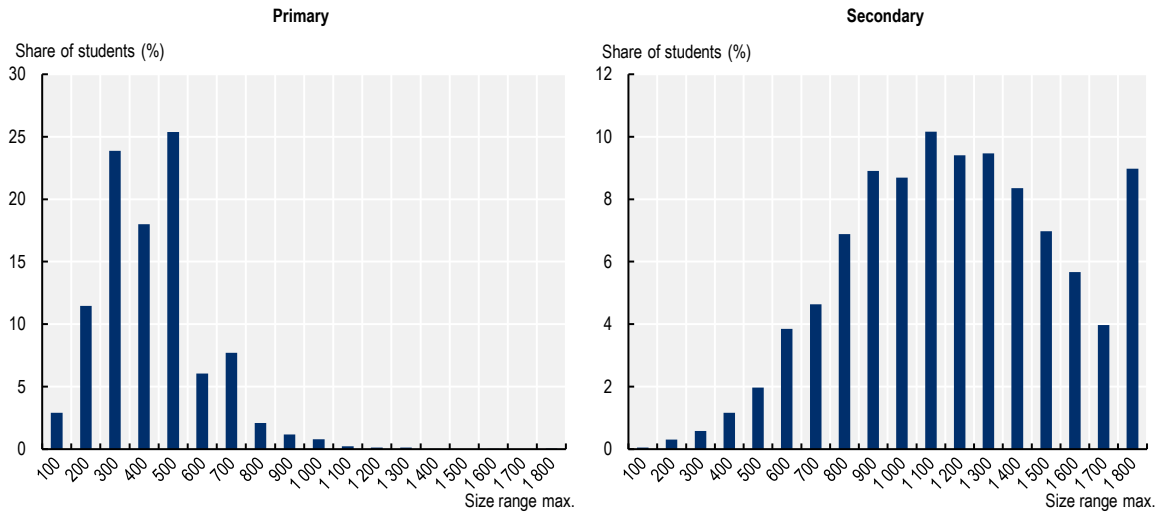
Beyond financial considerations, school size can influence the quality of the educational offer for students as well as the working environment for teachers. Since small schools are more prevalent in rural and remote areas than in more densely populated areas, concerns about the quality of education provided in such locations should also be viewed in the context of the rural-urban skills gap.

In general, different levels of education are associated with different school sizes: primary schools usually much smaller than secondary schools and lower secondary institutions again have a smaller size than upper education schools in most countries (OECD, 2018, p. 55[3]). The prevalence of small schools varies widely across OECD countries. Analyses of data on 15-year-old students surveyed by the OECD PISA study suggest that in 2015, in 17 OECD countries, there were no secondary schools with 100 or fewer

students. In Austria, Estonia, Greece, Hungary, Latvia, Mexico and Poland, more than 5% of students were enrolled in such small secondary schools (OECD, 2018, p. 57[3]).

Figure 3.8. School size distribution of primary and secondary schools, England (UK)

2018-19 values



Source: Gov.uk (2019[21]), *Schools, Pupils and Their Characteristics: January 2019*, https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2019 (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226595

In the absence of recent internationally comparative data,[2] some examples can illustrate how different countries approach the regulation of class sizes. Measures seem to more commonly focus on avoiding what is seen as too-large classes, while the establishment of minimum sizes appears less salient:

- **Establishment of maximum class sizes**: In Estonia, basic school classes are limited to 24 students, albeit with possible school-owner specific exceptions for up to a year, and there is a provision for smaller schools to merge classes with fewer than 16 students. New state-run upper secondary general schools are advised to limit class size to a maximum of 28 students for small schools (i.e. planned for 252 students), 30 students for medium-sized schools (planned for 360 students) and 36 students for schools located in larger towns (planned for 540 or 750 students). Smaller classes are regulated for children with special educational needs (Santiago et al., 2016, p. 166[22]). In Denmark, in 2011 only, a regulation regarding class size in upper secondary school was introduced, limiting the number to a maximum of 28 students per class in view of a trend of increasing student-teacher ratios (EC/EACEA/Eurydice, 2013, p. 62[23]). In 2011-12, Slovenia gradually lowered the maximum class size at the upper secondary level from 32 to 30 students in general and technical education, and from 30 to 28 students in vocational education. Similarly, in Scotland (UK), the maximum class size in the first year of primary school was reduced from 33 to 25 pupils from 2011 (EC/EACEA/Eurydice, 2013, p. 62[23]). Analysis on Israel, where classes in primary education split once they have more than 40 students, suggest that hard limits can also unintentionally trigger efforts to artificially modify enrolment figures to provoke a split of classes and thereby achieve more favourable class sizes (Angrist et al., 2019[24]).
- **Establishment of minimum class and school sizes**: The state of West Virginia, United States (US), requires new high schools to have a minimum of 1 000 students to be able to benefit from

state facilities funding (McColl and Malhoit, 2016[25]). In Portugal, as part of a larger re-organisation of the school network, the minimum and maximum class sizes have both been raised since 2010-11 and a minimum number of 21 students has been set for operating a school providing the first cycle of primary education (EC/EACEA/Eurydice, 2013, p. 61[23]). In the Netherlands, the average minimum school size increased from 62 to 101 students in primary school as part of a reform implemented in 1994. This reform entailed a move from a step functioning determining minimum size based on the number of municipalities' inhabitants to a smooth function based on the density of students in a municipality (De Haan, Leuven and Oosterbeek, 2016[26]). The flexibility of the Dutch approach reflects the importance of considering different local circumstances and scopes for action when defining and implementing such minimum levels so that they do not exacerbate spatial inequalities (OECD, 2018, p. 62[3]).

Establishing regulations on minimum class and school sizes are one possible approach to ensuring a financially viable delivery of quality education services in sparsely populated areas. Minimum class sizes may, for instance, be used to incentivise or mandate the merger of small classes, potentially with additional support for multi-grade teaching arrangement, while funding formulae can use the assumption of maximum class sizes to nudge schools to align usage and capacity, as in Denmark (OECD, 2018, p. 62[3]) (see Box 3.2 for an in-depth discussion of the case of England). At the same time, smaller classes are often seen as an indicator of higher quality education provision. There is research documenting the benefits of smaller classes for students of younger ages and specific groups, such as primary school pupils and students from disadvantaged backgrounds, and that students in secondary schools with smaller classes are more likely to report the adaptation of lessons to students' needs and knowledge through teachers. But the broader evidence on the relations between class size and student outcomes in secondary education across countries is not consistent (OECD, 2019, p. 377[7]; 2019, p. 109[27]). Small classes also need to be seen in the context of teacher supply: if there is already a lack of qualified teachers, potential benefits of smaller classes may evaporate if they are achieved by lowering requirements on teaching quality, which is key for supporting the learning of all students.

Box 3.2. Funding and organisation of the education system in England, UK

As shown in Figure 3.2, the UK's expenditure on educational institutions is higher than the OECD average across primary, lower secondary and upper secondary general programmes. Contrary to the order found on average across OECD countries, per student expenditure in the UK is highest for upper secondary general programmes, followed by primary and then by lower secondary education. Secondary and primary school expenditure per student had been increasing for decades, froze between 2010 and 2015 and has since seen a small drop in real terms (Belfield, Farquharson and Sibieta, 2018, p. 29[28]). Statutory teacher salaries are the same for all three levels in England (Figure 3.2.). Within this context, the reforms implemented in England provide a good illustration of government efforts to improve efficiency and structure market mechanisms.

In England, access to school has been mediated by a model of school choice since 1988, with parents submitting a ranking of their preferred schools to local authorities and pupils are then allocated to schools based on publicly available criteria that are being processed by an algorithm (Burgess, Greaves and Vignoles, 2019[9]). The system was amended in 2007 to avoid strategic or "safety-first" choices and the algorithm is designed in a way that parents' have an interest in revealing their true preferences to achieve the best result. A recent study suggests that parents in area with a lower density of schools are more likely to select the closest school as their first choice (Burgess, Greaves and Vignoles, 2019, p. 701[9]).

Until 2002, there has been a steady increase in the delegation of financial responsibilities to the school level in England to improve the efficiency of spending (Levačić, 2008, p. 231[29]). Some authority, such

as for the planning of school places, remains with local governments (OECD, 2015, p. 22[30]). The 2013/14 school funding reform in England sought to simplify the funding system and improve transparency and the quality of choices regarding education (OECD, 2015, p. 25[30]). The reform tried to make the funding system more student-driven and improve the consistency and equivalence of allocations to schools. In 2016, simplifications to the overall allocation mechanism were introduced to allow for greater flexibility at the local level: the block grants for schools are split into a schools block, an early years block and high needs block, incorporating most of the previously separate grants (targeted funding) (OECD, 2017, p. 112[31]). At the same time, the funding formulae for local authorities were simplified to include 2 mandatory factors (i.e. minimum amounts per primary and secondary student and deprivation) and up to 12 other optional factors (e.g. location in sparsely populated or rural areas).

In 2018, a new national funding formula started to be implemented in England to address unintended differences in funding for similar schools across the country related to the local variation in funding formulae (Belfield, Farquharson and Sibieta, 2018, pp. 33-35[28]). Even before becoming fully implemented within local authorities (scheduled for 2021-22 at the earliest), the new national formula has brought school funding available to similar local authorities closer together. Given that many local authorities already aligned their formulae for the allocation of funding to schools with the national reference, there has also been a trend towards more similar funding levels for similar schools. Yet, some exceptions remain in place and the full implementation would imply major shifts of funding between schools.

With regard to education governance, an organisational reform was implemented in 2010 to simplify education policy planning and implementation. This involved a redefinition of responsibilities of different departments as well as the closure and restructuring of certain institutions and their functions (e.g. government councils and bodies) (OECD, 2015, p. 22[30]). England also sought to remodel its education workforce through a reform starting in 2003. This involved an increase in administrative tasks for assistants to lower the administrative burden for teachers in favour of leaving more time for pedagogical tasks (Hutchings et al., 2009[32]). However, the outcomes fell short of expectations and from 2013, the use of pedagogical support staff was reduced (OECD, 2019, p. 175[13]). England tried to render schools' non-staff expenditure more efficient, too, for instance by providing a Schools' Buying Strategy in 2017 with tools and best practice advice as resources for school heads and financial administrators. Among other support, the ministry provides an online benchmarking system to enable schools to compare their own spending patterns to those of peers in view of exploring efficiency gains (OECD, 2018, p. 88[3]).

Source: Belfield, C., C. Farquharson and L. Sibieta (2018[28]), *2018 Annual Report on Education Spending in England*, https://www.ifs.org.uk/uploads/publications/comms/R150.pdf (accessed on 9 April 2020); Burgess, S., E. Greaves and A. Vignoles (2019[9]), "School choice in England: Evidence from national administrative data", http://dx.doi.org/10.1080/03054985.2019.1604332; Levačić, R. (2008[29]), "Financing schools", http://dx.doi.org/10.1177/1741143207087774; OECD (2015[30]), *Education Policy Outlook: United Kingdom*, https://www.oecd.org/education/UKM_profile_final%20draft_EN.pdf; OECD (2017[31]), *The Funding of School Education: Connecting Resources and Learning*, https://dx.doi.org/10.1787/9789264276147-en; Hutchings, M. et al. (2009[32]), *Aspects of School Workforce Remodelling: Strategies Used and Impact on Workload and Standards*, https://dera.ioe.ac.uk/10822/1/DCSF-RR153.pdf (accessed on 12 April 2020); OECD (2019[13]), *Working and Learning Together: Rethinking Human Resource Policies for Schools*, https://dx.doi.org/10.1787/b7aaf050-en; OECD (2018[3]), *Responsive School Systems: Connecting Facilities, Sectors and Programmes for Student Success*, https://dx.doi.org/10.1787/9789264306707-en.

Beyond class size, extant research can point to potential linkages between the size of schools and quality. A review of existing research on small rural schools in Sweden finds that the evidence points towards "small rural schools perform[ing] their obligations at least as well as other schools" (Åberg-Bengtsson, 2009, p. 106[33]). However, a Dutch study on the impact of a change in school size regulations found that an increase in the minimum school size was associated with an improvement in student achievement

outcomes, even when potential effects of changing the number of schools per municipalities, student segregation or closure of small and low-performing schools are being taken into consideration (De Haan, Leuven and Oosterbeek, 2016[26]).

The relations between size and student attainment also differ between primary and secondary schools, with some indications that school performance peaks at a smaller size for primary than for secondary schools (Ares Abalde, 2014[18]). Literature reviews by Leithwood and Jantzi (2009, p. 468[34]) and Knoth Humlum and Smith (2015, p. 22[35]) suggest that there is consistent albeit not very extensive evidence that smaller primary schools benefit students' academic achievement. However, they also conclude that schools should be neither "too big" nor "too small", in line with the fact that some "small schools" covered by the underlying research papers (e.g. schools with fewer than 200 students) may be much larger the small schools in question in remote areas. For secondary schools, there is evidence from a number of studies that greater school size has positive or at least no negative impact on student achievement, but may be associated with less favourable social outcomes (Knoth Humlum and Smith, 2015, pp. 23, 27[35]).

Small schools affect the education offer and put specific demands on principals and teachers. For principals, being in a rural area or village is, on average, also associated with a higher likelihood of having teaching responsibilities alongside their leadership role as compared to their peers in cities (OECD, 2020, pp. 236, Table II.3.20[17]). At the same time, they lack opportunities for collaboration among peers, which is an important factor for quality, professional learning and staff satisfaction. Teaching in small schools is often associated with supporting the learning of different age groups and grades in the same classroom when there are insufficient students to establish age-homogenous classes. As national data cited by Smit, Hyry-Beihammer and Raggl (2015, p. 99[36]) suggest, the prevalence of multi-grade classes differs greatly across countries, ranging from 24% in Switzerland to around 15%-16% in Austria and Finland and around 4% in Spain. While more prevalent in small rural primary schools, this approach can also be a pedagogical choice in some larger schools, such as in Sweden (Ares Abalde, 2014[18]; O Slatara and Morgan, 2004[37]; Lindström and Lindahl, 2011[38]).

Reviews of past studies indicate mixed and inconclusive findings regarding potential effects of such approaches on student outcomes across countries, suggesting that multi-grade teaching may be neither inherently positive nor inherently negative for students' learning (OECD, 2018, p. 134[3]). Multi-grade teaching requires different pedagogical practices and ways of organising lessons: for instance, teachers may seek to overcome the heterogeneity of students through parallel curricula or whole-class teaching focusing on the same content or instead embrace the heterogeneity to spend more time on free work or personal work plans instead of direct teaching (Ares Abalde, 2014, p. 11[18]; Smit, Hyry-Beihammer and Raggl, 2015, p. 101[36]; Smit and Engeli, 2015[39]; Hyry-Beihammer and Hascher, 2015[40]; Kalaoja and Pietarinen, 2009[41]). Yet, there are concerns about the extent to which pre- and in-service training sufficiently prepares teachers for this specific environment and whether relevant support materials are available (Raggl, 2015[42]; Ares Abalde, 2014[18]).

Potential constraints about small schools' ability to provide a broad offer to students are often cited as a reason for favouring larger settings. For instance, larger schools are assumed to be more easily able to teach a more diverse set of subjects through an expanded curriculum. However, there are concerns that a diverse offer that tends to be less used by students with lower socio-economic status (who represent a higher share in rural areas, as shown in Figure 3.10) and that an increased breadth may be less relevant for student outcomes than ensuring the successful implementation of a high-quality core curriculum (Leithwood and Jantzi, 2009[34]; Echazarra and Radinger, 2019[20]). In addition, some earlier research suggests that the size of secondary schools from which greater curricular breadth can be realised may be as low as 400 students (Monk, 1987[43]). Another potentially more relevant consideration about scale relates to the ability of small schools to provide specialist support to students with special educational needs. While small schools and classes may allow for more tailored interactions with each pupil based on their respective needs, including in the context of multi-grade teaching with a more project-based

approach, especially remote settings are struggling to offer support by other specialised professionals (Ares Abalde, 2014[18]; Echazarra and Radinger, 2019[20]).

Table 3.2. A large-scale survey perspective on challenges and opportunities for rural schools

Selected insights from OECD PISA and TALIS 2018 comparing rural and city schools at the secondary level

Challenges in rural schools in terms of quality	Opportunities for rural schools in terms of quality
Resources	
Greater shortage of educational material (PISA 2018 new)	Fewer students per teacher in schools and smaller class size (PISA 2018 new)
Higher ratio of new teachers in rural schools (Table II.2.58, TALIS 2018 Vol II)	Longer teaching experience of teachers in the same school (Table II.3.71, TALIS 2018 Vol II)
Lower share of computers connected to the Internet (PISA 2018 new)	Teachers more likely to be satisfied with their salary (Table II.3.58, Vol II TALIS 2018)
A greater lack of teaching staff and more inadequate or poorly qualified teaching staff (PISA 2018 new)	Higher number of computers available per student (PISA 2018 new)
Teacher and parent behaviour	
Less teacher participation in collaborative professional learning in rural schools (Table II.4.11, TALIS 2018 Vol II)	Higher level of teacher enthusiasm (Figure III.5.1, PISA 2018)
Parents less likely to discuss children's progress on their own initiative (Figure III.10.2, PISA 2018)	Higher level of teacher support (Figure III.6.2, PISA 2018)
Larger share of students' parents who volunteered in physical or extracurricular activities (Table III.B1.10.6, PISA 2018)	Lower level of teacher behaviour hindering learning (Figure III.7.2, PISA 2018)
Higher teacher turnover in rural schools [Table II.2.59 TALIS 2018 Vol II]	
Student characteristics, outcomes and behaviour	
Lower test scores of 15-year-olds in reading (PISA 2018 new)	Larger share of students reporting to be satisfied with their lives (Table III.B1.11.6, PISA 2018)
Students have a lower socio-economic status (PISA 2018 new)	Students less likely to report feeling sad sometimes or always (Table III.B1.12.8, PISA 2018)
Higher levels of student truancy (Figure III.4.1; PISA 2018)	Less student lateness (Figure III.4.2, PISA 2018)
Students less likely to expect completing a university degree (PISA 2018 new)	
Weaker sense of belonging and lower self-efficacy (Figure III.9.2, Table III.B1.13.7, PISA 2018)	

Note: Differences between rural and city schools refer to statistically significant differences of the OECD average in the underlying surveys.
Source: OECD (2019[2]), *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, https://dx.doi.org/10.1787/acd78851-en; OECD (2019[4]), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, https://dx.doi.org/10.1787/1d0bc92a-en; OECD (2020[17]), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, https://dx.doi.org/10.1787/19cf08df-en.

Education outputs and outcomes

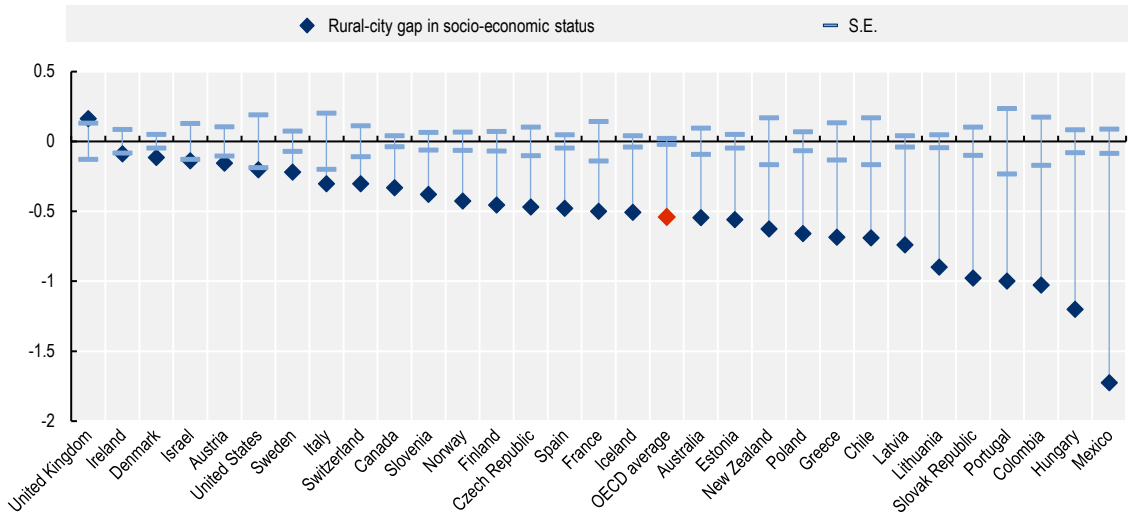
Neither the evidence on the relationship between student-teacher ratios and quality nor on the relationship between school size and quality allows identifying specific "advisable" minimum and maximum sizes (Ares Abalde, 2014[18]). As Newman et al. (2006[44]) summarise, the overall relationships between school size and outcomes are complex, inconsistent and depend on what dimension is in focus. For instance, the studies they reviewed suggest that student attitudes, teacher perception and expenditure tend to be negatively related to school size whereas the improvements in exam scores and student absences that are associated with larger schools are reversed after a certain size threshold is passed. When drawing

policy conclusions, it is key to consider the specific context of providing education in settings and groups of different sizes (OECD, 2018, p. 62[3]).

While incentives to create larger schools and classes may raise quality and efficiency in more dense areas, a minimum school size, class size or funding mechanisms penalising small structures may be counterproductive for remote schools that admit at most one class per year. Thus, the regulation of minimum thresholds needs to include safeguards and strategies to avoid further disadvantages for remote rural schools.

Rural students tend to start their educational journey with a disadvantage as they are, on average, from family backgrounds with a lower socio-economic status as compared to their peers in city schools in most OECD countries (Figure 3.9). The largest gaps in socio-economic status between rural and city students occur in Latin American OECD countries, including Colombia and Mexico, as well as European OECD countries including Hungary, Lithuania, Portugal and the Slovak Republic.

Figure 3.9. The rural-city gap in students' socio-economic status



Note: Socio-economic status measured by the PISA Index of Economic, Social and Cultural Status. S.E = Standard error.
Source: OECD (2018[19]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020), adapted from Echazarra, A. and T. Radinger (2019[20]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://dx.doi.org/10.1787/8b1a5cb9-en.

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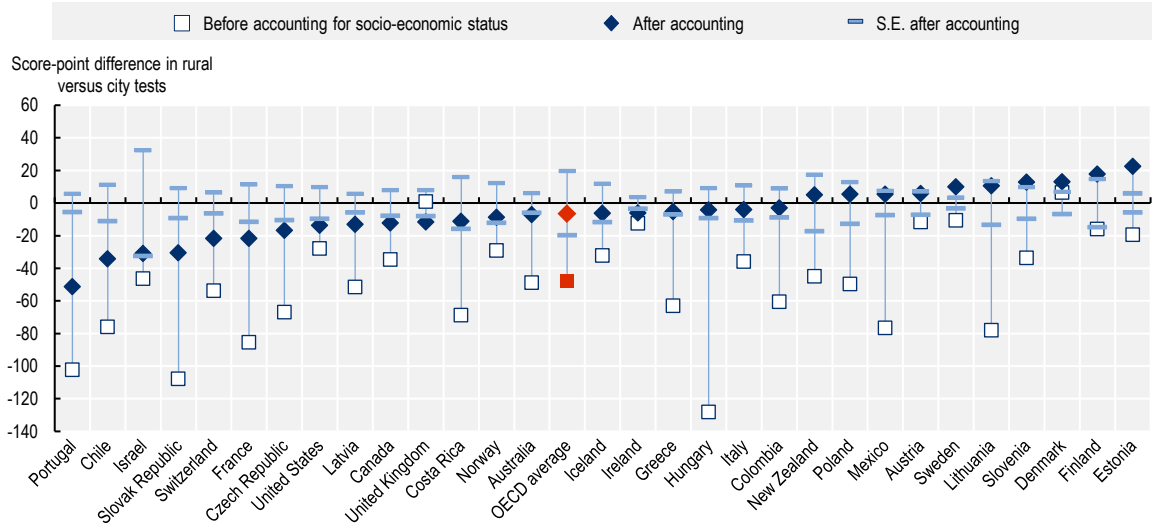
In terms of the level of skills of students, results from PISA show that students in rural schools, defined as villages, hamlets or rural areas with fewer than 3 000 people, tend to underperform in secondary education outcomes in comparison to cities that have more than 100 000 inhabitants (Echazarra and Radinger, 2019[20]). On average, students in city schools across OECD countries scored 48 points higher in reading than their peers in rural schools, according to the PISA 2018 data – more than the equivalent of a year of schooling (Figure 3.10). Yet, when the comparison accounts for socio-economic status of students and schools, the performance gap between rural and city schools was no longer statistically significant. This means that differences in the socio-economic composition of the population tend to explain the rural-urban gap in academic performance.

Figure 3.10. The rural-city gap in reading performance of secondary school students



Note: Results based on linear regression models. S.E = Standard error.
Source: OECD (2018[19]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020), adapted from Echazarra, A. and T. Radinger (2019[20]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://dx.doi.org/10.1787/8b1a5cb9-en.

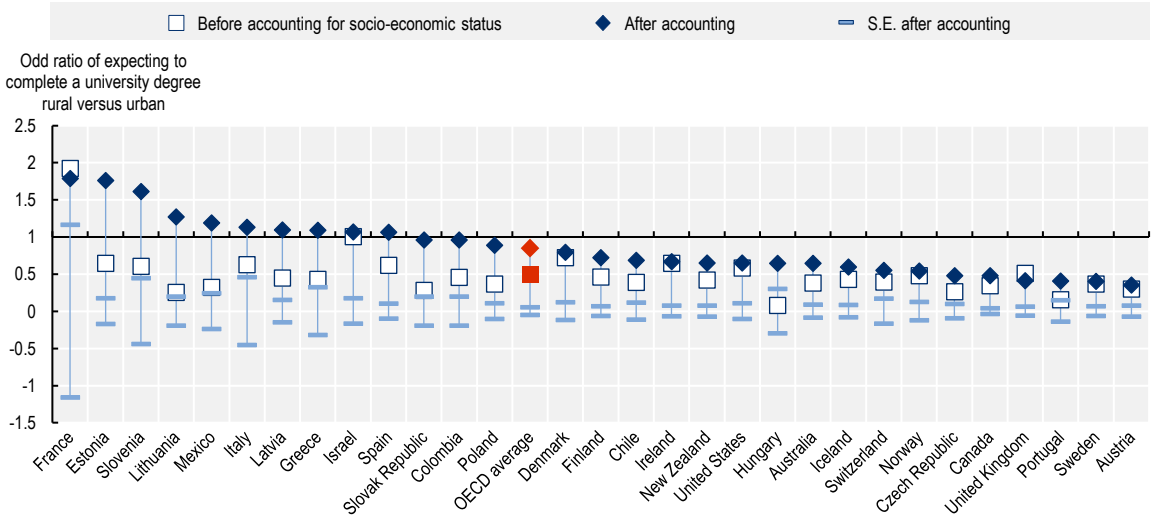
StatLink https://doi.org/10.1787/888934226633

The rural-urban education gap is even more visible when analysing rural students' educational expectations. Based on a survey among 15-year-old students carried out by PISA 2018, on average across OECD countries, students in rural schools are half as likely to expect completing a university degree as those in city schools (Figure 3.11; new analysis of PISA 2018 data adapted from (Echazarra and Radinger, 2019[20]). This reflects students' self-assessment of their opportunities and capacities regarding higher education (OECD, 2017[45]). In that sense, beyond financial facilities, geographical barriers, lack of career role models and highly skilled jobs in their home areas are factors that might discourage students in rural areas to advance further in their studies. This ultimately feeds into lower educational attainment and achievement in rural areas, lower geographical mobility and higher territorial inequalities.

Attracting highly skilled teachers to rural areas is key to improve student outcomes. While differences in the highest level of education are on average not statistically significant between rural and city schools OECD countries, there tends to be a greater share of new teachers and a higher turnover rate in rural schools (OECD, 2020[17]). As teachers in rural schools also tend to be more satisfied with their salaries (Figure 3.5) and are reported to be more enthusiastic (Figure 3.12), policymakers need to take a broader approach to measures to attract and retain teachers to those locations, for instance by offering opportunities for skill development. Those trends vary across countries but they highlight that a spatial lens is warranted when considering the support teachers need to deliver high-quality education in different locations.

The question of accessibility is paramount for decisions about the operation of small schools. There is a clear trade-off between the implications of regulations mandating a minimum size for schools and other rules seeking to contain the travel time for students attending schools in other villages or towns in sparsely populated areas. For instance, school size and attendance have been found to be negatively correlated at primary and secondary levels, in line with concerns that transportation costs and other negative effects on the school environment may overshadow positive effects of increased school size (Knoth Humlum and Smith, 2015, p. 26[35]).

Figure 3.11. The rural-city gap in educational expectations

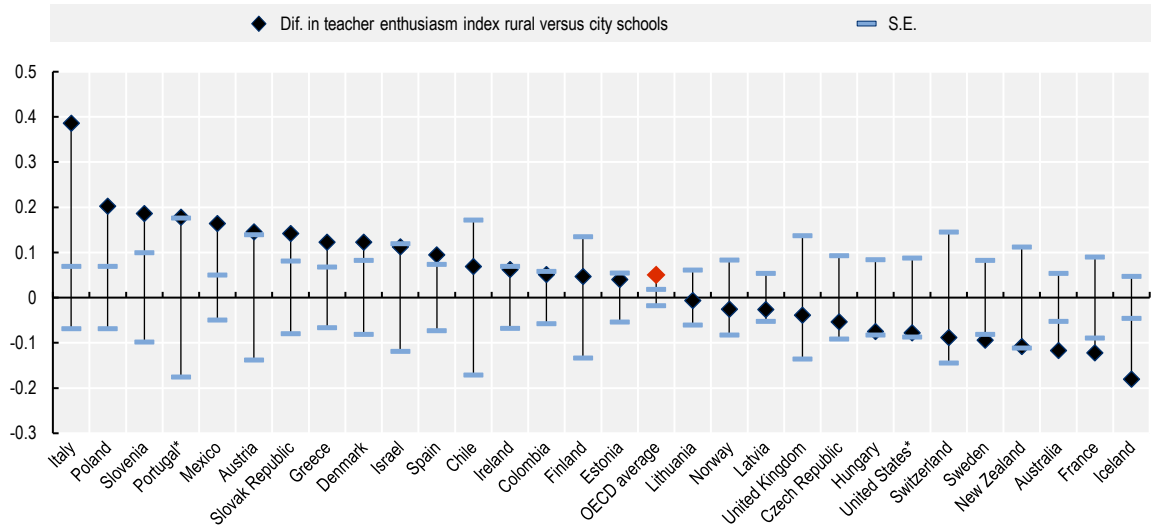


Note: Results based on logistic regression models. The odds ratio is a measure of the relative likelihood of a particular outcome across two groups. An odds ratio below one denotes a negative association; an odds ratio above one indicates a positive association; and an odds ratio of one means that there is no association. S.E = Standard error.

Source: OECD (2018[19]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020), adapted from Echazarra, A. and T. Radinger (2019[20]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://dx.doi.org/10.1787/8b1a5cb9-en.

StatLink https://doi.org/10.1787/888934226652

Figure 3.12. Rural-urban gap in teacher enthusiasm



Note: S.E = Standard error.

* Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4 from PISA 2018 Database). In some countries/economies, sub-units within schools were sampled instead of schools; this may affect the estimation of between-school variation components (see Annex A2 from PISA 2018 Database).

Source: OECD (2018[19]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020), Table III.B1.5.4.

StatLink http://dx.doi.org/10.1787/888934029584

What can policymakers do to ensure access to quality education services in rural areas while pursuing cost efficiency?

In view of the above-mentioned demographic and financial pressures, policymakers at different levels of government can consider a variety of measures to render the delivery of education services more efficient. The options discussed in the following should be seen against the backdrop of the majority of OECD countries with available data including locational criteria in their funding formulae, i.e. countries that consider spatial differences when allocating funding for current expenditure (OECD, 2017, pp. 150-153[31]). This chapter does not discuss, however, the country-specific issue of whether these allocations are sufficient to compensate for unavoidable costs in rural areas.

Restructuring rural schools

While efforts to improve rural education require sector-specific considerations, general strategies to improve the efficiency of public service delivery, such as colocation, collaboration, co-operation and co-production, remain salient in this domain. Previous analyses by the OECD (2018[3]) provide an overview of potential strategies to address both financial and quality concerns as school networks in rural areas are faced with dwindling numbers of students. These strategies are evaluated keeping in mind that interventions aiming at centralising provision to increase scale will likely lead to lower access and increased travel times and costs for students.

Creating school clusters and establishing co-operations

Another approach to fostering economies of scale is the formation of clusters or federations, i.e. structures in which schools formally co-operate under a single leadership to allocate resources, such as staff, more flexibly and efficiently (OECD, 2018[3]). Even though this approach may effectively also entail the closure of schools in their current form, it can be seen as a potential alternative to or a step short of completely halting service provision in one location (OECD, 2018[3]; Ares Abalde, 2014[18]). Clusters can involve both horizontal (i.e. integrating schools with a similar educational offer) and vertical integration (i.e. integrating schools at different levels of education). Such arrangements usually imply the designation of a lead or core school with satellites schools in other locations but can also mean the creation of schools split across different sites with a single management and budget. School clusters in countries covered by a recent OECD review were of different sizes but typically comprised up to 15 schools which were geographically relatively close to each other (OECD, 2018, pp. 143-144[3]).

Clusters may be established in the context of a strategy of the ministry of education, potentially even obliging schools to participate, or as a locally initiated approach to foster information exchange and more efficient resource use (Giordano, 2008, p. 88[46])

Co-operation and sharing of resources can also be fostered without structurally changing the school network. This approach can entail, for instance: the joint provision of specialised programmes for students and professional development training for teachers; shared human resources and infrastructure; joint purchasing of materials or services; or co-ordinated student transport (OECD, 2018, p. 138[3]). This co-operation of providers enables economies of scale and scope, with the prospect of improving efficiency and providing a larger array of opportunities to students. Whether or not local authorities or schools engage in such co-operation depends on, for instance, local capacity, potential incentives as well as the presence of pre-existing structures and traditions facilitating or hampering co-operation.

The formation of school communities or associations can be incentivised at the educational system level, for instance by providing additional staff resources to be shared across schools that voluntarily participate, as was done in the Flemish Community of Belgium (OECD, 2018, pp. 138-139[3]; Nusche et al., 2015[47]). In Spain, so-called Grouped Rural Schools (*Colegios Rurales Agrupados*) allow providers across

municipalities to share resources, such as peripatetic teachers and instruction materials, jointly offer extracurricular activities and support the professional community of teachers through regular co-ordination meetings (Ares Abalde, 2014, p. 30[18]). To address the challenge of providing specialised services in small schools, for instance with regard to children's special educational needs, a regional approach of allowing specialists to work across geographically proximal schools can be a possible strategy, as applied in countries like Austria or Estonia (OECD, 2018, p. 141[3]).

Adapting the definition and distribution of education levels across schools

While the distribution and combination of different grade levels, such as primary, lower and upper secondary education, often follows regulatory or traditional conventions, some flexibility regarding the grade levels delivered in a single institution can facilitate the response to a changing demand (OECD, 2018, p. 141[3]). Estonia, for instance, has separated general upper secondary and basic education to a greater extent to enable a consolidation of the upper secondary school provision without affecting the lower secondary school network (Santiago et al., 2016[22]). This approach also seeks to align requirements for proximal provision with municipalities' capacity to ensure the quality of education for younger students.

Consolidating schools

The consolidation of schools implies that one or more schools are being closed and that students are transferred to other providers in the vicinity, increasing their total enrolment. Because of the impacts of school closures on communities, consolidation constitutes a last resort policy after a continued approach involving other strategies discussed above has been tried. As an illustration, Box 3.3 discusses the impact of school closures on educational inequality following COVID-19 restrictions in the UK.

Box 3.3. The impact of school closures during COVID-19 restrictions on educational inequality in the UK

The closure of schools as a consequence of restrictions following the COVID-19 pandemic led to a significant increase in educational inequalities in the UK. According to the British Centre for Macroeconomics (CFM), the economic cost of school closures was felt in educational, socio-economic and gender equality levels:

- At the educational level, according to the UCL Institute of Education, children spent an average of just 2.5 hours a day on schoolwork during the school closure period between March and summer, with no more than 1 online lesson a day for 71% of state school children. The length of education disruption in the life of a child can have significant consequences on future skills. Meyers and Thomasson (2017[48]) found that the skills of children aged 14-17 during the 1916 polio pandemic were found to be lower than those of their older peers.
- At the socio-economic level, home schooling will undoubtedly penalise pupils from less advantaged backgrounds with lower access to the Internet and a computer and the opportunity to get help from their parents, with significant differences across income groups. Burgess, Greaves and Vignoles (2019[9]) report that students in the poorest quintile had seven fewer school days' worth of time spent on schooling compared to their richest peers. Green (2020[49]) reports that children entitled to free school meals are almost three times more likely than non-eligible children not to have access to a computer at home. Cullinane (2020[50]) notices that working-class children are less likely to receive home schooling from their parents (by a ten-percentage-point margin) than are middle-class children.

- In terms of gender inequality, as women are responsible for the majority of childcare responsibilities, the time spent by women on developmental childcare (including home schooling) has naturally increased with the COVID-19 pandemic (Hupkau and Petrongolo, 2020[51]). Furthermore, whether they telework or not, women are slightly more likely than men to lose their jobs during the COVID-19 pandemic: women in the US and the UK are respectively 7 and 5 percentage points more likely to lose their jobs compared to men (Adams-Prassl et al., 2020[52]).

Source: Ilzetzki, E. (2020[53]), "The economic cost of UK school closures", https://voxeu.org/article/economic-cost-uk-school-closures?utm_source=dlvr.it&utm_medium=twitter; Burgess, S., E. Greaves and A. Vignoles (2019[9]), "School choice in England: Evidence from national administrative data", http://dx.doi.org/10.1080/03054985.2019.1604332; Meyers, K. and M. Thomasson (2017[48]), "Paralyzed by panic: Measuring the effect of school closures during the 1916 polio pandemic on educational attainment", https://www.nber.org/system/files/working_papers/w23890/w23890.pdf; Green, F. (2020[49]), "Schoolwork in lockdown: New evidence on the epidemic of educational poverty", https://www.llakes.ac.uk/sites/default/files/LLAKES%20Working%20Paper%2067.pdf; Cullinane, C. and R. Montacute (2020[50]), "COVID-19 and social mobility impact brief #1: School shutdown", http://www.suttontrust.com/wp-content/uploads/2020/04/COVID-19-Impact-Brief-School-Shutdown.pdf; Hupkau, C. and B. Petrongolo (2020[51]), "COVID-19 and gender gaps: Latest evidence and lessons from the UK", https://voxeu.org/article/covid-19-and-gender-gaps-latest-evidence-and-lessons-uk; Adams-Prassl, A. et al. (2020[52]), "Inequality in the impact of the coronavirus shock: Evidence from real time surveys", No. 13183.

The approach of merging and closing schools is widespread and, according to the European Commission (EC), two-thirds of countries and regions in the European Union (EU) enacted such measures between 2010 and 2012 (EC/EACEA/Eurydice, 2013, p. 60[23]). In Poland, for instance, the number of rural primary schools has dropped by 9.3% since 2003-04 (EC/EACEA/Eurydice, 2013, p. 61[23]). While those decisions were mainly motivated by the goal of aligning public investment with the changing demographic context, in several countries the overall financial and economic context was also an important factor (EC/EACEA/Eurydice, 2013, p. 61[23]).

Policymakers can bring about consolidation and closures of schools through a variety of financial and regulatory tools. For instance, if the number of enrolled students determines the allocation of funding to schools or local authorities, the operation of small schools becomes economically less viable, while providing temporary grants to cover the costs of the transition to consolidated units can alleviate short-term financial challenges (OECD, 2018[3]). The decentralisation of school funding to the local level, as in Sweden in the 1980s and 1990s, can also trigger an effort to cut costs in the provision of schooling by consolidating the offer in order to create fiscal space for other expenditures (Ares Abalde, 2014[18]).

While consolidation and the organisation of education provision in larger units promise to reap economies of scale and lower per student expenditures, costs may increase at least temporarily in other respects, for instance, due to increased transportation costs or the need to adapt the school infrastructure to larger enrolment numbers (OECD, 2018[3]; Ares Abalde, 2014[18]). As discussed above, the evidence on the effects of school size itself is somewhat inconclusive. For the process of school consolidation, research from Norway finds no negative effect on student achievement (Thorsen, 2017[54]), while a Danish study suggests that, especially for students coming from small schools, there is a negative effect in the short term which weakens over time (Beuchert et al., 2018[55]).

Comprehensive and digital approaches

In addition to the above-described measures that largely remain within the framework of mainstream education delivery, there are other approaches that can introduce flexibility to help address rural and remote challenges. This set of approaches can be seen as complementary to the measures concerning the setup of the school network itself.

Information and communication technology (ICT)-based support to education delivery

Distance learning is a well-established approach to facilitating educational provision in remote areas, either delivered in the presence of teachers or independently from onsite pedagogical staff (OECD, 2018, p. 162[3]). Distance learning allows small and remote schools to diversify their curriculum and course offer and can help teachers access relevant professional development opportunities and learning materials (Ares Abalde, 2014, p. 32[18]). Chapter 5 discusses distance learning in the context of digital service provision in more detail.

Involve stakeholders and draw on local community support

Schools in rural areas are often seen as front and centre of community life and social cohesion in localities (OECD, 2018, p. 165[3]). This means that those rural schools are more likely to be able to draw on community resources for their support. PISA 2018 results suggest that in many countries, a larger share of parents participates in extracurricular activities of rural schools as compared to those in cities (OECD, 2019[2]). Parents and community members may also volunteer or be invited to make a financial or in-kind contribution to help sustain rural schools, for instance, to ensure the maintenance of the physical infrastructure (OECD, 2018, p. 166[3]). The regulation of such community engagement needs to strike a balance between the adherence of important standards, such as regarding health and safety, and the flexibility to allow the community to provide support in a way that can lower the cost of operation and capital. The Small School (*Mala szkola*) programme in Poland, for instance, lifts certain norms, such as requirements for cleaners and kitchen staff, so that parents can take on such roles as volunteers to contain costs (OECD, 2018, p. 166[3]). When schools in Poland come under threat of closure through local governments or are being closed, they are increasingly taken over by associations, which allows for partial deregulation of teacher salaries while continuing to benefit from public funding (EC/EACEA/Eurydice, 2013, p. 61[23]).

Box 3.4. Networked Schools in Québec, Canada

The project Networked Schools (*L'École en réseau*) in Québec (Canada) was designed by researchers in collaboration with teachers and offers an alternative approach to ensuring the delivery of quality education in low-density regions by other means than school consolidation. The initiative stands out in seeking to leverage ICT to foster social innovation in primary and secondary schools, rather than only digitalising existing practices or offering distance learning. Around half of the school boards across the province are joining the initiative each year, involving more than 1 000 teachers. The Québec Ministry of Education has been providing financial support since 2012 and in 2018 the initiative was included among the measures of the ministry's digital plan. The annual budget of CAD 500 000 is allocated according to criteria such as the number and size of participating classrooms.

By joining the network, schools are expected to enrich the learning environment and thereby address quality concerns ahead of time that would otherwise serve as potential reasons for closing schools. The project promotes the establishment of a community of learning and student participation to develop knowledge across schools by harnessing digital technology. It supports teachers and students alike to gain independence. The network involves new ways of work organisation, such as: the collaboration of two teachers in two different schools realising joint activities with their students; the inclusion of a teacher from another school in the local teacher's implementation of specific activities for their students; project-based groupwork involving students from different schools; and remote interventions by specialists and counsellors. The project encourages co-operation with scientists, museum staff, experts and other partners to enhance learning activities even in remote regions.

Pedagogical and technical support plays a key role in developing the capacity of teachers to harness the new tools in their work, for instance, to participate in web conferences or a forum for joint knowledge development. To this end, a university team addresses requests and training needs via video-conferencing to provide support to teachers and students. Students themselves can assist teachers in the use of digital tools and, by acquiring technical skills, in addition to pedagogical ones, teachers can in turn improve students' learning experiences. Students in the project were found to benefit from new opportunities to extend their skills in using new technologies, problem-solving, reading comprehension, reasoning and argumentation in different domains, as well as oral expression in person and via video-conferencing, with an extended vocabulary. Overall, the model allows increasing both the quantity and quality of learning experiences available to students through real-time and on-demand digital solutions.

The project's experience also highlights that the take-up of new ICT-based teaching and evaluation practices is a gradual process and cannot be expected to take place from one day to another. For example, available analysis tools for tracking students' use of new vocabulary in the project are still underutilised by teachers. More generally, case studies suggest that for the flawless operation of digital tools in schools, technical support that is close to the users and available just in time is superior to more centralised, distant support services.

Source: CEFRIO (2011[56]), *L'École éloignée en réseau (ÉÉR), un modèle*, https://eer.qc.ca/publication/1599172066320/eer-rapport-synthese-2011.pdf (accessed on 27 January 2020); CEFRIO (2015[57]), *Usages du numérique dans les écoles québécoises*, https://eer.qc.ca/publication/1599172483031/rapport-synthese_usages_du_numerique_dans_les_ecoles.pdf accessed on 25 February 2020); Québec Ministry of Education (2018[58]), "Plan d'action numérique [Digital action plan]", http://www.education.gouv.qc.ca/fileadmin/site_web/documents/ministere/PAN_Plan_action_VF.pdf (accessed on 5 April 2020).; personal communication.

Improve transport provision for students and teachers

Especially in the case of school consolidations that may increase the distance between schools and homes for some students, the provision of school transportation is key to avoid conflicts with parents work schedule and ensure a safe commute for students (OECD, 2018, p. 156[3]; Gottfried, 2017[59]). In Chile, for example, the central government provides transportation services for students attending municipal schools located in remote areas free of charge from pre-primary to secondary education (Santiago et al., 2017, p. 131[60]). While school transportation can mitigate some of the challenges of longer travel distances, there is also a risk that an increased time of travel and transportation costs affect the net benefits of school consolidations, both financially and in terms of students' learning experience (Ares Abalde, 2014[18]).

In addition to measures to ensure students' access to schools, rural education provision hinges upon the ability to attract and retain teachers in rural and remote schools. Although financial incentives may not be able to outweigh downsides of remote locations, they have proved effective in attracting teachers to rural schools. For instance, a few countries like Colombia, Kazakhstan or Uruguay provide higher base salaries for teachers in those areas, whereas in others like the Czech Republic, Estonia and Sweden, it is at local authorities' discretion to establish financial incentives (OECD, 2019, p. 239[13]).

Extending and combining services provided in a single location

A larger scale of provision can also be ensured by colocation, that is, expanding the services provided in a single location, either for students or for a broader set of community members. In Chile, for instance, rural schools offering boarding services to be able to serve students with long travel times receive an additional subsidy to cover accommodation and meals for those students (OECD, 2018, p. 214[3]). Similarly, in Australia, boarding facilities are used at the upper secondary level to complement the provision through rural school networks in cases where distances to students' homes are too far for a daily commute. A large multivariate study from Australia suggests that although boarding significantly changes students'

experience at school, there is parity between day and boarding students with regard to most measures of motivation, engagement and psychological well-being (Martin et al., 2014[61]).

The transformation or integration of schools into hubs for the provision of a broader set of public services is a way to reflect the importance of the availability of public services for the cohesion of rural communities (Berry, n.d.[62]). In Lithuania, for instance, municipalities created so-called "multi-function centres" (*daugiafunkcis centras*) with financial support from EU Structural Funds to exploit economies of scale and improve service provision in rural areas. Those centres unite kindergarten or day care services, pre-primary and primary education, and a community facility under a single management structure, allowing for greater co-operation and alignment across different levels of education (Shewbridge et al., 2016, p. 62[63]). In a similar effort, the extended schools programme in England (UK) encourages schools to provide a wider set of services for the community such as information technology facilities, sports facilities, parenting support or childcare (Carpenter et al., 2010[64]; Moseley, Parker and Wragg, 2004[65])

Consider rural education provision as part of regional economic development efforts

Rural education provision is intertwined with local economic development. On the one hand, depopulation and dropping student numbers are indicative of an economic decline starting well before schools come under pressure. On the other hand, efforts to strengthen the local economy and make rural life attractive require quality public services, including education (OECD, 2018, p. 167[3]). The positive relationship between the availability of schools in surrounding areas and the local economic development has been empirically shown, however without establishing a causal mechanism in one direction or another (Sipple, Francis and Fiduccia, 2019[66]). School closures often face resistance in local communities because of fears that young families would subsequently leave the area and thus further weaken the local economy (OECD, 2018, p. 160[3]; Lyson, 2012[67]). However, it would be misleading to expect rural schools to sustain rural social and economic activities against all odds, especially when dwindling student number make it hard to provide quality education services in the best interest of students (OECD, 2018, p. 161[3]).

Conclusions

This chapter set out to explore the question of how to provide quality education in rural and remote areas today and in the future. The analysis showed that this question is intertwined with the trend towards smaller schools and/or decreasing student enrolment. While there is no clear and direct effect of school size on performance, small school sizes pose a challenge for financial sustainability in communities that will likely continue losing population. At the same time, centralisation of education aiming at increasing scale economies brings higher travel times and reduced access for students and teachers, and can as such have consequences on school attendance and performance. This chapter suggests novel alternatives to primary and secondary education provision that can bring benefits not only in terms of cost reduction but also in terms of important dimensions of education such as diversity and motivation of students and teachers.

The chapter proposed two main policy areas for dealing with potential issues in rural schooling provision: restructuring schools and working on consolidating schools where necessary, and embracing comprehensive and digital approaches to introduce flexibility to school provision in rural and remote areas. For restructuring schools, policy options include creating school clusters and co-operation networks, and adapting the definition of school levels to local realities. Digital and other approaches to increase flexibility include: expanding ICT support; involving different stakeholders in different rural communities to build support; improving the geographical mobility of students and teachers; incorporating schools in service integration strategies; and fully incorporating the delivery of education into local and regional development plans.

A common thread across the different policy options outlined in this chapter is the effort to increase scale through various means. This may involve having fewer but larger institutions, but can also imply to open up networks allowing schools, principals, teachers and even students to collaborate across institutions. Finding ways to build and support these networks and collaborations will pay off in terms of equity and efficiency of school provision in the future. Above all, this chapter makes clear that place-based policies are called for given current and future levels of inequality in access to education.

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Notes

[1] England has a rule as part of their block national funding formula to decide if a school is eligible for sparsity funding. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/844007/2020-21_NFF_schools_block_technical_note.pdf.

[2] See Eurostat and Eurydice for 2010/11 data on maximum class sizes in European countries (Eurostat/Eurodyce, 2012[68]).

4 Delivering quality health services in rural communities

As costs, quality and access to healthcare are all affected by distance and density, reducing inequalities in quality healthcare provision requires a place-based dimension. This chapter compares evidence on structural trends affecting health systems across territories in OECD countries, including income and educational inequalities, exposure to risk factors, and ageing. It also discusses the organization and concentration of health services and the trade-offs between quality, access and cost of healthcare from a spatial point of view. The chapter looks at holistic and people-centred comprehensive strategies, including reinforcement of primary care and new models of care such as service integration, in order to reduce costs while increasing performance of healthcare provision in rural areas. Finally, the chapter examines innovative approaches to healthcare delivery including digital approaches and new forms of hospital and care organisation.

Introduction

Rural health is a key component of a high-performing health system. This is true not only because rural regions host around 30% of the OECD population but also because inequalities in provision are more likely to happen in rural places (OECD, 2020[1]). Rural residents have shorter life spans, less healthy lifestyles and overall, live in worse health states due to a higher incidence of chronic disease. They also face a wide range of threats to health status and health performance challenges including increased poverty and joblessness. The provision of quality health services in rural areas is not only challenged by a larger share of ageing populations but also by poor social determinants of health, barriers to system access and issues finding and retaining qualified medical personnel. Rural healthcare facilities also face financial pressure from low economies of scope and scale, making the balance between access and efficiency particularly difficult.

The health status across OECD countries has improved significantly in recent decades due to advances in treating and preventing disease, reductions in health risks such as smoking and drinking, and effective legislation in other sectors such as road safety (OECD, 2004[2]; 2019[3]). However, a number of new and existing challenges must be managed to continue to deliver high performance and reduce spatial disparities in health access and outcomes. Health provision in many rural areas must find ways to increase scale and financial sustainability in a context of increasing health needs and population decline. Countries have a range of innovative ways to improve health services in rural areas, including telemedicine (discussed in more detailed in Chapter 5), increased co-operation across health providers through networks, changing incentives for health professionals, and modifying responsibilities and organisation of providers.

Implementing effective policy relies not only on understanding the health issues facing rural populations but also how rural health fits new health systems organisation and measurement trends. The trade-offs between quality, access and costs are inseparable from the spatial organisation of health systems and call for a territorial approach to the management of health care provision. Chapter 6 further elaborates on financial and governance aspects of healthcare provision with a focus on system decentralisation.

The next section discusses statistical evidence on structural trends in affecting health systems in OECD countries and how they play out in rural areas. The third section discusses the organisation of health systems and links this organisation to the relative concentration of health services. The fourth section introduces the trade-offs between quality, access and cost of health care in rural areas. The fifth section discusses comprehensive approaches to reduce costs while increasing the overall performance of healthcare provision in rural areas. Before the concluding remarks, the last section presents an overview of innovative approaches to healthcare delivery in rural areas.

Structural trends affecting health systems and their effect in rural areas

Identifying structural trends affecting health systems in OECD countries is the starting point to understand the present and future of health provision in rural communities. This section discusses three structural trends and their effects in rural areas: inter-personal and territorial inequalities and their effect on health outcomes; higher exposure to risk factors for chronic conditions; and ageing and its effect on rising costs of care. Rural areas host a disproportionate share of older, lower-income and lower-educated population, and show slower progress in unhealthy habits, and many have faced disinvestment in health infrastructure in the face of higher costs. The way in which these trends play out in local contexts depends not only on the demographic composition and territorial inequalities but also on the compound effect of multiple determinants on health outcomes and needs. The first part of this section discusses the three trends affecting health systems in OECD countries and the second evaluates these trends in rural areas based on existing statistical evidence.

Structural trends in affecting health systems

There are three structural trends affecting health systems in OECD countries that are relevant to rural areas: i) inequalities and their effect on health outcomes; ii) higher exposure to risk factors for chronic conditions and its link to inequalities; and iii) rising costs of care in the context of ageing.

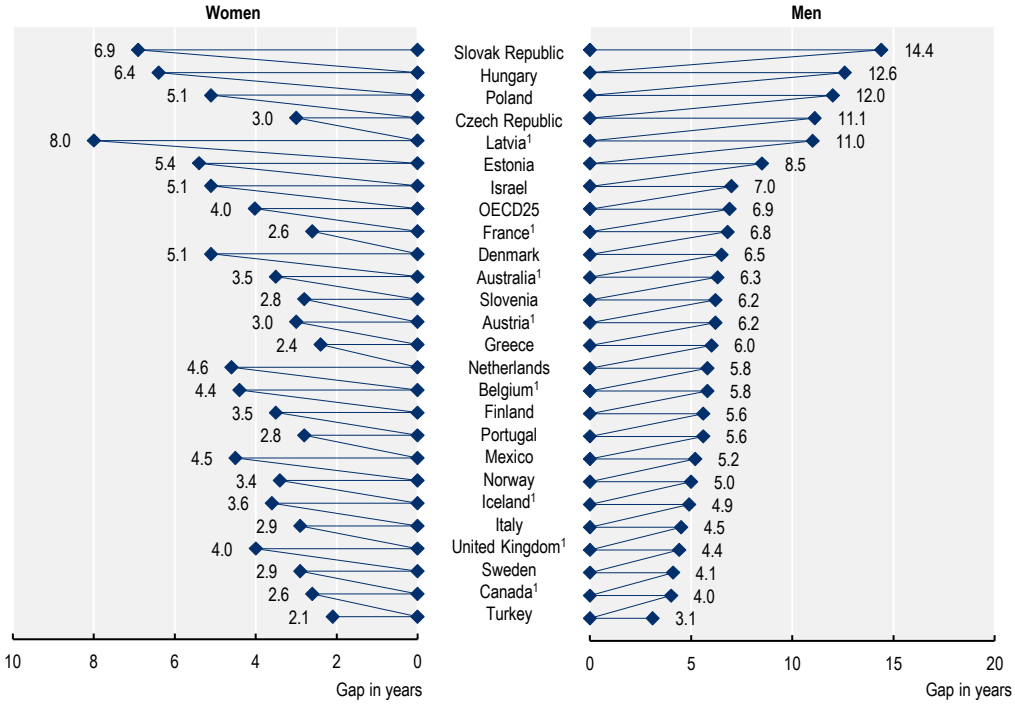
Lower income and education levels are linked to poorer health outcomes

Income levels relate to a great number of disparities in health in OECD countries, ranging from health literacy to access to the medical system and health outcomes. A person in the lowest income quintile is much less likely to see a doctor compared to those in the highest income quintile, including both general practitioners as well as specialists. Once this initial contact is made, however, all income groups have the same number of doctor's visits, highlighting the importance of reducing initial barriers (OECD, 2019[4]). Use of preventive services such as cancer screening or dental care is also concentrated among higher income groups in the vast majority of European Union (EU) and OECD countries. For cervical cancer, the difference in screening rates reaches on average 17 percentage points across income groups (OECD, 2019[4]).

Similarly, people in the lowest education category are twice as likely to view their health as poor compared to those with tertiary education in perception surveys (44% vs. 23%). The same applies to other variables of health status, such as limitations in daily activities and the prevalence of multiple chronic conditions. The average difference in life expectancy between the highest and lowest education levels across OECD countries was 4 years among women and nearly 7 years among men (Figure 4.1).

Figure 4.1. Gap in life expectancy at age 30 between the highest and lowest education level, by gender

2015-2017 or latest available year



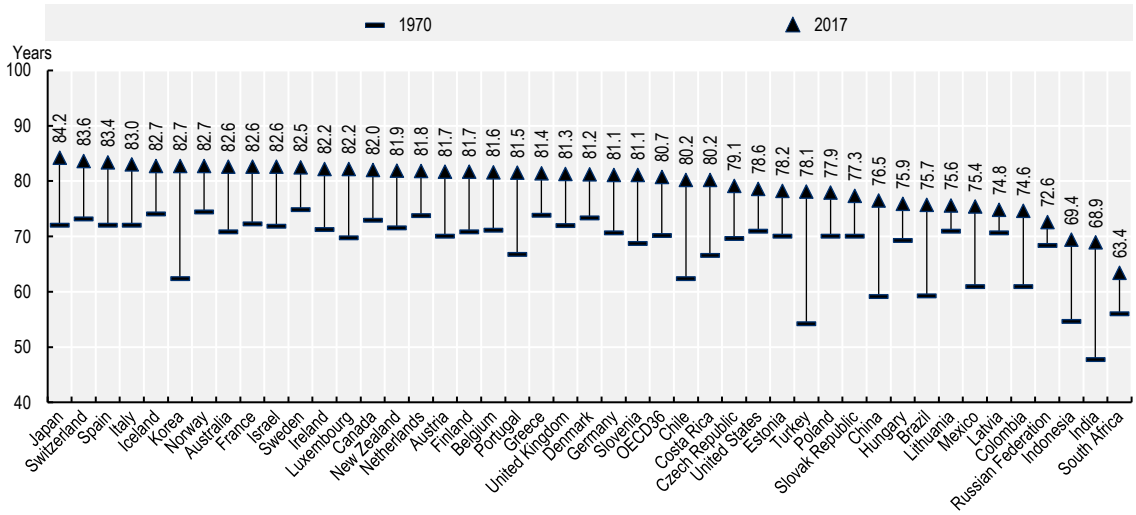
Note: 1. 2010-12 data.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/6682aee3-en

Longer lives can raise health costs

Figure 4.2 shows life expectancy at birth across OECD countries in 1970 and 2017. On average life expectancy has increased over 10 years across OECD countries during this time as a result of stronger health systems offering more accessible and higher quality care. Determinants of health outside the health system have also played an important role in this increase include rising incomes, better education and improved living environments (James, Devaux and Sassi, 2017[5]). Longer life expectancy on the country level is generally associated with higher health spending in OECD countries although this relationship is weaker at the highest spending levels highlight both the importance of both sufficient and well-targeted spending (OECD, 2019[3]).

Figure 4.2. Life expectancy at birth, 1970 and 2017 (or nearest year)



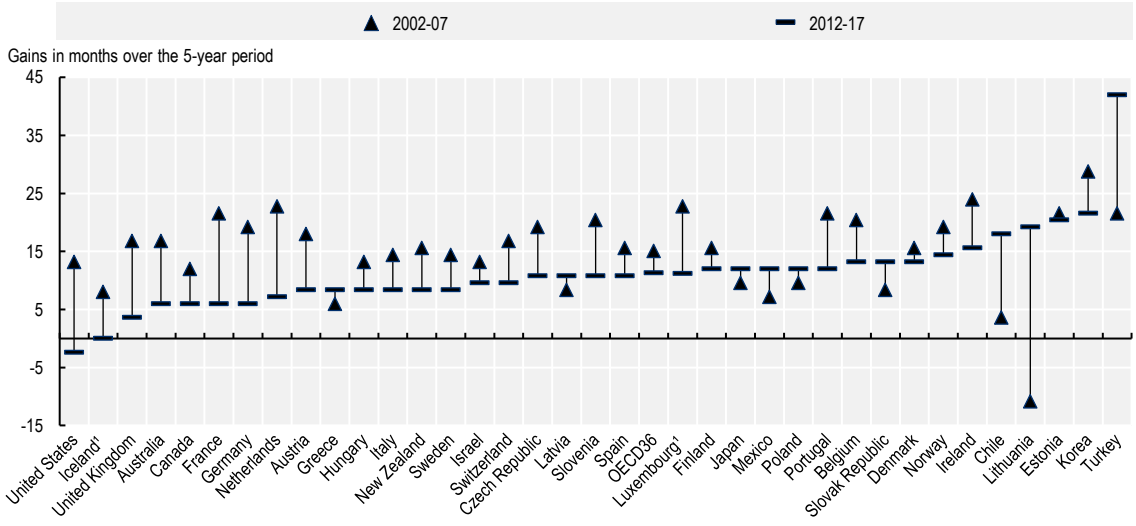
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934014821

While significant progress has been made in the overall health status in OECD countries, this progress is slowing. Improvements in life expectancy in recent years have been much slower and have even reversed course in certain countries highlighting current challenges facing health systems. Figure 4.3 shows the rate of slowdown in life expectancy. Comparing the last 5 years (2012-17) with a decade earlier (2002-07), 27 OECD countries experienced slower gains in life expectancy. These slowdowns were especially large in France, the Netherlands and the United States (US). In the US, life expectancy actually decreased during the period from 2012 to 2017. The reasons for the slowdown in life expectancy improvements include rising levels of certain health risk factors such as obesity and diabetes as well as the increased burden of respiratory diseases such as influenza and pneumonia among older people. A recent study examining these issues in OECD countries identified slower reductions in cardiovascular disease mortality as a key component (The King's Fund, 2020[6]; OECD/The King's Fund, 2020[7]).

The combination of longer lives with a decline in birth rates has led to an increase in the share of the elderly population across OECD countries. An older population implies greater health needs, as not all additional years from higher life expectancies will be lived in good health.

Figure 4.3. Slowdown in life expectancy gains, 2012-17 and 2002-07



Note: 1. 3-year average.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

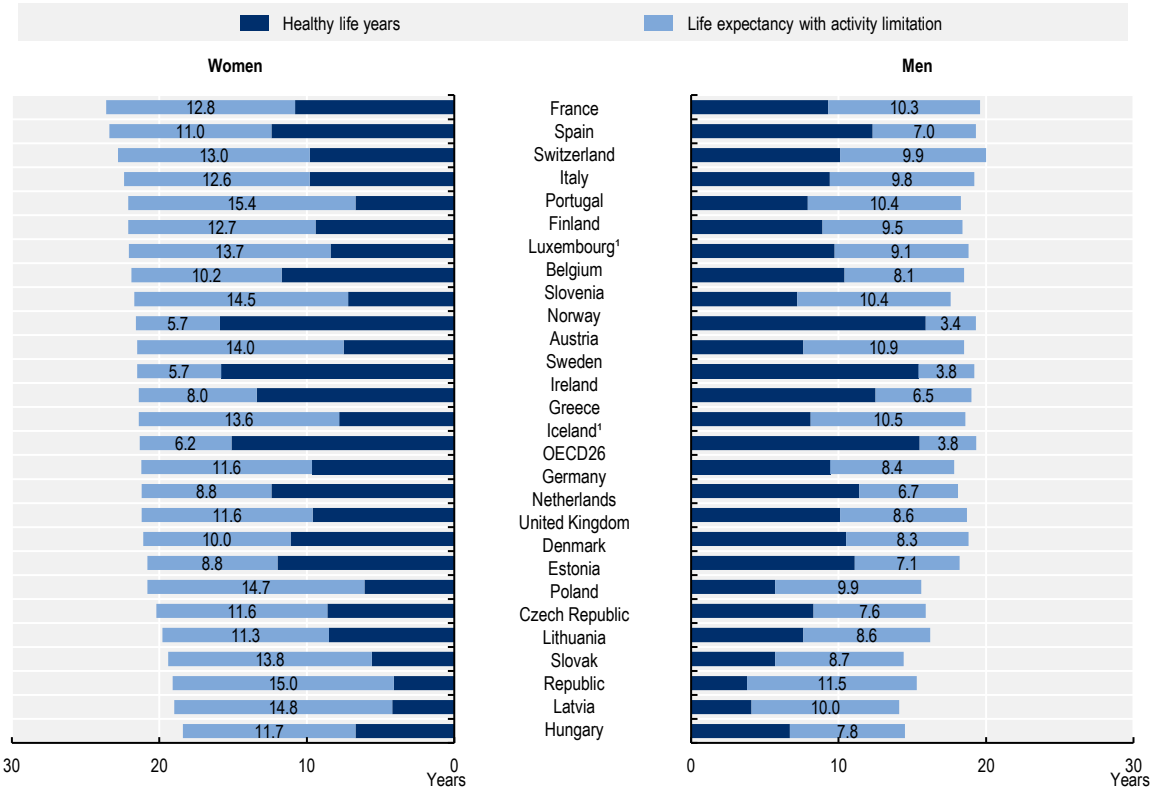
StatLink https://doi.org/10.1787/888934014840

Important disease categories such as cardiovascular disease, cancer and mental health become significantly more prevalent with increasing age. Figure 4.4 shows the number of healthy life years expected for those 65 and older, that is, the years of life expectancy that are likely to be free from major disability. Across the OECD, less than half of the expected years of life after 65 are expected to be healthy life years, indicating significant health burdens in these groups. For instance, in Latvia and the Slovak Republic, women spend nearly 80% of additional life years in poor health. To reduce the health burden of ageing, the World Health Organization (WHO) recommends so-called “healthy ageing” policies such as prevention of falls, promotion of physical activity or prevention of social isolation (WHO, 2005[8]).

Along with rising health needs come rising health care costs. A study of health costs per age showed that patients aged 50 and over costs 4 to 5 times patients in their late teens. In the US, personal health expenditure also rises sharply with age within the Medicare population. Care for patients 85 years and older costs 3 times as much per person as those aged 65-74, and twice as much as those aged 75-84 (Alemayehu and Warner, 2004[9]). Some of this cost can be avoided through health promotion policies which were predicted to reduce health spending as a percentage of gross domestic product (GDP) from a projected 10% in 2030 to 9.7% in a study across 26 OECD countries (Lorenzoni et al., 2018[10]). Much of the additional cost with age occurs during the last year of life with high rates of medical interventions and hospital admissions (Rouzet et al., 2019[11]).

A number of OECD countries are exploring expanded palliative care options to better care for patients during this period and reduce potentially unnecessary and harmful care (Knaul and Bhadelia, 2017[12]). Currently, public support for home health aides varies widely across OECD countries, from almost nothing in countries like Estonia and the US to nearly 100% coverage in countries like Finland, Iceland and the Netherlands (Oliveira Hashiguchi and Llena-Nozal, 2020[13]).

Figure 4.4. Life expectancy and healthy life years at age 65, by gender, 2017 (or nearest year)



Note: Data comparability is limited because of cultural factors and different formulations of question in EU-SILC.
1. Three-year average (2015-17).
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934018317

Exposure to risk factors increases the risk of chronic conditions

Advances made with respect to health risk factors have played a large role in increasing life expectancies, although the picture is less clear in rural areas. Reductions in smoking rates are particularly important as smoking increases risk for cancers, cardiovascular disease and respiratory disease. Between 2007 and 2017, smoking rates decreased on average from 23% to 18% among OECD countries (Figure 4.5).

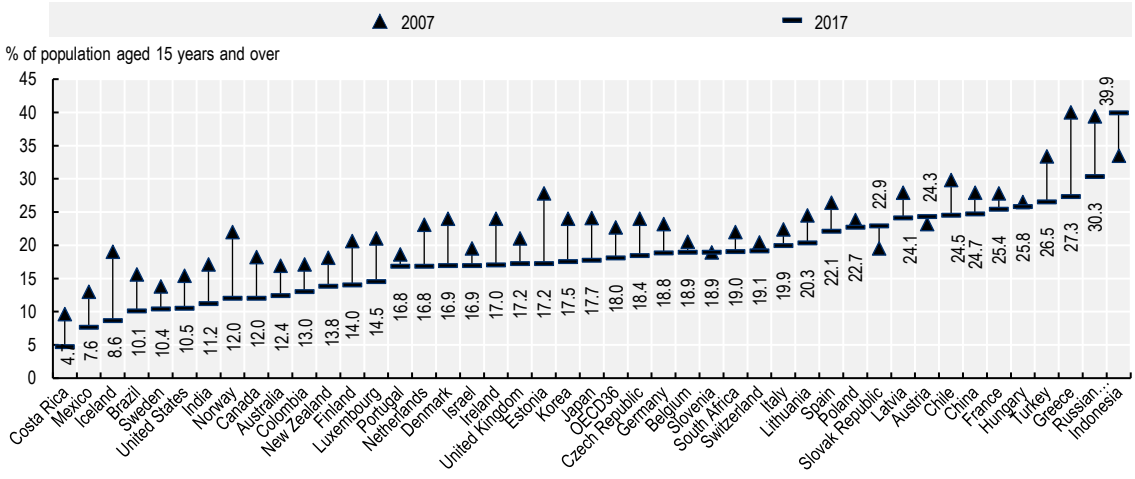
Reduction in alcohol consumption has also provided significant benefits to health over the past decade. Between 2007 and 2017, OECD countries reduced their per capita consumption of alcohol on average from 10.2 to 8.9 litres, reducing population risks of heart disease, stroke and some cancers.

Health systems in OECD countries also have to manage an increasingly overweight population. Being overweight or obese due to higher calorie intakes and sedentary lifestyles is linked with many of the highest-burden diseases, including cardiovascular disease, diabetes and cancer. Childhood obesity is particularly dangerous as the health impacts of extra weight can accumulate over years. Across 23 OECD countries, 58% of adults were overweight or obese in 2017 on average (Figure 4.6).

Older populations living unhealthier lifestyles are shifting the disease burden in OECD countries and a growing number of people are living with more chronic disease. As populations continue to age, this burden is expected to continue to grow. Chronic diseases such as cancer, heart attack and stroke, chronic respiratory problems and diabetes are the leading causes of death across OECD countries.

Chronic disease also represents a major disability burden amongst the living. Almost one-third of people aged 15 years and over report living with two or more chronic conditions (multi-morbidity), on average across 27 OECD countries (Figure 4.7). Almost half of the population in Germany and Finland are living with multi-morbidity which is far more common among older age groups. On average, 58% of adults aged 65 or over reported living with two or more chronic diseases (vs 24% of people aged less than 65). Socio-economic status is also related to living with chronic disease and 35% of people in the lowest income quintile report two or more chronic conditions, compared with 24% of people in the highest income quintile.

Figure 4.5. Adult population smoking daily, 2007 and 2017 (or nearest years)

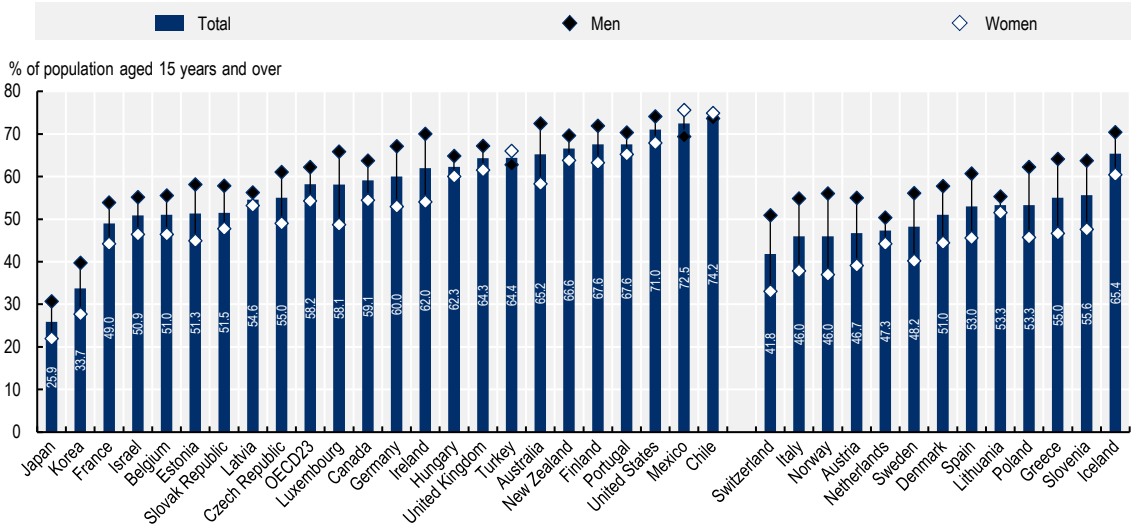


Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934015296

Figure 4.6. Overweight including obesity among adults by gender, measured and self-reported

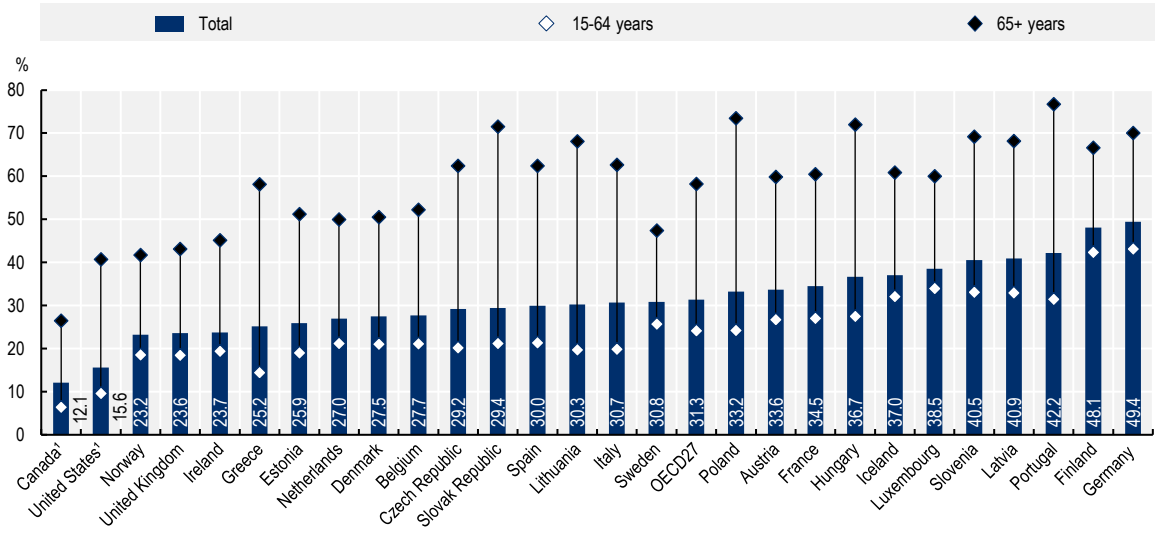
2017 (or nearest year)



Note: Left- and right-hand side estimates utilised measured and self-reported data respectively.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934015467

Figure 4.7. People living with two or more chronic disease, by age, 2014



Note: 1. The number of conditions included for Canada and the United States are lower than European countries (8 instead of 14), resulting in a downward bias. Data for these countries are thus not directly comparable with European ones.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934015087

The burden of chronic disease represents an enormous expense for health systems. In 2016, the total costs in the US for direct healthcare treatment for chronic health conditions totalled USD 1.1 trillion, equivalent to nearly 6% of the nation's GDP (Waters and Graf, 2018[14]).

Evidence of the effect of broad health system trends in rural areas

Rural regions in OECD countries have on average lower income per capita levels (OECD, 2020[1]), lower educational levels, as evidenced for the case of tertiary education shares in European countries (see Chapter 2) and higher levels and rates of change in age dependency ratios compared to metropolitan regions (Figure 4.9). Consequently, rural OECD regions host a larger share of the population at risk of worse health outcomes. Moreover, factors such the lack of health insurance of poorer, rural populations as observed in the US (CDC, 2020[15]) and long distances and more expensive commutes to healthcare facilities in rural areas compound the effect of inequality and ageing on health outcome territorial disparities.

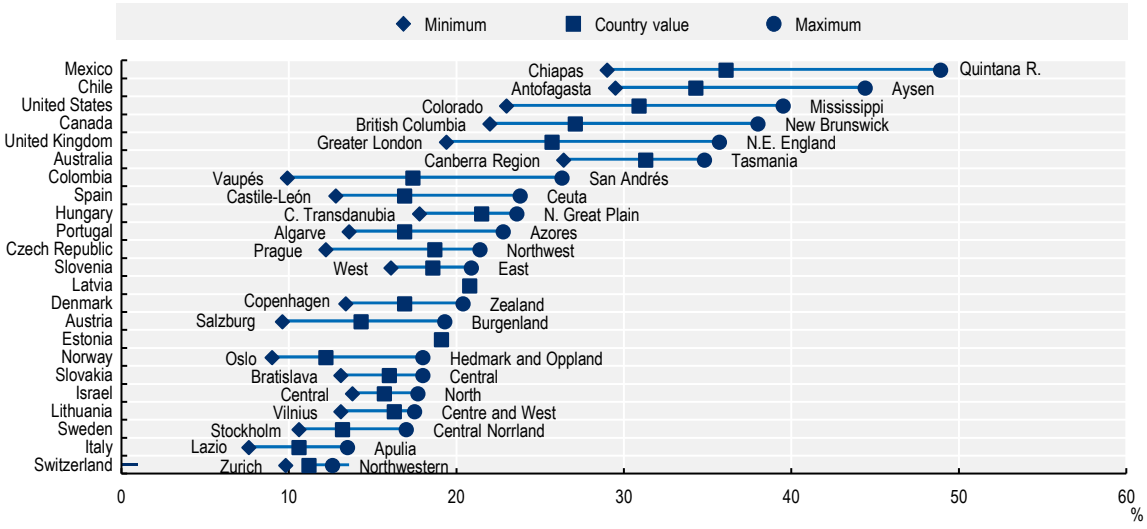
The burden on health systems of older populations living unhealthier lifestyles can be much larger in rural areas. Alcohol consumption remains higher in rural areas across OECD countries (Donath et al., 2011[16]). In the US, measures of unhealthy lifestyles including smoking, alcohol consumption and less leisure-time physical activity are also higher in non-metropolitan areas compared to metropolitan areas (CDC, 2020[15]). However, both smoking and alcohol drinking rates are lower in rural areas in Germany and Poland (Borders and Booth, 2007[17]; Włodarczyk et al., 2013[18]; Völzke et al., 2006[19]). In Australia, the prevalence ratio of current daily smokers in outer regional and remote areas (19.6%) was larger than in major cities (12.8%) in 2017-18 (Australian Institute of Health and Welfare, 2020[20]). Unhealthy lifestyle factors in rural populations have been associated with lower overall education levels and relatively fewer preventive services (Dixon and Chartier, 2016[21]).

Rural populations across the OECD are also significantly more overweight and obese and show more risk factors for obesity than urban populations. A recent study reported that the global rise in obesity over the

past three decades was due in large part to rises in rural obesity. In high-income countries, the increase in obesity was particularly large for rural women (Bixby et al., 2019[22]). In Chile, Mexico and the US, this figure exceeds 70% and these countries also exhibit the largest differences across TL2 regions in obesity rates (Figure 4.8). In contrast, in Japan and Korea, less than 35% of adults were overweight or obese.

Figure 4.8. Obesity rates by large (TL2) regions, 2018 or most recent year

Percentage of adult population, large (TL2) regions



Note: Obesity refers to the population aged 15 years old or more with a Body Mass Index above 30 kg/m^2.
Source: OECD (2020[23]), *OECD Regions and Cities at a Glance 2020*, https://doi.org/10.1787/26173212.

StatLink https://doi.org/10.1787/e502c304-en

In rural areas, the older population and increased health risk factors result in higher levels of chronic disease and multi-morbidity. In the US, the percentage of the population with 2 to 3 chronic conditions was 18.9% in metropolitan regions and 22.6% in non-metropolitan regions. These numbers were 4.2% and 5.1% for those living with 4 or more chronic conditions (CDC, 2020[15]).

In conclusion, in comparison to their urban counterparts, rural populations: i) have lower incomes and educational levels, both of which are linked to health outcomes; ii) are older and projected to become even more so; iii) lead less healthy lifestyles with higher rates of smoking, alcohol consumption, and obesity; iv) have more chronic diseases; and v) have higher rates of avoidable hospital admissions.

Geographical dimensions of health systems

The previous section outlined individual characteristics that are linked to worse health outcomes and higher provision costs that result in territorial disparities. This section shifts the focus to the organisation of health systems and its link to the concentration of different levels of care in space.

Health systems are a critical component of a functioning society because they improve well-being, keep workers healthy and help students learn better. They also represent a major economic sector accounting for nearly 10% of GDP spending in OECD countries (OECD, 2019[3]). Creating and managing an effective health system is one of the most important responsibilities many governments have. Yet, the organisation of healthcare can be complex and quite diverse across countries or systems involving different health structures and types of health professionals. This section starts by outlining a definition of health systems

and its objectives, followed by a discussion of the organisation of healthcare in primary, specialist and acute levels and the different levels of spatial concentration of each level.

Objectives and organisation of health systems

The central objective of any health system is to improve the health and well-being of the population, in line with the concept of universal health coverage (see Box 4.1 for a definition of health systems). Universal health coverage, one of the Sustainable Development Goals (SDGs), means that individuals and communities receive the health services they need without suffering financial hardship. It also enables access to services that address the most significant causes of disease and death and ensures that the quality of those services is good enough to improve the health of the people who receive them.

Box 4.1. How are health systems defined?

The WHO defines the health systems as: i) all the activities whose primary purpose is to promote, restore and/or maintain health; and ii) the people, institutions and resources, arranged together in accordance with established policies, to improve the health of the population they serve, while responding to people's legitimate expectations and protecting them against the cost of ill-health through a variety of activities whose primary intent is to improve health. This definition encompasses all common health system elements such as health professionals (e.g. doctors and nurses), physical components such as hospitals, ambulances and medical equipment, as well as schools for educating medical staff and government bodies such as the health ministries that manage the system.

System organisation and spatial distribution of healthcare within countries

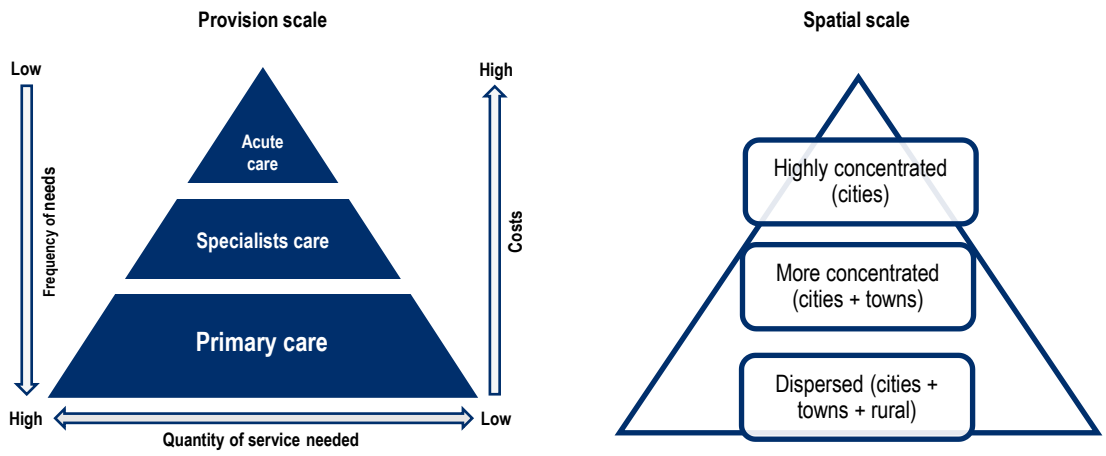
While the system organisation differs across countries and regions, the main components of health care provision can be described as having three main levels: primary care, specialist care and acute care. Each level aims to meet different health objectives and often involves different types of health personnel and physical resources. These levels also differ on population coverage, level of specialisation, resource intensity and cost among other aspects, resulting in the higher or lower spatial concentration of the services.

The triangle on the left of Figure 4.9 presents the three levels of care as a pyramid with cheaper and more available primary care treating the great majority of needs and supporting the relatively less frequent and more expensive specialist and acute care levels. The triangle on the right presents the spatial scale at which these levels are more likely to occur. The relationship between levels and the relative resources dedicated to each level vary across countries and even regions, depending on care needs, population preferences or system organisation. For this reason, the discussion in this section provides a general discussion without specifically referring to any particular context.

Primary care covers the vast majority of health needs of a population and is the first level of contact with the health care system. Primary health can be defined as "a whole-of-society approach to health…focusing on people's needs and preferences…as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitation and palliative care, and as close as feasible to people's everyday environment" (OECD, 2020[24]). Common primary care providers include primary care physicians, nurses, pharmacists, auxiliaries and community health workers. Activities of primary care include health promotion, disease prevention, health maintenance, counselling, patient education, diagnosis and treatment of acute and chronic illnesses. Along with providing care, primary care also seeks to ensure that patients receive comprehensive care within the system by co-ordinating care with other health providers

and other care levels, such as social services. Because of its role in care co-ordination and disease prevention, strong primary care is essential to building and maintaining health across the population.

Figure 4.9. Levels of health care provision



The costs per head of primary care are relatively lower than both specialist and acute care, as it needs fewer resources and less specialised health workers can provide care and co-ordination. WHO data show that a visit to the hospital for ambulatory care in Europe was approximately six times more expensive than a visit to a primary care setting (WHO, 2020[25]). Primary care can be provided in a wide range of settings from primary care clinics, to hospitals, solo-practitioner offices and a patient's home. Primary care is not necessarily attached to a health facility and its provision is usually spread out within countries so that it is within short distances from users. This means that primary care facilities and professionals can be found at all spatial scales – cities, towns and rural areas – and local units such as municipalities can play a role in its provision.

Strong primary care can also help prevent chronic disease and reduce mortality. A recent study across 18 OECD countries showed that the stronger the primary care orientation of a health system, the lower the mortality rates across a wide range of causes (OECD, 2020[24]). The role in prevention, from encouraging people to stop smoking to early detection of cancers, is also critical in overall health system performance. Primary care can also greatly improve patient experiences through better co-ordination of the health system and help ensure health access to vulnerable populations that otherwise can struggle to access medical services. Lastly, strong primary care can present savings for health systems by preventing costly hospital admission through better disease management and disease prevention roles (Kravet et al., 2008[26]).

Specialist care taking place in secondary level health units is generally reserved for health problems that cannot be handled in the primary care sector. It is provided by specialist doctors such as urologists, dermatologists or cardiologists, either in hospitals or as ambulatory care. Specialist care is more expensive and resource-intense than primary care because it often requires more intense technology and expertise, including testing capacity, pharmaceuticals and smaller interventions. Because of the higher requirements in terms of medical expertise and equipment, specialist care is more spatially concentrated than primary care and it is usually located in cities and towns with relatively high populations that also provide access to surrounding rural areas. The travel times of rural users to secondary health facilities vary greatly across countries depending on population settlements and general accessibility conditions.

In general terms, access to specialist care varies greatly across OECD countries depending on the rules regulating access, with access ranging from free for anyone covered by the health system to available only

upon referral from a primary care provider. For instance, the organisation of healthcare around the functioning of hospitals allows more access to specialist care in France and Germany (where access to specialist care is nearly free). Meanwhile, the Netherlands and the UK have a strict gatekeeping policy requiring a referral from a primary care provider.

Acute care is the most specialised type of care and is very often reserved for patients with a referral from primary or specialist care settings or emergencies. Some examples of acute care include: major plastic surgery, burn treatment, cardiac surgery, advanced cancer management, neurosurgery, as well as complex medical and surgical interventions. Acute care is meant to treat the most difficult and urgent cases including life-threatening issues such as heart attacks and usually takes place in large hospitals with specialised equipment and staff with significant expertise. Acute care is also often provided by teams dedicated to specific treatments such as surgeries or treatment of stroke. The costs of acute care can be quite high as this care can be extremely resource-intensive requiring specialised machines, significant hospital stays, drugs and care from multiple, highly specialised personnel. This means that provision is highly concentrated in space, with large hospitals located in cities with sizeable populations. Acute care usage also varies across countries depending on their health system organisation. For instance, in Germany, a strong system focus on patient choice and willingness to admit patients into acute care has led to a very high proportion of tertiary care resources.

Balancing quality, access and cost of health care in rural areas

Three major criteria for determining health performance found nearly universally in health care frameworks are quality, access and cost (Carinci et al., 2015[27]). Although achieving all three objectives is desirable, often improving one dimension means worsening another. One example is the case of treatment for acute myocardial infarction (heart attack), where patients treated in hospitals that treat more cases have better outcomes (i.e., higher survival rates), as found in a study across 10 OECD countries (Lalloué et al., 2019[28]). As most hospitals with large case numbers are in cities, improving quality by centralising treatment in larger hospitals may imply a reduction in physical access and an increase in waiting times. On the other hand, policy interventions undertaken locally such as vaccination can provide benefits across all three criteria as they can improve health outcomes not only at the primary care level but also at higher levels, while being low-cost and high-access. This highlights the inter-connections between the three levels of care and the importance of place-based policies in influencing the performance of health systems.

Table 4.1 summarises the care provision levels and objectives and their relationship with a performance by health care level. Each of the levels of care discussed before can have direct or indirect impacts on the others. Proper treatment of certain chronic conditions such as asthma in primary care for example can reduce the need for emergency treatment for this condition in tertiary care. On the other hand, free access to specialist doctors providing specialist care may lead to patients consulting with specialist doctors for issues that could have been dealt with in primary care (Pichlhofer and Maier, 2015[29]). For example, measures to lower the number of specialist visits will be different in the UK where a strict gatekeeping system regulates access to specialists compared to Japan, where patients have more independence in accessing specialist care. Using this framework, this section discusses the trade-off between quality, access and costs in rural areas, discussing, in turn, the roles of primary, specialist and acute care and the appropriate measures to monitor their quality.

Quality health care in rural areas

The quality of health care is fundamental to a high performing health system and a major focus of OECD health systems. Quality care can be defined as providing care that is:

- Effective: achieving desirable outcomes, given the correct provision of evidence-based health care services to all who could benefit, but not to those who would not benefit.
- Safe: reducing harm caused in the delivery of health care processes.
- Patient-centred: placing the patient/user at the centre of its delivery of health care.

People-centredness, a notion that has gained momentum recently, is defined as a system's capacity to take into account an individual's specific health needs and desired health outcomes (OECD, 2019[30]). A people-centred approach treats patients as partners with their health care providers and providers treat patients not only from a clinical perspective but also from an emotional, mental, social and financial perspective. It can be measured through patient-reported measures such as the proportion of patients who felt the doctor spent adequate time with them explaining their problem and the treatment.

There are currently a number of validated indicators for measuring the three components of quality of health systems, namely effectiveness, safety and patient-centredness. While life expectancy is the main measure of health care quality that reflects the overall performance of a health system, indicators such as vaccination rates or cancer survival rates can be used to measure effectiveness. To measure so-called "patient safety" issues, indicators such as hospital-acquired infection rates or adverse events in hip and knee surgeries can be used (OECD, 2019[3]).

Table 4.1. Care provision levels, objectives and relationship to performance

Level	Providers	Objectives	Quality measure examples	Other performance notes
Primary care	General practitioner, nurses, pharmacists	Health promotion, disease prevention, health maintenance, counselling, patient education, diagnosis and treatment of acute and chronic illnesses	Appropriateness of drugs (antibiotics, opioids) prescribed, avoidable hospital admission rates (chronic obstructive pulmonary disease [COPD], asthma, and other chronic conditions), immunisation and screening rates	Lowest cost care, easiest to access, closest to people's needs and expectations
Specialist care	Specialist doctors (dermatologist, urologist, oncologist)	Complementary disease management requiring organ- or condition-specific expertise about their diagnosis, treatment and prognosis	Cancer survival rates (shared responsibility with primary and acute care)	Higher cost, access depends on system (some require and/or encourage referral)
Acute care	Hospital care, specialised teams	Treat the patients in need of most specific in-hospital expertise and urgent care including life-threatening issues such as heart attacks	Stroke, heart attack survival rates	Highest cost, access can vary with system arrangements (mostly on referral)

Life expectancy is lower and mortality is higher in rural areas

Some factors specific to rural areas contribute to lower life expectancy than would be expected from the broad trends outlined in the second section. In North America, the opioids crisis with its strong rural component has also played a large role in life expectancy slowdowns in these countries. In the US, the opioid crisis has caused approximately 400 000 deaths (CDC, 2020[31]). The toll on the rural population is particularly high particularly for deaths from natural and semi-synthetic opioids. Opioid-related deaths are also relatively high in Canada, Estonia and Sweden (OECD, 2019[32]). Mortality rates from major diseases are higher in rural areas of the US, where rural residents are more likely to die from heart disease, cancer,

unintentional injury, chronic lower respiratory disease and stroke than non-rural residents. Accidental deaths from motor vehicles crashes and drug overdoses are also significantly higher in rural areas (CDC, 2020[31]). Table 4.2 shows age-adjusted death rates for urban and non-urban areas in the US.

Table 4.2. Age-adjusted death rates per 100 000 inhabitants, by metropolitan area in the US, 2014

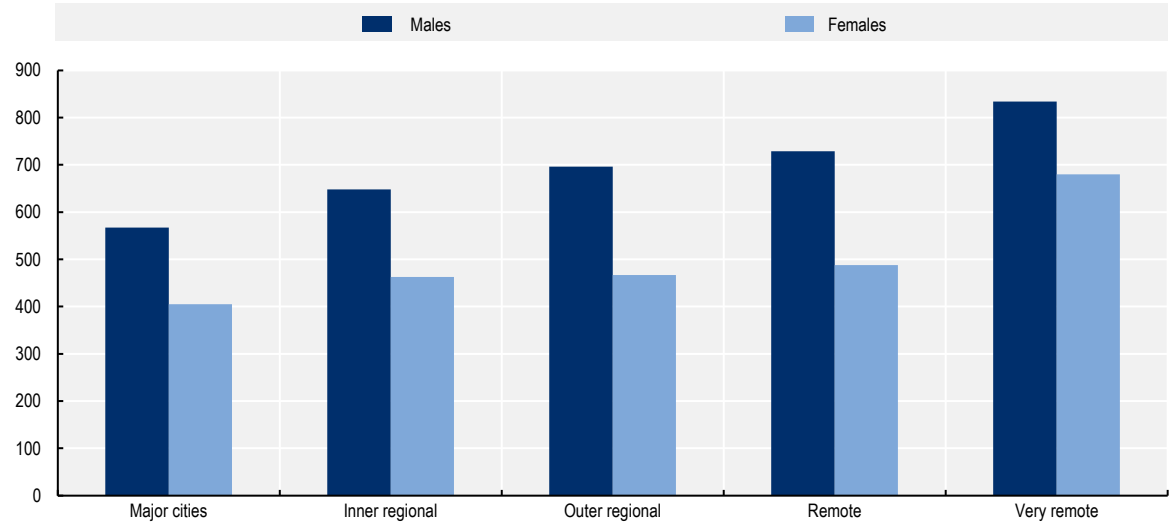
Cause of death	Non-metropolitan areas	Metropolitan areas
Heart disease	193.5	161.7
Cancer	176.2	158.3
Unintentional injury	54.3	38.2
Chronic lower respiratory disease	54.3	38.0
Stroke	41.5	35.4

Source: Rural Health Information Hub (2020[33]), *Rural Health Disparities Introduction*, https://www.ruralhealthinfo.org/topics/rural-health-disparities (accessed on 23 July 2020).

Similar regional differences in mortality are also seen in other countries. In Portugal, large disparities in life expectancy exist between urban-coastal regions and rural-interior regions (Barros, Machado and Simões, 2011[34]). In Australia, a clear gradient between death rates and urbanisation is evident with larger mortality rates seen in more remote regions. The clear jump in very remote areas (especially for females) is linked to higher mortality rates among Indigenous populations due predominantly to coronary heart disease, diabetes, chronic obstructive pulmonary disease (COPD), lung cancer and suicide (Figure 4.10) (Australian Institute of Health and Welfare, 2020[20]).

Figure 4.10. Mortality rates by remoteness and gender in Australia

Deaths per 100 000 inhabitants, 2018 values



Note: Age-standardised rate to the 2001 Australian population.
Source: Australian Institute of Health and Welfare (2020[20]), *Rural and Remote Health - Health Status and Outcomes*, https://www.aihw.gov.au/reports/rural-remote-australians/rural-remote-health/contents/health-status-and-outcomes (accessed on 23 July 2020).

StatLink https://doi.org/10.1787/888934226671

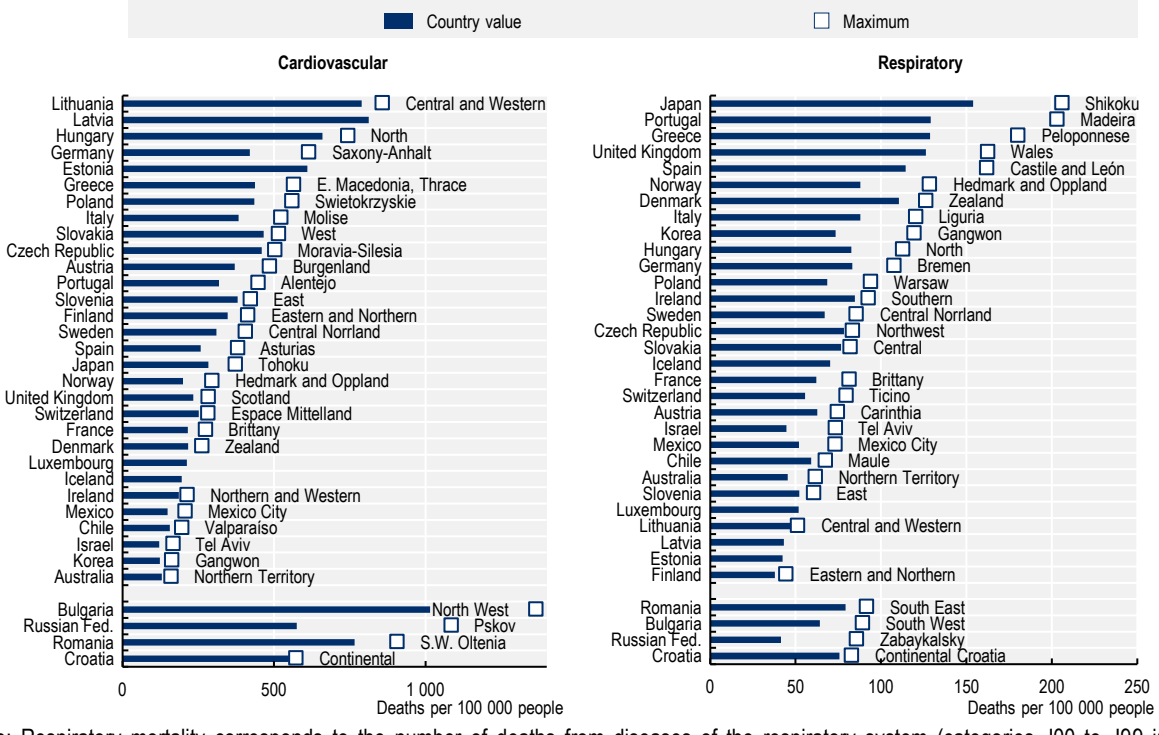
Survival rates to major causes of death are lower in rural areas

While survival rates to major causes of death like cancer are improving across OECD countries, progress in rural areas where mortality rates are higher is slower. Survival rates for a range of cancers are rising thanks to both improved prevention and curative care, contributing to overall higher survival rates because cancer accounts for roughly 25% of all deaths in OECD countries. For instance, across OECD countries, women diagnosed early for breast cancer have over a 90% probability of surviving their cancer for at least 5 years, up from just over 80% in the early 2000s. Some of these improvements have been slower in rural areas, however. In the US, cancer death rates in rural areas declined 1% a year vs 1.6% annually in urban areas (CDC, 2020[35]).

Acute myocardial infarction (AMI) is another major cause of death across OECD countries. Thirty-day mortality rates for AMI have also decreased significantly in the last decade thanks to technological advances, better care co-ordination and better pre- and post-hospital care. Figure 4.12 shows the 30-day mortality rate after admission to the hospital for an AMI including death both inside and outside the hospital. These mortality rates dropped from 12.5% to 9.1% on average across OECD countries between 2007 and 2017. Mortality rates due to respiratory and cardiovascular diseases show large variation across regions in most OECD countries. The regional differences in deaths due to respiratory diseases are largest in Greece, Portugal and Japan, where the region of Shikoku records 50 additional deaths per 10 000 people compared to the national average (Figure 4.11). Mortality rates from cardiovascular diseases are much larger and can vary as much as over 500 additional deaths per 10 000 inhabitants in Russia.

Figure 4.11. Mortality rate due to respiratory and cardiovascular diseases, 2018 or most recent

Deaths per 100 000 people, large (TL2) regions



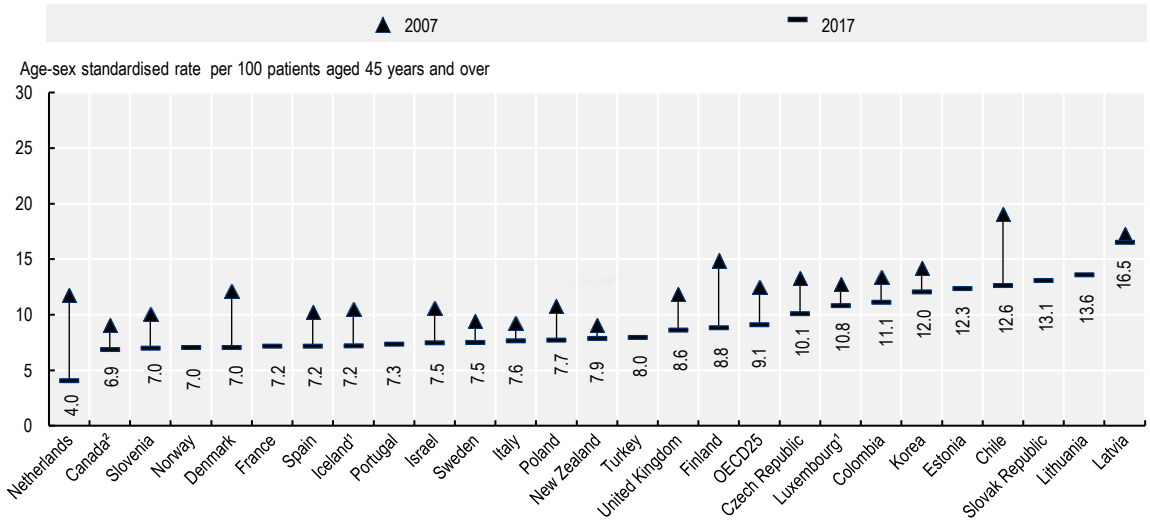
Note: Respiratory mortality corresponds to the number of deaths from diseases of the respiratory system (categories J00 to J99 in the International Classification of Diseases). Circulatory (cardiovascular) mortality corresponds to the number of deaths from diseases of the circulatory system (categories I00 to I99 in the International Classification of Diseases).
Source: OECD (2020[23]), *OECD Regions and Cities at a Glance 2020*, https://doi.org/10.1787/959d5ba0-en.

StatLink https://doi.org/10.1787/9b6027cc-en and https://doi.org/10.1787/8d96931f-en

Rural areas perform worse on key health quality indicators such as mortality rates for AMI. In Australia, many of the excess deaths in rural regions are considered as "potentially avoidable" through proper primary care or individualised care. These include deaths due to certain cancers, diabetes or cardiovascular diseases such as COPD or asthma (Australian Institute of Health and Welfare, 2020[20]).

The quality of rural hospitals is generally lower than larger hospitals as measured by key measures such as mortality after a heart attack (Lalloué et al., 2019[28]). These poorer outcomes could be due to the relative inexperience of staff or skills mismatch due to workforce recruitment difficulties. On the other hand, some rural hospitals in the US have been found to provide superior quality for measures such as: safety, person and community engagement, and efficiency and cost reduction (Rural Health Information Hub, 2020[33]). It is important to note that comparing the quality of care in rural hospitals to larger hospitals is difficult because of insufficient numbers of cases.[1]

Figure 4.12. Thirty-day mortality after admission to hospital for AMI based on linked data, 2007 and 2017 or nearest year



Note: 1. Three-year average. 2. Results for Canada do not include deaths outside of acute care hospitals.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/888934016284

Avoidable admissions are higher and disease prevention is lower in rural areas

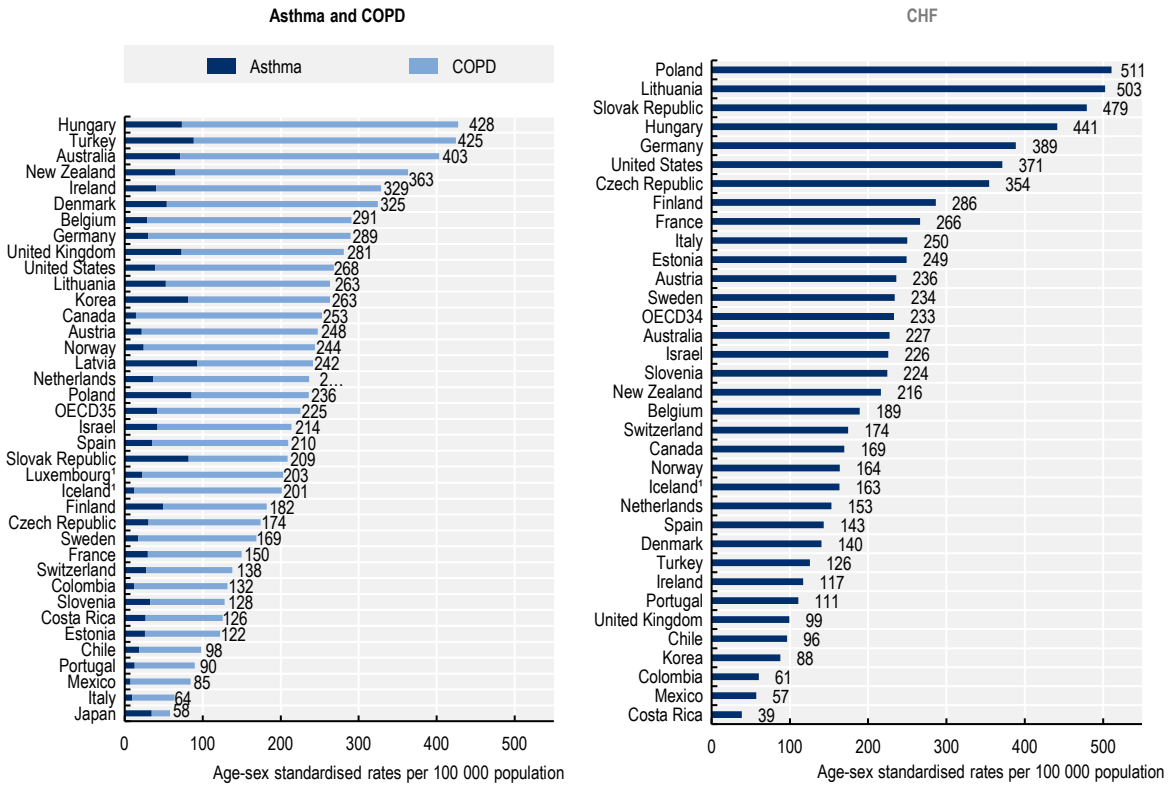
Rural areas have higher rates of avoidable hospital admissions that arise from weak primary care provision, lack of treatment alternatives and low access to emergency services. A study for 13 OECD countries found that medical hospitals admission rates of hysterectomies and caesarean sections were significantly higher in rural areas, while rates for revascularisation procedures were low (OECD, 2014[36]). High rates of hysterectomies were found to be correlated with a lack of access to alternative treatments in some rural areas, while the high rates of caesarean sections were linked to small and rural hospitals without the emergency services necessary to deal with birth complications programming caesarean sections. Lastly, low rates for revascularisation procedures suggest a suboptimal use of these treatments likely due to issues of access or local capacity to perform such procedures.

Diseases such as asthma, COPD and congestive health failure (CHF) are considered to be treatable through proper primary care, so that hospital admissions for these causes indicate weak primary care systems (OECD, 2020[24]). Figure 4.13 shows the rates of hospital admissions for asthma, COPD and CHF.

Some progress has been made on these measures in recent years but recent analysis suggests that these improvements are not happening fast enough (OECD, 2017[37]). Importantly, these so-called "avoidable" hospital admissions are not homogenous across countries with rural areas showing significantly higher rates. In 2017-18, potentially preventable hospitalisation rates in very remote areas in Australia were 2.5 times higher than in major cities (Australian Institute of Health and Welfare, 2020[20]).

Figure 4.13. Asthma, COPD and CHF hospital admissions

Hospital admission in adults, 2017 (or nearest year)

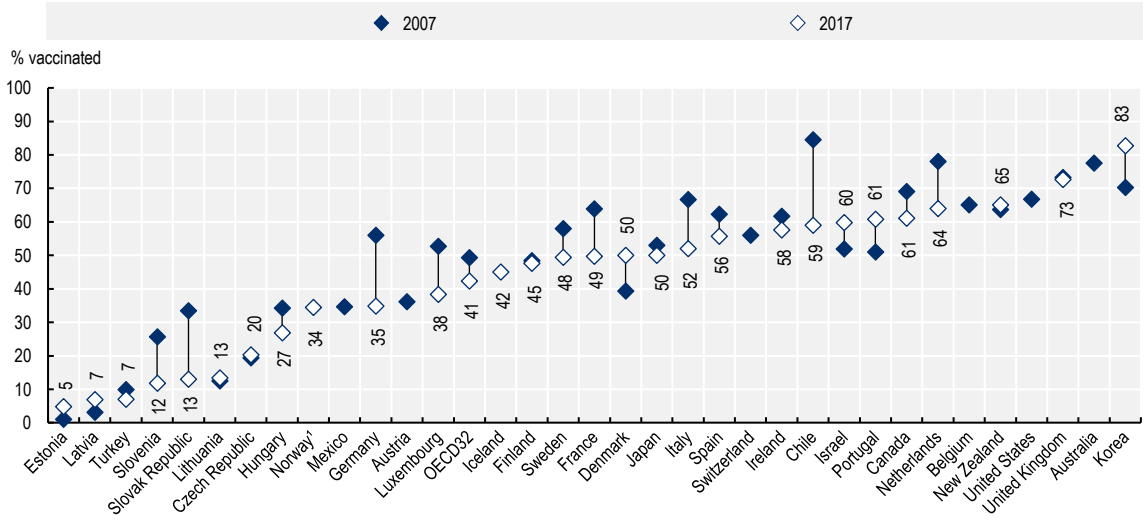


Note: 1. Three-year average. COPD= Chronic Obstructive Pulmonary Disease; CHF= Congestive Health Failure.
Source: OECD (2019[38]), *Health Statistics 2020 (database)*, http://www.oecd.org/health/health-data.htm.

StatLink https://doi.org/10.1787/e1a68f0a-en and https://doi.org/10.1787/341023ec-en

Disease prevention, another measure of the quality of health that has become increasingly relevant in the context of COVID-19, is also lower in rural areas in countries with the available evidence. This happens in a context of overall lower-than-recommended vaccination rates. While in 2003 member of the WHO World Health Assembly sought to increase vaccination for flu among those over 65 years of age to 75% annually, on average across OECD countries, vaccination rates stood at 41% in 2017. In rural areas, vaccination levels across a range of vaccines rest significantly below national averages in some European countries due in part to issues of access (WHO Europe, 2015[39]). Numerous strategies from various forms of rural-specific education to delivery mechanisms have been developed to help improve these rural rates such as pharmacy-based programmes allowing pharmacists to administer vaccines, school-based programmes or mobile immunisation clinics (Vanderpool, Stradtman and Brandt, 2019[40]).

Figure 4.14. Percentage of population aged 65 and over vaccinated for influenza, 2007 and 2017



Note: 1. 2017 data estimated.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en.

StatLink https://doi.org/10.1787/88aec836-en

Generally, while some differences in practice variation reflect normal patient choice and population needs, some variations are unwarranted and may represent over- or underuse. A number of strategies have shown to be effective in reducing geographic variations including: public reporting of rates; target settings; creating and monitoring clinical guidelines; provider-level reporting and feedback, and financial incentives (OECD, 2014[36]).

Equitable access to health care in rural areas

Ensuring equitable access to health care is another key component of a high-performing health system. Access can be defined as "the timely use of personal health services to achieve the best health outcomes" (Millman, 1993[41]). Good doctors and well-organised hospitals will not have the desired impacts on population health and advance societies toward universal health coverage if the population cannot access these services. A high performing health system depends on both good care as well as access to this care.

Ensuring access means removing barriers including financial, physical or cultural factors. Low rates of health insurance coverage and high costs of services can prevent people from receiving the health care they need due to financial concerns. Long distances between patients and doctors or long-waiting times due to the insufficient supply of health personnel can also prevent equitable and timely access. A sparser population in rural areas directly affects access because of larger travel distances. More importantly, the obstacles to meeting workforce demands in the health sector, including a lack of properly trained workforce for both doctors and nurses and an older workforce, are particularly challenging in rural areas because of demographic factors and depopulation.

Higher unmet medical needs in rural areas

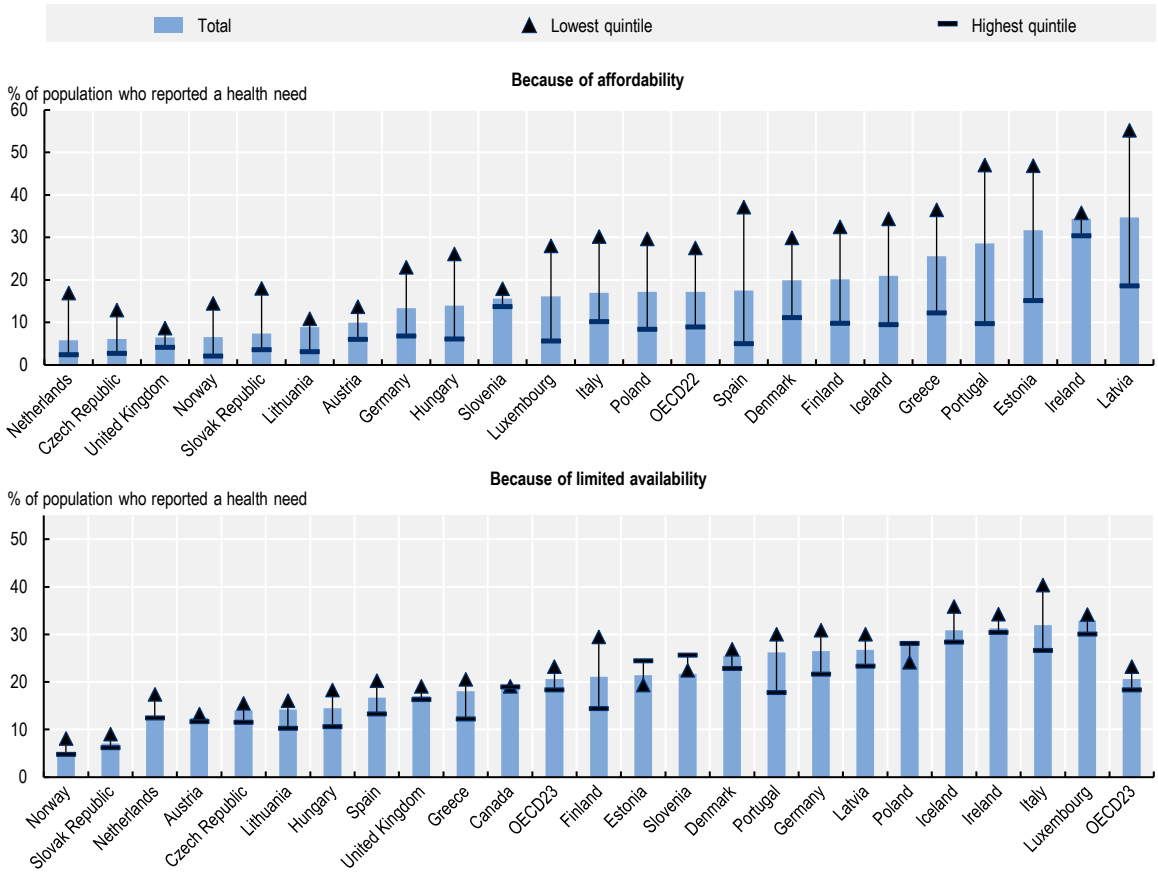
Across OECD countries health coverage across the population for a set of core health services is at or near 100% with some notable exceptions including the US at just over 90% and Mexico at just under 90%. The government and compulsory insurance schemes covered over 77% of all spending on average across OECD countries.

Across European countries, rural residents reported significantly higher unmet needs for health (4.2% in rural areas versus 3.8% in towns and suburbs and 3.5% in cities) resulting from problems in accessing care such as distance from providers or financial barriers. These disparities were higher among newer European Union (EU) countries including Bulgaria, Croatia and Romania (Eurostat, 2020[42]). The Netherlands has actively implemented policies to remove physical and financial barriers and records one of the lowest levels of unmet health needs (OECD, 2019[3]).

Despite high health coverage, many people report unmet health needs either due to limited availability of services because of waiting times or transportation difficulties (over 20% across OECD countries) or because of financial constraints (over 17% across the OECD) (OECD, 2019[3]). The differences between the highest and lowest income quartiles were also significant in reporting forgoing care due to affordability issues. On average, 28% of people in the lowest income quintile forgo care for financial reasons compared with 9% for richer individuals (Figure 4.15). A recent survey across 23 OECD countries showed that between 11% and 65% of people reported unmet medical needs in 2015/16 due to barriers in access to care including waiting times, distance and transportation concerns (OECD, 2019[4]). Large inequalities in access linked to income differences were also reported for access to screening tests.

Figure 4.15. Population forgoing or postponing care because of limited affordability or availability, by income

2014 values



Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en; OECD (2019[38]), *Health Statistics 2020 (database)*, http://www.oecd.org/health/health-data.htm.

StatLink https://doi.org/10.1787/96c95514-en and https://doi.org/10.1787/fd31d56f-en

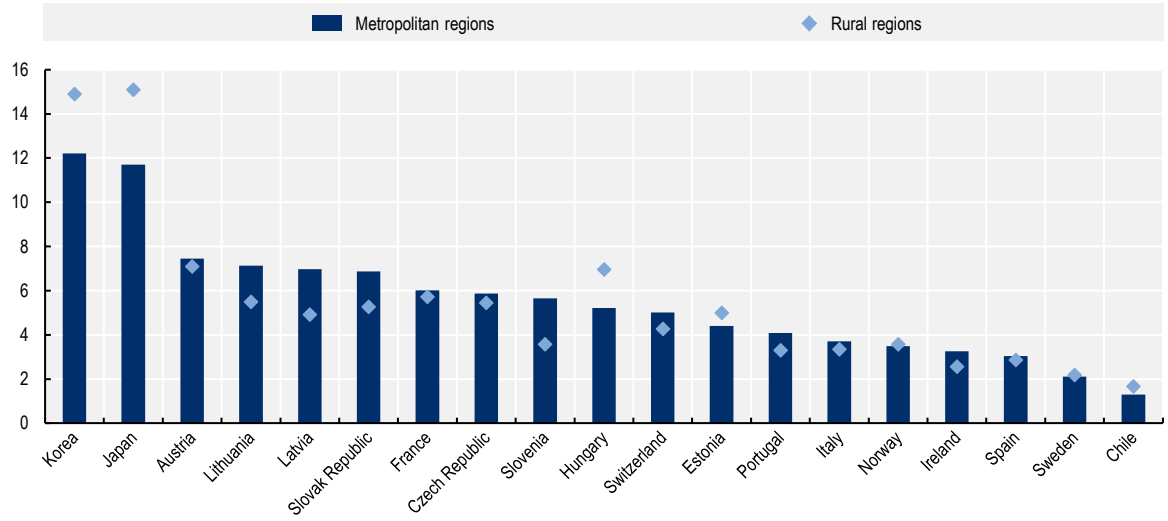
Lower access to facilities and medical professionals

Rural hospitals are critical for the provision of care in rural regions and are indispensable to maintain sufficient care access in many areas. These hospitals provide care for large proportions of the populations in many OECD countries. In the UK, nearly half of the population is served by "small" hospitals (Vaughan and Edwards, 2020[43]). Rural hospitals also provide a wide continuum of care from primary care to long-term care and are important safety nets. In the US per capita, non-metropolitan emergency departments have higher visit rates that metropolitan emergency departments due in part to substandard primary care access (Rural Health Information Hub, 2020[33]).

Still, access to hospital services, as approximated by hospital rates beds, varies widely not only across but also within countries. While Japan and Korea have over 11 beds per 1 000 inhabitants, Chile only has 1.5 (Figure 4.16). In 11 out of 19 countries with available data, hospital bed rates are lower in rural regions compared to metropolitan regions, with the largest gaps observed in small OECD countries (Latvia, Lithuania and Slovenia), and countries badly hit by the 2008 global financial crisis (Ireland and Portugal). In contrast Hungary, Japan and Korea have significantly higher hospital beds rates in rural regions compared to metropolitan regions.

Figure 4.16. Hospital beds rate by type of TL3 region

Number of hospital beds by 1 000 inhabitants, 2018 (or latest year available)



Note: 2017 values for Chile, Estonia, Italy, Latvia and Lithuania.
Source: OECD (2020[44]), *OECD Regional Statistics*, https://doi.org/10.1787/region-data-en (accessed on 15 May 2020).

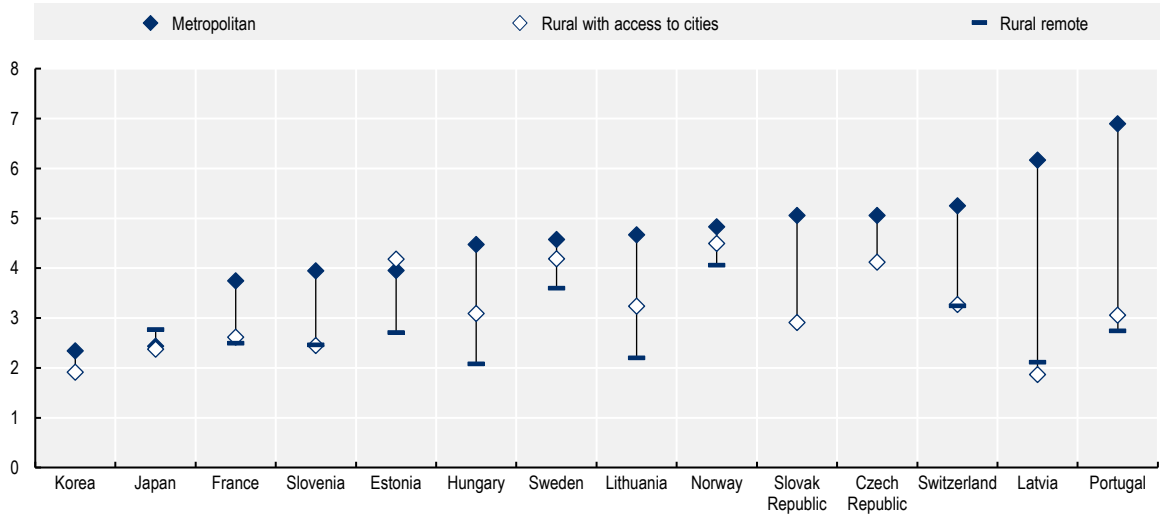
StatLink https://doi.org/10.1787/888934226690

Rural areas have less access to mental health services, which are disproportionally concentrated in urban areas (Gruebner et al., 2017[45]). Still, there is no evidence of significant differences in the prevalence of mental illness between people living in rural and urban areas. Good mental health is vital for people to be able to lead healthy, productive lives but an estimated one in two people experience a mental health problem in their lifetime (Hewlett and Moran, 2014[46]). People who reported mental health problems were significantly more likely to say that their health had a negative impact on their daily life. In France and Norway, more than 50% of respondents who had been told by a doctor that they had a mental health problem felt that their ability to work or carry out daily activities were limited.

In addition to gaps in access to hospital infrastructure, considerable disparities exist in workforce coverage across territories. The distribution of doctors across regions varies widely between metropolitan and rural regions. The number of active physicians per 1 000 inhabitants was lower in rural regions than metropolitan regions in 12 out of 14 OECD countries with available data in 2016 (Figure 4.17). The gap is as large as 3 times more physicians per 1 000 inhabitants in metropolitan regions compared to rural regions in Latvia and Portugal. The difference in access to doctors between rural regions with access to regions and rural remote regions is largest in Estonia, Hungary and Sweden.

Figure 4.17. Active physicians rate by TL3 region type

Active physicians per 1 000 inhabitants in 2016



Source: OECD (2020[44]), *OECD Regional Statistics*, https://doi.org/10.1787/region-data-en (accessed on 15 May 2020).

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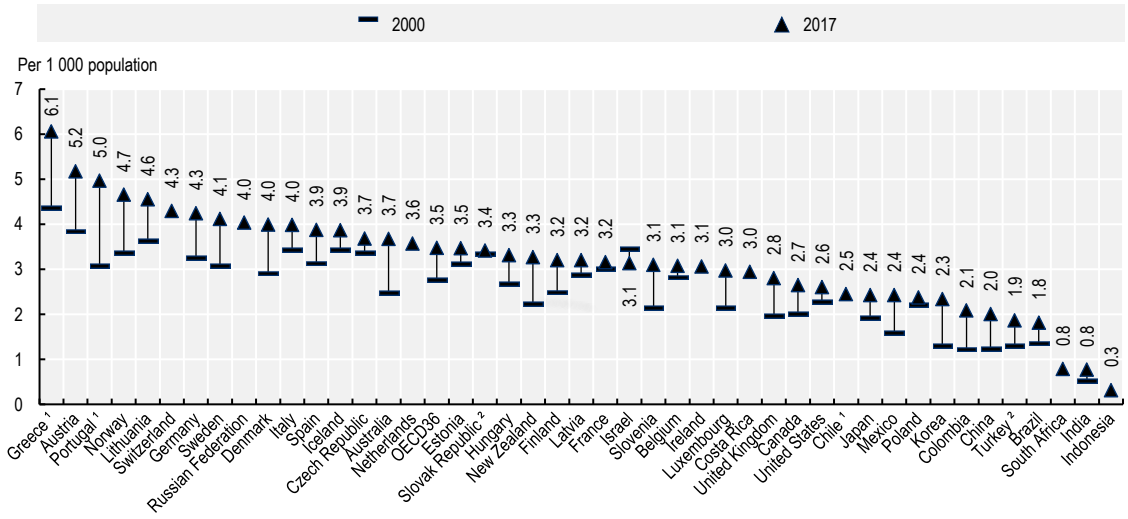
The number of doctors per population served in OECD countries and a decrease in the proportion of primary care physicians across OECD countries has fallen in recent years. On average, across OECD countries, generalists accounted for less than three out of ten physicians in 2017 (Figure 4.18). Furthermore, this share is falling. In Australia, Denmark, Estonia, Ireland, Israel and the UK, the share of generalist medical practitioners decreased by more than 20% between 2000 and 2017 (OECD, 2020[24]). These reductions have resulted in increasing dissatisfaction with care co-ordination and increasing the workload of existing primary care physicians. The current workload for primary healthcare physicians was found to be unreasonable and unsustainable over the longer term in 14 European countries with potential adverse impacts on the quality of patient care (Fisher et al., 2017[47]). The lack of health personnel has been particularly problematic in long-term care as these positions are difficult and relatively poorly paid. This lack of long-term personnel becomes more critical each year and the proportion of elderly in the population grows.

Health workforce issues are amplified in rural areas because jobs in these areas are less attractive and harder to fill to start with. Finding qualified staff is particularly problematic for rural hospitals. Lower salaries, unappealing professional prospects, concerns about prestige or urban-centric medical education can make recruitment for workforce difficult for rural hospitals. Along with short-handed and overburdened staff, this can mean that skill mismatches may occur. For example, emergency departments in rural hospitals in the US are less likely to be staffed by emergency medicine physicians and more likely to be staffed by

non-emergency medicine physicians, such as family medicine or internal medicine physicians (Hall et al., 2018[48]).

Figure 4.18. Practising doctors per 1 000 population

2000 and 2017 (or nearest year)



Note: 1. Data refer to all doctors licensed to practice, resulting in a large overestimation of the number of practising doctors (e.g. of around 30% in Portugal). 2. Data include not only doctors providing direct care to patients but also those working in the health sector as managers, educators, researchers, etc. (adding another 5-10% of doctors). The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en; OECD (2019[38]), *Health Statistics 2020 (database)*, http://www.oecd.org/health/health-data.htm.

The difference in densities of health practitioners can, in extreme cases, lead to so-called medical deserts where the availability of health care is significantly lower than in the general population. These medical deserts are growing in rural areas across a number of OECD countries. In France, for instance, the percentage of the population living with access to less than 2.5 medical visits a year grew from 3.8% in 2015 to 5.7% in 2018.

The differences in workforce densities can have measurable impacts on population health. A recent study in the US showed that an increase of 10 primary care physicians per 100 000 population was associated with a 51.5-day increase in life expectancy across the same population. An increase in primary care physicians was also related to decreases in cardiovascular, cancer and respiratory mortality. Specialist doctors also had a positive but weaker impact and a similar rise in the density of specialist doctors was associated with an increase of 19.2 days of life expectancy (Basu et al., 2019[49]).

Sustainable health costs in rural areas

Constitutional mandates to provide health care to all implies that health systems must take eventual additional costs of providing health care in rural areas into account. The cost of rural health depends firstly on cost drivers of national systems, including increasing technology use, drugs prices, financial incentives and changing disease burdens. Several factors can add to the cost of health care in rural areas, including low population density and more dispersed settlements leading to lower economies of scale, longer ambulance transportation times and financial incentives used to attract health workers to rural areas.

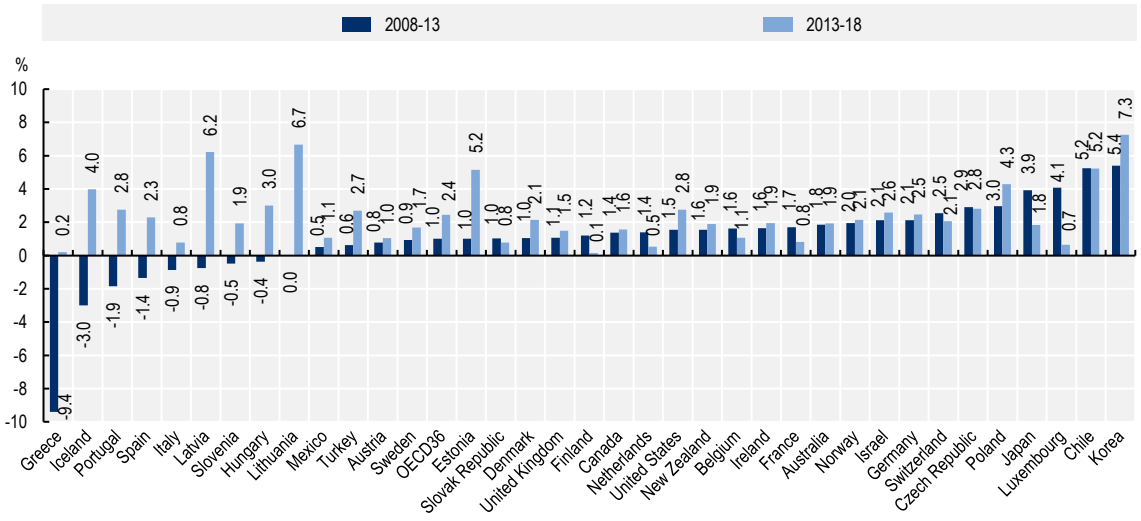
While spending more money for rural care can help increase the equity of the system and ensure the entire population has equal access and quality, it may challenge spending efficiency. The extra costs incurred by rural health make these investments relatively less efficient than those in more urban settings (Palmer, Appleby and Spencer, 2019[50]). On the other hand, underspending on health can have clear impacts on access and performance as the resources necessary to provide good care cost money. The relationship between spending and quality is not always straightforward, however. The US spends more than twice as much on health per capita than the OECD average but life expectancy is below the OECD average and the population coverage for a core set of health services is among the lowest in the OECD (OECD, 2019[3]).

Health expenditures and the impact of austerity measures on rural health

Common measures for assessing the cost of health systems include health spending per capita, health spending as a share of GDP and the number of practising health workers. Health spending can vary greatly across countries and finding the right amount of health spending, and the most efficient areas for this spending, is constantly being assessed (OECD, 2017[51]). Health expenditure accounts for nearly 9% of GDP on average and is projected to increase steadily as populations continue to age and more people live with chronic disease and multi-morbidity. Between 2015 and 2030, health spending across OECD countries is predicted to grow at a pace of 2.7% annually (OECD, 2019[3]). Per capita healthcare spending has increased in all OECD countries between 2013 and 2018, after decreases in 2008-13 in countries badly hit by the 2008 financial crisis including Greece, Italy and Portugal (Figure 4.19).

Figure 4.19. Annual growth in health expenditure per capita (real terms)

2008 to 2018 (or nearest year)



Source: OECD (2019[3]), *Health at a Glance 2019: OECD Indicators*, https://dx.doi.org/10.1787/4dd50c09-en; OECD (2019[38]), *Health Statistics 2020 (database)*, http://www.oecd.org/health/health-data.htm.

Reducing or containing health costs has been a priority for OECD countries and a wide range of strategies to reduce public health expenditure have been implemented across OECD countries (see Box 4.2 for a review of general cost-saving strategies). Reducing health coverage is a relatively straightforward method for cutting health spending. Nevertheless, it can increase inequalities when it targets the most vulnerable population groups. An example are measures to reduce public health care coverage for undocumented foreign nationals that the Czech Republic and Spain introduced following the financial crisis. Reducing the size of the health workforce including providers and administrative personnel can also lower public health

spending. These policies include fixed objectives for staff reductions, non-replacement policies for staff on leave, ending temporary contracts and voluntary redundancies. Finally, reducing hospital capacity including the number of beds also leads to cost reductions. Hospital capacity has been a policy target with cuts to the number of beds in Greece, Ireland, Italy, Portugal and Spain (Mladovsky et al., 2012[52]; Gené-Badia et al., 2012[53]).

Evidence shows that cost-cutting strategies greatly reduced rising health care spending in many countries, including a reduction in total health care expenditure in some (Morgan and Astolfi, 2014[54]). However, they also brought measurable negative impacts on health access, usage and outcomes in many cases. An international survey of 11 OECD countries showed that, on average, around 15% of respondents said that costs stopped them from visiting their doctor, filling a script and/or undertaking a medical test at least once during the 12 months after the crisis unfolded (Schoen et al., 2010[55]). In OECD countries, preventive services are used much less frequently during economic downturns. Unmet health needs are a particularly large problem during times of health cuts, most notably among lower socio-economic groups (van Gool and Pearson, 2014[56]).[2] In the Navarre region of Spain, access was one of the top issue reported by health professionals following austerity measures (Tolosana, 2018[57]). Austerity measures also led to an overall decline in hospital admissions in OECD countries (van Gool and Pearson, 2014[56]).

Austerity can have direct impacts on mortality. Research for Spain suggests that medical staff and hospital bed reductions accounted for a significant increase in mortality rates from circulatory diseases and external causes (Borra, Pons-Pons and Vilar-Rodríguez, 2020[58]). Countries that enacted high health spending cuts also showed significantly higher rates of obstetric trauma with rising unemployment compared to those countries with relatively less spending cuts.

Box 4.2. Direct health cost reduction strategies and their consequences

Direct cost reduction measures focus on maintaining financial sustainability by reducing the public resources available for the system. Strategies to reduce or contain spending have been a focus across OECD countries particularly since the economic crisis of 2008. These include initiatives to pay providers differently, to reduce expensive hospital care, to reduce unnecessary or defensive care, or to negotiate pharmaceutical prices. The years following the 2008 financial crisis also saw a number of measures focusing on reduced health spending through direct measures such as cuts to health budgets or increased cost-sharing.

The most common direct cost-cutting strategy used by governments in OECD countries following the financial crisis was to negotiate reduced prices paid for healthcare goods and services. This strategy was used most heavily for pharmaceuticals. In the years following 2008, Spain reduced prices paid for generic drugs by 30%, Italy reduced these prices by 12.5% and Ireland by 20% to 30%. Ireland also cut prices by 40% for 300 common off-patent drugs (van Gool and Pearson, 2014[56]). Other countries including Greece, Portugal and Switzerland initiated routine reviews to investigate the prices paid for pharmaceuticals.

Governments also reduced wages paid to the health workforce including administrative staff. Several countries including Estonia, Greece, Iceland and Ireland reduced both nurse and salaried general practitioner (GP) wages. In Portugal, rates paid for overtime were cut in half while in Greece, salaries and benefits of health workers were cut by EUR 568 million. In Ireland, professional fees were reduced by 8% in 2009 and a further 5% in 2010 and 2011. In Spain, salaries were cut by 5%-7% for all civil servants, including most healthcare personnel in 2010 (van Gool and Pearson, 2014[56]). While cutting wages and prices for goods allows the maintenance of volume while reducing spending, it created significant unrest in the health workforce and industry in the countries where it was enacted. Furthermore, the long-term impacts may include workforce or supply shortages.

A number of countries re-examined the benefit basket of health goods and services covered by public funding and excluded certain products and services. For example, Estonia ended cash benefits for dental check-ups for adults (van Ginneken et al., 2012[59]). Pharmaceutical reimbursement was also targeted and Portugal delisted some over-the-counter drugs while Greece re-introduced a positive list for pharmaceutical coverage. The Czech Republic also began a review of all medicines covered (Vogler et al., 2011[60]).

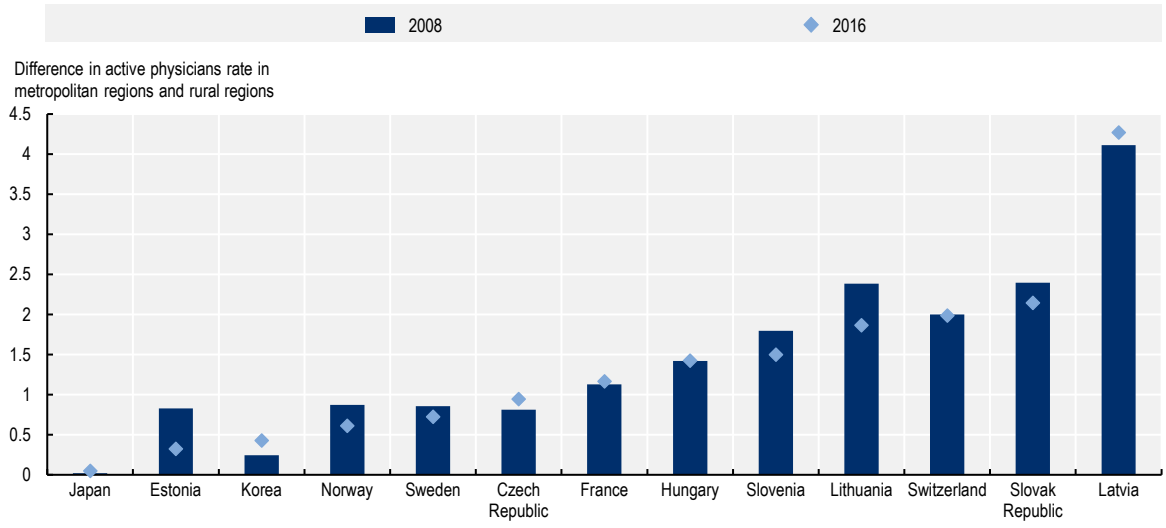
Increased cost-sharing is another form of coverage reduction and one that was very popular following the crisis: Austria and Belgium introduced automatic annual increases in co-payments for pharmaceuticals; France decreased their 35% reimbursement level to 30% in 2011 and Denmark increased co-payments for fertility drugs. Iceland also increased co-payments for prescription drugs in 2010 and again in 2011 (Vogler et al., 2011[60]).

Source: van Gool, K. and M. Pearson (2014[56]), "Health, Austerity and Economic Crisis: Assessing the Short-term Impact in OECD countries", https://dx.doi.org/10.1787/5jxx71lt1zg6-en; van Ginneken, E. et al. (2012[59]), "The Baltic states: Building on 20 years of health reforms", http://dx.doi.org/10.1136/bmj.e7348; Vogler, S. et al. (2011[60]), "Pharmaceutical policies in European countries in response to the global financial crisis", http://dx.doi.org/10.5655/smr.v4i2.1004.

Cost reduction strategies that disproportionally affect the quality of and access to medical professionals and facilities in rural regions contribute to increasing territorial inequalities. Cost-cutting measures had a significant negative impact on health access in many rural regions. Available evidence from European countries shows that austerity measures in health are regressive, as they impact the poor and deprived regions the most (Stuckler et al., 2017[61]) (see Box 4.4 for a discussion of the case of Greece). Policies to reduce the size of the health workforce in Greece, Ireland and Spain led to significant reductions in workforce growth or reductions in absolute numbers (Gené-Badia et al., 2012[53]). Trends for other OECD countries suggest that the gap in access to doctors between metropolitan and rural regions has been persistent since the crisis, especially in countries with significant territorial differences in access such as Latvia, the Slovak Republic and Switzerland (Figure 4.20).

Figure 4.20. Gap in active physicians rate between metropolitan and rural TL3 regions

Active physicians per 1 000 inhabitants. 2008 and 2016



Source: OECD (2020[44]), *OECD Regional Statistics*, https://doi.org/10.1787/region-data-en (accessed on 15 May 2020)

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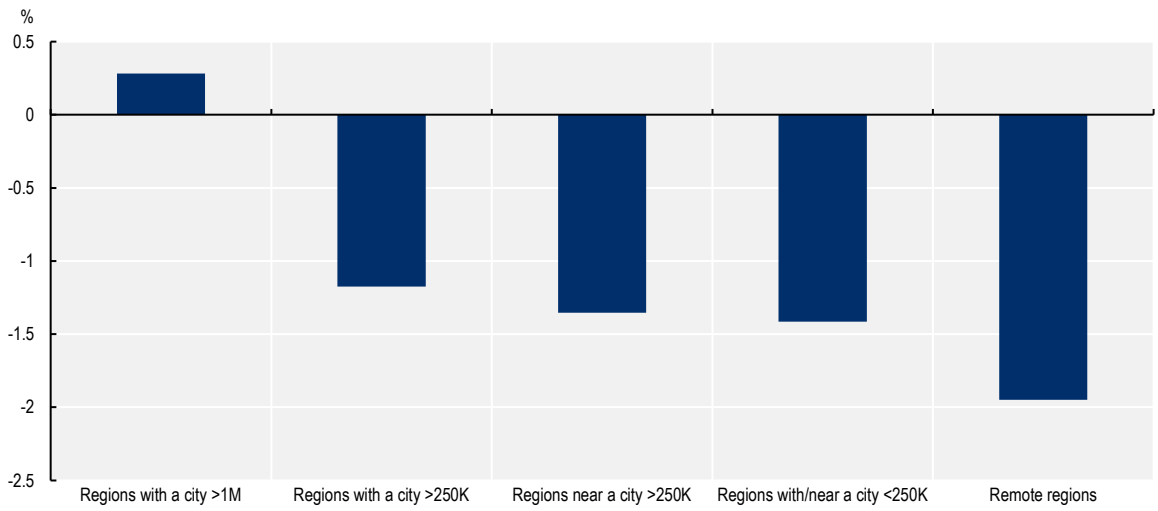
While strategies to reduce capacity have proven to be effective in reducing spending, their negative impacts on access have been felt disproportionally by rural regions. Hospital beds rates decreased in all types of rural regions since the 2008 global financial crisis at an average rate of -0.7% per year, while they slightly increased in metropolitan regions (Figure 4.21). The decrease was largest in rural regions far from large cities (between -1.5% and -2% per year). The reduction in capacity happens in a context of higher workloads of the remaining staff. This has gained meaning with the saturation of hospitals in several regions during the COVID-19 pandemic.

Figure 4.21. Yearly percentage change in hospital beds rate by type of region after the global financial crisis

Beds per 1 000 inhabitants. Yearly change over 2008-18



Source: OECD (2020[23]), *OECD Regions and Cities at a Glance 2020*, https://doi.org/10.1787/959d5ba0-en.

Given the possible effect of direct cost-cutting strategies in augmenting territorial inequalities, countries can also consider other strategies are less impactful in the short term but have the benefit of having a neutral effect on inequality and positive effects on the environment (see Box 4.3).

Box 4.3. Increasing taxation and reducing wasteful spending can reduce health costs

While not a strategy to reduce spending, increasing taxation was also an often-used policy solution to increase the revenue base following the crisis. In 2011, Ireland introduced the universal social charge, a progressive tax of annual earnings to generate more money for health. In Slovenia, measures to improve revenue collection and broaden income categories were introduced to create additional funds. In Portugal, pensioner's tax contributions were increased while Estonia and Greece increased revenue through higher general taxes. Along with general taxes, some specific "vice" taxes on items like cigarettes or alcohol were implemented in countries like France and Hungary. From a health perspective, such taxes can not only raise revenue but reduce expenditure by preventing healthcare costs through reductions of risk behaviours (Sassi, Belloni and Capobianco, 2013[62]).

Finally, reducing "wasteful" spending is a viable alternative to reduce health expenditures with no negative impacts on health access or quality. Wasteful spending is money spent either unnecessarily

or for services and procedures with little to no benefit. This can include a range of categories including unnecessary prescriptions such as antibiotics for viral infections, low-value use of diagnostic equipment such as imaging for lower-back pain, or avoidable care such as healthcare-acquired infections. Wasteful spending makes up a significant proportion of all health spending including an estimated 10% of all hospital spending. Cutting out wasteful spending can be more complicated than direct spending cuts, however, requiring a range of different targets and interventions such as clinical guidelines for medicine and diagnostic use, or procedures for avoidance of patient safety events in hospitals (OECD, 2017[51]).

Source: OECD (2017[51]), *Tackling Wasteful Spending on Health*, https://dx.doi.org/10.1787/9789264266414-en; Sassi, F., A. Belloni and C. Capobianco (2013[62]), "The Role of Fiscal Policies in Health Promotion", https://dx.doi.org/10.1787/5k3twr94kvzx-en.

Financial sustainability of rural hospitals

Two factors drive financial pressures on rural hospitals: the relatively low volumes of patients resulting from low and declining rural populations, and pressures to provide care outside of hospitals arising from the health system. These low volumes mean that the fixed costs of running a hospital make up a greater share of overall costs and that efficiency is lower than in a higher volume hospital. In recent years, these financial pressures have increased with low care reimbursement rates, increased regulation and uncompensated care (Vaughan and Edwards, 2020[43]). The increasing use of diagnostic related groups (DRGs), a system that classifies patients into predefined categories based on their health profiles and pays hospitals according to these categories, has contributed to this financial pressure. Reimbursement rates for DRG classifications do not account for these higher fixed costs inherent in rural care.

Financial pressures, a push to centralise services and minimum quality requirements have led to an acceleration in the closing of numerous rural hospitals that combine high relative costs, low volumes, poorer overall quality and workforce issues. A recent report in Germany has proposed closing half of all hospitals, while in France medical staff are protesting rural hospital closures. In the US, a number of rural hospitals were forced to close in the late 1980s and early 1990s because of insufficient Medicare reimbursement, as the Medicare's Prospective Payment system relied on costs calculated from larger, urban hospitals (Williams and Holmes, 2018[63]). In fact, in the US, more hospitals have closed than opened since 2011, and most closures have concentrated in rural areas. In addition to hospitals closing, rural hospitals are losing services including imaging, obstetric and primary care services in countries such as Australia, Canada and the US (Vaughan and Edwards, 2020[43]). In the UK, the National Health Service (NHS) adjusts payments based on income levels and location, with higher payments made for increasing rurality to help ensure equal access.

Unlike urban areas where the closing of inefficient hospitals may increase patient welfare and result in overall cost savings, the negative impacts on the distance to care, and treatment delays for patients due to hospital closures in rural areas can offset any cost gains (Hsia et al., 2012[64]; McNamara, 1999[65]). Studies on competition also show that rural hospital closings can have negative impacts on the quality of surrounding hospitals through a decrease in competitors (Gaynor, Moreno-Serra and Propper, 2013[66]).

The impact of hospital closures also goes beyond simply providing health care, as rural hospitals are often large local employers and source of community pride. On average, the health sector constitutes 14% of total employment in rural communities, with rural hospitals typically being one of the largest employers in the area. A study in the US showed that the closure of the sole hospital in a community reduces per capita income by 4% and increases the unemployment rate by 1.6 percentage points in the area (Holmes et al., 2006[67]).

The ongoing COVID-19 pandemic has also hastened the closure of many rural hospitals which were already on unsteady financial ground before the pandemic and were unable to sustain the financial shock and even lower volumes due to quarantine periods and patients choosing to delay or forgo care (Fried,

Liebers and Roberts, 2020[68]). Recent research for the US has shown that more than half of rural residents are at high risk of serious illness if infected with SARS-CoV-2, potentially leading to 10% more hospitalisations for COVID-19 per capita compared to urban residents (Kaufman et al., 2020[69]).

Box 4.4. Cost reductions: The Greek case

Greece was one of the countries hit hardest by the 2008 financial crisis and provides evidence of the impact of direct price-cutting measures in health as part of austerity plans.

With public debt exploding in the years following the crisis, Greece agreed to a series of loans from international bodies along with stipulations on reaching fiscal targets. To meet these targets, Greece began implementing extensive public austerity measures including in the health sector.

Between 2009 and 2012, the total health expenditure in Greece decreased by EUR 5.4 billion (23.7%). Major cuts were made to hospital and pharmaceutical spending as well as to salaries and benefits to health personnel. Salary cuts of 12% in January 2010 with a further 8% cut in June 2010 were applied to all public healthcare staff, including administrative personnel, doctors, nurses, pharmacists and paramedical staff.

Other workforce measures aimed at reducing costs include the non-renewal of contracts for temporary staff employed under fixed-term contracts and a reduction in the replacement levels of retiring staff with only one appointment for every five retirees. At the same time, out-of-pocket payments for patients also increased from 27.6% in 2009 to 28.8% in 2012 due to increased cost-sharing measures.

Many of the policy measures introduced under pressure from bailout conditions made health sector financing more inequitable. Public health spending was restricted to no more than 6% GDP with negative impacts on middle- and low-income households. Private health insurance necessary to cover the growing gaps in public coverage were only affordable by certain people creating additional inequalities.

Access became a major concern because of these reforms. Nearly 20% of survey respondents in 2011 reported major problems in accessing public hospitals because of waiting list issues and 28% reported that they could not buy their medicines because of continuing pharmacists' strikes. Measures such as self-reported health, mental health and infectious diseases all worsened during austerity as did reports of unmet medical and dental needs.

Source: Simou, E. and E. Koutsogeorgou (2014[70]), "Effects of the economic crisis on health and healthcare in Greece in the literature from 2009 to 2013: A systematic review", http://dx.doi.org/10.1016/j.healthpol.2014.02.002.

Comprehensive measures to save costs and improve performance in rural areas

While cost-saving strategies are relatively straightforward from a policy side and can be effective in reducing public health spending, they often come at a cost and have led to protest in many communities and professions. In order to maintain high system performance, any possible cost savings of these measures must be balanced with improvements in quality, access and people-centredness.

More recently, reforms focused on strengthening primary healthcare, or increasing care integration have sought to affect not only cost but also improve access and quality. A number of recent reforms in OECD countries are taking this more general approach to fiscal sustainability in an effort to reduce costs while maintaining or increasing overall performance. These reforms include reinforcement of primary care and new models of care such as service integration. Each of these strategies has the potential to improve all

aspects of health systems performance and can be implemented into rural contexts without obvious negative impacts on performance. Some evidence shows that these more holistic and people-centred strategies can result in improvements across all aspects of performance.

Reinforcing primary care

Primary care has become a focus of policy reforms in recent years as it can be cost-saving and responds well to a number of the growing health needs in OECD countries. For instance, access to effective primary care is the backbone of healthy ageing policies, as health promotion and disease prevention services are critical to maintaining the well-being functional abilities in older populations.

Despite the many advantages of strong primary care systems, their potential is not being realised in many OECD countries and their rural areas. In rural areas, reinforcing primary care could be particularly beneficial given the most important health needs in these areas. For example, high-performing primary care can help co-ordinate and manage the growing number of patients with multi-morbidity as well as save costs by reducing unnecessary hospital admissions. A number of OECD countries have recognised the importance of reinforcing primary care and have implemented a wide range of strategies to do this.

Reducing financial barriers and increasing financial incentives for primary care professionals

A direct strategy to reinforce primary care is to reduce financial barriers to its access and spend more on it. Several OECD countries are taking steps to remove financial barriers that impede access to primary health care. These strategies range from making primary health care free at the point of care (as seen in Greece in 2016), to reducing the amount of out-of-pocket payments or setting a ceiling (as seen in Belgium and Iceland in 2017).

A complementary strategy is increasing the incentives for primary health care workers. This may include either better remuneration for those working in the sector or economic incentives based on performance. Economic incentives for performance can take the form of add-on payments where physicians receive additional money for achieving certain targets such as the management of chronic disease, care-co-ordination or early discharge from hospitals. In 2018, 11 OECD countries, reported using specific add-on payments to incentivise care co-ordination, prevention activities or active management of chronic disease. Other countries, such as Chile and the Netherlands, reported using pay-for-performance mechanisms in primary health care.

Patient involvement

Patient involvement is critical to a high-performing and people-centred health system and providing a broader role to patients in primary care is central to many of the current system reforms. Studies have shown that patients who are more involved in their care show better outcomes and experiences (Hibbard and Greene, 2013[71]). Health coaching or counselling is often included in combined lifestyle interventions and give patients the tools to take an active role in managing a chronic condition. Evidence from these interventions shows they can be effective in making important and lasting changes in behaviour including nutrition, physical activity and medication adherence (DeJesus et al., 2018[72]).

Several OECD countries are also turning toward digital tools to help with patient involvement in care. Canada and Finland for example use patient-provider portals to increase communication and allow patient access to their own data and other relevant health data. Such digital tools have the significant advantage of being potentially accessible even in rural or remote areas. Chapter 5 discusses policies for next generation technologies in rural areas in the context of telemedicine.

Shifting responsibilities across health care professionals

Another strategy to improve the performance of primary care is through the shifting of responsibilities. Across OECD countries, there is a mismatch of skills and tasks within primary health care teams to population and patient needs (Frenk et al., 2010[73]). More than three-quarters of doctors and nurses report being overqualified for some of the tasks they have to do in their day-to-day work. Shifting some of these lower-qualification or non-medical responsibilities to other health professionals may provide more time for physicians or highly skilled nurses to devote to more complex medical issues.

A number of OECD countries are trying this strategy by introducing new care co-ordinator roles to focus on providing continuous care across different specialities. These can include co-ordination not only with other parts of the health systems but in a larger well-being sense including with social services or long-term care. In Canada, registered nurses and nurse navigators have an important role in improving co-ordination and continuity of care in the MyHealthTeam model of primary health care. Australia, Estonia, Ireland, Latvia, Mexico, Sweden and the UK are also increasing the role of nurses in primary health care while in Belgium, England (United Kingdom), Finland, Italy and Switzerland, community pharmacists are taking a greater role in health promotion and prevention. During the COVID-19 pandemic, the expansion of pharmacist duties was particularly important in authorising pharmacists to extend prescriptions without a doctor's prescription.

These shifting roles in primary care also include new trends targeted at better serving rural and remote areas to reduce inequalities and increase access. Notably, many OECD countries are increasing the role of nurse practitioners, community pharmacists and community health workers to make up for the lack of doctors in rural regions. In France, the Ma santé 2022 national plan extends the roles of nurses and pharmacists to improve access in underserved areas. It also includes a new profession, Advanced Nurse Practitioner, to work within a primary health care team and manage patients with chronic conditions.

Pharmacists have also been given expanded roles to help with lack of access. In Switzerland, the Swiss Pharmacist's Association (pharmaSuisse) has developed the Netcare programme to face a relative shortage of GPs. Participant community pharmacists provide primary triage using a structure decision tree for 24 common conditions and may manage care in certain circumstances. Recent evaluation shows positive results (Erni et al., 2016[74]), with pharmacists able to resolve around three-quarters of the cases presented to them.

Increase care co-ordination through integrated care

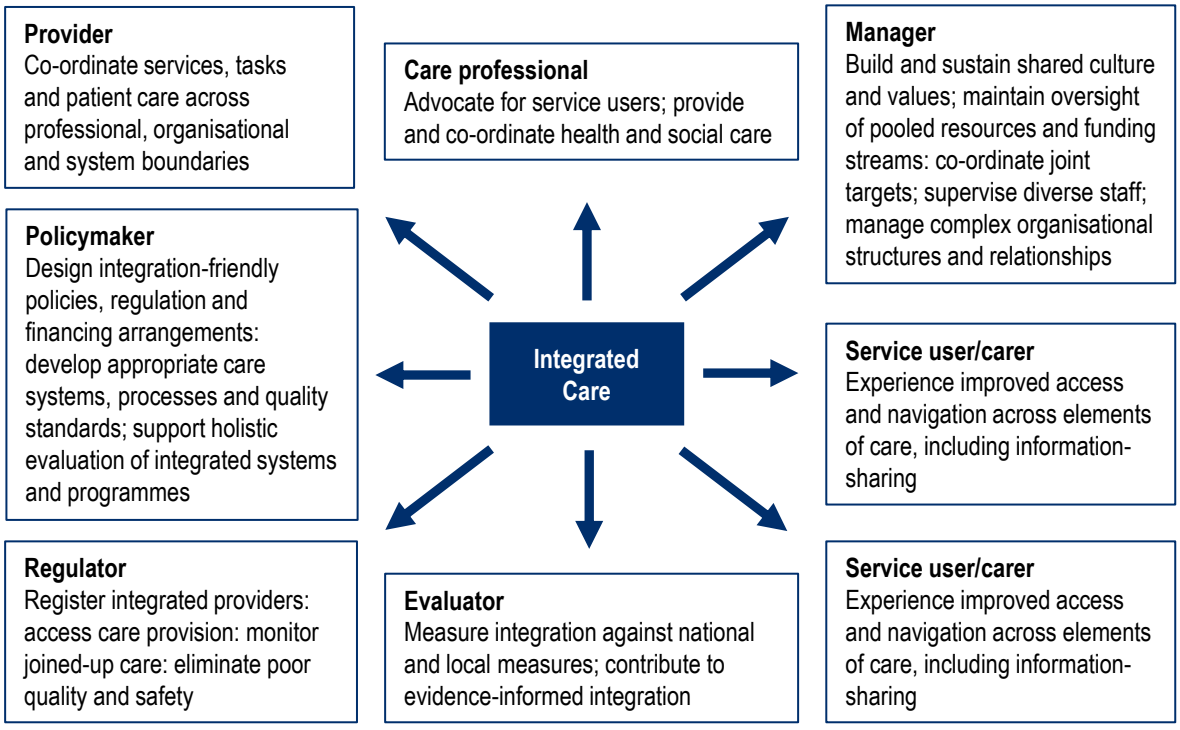
With the rise in multi-morbidity and chronic disease, patient needs and expectations of the health system are changing. Integrated care is a potential policy response to meet these changing needs by increasing care co-ordination while producing cost savings from better health outcomes and increased patient participation.

While no single definition exists, integrated care is an approach focused on filling gaps in care and improving care co-ordination. It seeks to connect services and providers and facilitate movement and communication between them and with the patient. Integrated care is most often used for patients with chronic disease or multi-morbidity who have frequent contact with the health system including different providers. In recent years, a number of different approaches to care integration have arisen in different contexts such as clinical care, disease management and long-term care including home care in OECD countries.

The definition of integrated care can change depending on the perspective within the system. A key component is that the patient remains at the centre of this perspective. Figure 4.22 provides some examples of these changing perspectives. Integrated care is most commonly used with older, sicker populations and the most commonly cited benefits were increased health access. Given the relatively older

and sicker populations in rural areas along with the relatively lower levels of access, integrated care as the potential to be effective in these areas.

Figure 4.22. Perspectives of integrated care



Source: Adapted from WHO Europe (2016[75]), "The Veneto model – A regional approach to tackling global and European health challenges", World Health Organization Europe.

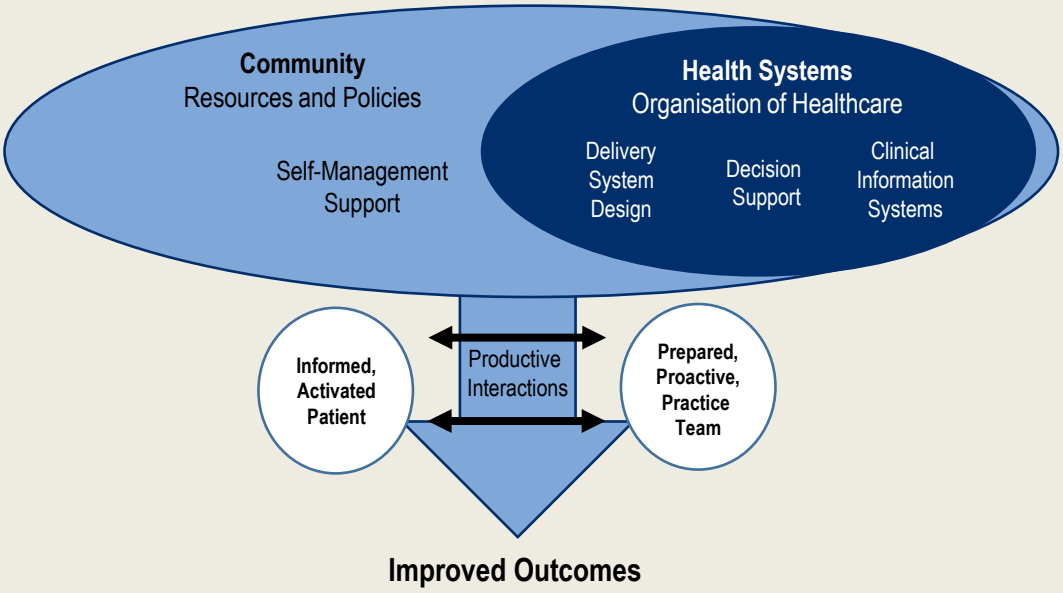
The integration in integrated care can happen in a variety of different ways and on a variety of different levels. Four common classifications include organisational, functional, service and clinical integration. The World Health Organization (WHO, 2016[76]) provides a useful definition of these classifications. Organisation integration can be defined as "bringing together several organisations through co-ordinated provider networks and mergers" while functional integration means "integration of non-clinical and back-office functions through, for example, shared electronic patient records", service integration "integration of different clinical services at an organisational level by, for example, establishing multidisciplinary teams" and clinical integration is defined as "integration of care into a single and coherent process within/or across professions by means of, among others, using shared guidelines and protocols" (WHO Europe, 2016[75]).

Integrated care can also be broken down by model type including the individual, disease-specific and population-based models. See Box 4.5 for more information on disease-specific models. Individual models of integrated care are focused on co-ordination of the care for the individual patient to facilitate appropriate delivery across the system. This usually focuses on high-risk patients with multiple conditions who need care from multiple health actors. Examples of this can include creating an individualised care plan with a care co-ordinator or assigning patients to case managers who manage a patient's care in the system and monitor progress. People-centred medical homes are another example. These organisations combine expertise from a range of health disciplines to provide comprehensive care to patients.

Box 4.5. Disease-specific care models

Among disease-specific models, the most well-known is that of the chronic care model (Figure 4.23). This model focuses on long-term preventive care rather than acute curative care for chronic disease. Within the model are six domains which should work together to support better outcomes including the community, the health system, self-management support, delivery system design, decision support and clinical information systems. Interactions between these domains work together to create a healthy environment and empowered patients.

Figure 4.23. The Chronic Care Model



Source: Adapted from Heerman, W. and M. Wills (2011[77]), "Adapting models of chronic care to provide effective diabetes care for refugees", http://dx.doi.org/10.2337/diaclin.29.3.90.

Disease-specific models of care also exist which integrate care for the elderly and frail or specific diseases such as diabetes. Lastly, a number of population-based models integrating care exist such as that used by Kaiser Permanente, an integrated managed care consortium in the US. This model is based on providing services to the population covered by Kaiser through the use of risk stratification. Patients that fall into different risk categories based on patient characteristics and each category received specific support for health promotion, disease management or care co-ordination. A key to this model is an extensive information system that allows patients and providers to access information to manage care.

Many countries or regions are using integrated care strategies and case managers including the Program on Research for Integrating Services for the Maintenance of Autonomy (PRISMA) model in Canada for community-living individuals with impairment, or for older people living in the communities in regions of England (UK) and Italy. In Sweden, integrated pathways including all levels of healthcare are organised for specific diseases.

The Basque Country in Spain has implemented a number of integrated care principles for care co-ordination and structural integration, including merging hospitals and primary care structures into

Integrated Healthcare Organisations. New roles were also created such as liaison nurses and referral internists to co-ordinate and organise care and follow-up, and a tool has been developed to help chronic disease patients manage their own symptoms. The region in Veneto is also an example of a number of the principles of integrated care (see Box 4.6).

Box 4.6. The Veneto model of health care

The north-eastern Italian region of Veneto has been successful in responding to local health needs through a combination of strengthening primary care, integrating care, increased use of health technology, and increasing patient participation.

The regional health system in Veneto serves 5 million people and like many other OECD regions faces an ageing population and high rates of chronic disease. Roughly 20% of the population in the region is over 65 and 25% of the population lives with a chronic health problem. Despite these pressures, health spending in the region is lower than the Italian and OECD average, the incidence of cancer is decreasing and hospitalisation rates are also lower than average.

These positive results are due to a strong health system based on the principles of participation, healthy financing, integration of health and environment, inter-sectoral strategies and health promotion. In recent years, specific areas for action include primary care, integrating care using information-based assessments and team-based services.

Patient participation is one of the key principals of the system not only in caring for themselves but also in organising the system. The Veneto region organises open meetings with the public to receive ideas to integrate into health plans.

The primary care model is another key to Veneto's success. This model was developed through a participatory process including professionals, voluntary groups and citizens and is organised into GP groups designed to serve around 15 000 people, each providing a medical team with 24-hour support. Linking primary care to hospitals and co-ordinating care is facilitated by the use of local communication points (*centrale operativa territorial*) which use a single information technology (IT) infrastructure to facilitate professional communication. To provide additional co-ordination and facilitate a people-centred approach are care managers which determine patients' needs and preferences and create care guides and actions plans with the patient and GP. Patient satisfaction with the care manager programme was extremely high with nearly 100% of patients noting that they were moderately or highly satisfied with the programme.

System flexibility is another key component of this health system and the needs and resources are constantly monitored and adjusted as health needs change. The region uses the Johns Hopkins adjusted clinical groups system which includes analysing disease, services and cost data to determine the most effective system responses in a timely manner.

Source: Based on WHO Europe (2016[75]), "The Veneto model – A regional approach to tackling global and European health challenges", World Health Organization Europe.

Establishing integrated care is a multifaceted and long-term process. It is therefore difficult to provide systematic evidence of its effectiveness. Furthermore, some objectives of integrated care are not easily measurable and comparison cases and rare. There does exist however some examples of the effectiveness of integrated care in specific situations.

A review of the effectiveness of integrated care across OECD countries concluded that integrated care leads to an increase in patient satisfaction, increased perceived quality of care and increased or improved

patient access (Baxter et al., 2018[78]). Other studies from North America found evidence that case-management and people-centred medical homes can reduce the number of hospital admissions and readmissions and case-management can improve patient satisfaction (Curry and Ham, 2010[79]; Schram, 2010[80]). A recent review of patient quality showed mixed results from integrated care interventions internationally. In general, interventions were typically found to be more effective in improving condition-specific quality of life scores rather than the global quality of life scores (Flanagan, Damery and Combes, 2017[81]). Despite some positive indications on patient-reported measures, the evidence on the impact of care integration on cost and care outcomes remains inconclusive (Marino et al., 2018[82]).

While the impacts of care integration continue to be studied, the WHO recommends the following aspects for successful integration: i) having a regulatory framework that encourages integration and integrated care; ii) having a financial framework that encourages integrated care; iii) providing support to innovative approaches to commissioning integrated services; iv) applying national outcome measures that encourage integrated service provision; and v) investing in continuous quality improvement including publishing the use of outcome data for peer review and public scrutiny (WHO Europe, 2016[75]).

Innovative approaches for sustainable rural health care provision

Policies should focus on reinforcing primary and integrated care, ensuring access to quality health care and requiring the integration of innovative approaches to health care provision. More extensive use of telemedicine and mobile clinics, as well as new forms of hospital and care organisation, such as clinical networks and multi-disciplinary teams, are key to the sustainability of rural health care provision. These strategies have to be complemented with policies for workforce attraction that combine multiple ingredients including financial incentives, multi-disciplinary medical homes and sharing of responsibilities. This section discusses these approaches, while the next chapter goes deeper into how telemedicine services can benefit rural populations.

Exploiting the power of networks to expand and co-ordinate rural care

A number of OECD countries are working to reorganise care and care structures to ensure access to emergency services and prevent further hospital closings. A recent review of eight countries (Australia, Canada, Croatia, Estonia, Italy, Spain, the UK and the US) identified a range of policies in place to ensure rural emergency and hospital care (Rechel et al., 2016[83]). Interestingly, only Italy had a national policy on hospitals in rural or remote areas while the rest either had no specific policy or left these decisions to subnational governments.

The use of rural-specific health centres was noted in both Australia and Canada. These centres provide a wide range of services including emergency services that are lacking in these areas. In the US, smaller rural centres providing emergency care are eligible for specific funding from Medicare. Besides these strategies, the most popular mechanisms for managing hospitals in rural regions involved organising hospitals into networks including the use of a hub-and-spoke model.

Clinical networks

A rural health care network can be defined as a group of three or more rural health providers and/or other stakeholders that join forces to address mutually agreed-upon needs in the community (Rural Health Information Hub, 2020[33]). Clinical networks can be organised for any type of service from primary care to emergency or disease-specific care. The purpose is much like that of integrated care in that it seeks to improve outcomes for complex patient pathways by using an integrated, whole-system approach.

In rural areas, these networks can be useful by combining the resources of several hospitals in order to provide a range of services to the population while seeking cost savings from resource efficiencies in areas such as purchasing or administrative costs. Australia has established emergency medicine networks at

almost all levels. The NHS in the UK also sees hospital networks as a potential solution to the "small hospital problem" while hospital networks are growing in Estonia in order to share resources in a more organised way (Rechel et al., 2016[83]).

Important ingredients for successful clinical networks include visionary and strategic leadership with strong links to external stakeholders and having formal infrastructure and processes to enable the development and management of work plans aligned with health priorities (McInnes et al., 2015[84]).

Hub-and-spoke model

One of the most popular models of clinical network organisation and one perhaps most appropriate to rural care is that of the hub-and-spoke model. This model arranges care into a central "hub" hospital with a wide range of services and skills and small "spoke" hospitals with more limited services that provide basic care when necessary and refer more complex patients to the hub hospital. The advantage of this organisation is to retain the benefits of centralisation in the quality and efficiency of the hub without losing population coverage. Using this model, geographic access can be addressed by adding an additional "spoke" or "hub" hospital in underserved regions depending on the needs. However, the risks of implementing a hub-and-spoke model include: congestion at hubs; overextension of spokes; staff dissatisfaction at spokes; and transportation disruptions (Elrod and Fortenberry, 2017[85]).

As one of the few countries with national legislation on hospital care in rural regions, Italy has established hub-and-spoke models for hospital care. These include four levels of hospitals, each with different capacities and built around a hub hospital with emergency and urgent care departments. Australia has also adopted this model for emergency care as patients are stabilised in smaller hospitals and transferred for more intensive care to larger central hospitals.

The theoretical benefits of hospital networks are many but the literature on the effectiveness and cost-effectiveness of these strategies remains inconclusive. The performance of these strategies is difficult to assess as they apply across a wide range of settings and different outcomes. Some success has been seen however with stroke care using hub-and-spoke models. Models of the financial impact of a hub-and-spoke network using data for the US found that a telestroke network with 1 hub and 7 spokes was associated with annual savings of USD 358 435 or almost USD 45 000 per hospital a year (Switzer et al., 2013[86]).

A review of the literature on clinical networks more generally also found some evidence of effectiveness. Evidence indicated that these networks can be effective in improving quality of service delivery but some studies were limited by poor study design, making it difficult to implement network-wide changes to more complex processes such as care pathways. Qualitative studies also showed some positive impacts of networks provided that they were designed and managed effectively (Brown et al., 2016[87]).

Reorganisation into multi-disciplinary teams

Many OECD countries are reorganising primary care around multi-disciplinary teams. These teams include not only general medical practitioners but may also include family physicians, registered and advanced nurses, community pharmacists, psychologists, nutritionists, health counsellors and non-clinical support staff. This mix of expertise includes access to social services and is particularly important to patients dealing with multi-morbidity.

Common elements of these multi-disciplinary teams are the focus on patient engagement in decision-making and the common use of sophisticated IT systems for risk stratification. The use of multi-disciplinary teams can have significant population health and system performance advantages. In the US, primary care medical homes have been found to improve care quality for a number of chronic conditions (Friedberg et al., 2015[88]; Schuchman, Fain and Cornwell, 2018[89]; Bates and Bitton, 2010[90]), improved patient experience and increased staff satisfaction. See Box 4.7 for an overview of the multi-professional health centres in France.

Box 4.7. Better co-ordination of care: the case of multi-professional health centres in France

In France, Multi-professional Health Houses (*maisons de santé pluriprofessionnelles*, MSP) are multi-disciplinary structures where doctors and medical auxiliaries work in a co-ordinated manner. The idea is to create a space dedicated to the co-ordination of care as close as possible to the population through the sharing of skills. They allow better management of professionals' time, mutualisation of operating costs, greater attractiveness of under-endowed areas and maintenance of local public services. The Health Houses, which are financed from public funds, sign a multi-year contract with the Regional Health Agency (*Agence Régionale de Santé* in French) setting out their objectives and resources before any financial aid is paid out by the agency.

The Health Houses, together with the health centres (*centres de santé*), are a lever for improving access to care, particularly in rural areas and in priority urban policy neighbourhoods, and help to resolve the isolation of certain territories. They are above all local initiatives led by health professionals in conjunction with local elected representatives.

The Health Houses have legal personality and are made up of medical professionals, medical assistants and pharmacists (at least two general practitioners – or one on a temporary basis – and a medical assistant). These health professionals must draw up a health project attesting to the co-ordination of their practice, which must be submitted to the Regional Health Agency.

In 2017, France had approximately 910 Health Houses on its territory. In 2018, 3.2 million patients were treated in Health Houses, an increase of 33% compared to 2017, and 13 096 healthcare professionals were practising in a Health House, an increase of 34% compared to 2017. The enthusiasm for Health Houses should therefore be confirmed in the coming years with the government's objective of doubling their number by the end of 2022. Moreover, this determination has been shown in the "Strategy for the transformation of the health system" announced in February 2018, which clearly gives priority to the exercise of networks and co-ordinated care structures.

Source: Ministère de la Santé (2018[91]), *Les chiffres clés de l'offre de soins*, https://solidarites-sante.gouv.fr/IMG/pdf/dgos_cc_2018_02_16_a_web_pages_hd.pdf.

Multi-disciplinary teams may also have significant scale advantages from lower transition costs, shared inputs such as equipment and human resources or communication technologies, and avoiding the duplication of services (Mousquès, 2011[92]). They have also been linked to lower rates of emergency department visits and fewer hospitalisations for patients with chronic conditions (Schuchman, Fain and Cornwell, 2018[89]; Bates and Bitton, 2010[90]).

Finally, the exchange of information across rural health care actors and providers also needs to be fostered. Strategies such as the establishment of information networks can bring high returns for low investments and, besides increasing co-ordination, can increase the sense of ownership of rural health care actors. Box 4.8 discusses a related initiative in the US.

Box 4.8. Rural Health Information Hub (RHIhub)

The Rural Health Information Hub (RHIhub) is an information centre managed by the Center for Rural Health at the University of North Dakota covering rural health and related issues that have been in operation in the US since 2002. The goal of the hub is to help rural communities access the full range of programmes, funding, research and model programmes that can enable them to provide quality healthcare and promote the health of rural populations. RHIhub's audience includes anyone seeking to improve or maintain healthcare or promote population health in rural areas, including local-level healthcare and public health personnel, along with people working in state and national organisations, and government officials at all levels.

RHIhub provides a rich website of rural information – which can be found at ruralhealthinfo.org – along with a weekly email newsletter and a resource and referral service whereby it assists individuals with finding information and experts to answer their questions on rural health matters. In addition to providing information to rural stakeholders, RHIhub offers an online news magazine covering rural issues, models of what has worked in rural communities, evidence-based toolkits on implementing different types of rural projects, topic guides which serve as primers and bring information together from across the site on a variety of rural health issues, as well as data visualisations, and more. The website is widely used in the US rural health community, receiving over 2 million visits per year in recent years.

RHIhub works closely with a wide network of agencies, experts and rural health practitioners to ensure that the information presented on its site is accurate and as complete as possible. An example is the inclusion of timely information related to opioid use in rural areas, farmers' mental health and most recently, the COVID-19 pandemic.

Source: Presentation of Kristine Sande, associate director at the Center for Rural Health (CRH) at the University of North Dakota (UND) School of Medicine & Health Sciences in Grand Forks at the 24th WPRUR meetings, October 2020; personal communication.

Increasing access in rural areas with telemedicine and mobile clinics

Telemedicine, including teleconsultations, can also improve access by making health care services available to patients closer to their home or work. Available evidence associates telemedicine with improvements in access to care, reduced travelling costs and better equity for rural and Indigenous populations (Caffery, Farjian and Smith, 2016[93]; Atherton et al., 2018[94]; Oliveira Hashiguchi, 2020[95]). Telehealth technologies can provide links between rural hospital and specialist doctors located in other areas thus allowing for high-quality specialist consultations for rural residents closer to home.

These advantages may be particularly beneficial to rural areas with low access and an older and poorer population requiring more co-ordination of multi-morbid conditions. The cost savings of telemedicine can also be substantial. A study for the rural region of North Karelia in Finland finds that increasing self-monitoring and remote consultancy in the treatment of type 2 diabetes (T2D) can reduce health care and travel costs from EUR 2.5 million to 1.1 million (a 56.3% reduction) (Leminen, Tykkyläinen and Laatikainen, 2018[96]).

Telehealth can not only provide greater access to additional services but also greatly increase safe access to quality specialist doctors. This can also have benefits on rural health workers who may experience fewer demands and skill mismatches. Along with specialists, telehealth can be useful in providing diagnostic services or for emergencies such as stroke and in extraneous circumstances on rural hospitals like the ones brought by the COVD-19 pandemic. Chapter 5 discusses telemedicine in the context of digital service provision.

Mobile clinics can also provide services and increase primary care access particular among high-risk or rural populations (OECD, 2019[4]). Mobile health clinics provide a wide range of primary care services (including preventive care, mental health or dental services) from a bus or a van equipped with all of the necessary technology to provide clinical services in underserved or disadvantaged areas. Increased screening, management of chronic diseases and access have already been noted by countries such as France, Latvia, Mexico and the US, which already use mobile clinics. Some rural areas in Germany and Portugal have implemented mobile health clinics to guarantee adequate primary care and help alleviate workforce shortages.

Overcoming workforce shortages

Initiatives to increase the performance of health systems including integrated care, primary care or even increased use of telemedicine cannot be effective without an adequate health workforce. Finding the right numbers of health workers with the right skills for current and future challenges has been difficult for many OECD countries facing an ageing health workforce, increased demands and changing skillsets. A wide range of strategies has been put in place to help improve this situation particularly in rural areas where workforce numbers are low.

Foreign recruitment

As the need for health providers rises, many OECD countries have turned heavily toward foreign recruitment as a tool to fill open positions. This strategy has proven to be effective and among the 18 OECD countries for which data are available from 2010/11 to 2015/16, the number of foreign-born doctors rose by over 20% or twice as much as the general growth rate in the number of doctors. As a result, the proportion of foreign-born doctors across these OECD countries rose by 3 percentage points to 27% in 2016. A similar trend can be seen for nurses with the number of foreign-born nurses increasing by 20% over the same period, bringing their share of the total nurse population to 16% (OECD, 2019[97]).

While foreign recruitment has helped to meet the rising demand for doctors in many OECD countries, others are on the opposite end of this migration including many in Eastern Europe. Countries such as Estonia or Lithuania with high rates of migration face shortages due to this migration and are working to prevent uncontrolled migration (WHO, 2006[98]).

Educational reforms

Along with foreign recruitment, education reforms are some of the most commonly used strategies to respond to the need for health workers, particularly in rural regions. A number of OECD countries have included provisions to admit medical students from rural regions. The expectation is that these students will be more likely to return to practice in rural regions following graduation. Australia and Japan, for example, have fixed minimum quotas for students with a rural background, sometimes accompanied by financial support provided to these students.

Often medical schools are located in urban centres and new doctors remain in these areas after graduation (OECD, 2016[99]). In Canada, Japan and Norway, medical schools have established medical schools in rural or remote regions, with the expectation that more students graduating from these schools would remain in these regions afterwards. Additional education strategies to encourage rural medical practice can include clinical rotations, placements in rural regions, coaching or mentoring of students, and adaptation of curricula for rural health workers (EC, 2015[100]).

Financial incentives

Providing financial incentives for practising in rural regions is another popular strategy to improve recruitment and retention. This can include lump-sum payments to facilitate installation and/or recurrent payments or bonuses such as general salary increases. In Germany, most states offer financial incentives for GPs who are opening their practice for the first time, with GPs eligible to a higher payment if they choose to locate in underserved areas. In Australia, the recent Workforce Incentive Program provides financial support for both individual doctors practising in rural or remote regions as well as general practices operating in these areas. These incentives grow as population density decreases and as the number of years of practice in these areas goes up. Box 4.9 discusses details on policies to attract doctors to rural areas in Germany and Australia.

Box 4.9. Incentives for rural doctors in Germany and Australia

The Care Provision Strengthening Act in Germany

Launched by the German federal government, the Act to Strengthen Care Provision in the Statutory Health Insurance System (Care Provision Strengthening Act) came into force in July 2015 and took effect at the beginning of 2017 with the aim of establishing integrated care programmes and providing easily accessible, universal and needs-based medical care.

The main objective of this act is to ensure an adequate supply of doctors in both urban and rural areas. More specifically, it seeks to strengthen the role of family doctors and reduce the pressure on doctors by delegating certain medical services to qualified non-physician professionals as practice assistants. In addition, hospitals in underserved areas have been able to assume more responsibility for medical care. An innovation fund has been put in place at the Federal Joint Committee, endowed with EUR 300 million annually (initially from 2016 to 2019), with the aim of promoting innovative care structures, facilitating inter-sectoral co-operation among care providers, reducing administrative barriers for integrated care programmes (ICPs) and stimulating evaluation and research in the delivery of healthcare services such as telemedicine or the provision of care in rural areas (EUR 75 million have been reserved for this section) (EC, 2016[101]).

The act includes two measures to encourage physicians to settle in rural areas. First, German social health insurance (SHI)-accredited doctors' associations are implementing a series of measures to promote settlement in under-endowed areas or areas threatened by underuse. These measures include the organisation of counselling services and business start-up seminars, the introduction of security allowances, investment cost allowances and settlement allowances for the establishment or takeover of practices and branches, as well as turnover guarantees. Second, it includes measures to strengthen the training of physicians in rural areas. SHI doctors' associations have supported the implementation of clinical internships as well as residency periods in rural areas. The same associations have also granted scholarships to medical students who have undertaken to work in rural areas with the support of local and state governments and introduced a "rural doctor quota" linking the allocation of study places to future employment in rural areas (a commitment of 10 years after their studies is required at the risk of paying a fine of EUR 250 000) (Milstein and Blankart, 2016[102]; Ärzteblatt.de, 2020[103]).

Providing financial incentives for rural doctors in Australia

Implemented in early 2020, the Workforce Incentive Program (WIP) provides targeted financial incentives to both doctors and general practices to encourage service delivery in rural and remote areas. The WIP seeks to address workforce maldistribution and give patients in rural and remote areas improved access to quality medical, nursing and eligible allied health service.

Financial incentives are based on both the level of rural/remoteness and the number of years providing service with increasing years and remoteness leading to higher payments. Doctors providing care in the most remote areas are eligible to receive an annual payment of up to AUD 60 000. Eligible medical practices can receive incentives of up to AUD 125 000 per year depending on the practice size and hours worked by professionals in the practice. In addition to the WIP, a rural loading between 20% and 50% is applied to incentive payments to practices depending on the level of remoteness. A special focus of the WIP is strengthening team-based and multi-disciplinary models of care enabling collaborative arrangements to better support community needs.

Source: EC (2016[101]), *Germany: Health Care & Long-Term Care Systems*, https://ec.europa.eu/info/sites/info/files/file_import/joint-report_de_en_2.pdf (accessed on May 2020); Milstein, R. and C. Blankart (2016[102]), "The Health Care Strengthening Act: The next level of integrated care in Germany", https://doi.org/10.1016/j.healthpol.2016.04.006 (accessed on 15 May 2020); Ärzteblatt.de (2020[103]), "Landarztquote in Baden-Württemberg wird konkret", https://www.aerzteblatt.de/nachrichten/116826/Landarztquote-in-Baden-Wuerttemberg-wird-konkret.

Shifting responsibilities

Shifting responsibilities for medical professionals is another way to overcome workforce shortages. Expanding the responsibilities of local nurses and other local health workers can alleviate a shortage of doctors in rural areas. This approach is referred to in the Care Provision Strengthening Act in Germany law, discussed in Box 4.9. Along with increasing the professional health workforce, some countries are recognising and encouraging the contributions of informal caregivers such as family members. In Australia, Germany and the UK, financial incentives for these informal caregivers are in place.

Combining strategies

Rather than individual strategies, evidence shows that the most effective approach to the issues of rural workforce shortages is to combine strategies (EC, 2015[100]). For instance, in 2012, the French Ministry of Health and Social Affairs launched the Health Territory Pact to promote the recruitment and retention of doctors in underserved areas. This pact includes a wide mix of measures to encourage the establishment of young doctors in underserved regions including financial incentives, the creation of new multi-disciplinary medical homes allowing physicians and other health professionals to work in the same location, the promotion of telemedicine and a sharing of responsibilities with other local health care providers (OECD, 2016[99]).

Conclusion

This chapter outlined a number of potential strategies to bring a place-based approach to improving the performance of the health system and adapt to the higher and increasing demand for health care in rural communities. Place-based policies focusing for instance on improving primary care in areas with low accessibility can have positive trickle down effects on the health system through reduced needs for more complex and costly interventions. From a national perspective, while investments in rural health must be aligned with potentially competing health system goals, place-based policies can not only help reducing inequalities, but can also represent cost savings for the health system at large.

The majority of OECD countries include the idea of equity in their guiding principles for constructing health systems. This idea is also included in the majority of evaluation frameworks for the performance of health systems as well as integrated into the idea of universal health coverage. Equity in health is the idea that the entire population should have a fair opportunity to be healthy regardless of factors such as income or gender. Efficiency is also a guiding principle of health system performance that supports health systems

providing the maximum amount of health goods or maximising good outcomes. In rural areas, these two principles can come into conflict. Following the principle of equity would mean providing health resources close to patient homes even in the most remote areas. The principle of efficiency would deem this health provision inefficient due to the fundamental inefficiencies of providing healthcare in these areas.

Countries have adopted different approaches to this dilemma. The Australian government has spent considerable resources toward maintaining a basic level of medical care in remote regions from financial incentive to special training programmes. In other countries such as Spain where rural and non-rural health disparities are less pronounced, the density of the population is not even considered in the hospital classification systems. In Canada, stipulations that hospital care must be provided without financial barriers and on uniform terms and conditions has been interpreted to mean that rural and remote residents do not have a right to immediate local access but reasonable access to hospital care located elsewhere. In the UK, the NHS recognised the fundamental inefficiencies of rural care and has developed a financial system to maintain access despite this extra cost.

A direct approach to increase the efficiency of health care provision is to reduce expenditures by cutting coverage and workforce. The available evidence suggests that the measures introduced as part of reforms following the global financial crisis of 2008 led to increases in inequality in the provision and worsening of health care outcomes in rural areas. A more nuanced approach would combine direct cost-saving strategies with multiple strategies to increase the scale and scope of healthcare provision in rural areas, such as the introduction of clinical networks and hub-and-spoke models of provision. These strategies will be in vain without active and continuous efforts to overcome workforce shortages in rural areas that combine multiple strategies including financial incentives, educational reforms and rethinking health care provision and the organisation of medical teams.

Finally, the geographically disaggregated data needed to do a proper evaluation of the provision of quality health care in rural areas is currently not complete. While this chapter tried to combine national data with available statistical evidence for regions and rural areas, it also identified the need for better territorial statistics on all aspects of health care: quality, cost and access.

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Notes

[1] In a recent review of the impact of hospital size on quality outcomes in OECD countries, authors removed over 40% of hospitals from the analysis because the case numbers were insufficient to merit comparison (Lalloué et al., 2019[28]).

[2] Unemployment had a variable impact on hospital admission depending on the severity of austerity measures: countries with moderate cuts were still able to provide care to those who needed it (the unemployed) while those with higher cuts lacked this capacity countries (van Gool and Pearson, 2014[56]).

5 Unleashing the potential of digital services in rural communities

While providing digital services has the potential of overcoming distance barriers, the availability and scope of education and health care digital services is directly affected by lower quality broadband connections in low-density areas. This chapter examines how current digital provision of education and health services can address the challenges of rural areas, while assessing technological and digital barriers to this provision such as the broadband connectivity gaps or the need for digital skills. The chapter also illustrates the advantages and drawbacks of current and emerging broadband technologies. Finally, the chapter sheds light on several strategies deployed by OECD governments in order to improve rural connectivity and expand broadband to low-density rural areas.

Introduction

The cost of service provision in physical facilities increases with the degree of remoteness and sparsity. Lower density means higher transportation costs, loss of economies of scope and economies of scale, and greater difficulty in attracting and retaining professionals (e.g. health care professionals). Population ageing and decline in rural areas will accentuate these factors, as populations become sparser and less mobile. In this context, new technological advances have opened the door to providing quality services in new forms and substituting physical forms of delivery with virtual ones. Digital provision allows decoupling service provision from specific locations, greatly improving access to services such as education or health care.

The digital provision of services is a fast-moving field. For example, early models of telemedicine where one could access health practitioners over the phone have now been complemented by videotelephony, advanced diagnostic methods and in-home care support and monitoring. Advanced imaging and health informatics have ballooned as have the application of these approaches. Looking ahead, technological innovations including artificial intelligence and the Internet of Things (IoT) promise a vast array of new capabilities with potentially transformative impacts for the economy and society (OECD, 2018[1]) while demanding ever-faster connections.

The availability and affordability of fast, reliable connectivity – and the equitable distribution of that connectivity across the terrain – is a key consideration for improving the provision of services, not just to enable digital tools for the delivery of public services but as a fundamental underpinning of national economic and social well-being going forward. Moreover, the uptake of emerging technologies requires professional training, reskilling and capacity building at local levels. Besides investments in physical infrastructure, there is a need for resources to integrate these systems into standard service delivery models and to ensure that the potential of digital technologies is fully exploited.

This chapter reviews current service provision efforts using digital tools across OECD member countries. Specifically, it looks at how governments are using the digital provision of education and health services as one way to meet the challenges associated with low-density terrain while discussing technological and other barriers (e.g. skills gaps) to this provision and mitigation strategies for these. Given the vital role of connectivity in the delivery of these services, the chapter also reviews the specific challenges that impede connectivity in rural places and offers a review of current and emerging broadband technologies, to better understand the advantages and drawbacks of each one, as well as how these technological constraints need to be factored into digital service design. Finally, it looks at a range of strategies deployed by OECD governments in an effort to improve rural connectivity, to examine how each of these works and identify some particularly effective approaches.

Digital provision of education and healthcare

Three conditions must be met in the transition to digital services including telehealth and distance learning: access to the Internet, the right technology and the skills needed to use it. The possibility to offer educational and health services digitally has been available for quite some time. Today's digital tools offer myriad capabilities, including rich interactive experiences and high-definition multi-channel video communication, but these capabilities demand connections that are thousands of times faster than in the early days of digital services. The COVID-19 restrictions to mobility brought to light not only the huge potential of distance learning and telemedicine for addressing provision gaps but also the broadband connectivity gaps rural and remote areas face. This section reviews the current state of distance learning and telehealth, including recent developments following COVID-19 restrictions.

Unlocking funding, skills and connectivity barriers to distance learning in rural schools

As early as 1960, the United States (US) government was funding the development of the PLATO system, which became the world's first e-learning system that sought to scale up the supply of mathematicians and engineers at the dawn of the space age (see Box 5.1). Since then, several initiatives have been put forward to support technology-enhanced learning in rural schools:

- The Chilean "Enlaces" programme for teachers' information and communication technology (ICT) skills and ICT use in the classroom has a dedicated component tailored to support technology-enhanced learning for rural schools. Given the potentially higher cost of training rural teachers, the programme provides training in a more concentrated form at certain times of the year (OECD, 2019, p. 58[2]). Through the programme, rural schools in Chile could also access digital teaching materials and benefit from improved technological infrastructure. For more than 2 000 schools with limited Internet access, offline digital resources were provided through a complementary programme (Santiago et al., 2017, p. 132[3]).
- In Ontario (Canada), the 2016 budget explicitly committed to fostering equitable and affordable access to high-speed broadband Internet in schools to support distance learning as well as the delivery of well-being and mental health services. E-learning resources allowed students to engage in blended learning or even take courses fully online, for example through a digital library of materials related to the curriculum as well as a virtual learning environment (Ontario Ministry of Education, 2017[4]). More recently, Ontario has launched a Broadband Modernisation Programme (2020-21) that aims to modernise distance learning opportunities and support access for students to the virtual learning environment wherever educational resources are available.
- In Quebec (Canada), the project Networked Schools (*L'École en réseau*) allows students and teachers in small and remote schools to learn and collaborate via ICT tools such as video-conferencing, enabling the formation of learning communities and augmenting pedagogical approaches (CEFRIO, 2011[5]).
- In Spain, the ProFuturo initiative, an educational programme launched by the Telefónica Foundation and "la Caixa" in disadvantaged areas, is based on five pillars: teacher training, provision of digital platforms and equipment, technical and pedagogical support, community awareness and monitoring evaluation. After the emergence of the COVID-19 pandemic, ProFuturo designed resources for teachers (a digital learning platform with 160 courses and 2 800 hours of free training in different languages), students (1 600 additional hours of content in language, mathematics, science, technology and life skills to continue learning from home) and institutions (opening student content to organisations with common objectives). ProFuturo currently works in 38 countries and has 450 000 teachers and 11.5 million beneficiaries.

Box 5.1. PLATO, the first e-learning tool

The PLATO (Programmed Logic for Automated Teaching Operations) system, developed at the University of Illinois (University of Illinois[6]), was a mainframe/terminal-based e-learning tool that delivered automated classes in a variety of subjects to students from kindergarten through to university. From the 1960s through to the arrival of the personal computer (PC) in the 1980s, PLATO was used to educate tens of thousands of students across the US and internationally. These tools have always relied on connectivity; PLATO's terminals communicated with their mainframe using a connection that transferred 1 200 bits per second (Britannica[7]), enough to enable teaching materials that used simple graphics and text.

Source: University of Illinois (n.d.[6]), *PLATO – Illinois Distributed Museum*, https://distributedmuseum.illinois.edu/exhibit/plato/ (accessed on 11 August 2020); Britannica (n.d.[7]), *PLATO, Computer-based eEucation System*, https://www.britannica.com/topic/PLATO-education-system (accessed on 11 August 2020).

Resources, skills and connectivity gaps limit the potential of distance learning

Digital technologies can be a key lever for enabling quality distance learning but are limited by rural-urban gaps in ICT resources in schools and beyond (Trendov, Varas and Zeng, 2019[8]). For instance, rural schools tend to have, on average, more computers per students than city schools but they are less frequently connected to the Internet across OECD countries (Figure 5.1).

Local capacity in effectively scheduling and delivering distance courses to support all students is key to distance learning, beyond immediate Internet connectivity issues (OECD, 2018, p. 162[9]).

Figure 5.1. The rural-urban gap in schools' material resources

Based on school principals' 2018 reports.

Rural schools **better** equipped than **city** schools

No statistically-significant difference

City schools **better** equipped than **rural** schools

	Shortage of educational material	Number of available computers per student at modal grade	Share of computers connected to the internet
Australia			
Austria			
Canada			
Switzerland			
Colombia			
Czech Republic			
Spain			
Estonia			
Greece			
Hungary			
Iceland			
Lithuania			
Latvia			
Mexico			
Poland			
Portugal			
Slovak Republic			
Slovenia			
Sweden			
OECD average			

Note: Shortage of educational material is measured by an index based on school principals reports about the extent to which their school's capacity to provide instruction is hindered ("not at all", "very little", "to some extent", "a lot") by a shortage or inadequacy of physical infrastructure, such as school buildings, heating and cooling systems, and instructional space; and educational material, such as textbooks, laboratory equipment, instructional material and computers. No statistically significant differences in any category in Chile, Denmark, Finland, France, Ireland, Israel, Italy, Norway, New Zealand, the United Kingdom (UK) and the US.

Source: OECD (2018[10]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020); adapted from Echazarra, A. and T. Radinger (2019[11]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://doi.org/10.1787/8b1a5cb9-en (accessed on 6 August 2019).

Distance learning requires the development of several new digital skills in students, including managing and operating software, communicating and researching with ICT, and being mindful of changing and complex intellectual property and security protocols. While some countries like Australia have developed

specific frameworks, promote digital skills beyond the classroom and track progress in skill development, in many countries, the development of digital skills in schools has relied primarily on ICT or computational science classes (see Box 5.2 for more on the framework for digital competency of Australia).

Box 5.2. The Australian Curriculum, Assessment and Reporting Authority (ACARA)

At the school level, an example of a framework for digital competency is the one put forward by the ACARA. Students who develop an ICT capability are students who "learn to use ICT effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively in all learning areas at school and their lives beyond school" (ACARA, 2015[12]).

For ACARA, ICT capability development is organised around several dimensions: managing and operating ICT (e.g. managing data, selecting and using software), communicating with ICT, creating with ICT (e.g. using ICT to generate ideas or manage digital solutions for issues arising in learning activities), investigating with ICT (e.g. finding and analysing information, verifying sources and reliability of digital data), and applying social and ethical protocols and practices when using ICT (e.g. recognising intellectual property, applying personal security protocols).

Students' proficiency is assessed in all these dimensions and across all school years since the development of ICT capability is considered as a learning continuum. At the same time, ICT capability supports student learning in all subjects covered by the curriculum, for instance by using digital tools to create artwork, looking for and critically analysing online information about historical events or investigating mathematical concepts using multimodal technologies. A digital technologies learning area is also part of the curriculum, focusing specifically on "understanding the characteristics of data, digital systems, audiences, procedures and computational thinking" (ACARA, 2015[12]).

The framework developed by ACARA is an example of a progressive move from developing digital skills as part of stand-alone ICT classes, to a more comprehensive approach fostering digital skills in other learning areas.

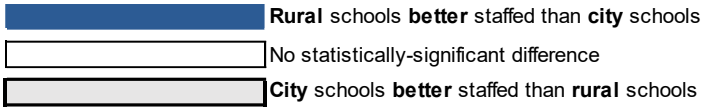
Source: ACARA (2015[12]), *Information and Communication Technology (ICT) Capability*, https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/information-and-communication-technology-ict-capability/ (accessed on 15 May 2020).

Beyond students' digital skills, the adoption of distance learning will also require a dramatic increase in ICT training for teachers in rural areas. As Chapter 2 showed, rural areas in most countries in Europe considerably fall behind in the share of individuals living in rural areas with basic or above digital skills compared to individuals living in cities. The need for training in the use of ICT for teaching was recognised as the second most important need identified by teachers in OECD countries even before the COVID-19 pandemic (OECD, 2020[13]). This context calls for policy efforts to help integrate the specific needs of rural teachers into technological products and services.

Digital tools can support the delivery of much-needed ICT training for teachers in rural areas. According to the latest OECD Education Review, only 36% of lower secondary teachers report participating in online courses or seminars, less than half the share participating in courses or seminars in person. The case of Korea, where over 90% of teachers report undertaking online professional development, shows that there is great room for improvement in the digital provision of ICT training for teachers (OECD, 2020[13]). Closing ICT skills gaps among teachers in rural areas requires special attention to their professional development. Data from PISA 2018 on teaching staff gaps between rural and urban schools show that city schools have significantly higher shares of teachers participating in professional development compared to rural schools in six countries (Figure 5.2).

Figure 5.2. The rural-urban gap in teaching staff

Based on school principals' 2018 reports



	A lack of teaching staff	Inadequate or poorly qualified teaching staff	Share of fully certified teachers	Share of teachers participating in professional development
Australia	City better	City better		
Austria			City better	City better
Bulgaria	Rural better	Rural better		
Canada		Rural better		
Switzerland				City better
Chile				
Colombia	City better	City better		Rural better
Estonia	Rural better		Rural better	
Finland				
France			Rural better	
Greece	City better			
Hungary				City better
Ireland	City better			
Iceland		City better	Rural better	City better
Italy			City better	
Lithuania	Rural better			
Latvia	Rural better	Rural better		
Mexico				City better
Norway	City better			
New Zealand	City better			Rural better
Poland			Rural better	
Portugal		Rural better		
Slovenia	Rural better	Rural better	City better	City better
United States	City better			
OECD average	City better	City better		

Note: No statistically significant differences in any category in the Czech Republic, Denmark, Israel, Spain, Sweden and the UK.
Source: OECD (2018[10]), *PISA 2018 Database*, https://www.oecd.org/pisa/data/2018database/ (accessed on 15 May 2020); adapted from Echazarra, A. and T. Radinger (2019[11]), "Learning in rural schools: Insights from PISA, TALIS and the literature", https://doi.org/10.1787/8b1a5cb9-en (accessed on 6 August 2019).

The limitations of distance learning due to connectivity problems may affect not only students in rural and remote areas but also rural schools, as the case of Spain illustrates: estimates of the Association of Secondary School Principals in Madrid show that 90% of schools do not have a sufficient high-speed Wifi network to ensure multiple connections in classrooms and quality interaction with students confined to their homes. The cost of installing such a network in a school in Madrid has been estimated at around EUR 10 000 (Lucas, 2020[14]). These issues and the cost of fixing them extend to rural areas with limited broadband connectivity.

The COVID-19 pandemic stressed the need to overcome barriers to distance learning in rural areas

The COVID-19 pandemic took almost 1.6 billion children out of school in more than 190 countries worldwide, which affected over 94% of the world's student population (UN, 2020[15]). The risks of exclusion and dropping out of school exploded as the resources needed to learn properly from home, such as online courses, video classes and electronic textbooks, are insufficient for many pupils. The distribution of Internet access and its quality, access to equipment (tablets, laptops) and the existence and use of online distance learning platforms determines who benefits and who suffers from switching education to distance learning.

The switch to distance learning following COVID-19 restrictions came even as resources in schools were deemed insufficient, especially in disadvantaged households. Before the crisis, a quarter of school principals on average in OECD countries indicated that they did not have sufficient digital technology for teaching. In the UK, almost a third of disadvantaged students reported not having adequate resources and a suitable environment to study from home while schools were closed. Pupils spent an average of only 2.5 hours a day on school activities during the pandemic and 71% of them received a maximum of just 1 online lesson a day (Green, 2020[16]).

Even in countries with a strong technology base, distance learning was little exploited during COVID-19 restrictions because technology is not necessarily perceived as an educational tool. For instance, Japanese schools were not as keen to embrace distance learning during COVID-19 restrictions compared to what their technology availability would suggest. This was due to low use of computers at school, low skills of students (e.g. eighth graders are able to input only 17.4 characters per minute), lack of instructions from education councils, lack of initiative by local schools and cultural reasons such as the importance of looking in the eyes of ones' interlocutor (Daisuke, 2020[17]).

The COVID-19 restrictions will likely have a disproportionate impact on the performance and cognitive skills of the low-income pupils and likely widen already large territorial gaps. As a recent study reports, primary school students in the Netherlands made little or no progress from home during the eight-week school closure (Engzell, Frey and Verhagen, 2020[18]). Students from less-educated homes bore the brunt in terms of skill losses, with 55% larger losses for students with parents in the lower educational categories. In the UK, socio-economic skills gap could grow by 30% as a result of the COVID-19 pandemic, partly because working-class children are less likely than middle-class children to be helped at home by their parents (Cullinane and Montacute, 2020[19]),. This decline in human capital brings negative consequences on long-term economic opportunities: a learning loss of 0.2 standard deviations (1 SD = 100 PISA scores) can translate into a decrease of 2.6% in future income and a decrease in 0.86% in the probability of finding a job (Maldonado and De Witte, 2020[20]).

Other studies carried out following the closure of schools showed more positive results. In November 2020, an evaluation by the French Ministry of Education of the performance of more than 810 000 sixth grade students (Ministère de l'Éducation, 2020[21]) showed no difference in performance for student tested in September 2020 versus those tested in 2019. Beyond immediate performance, school closures could carry other consequences such as curbing of educational aspirations and disengagement from schooling, which could affect student outcomes for the long term.

The radical switch to distance learning during COVID-19 restrictions also required new ICT skills for teachers. Since the emergence of the crisis, the ability of teachers to use new technologies and to manage distance learning has likely improved because of increased exposure. Several OECD countries succeeded in rapidly training teachers who had difficulties with new technologies, including South Korea, where the government launched a digital platform where teachers could train their colleagues on a voluntary basis (Gouëdard, Pont and Viennet, 2020[22]). The COVID-19 pandemic will also likely encourage the integration of technology in pedagogical methodologies and distance learning, which however will require a territorial approach in order to reach rural communities.

Governments have also put in place measures to financially support schools and ensure the proper functioning of online education during the COVID-19 pandemic. Italy undertook measures in March 2020 to better equip schools with digital platforms and tools to guarantee distance learning, to lend digital devices to less well-off students and to train teachers to use digital tools. The UK put in place a school support plan in April 2020 to help schools meet additional costs, including opening schools during school holidays for priority students, providing free school meals for eligible children and cleaning schools following suspected or confirmed cases of coronavirus. In the US, the CARES Act Elementary and Secondary School Emergency Relief Fund from March 2020 provided support to schools in the districts most affected by the

virus. Australia launched in May 2020 the Higher Education Relief Package to reduce the costs of online courses and loan fees for Australian students for a period of six months.

Box 5.3. Education responses to the COVID-19 pandemic: OECD recommendations

As "learning is never a place, but an activity",[1] the COVID-19 pandemic crisis offers an unprecedented opportunity to stimulate innovation within education and accelerate the implementation of e-learning in education systems. The OECD paper "Education responses to COVID-19: Implementing a way forward" (Gouëdard, Pont and Viennet, 2020[22]) has drawn up a series of recommendations to effectively implement an education policy response during the next steps of the COVID-19 pandemic. The main elements of the four recommendations are as follows:

1. Identify key contextual factors relevant to the crisis: by assessing the resources necessary for a transition to distance or hybrid learning approaches; by broadening the co-operation between schools and potential partners such as existing institutions or national pedagogical centres; and by considering health, welfare and assessment policies in the education response.
2. Consider stakeholders as the main drivers of change: by co-constructing the education response with key stakeholders such as unions or parent associations to ensure broad policy support; by focusing responsibilities of different stakeholders such as school principals or local education authorities on supporting education delivery; by building on existing tools to support communication between stakeholders within school communities and across the system; and by adapting existing feedback loops such as surveys or other data collection to gather information on teaching and learning progress, challenges and solutions.
3. Design an educational policy informed by the educational impact of the crisis to respond to school needs: by developing a vision guiding the policy response that acknowledges the crisis and its implications; by choosing the adequate modes of education delivery based on the assessment of resources and stakeholders' feedback; by providing just in time professional development for teachers and parents to support learners in their instructional approach; and by empowering schools in the delivery of learning, building on the experience of the COVID-19 crisis to transform schools.
4. Shape a clear and coherent implementation strategy: by bringing together the different relevant dimensions, including the national education vision, the available resources or the updated assessment methods; by establishing a communication strategy that can reach different audiences; and by developing monitoring approaches to understand progress and avoid potential pitfalls.

Source: Gouëdard, P., B. Pont and R. Viennet (2020[22]), "Education responses to COVID-19: Implementing a way forward", https://doi.org/10.1787/8e95f977-en.

Unleashing the potential of telemedicine to increase access to quality health care in rural areas

Telemedicine encompasses a wide range of technology-assisted health activities and no single definition exists. Some of the more common uses of telemedicine include telemonitoring, store and forward, and interactive telemedicine. Telemonitoring is the use of mobile devices and platforms to conduct routine medical tests, communicate the results to health care workers in real-time, and potentially launch pre-programmed automated responses. For example, a patient with congestive heart failure may use a device to record vital signs that are communicated remotely to a health provider who can advise patients

if action is needed. Store and forward is similar to telemonitoring but is used for clinical data that are less time-sensitive and for which a delay between transmission and response is acceptable. For example, store and forward is used widely in dermatology. Finally, interactive or real-time telemedicine involves direct and synchronous communication between providers and patients. This can include between a doctor and a patient as part of a teleconsultation or between medical professionals (Oliveira Hashiguchi, 2020[23]).

The greatest potential benefit of telemedicine to rural populations is greater and timelier access to health care and specialists. A 2015 study estimated that a typical visit to a doctor takes 2 hours on average: 37 minutes are spent travelling, 84 minutes are spent at the clinic and only 20 minutes are spent on face-to-face physician time (Ray et al., 2015[24]). These times are likely much longer in rural and remote areas where distances are longer and medical professionals scarce. Teleconsultations can reduce travel and waiting times to nearly zero, resulting in significant time gains for patients and health workers. Moreover, as specialised clinics/services in rural areas are often sparse, going to a local primary health facility to have a telemedicine appointment can be time-saving for both patients and specialists. Teleconsultations can also help alleviate disparities in the geographic distribution of health workers. Doctors, including specialists who are not located in areas with low doctor density, can still provide medical care to those living in these zones.

Evidence of effectiveness of telemedicine

Like any medical intervention, the impact of telemedicine depends on the population served, the programme funding, the benefits provided and the goals of the service (Hauck, Smith and Goddard, 2004[25]). The flexibility of telemedicine that makes it adaptable to nearly any situation also makes it hard to determine a generalisable measure of effectiveness. The evaluation of the economic utility of telemedicine is also particularly difficult across settings and evidence is inconclusive. In some cases, telemedicine has been shown to increase access and effectiveness, while lowering costs. Studies of teleconsultations found that they were associated with increased access due to reduced waiting times and reduced travel (Caffery, Farjian and Smith, 2016[26]; Masino et al., 2010[27]). Patients in the Canadian Ontario Telemedicine Network avoided travelling 270 million km in 2017 and the network saved CAD 71.9 million in travel grants (Ontario Telemedicine Network, 2018[28]).

A survey of OECD country experts found that the vast majority thought that telemedicine can be beneficial (Oliveira Hashiguchi, 2020[23]). The most commonly cited benefits were increased access, quality of care and cost-effectiveness (Table 5.1). Regarding cost-effectiveness, it should be stressed that telemedicine should not be seen as a way to scale down massively health services in rural areas, as many of them still require face-to-face interaction.

A systematic review of the effectiveness of telemedicine found that nearly 90% of international studies concluded that telemedicine interventions were at least as effective as face-to-face interventions (Oliveira Hashiguchi, 2020[23]). Specific benefits included glycaemic control in diabetic patients, fewer hospitalisations for patients with chronic heart failure, effective pain management and effective management of health risk factors including exercise and nutrition.

Table 5.1. Impacts of telemedicine highlighted by experts

Impacts of telemedicine highlighted by experts*	Number of country experts agreeing
More cost-effective care	**9**
Improved quality of care	**7**
Improved access and reduced inequality in supply	**6**
Increased knowledge sharing and learning	**5**
More patient-centred care and health literacy	4
Savings in patients' time and avoided travel costs	4
Avoided hospitalisations and emergency care	3
Fewer unnecessary transfers and avoided subsidised travel	3
Better models of care for chronic diseases	3
Improved timeliness of care	3
Increased continuity of care	2
Higher volume of consultations	2
Reduced provider travel time	2
Improved care co-ordination	2
More equitable access to rural and aboriginal communities	2

Note: *Number of reporting countries = 13.
Source: Oliveira Hashiguchi, T. (2020[23]), "Bringing healthcare to the patient: An overview of the use of telemedicine in OECD countries", https://dx.doi.org/10.1787/8e56ede7-en.

Like effectiveness, the cost-effectiveness of telemedicine is difficult to generalise across settings and purposes. For example, cost-effectiveness analyses often take a health systems perspective, missing important cost categories for rural areas such as the cost of patient travel. These cost-effectiveness analyses also rarely take into account any cost savings to patients or patient families from reductions in health utilisation and avoided hospital visits due to more effective home care. Despite these limitations, current cost analyses point to positive cost impacts. In a review of 19 systematic reviews and/or meta-analyses on cost-effectiveness, 13 concluded that telemedicine interventions were either cost-effective or had the potential to be cost-effective (Table 5.1) (Oliveira Hashiguchi, 2020[23]).

More telemedicine uptake in rural areas requires a change in culture, more funding and sounder legislation

Despite the possible benefits, the use of telemedicine in OECD countries is still not at its full potential. This is in part due to a significant number of barriers to its use such as technological hurdles as well as inequalities in digital literacy. An OECD working paper from before the COVID-19 pandemic summarises the main barriers cited by experts on telemedicine in OECD countries (Oliveira Hashiguchi, 2020[23]). Amongst the most cited are legislations and technology management, including payment methods, the culture of integrating these new technologies and governance issues (Table 5.2). The resistance of health professionals that deal with poorly designed digital solutions and digital transitions that are not mindful of their needs and workloads represents an additional barrier to telemedicine. Especially in the case of health professionals working in rural areas, more training and support in terms of time and resources to undergo the needed digital transition are critical.

Table 5.2. Barrier and enablers of telemedicine use highlighted by experts

Barrier and enablers of telemedicine use highlighted by experts*	Enablers	Barriers
Single coherent governance, management, funding strategy	**5**	**7**
Culture of change and adoption of new technologies	**4**	**8**
Specific legislation on telemedicine (e.g. on liability)	**4**	**6**
Suitable qualification/accreditation/training of staff	**4**	**5**
Evidence of better quality of care and patient benefit	4	0
Interoperability and ICT infrastructure	2	6
Privacy and security legislation, information governance	2	4
Ease of use for providers and patients	2	1
Applications meet an existing need and emerge naturally	2	0
Clarity on division on tasks and responsibilities	2	0
Connectivity, access of broadband and coverage in rural areas	1	5
Professional organisations' view on remote care	1	2
Appropriate clinical and continuity of care models	1	2
Digital health literacy of patients	1	1
Recognition as a priority among competing priorities	1	1
Clear reimbursement mechanisms	0	9
Medical licensure	0	2
Evidence of cost-effectiveness or cost-benefit	0	2
Co-ordination of participating health professionals' schedules	0	2

Note: *Number of reporting countries = 13.
Source: Oliveira Hashiguchi, T. (2020[23]), "Bringing healthcare to the patient: An overview of the use of telemedicine in OECD countries", https://dx.doi.org/10.1787/8e56ede7-en.

Before COVID-19, telemedicine remained largely unregulated across OECD countries, with some countries even maintaining legal restrictions. Across OECD countries that use telemedicine, 12 have no national legislation, policy or strategy regarding telemedicine and 11 have no medical jurisdiction, liability or reimbursement for e-health services (Oliveira Hashiguchi, 2020[23]). In some countries, telemedicine depends on sub-level national authorities, as in the case of Spain where the autonomous communities are in charge of telemedicine services. While countries such as Austria, Slovenia and Sweden have integrated telemedicine into broader health laws due to the lack of specific national legislation (Oliveira Hashiguchi, 2020[23]), others maintain significant legal restrictions. In Hungary, certain services such as a major therapeutic change or the doctor's final diagnosis cannot be treated remotely. In Japan, telemedicine use requires an initial face-to-face appointment where the physician deems it appropriate and safe for the patient. In some states of the US such as Georgia or Texas, follow-up medical appointments preceded by an initial remote contact must be face-to-face (Thomas and Capistrant, 2017[29]).

The complexity of telemedicine makes the attribution of its management and regulation difficult and uncertain, requiring the production of specific guidelines for rural and remote areas. Medical councils or colleges have published national telemedicine guidelines, including Canadian medical colleges and the Medical Board of Australia. Examples of guidelines incorporating a territorial lens include the Rural & Remote Medicine Telehealth Guidelines produced by the Australian College. In Mexico, the *Centro Nacional de Excelencia Tecnológica en Salud* (CENETEC) has included rural areas in a Telehealth Service Catalogue with tools to make communication more consistent across providers.

The lack of clear regulation for larger data and information privacy and security issues also impedes the development of telemedicine. Telemedicine services have increased the circulation of sensitive personal

information protected by medical secrecy among health institutions, such as those relating to mental illness or cases of abuse. A governance framework including technical, legal and political mechanisms is needed to counter risks to individual privacy (OECD, 2015[30]).

Besides regulation, funding levels and fragmentation remain a key barrier to telemedicine services, especially those in primary care that are key to rural areas. In 2016, out of a total budget of USD 588 billion in the US, Medicare spent only USD 28.7 million on telemedicine services (Flannery and Jarrin, 2018[31]). The multiplicity of funding sources also represents a current challenge in many countries. In Norway, primary care is financed by municipalities and hospitals from central budgets. In Australia, primary care is funded by Medicare while hospitals are funded simultaneously by the states, the federal government and non-governmental organisations.[2] Due to this split in funding, in both countries, among others such as Germany, telemedicine would require several sources of funding, which limits the implementation of telemedicine services.

The lack of a clear publicly funding policy and reimbursement mechanisms also severely limits the use of telemedicine. In France, until recent COVID-19 restrictions, reimbursements for teleconsultations with a physician are made if the patient previously had a physical appointment with the same physician within the previous 12 months. In Poland, only a few telemedicine services such as cardiac rehabilitation are reimbursed. In the Czech Republic or Ireland, telemedicine services are generally not covered by health insurance and are at the patient's expense (Oliveira Hashiguchi, 2020[23]).

Regulation and funding barriers are compounded by skill and digital gaps in rural areas. Digital barriers include technological illiteracy and lack of training, poorly designed interfaces, lack of user feedback, poor correspondence between the services offered and the specific needs of patients and healthcare staff, and cultural preferences to prefer face-to-face appointments. In fact, patients living in rural and remote areas without adequate broadband access who could benefit the most from telemedicine have the most difficulty accessing and using it (Oliveira Hashiguchi, 2020[23]). Although telemedicine requires trained and qualified staff in order to optimise the provision of services, about one-third of health workers in OECD countries report lacking sufficient knowledge and skills to use digital solutions. Countries such as Australia, Canada, Germany and the US have implemented policies to improve clinical informatics skills and digital literacy among health workers. However, giving existing skill gaps, increasing skill levels and attracting digital technology professionals requires place-based strategies such as the dedicated institutes and increased course offer in universities in rural regions.

COVID-19 has uncovered the potential and limitations of telemedicine for rural areas

The ongoing COVID-19 pandemic has had a profound impact on the use and visibility of digital health technologies. Telehealth has been used to monitor the health and well-being of people who have been diagnosed with COVID-19, including both patients with less severe cases who are able to stay at home and the more critical cases who need to be hospitalised. Examples come from Israel and Korea where patients use wearables and communication technologies to remotely monitor patients with COVID-19 at home (OECD, 2020[32]).

Using teleconsultations has also been important to follow quarantine orders and avoid coming into contact with others for potential COVID carriers. Notably, barriers have been eliminated or relaxed in order to allow for additional use of telemedicine during this period. England, France, Germany, Japan and the US have relaxed regulatory barriers to encourage the use of teleconsultation (OECD, 2020[32]). In France for instance, patients are authorised to consult remotely with any doctor that uses telemedicine regardless of any previous contact and receive complete reimbursement of teleconsults. In Germany, a temporary provision was introduced to allow physicians to issue or renew prescriptions, referrals or sick notes digitally or by phone, and to offer video consultations. In the aftermath of the pandemic, policymakers should ensure that these tools are made available to all primary healthcare teams, patients and communities.

In most remote rural areas, the conditions of care have nevertheless worsened with the COVID-19 pandemic. Geographically isolated hospitals are poorly equipped to care for severe COVID-19 patients. The lack of care for other serious pathologies due to the pandemic is greater in these areas, which means that people no longer go to hospitals, even for emergencies. This situation, aggravated by the lack of access to broadband and technologies, has increased the feeling of anxiety and worsened issues of chronic pain of patients in rural and remote areas in the US (Stone, 2020[33]).

The pressing need for access in rural areas during COVID-19 restrictions calls for faster implementation of suitable regulations with a territorial approach. In France, the *Ségur de la santé*, a consultation of healthcare system stakeholders in May-July 2020, strongly supported the "development of telehealth in all territories". The agreement promises to extend the COVID-19 emergency provisions by relaxing physical consult preconditions for teleconsultation with specialists.[3] Although the consequent unleashing of access to specialists would greatly increase access for patients in rural and remote areas, the extension of this measure has been called into question in September 2020 because it would break existing territoriality principles in provision.[4] Current negotiations between private health professionals and the National Health Insurance Fund (CNAM in France) intent to enhance the role of community medicine and facilitate the use of telemedicine (Millet, 2020[34]).

Service provision in low-density rural areas and the digital gap

Maximising the potential of digital service provision in rural areas requires first and foremost appropriate broadband connectivity. Since the 2000s, broadband services have flourished, from 82 million fixed-line subscribers across the OECD in 2003 to over 431 million in 2019. There is now, on average, one fixed broadband subscription for every three people (OECD, 2019[35]). This expansion has included rural areas, with broadband service now available to the great majority of rural residents in almost all OECD member states except Chile, Colombia, Greece, Mexico, Portugal and Turkey, where 40% or more of households do not have Internet (OECD, 2018[36]) (Figure 5.3) (see Box 5.4 for a historical overview of broadband policies in rural areas). In Europe, research conducted on behalf of the European Commission (EC) has found that fixed-line broadband is now available to 96.7% of all households in the EU27+UK (IHS Markit and Point Topic, 2019[37]), including 87.4% of rural households, with satellite connectivity available to the remainder.

Box 5.4. A short history of broadband policies in rural areas

In the early days of the telephone in North America, private telephone companies showed little interest in connecting rural communities, the business case for investment simply was not strong enough, so they focused their network development activities on cities. In Canada and the US, rural residents responded by establishing independent mutual co-operatives and publicly owned telephone companies at the municipal and state/provincial levels to build the networks that private enterprise would not. By 1912, there were over 3 000 independent rural telephone systems in the US (NTCA[38]), while in Canada, the three Prairie Provinces (Alberta, Manitoba, Saskatchewan) had purchased the assets of the incumbent provider to create provincially owned telephone monopolies mandated to expand coverage. The early results were positive, with farmers in Manitoba, for example, paying only around half for their telephone service what it cost to provide it (Winseck, 1995[39]), thanks to the provincial government's recognition that connectivity was a key factor in driving economic development. Elsewhere, state ownership was typically the starting point, with the major telephone companies of Europe, Australia, Korea and other OECD members typically beginning life as divisions of their respective national postal services.

A century later, the challenges of connectivity in low-density regions remain, though there are some additional considerations today. Where traditional telephony was a stable technology, characterised by incremental innovation that built on existing network assets, modern digital connectivity is evolving at a more rapid pace and features more disruptive change. For network builders, these distinctions necessitate ongoing investment, with the risk that existing assets might be rendered irrelevant by emerging technologies such as new wireless or satellite-based technology. At the same time, rural regions across the OECD today face ageing and stalled or shrinking populations, further eroding the business case for private investment.

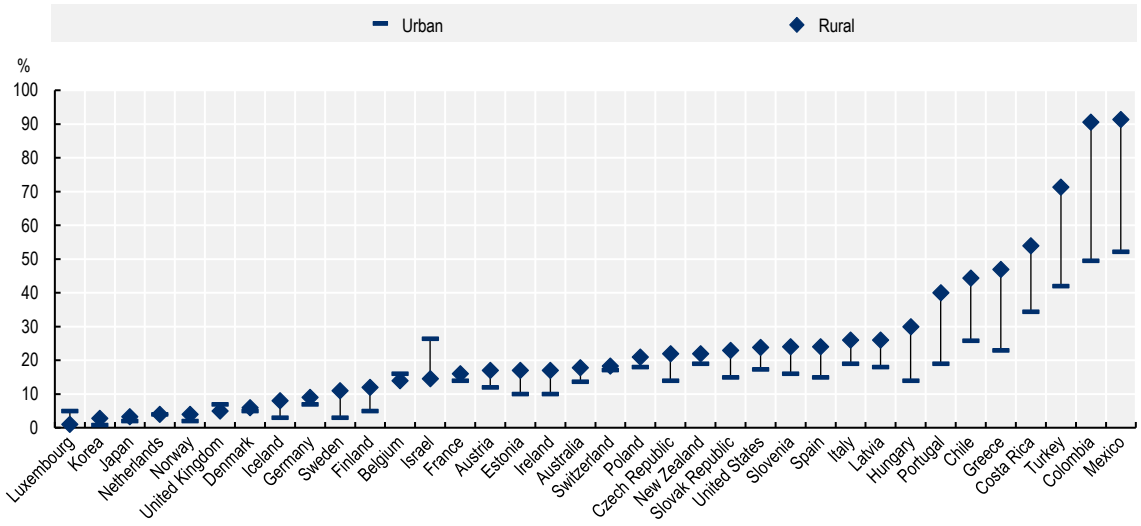
In 2004, the OECD urged governments to be patient before subsidising rural and remote connectivity (OECD, 2004[40]). At the time the organisation noted that rapid progress was already being made by the private sector and that an array of then-new technologies, such as fixed wireless Internet service providers (WISPs), were challenging the traditional relationship between cost and distance. Competition from new entrants using these technologies was prompting incumbent telecom networks to invest in upgrading their infrastructure or else risk losing their customers. The report concluded that "while there may be a place for government funding under some circumstances, the market should be given time to work".

Indeed, the organisation's research over the past two decades has shown that the liberalisation of the communication sector with the goal of fostering greater competition has brought many benefits in terms of increasing the affordability, availability and quality of communication services. Promoting competition enables users to benefit from greater choice from network service providers and spurs innovation in communication markets. It increases investment, lowers prices and drives up the overall quality and speed of broadband offers, including to underserved populations. Gaps, however, remain, particularly in low density and remote regions, where market mechanisms alone have not yet satisfactorily delivered the high quality connectivity demanded by modern services. Active intervention by governments, particularly in these areas, continues to play an important role (OECD, forthcoming[41]).

Source: Winseck, D. (1995[39]), "A social history of Canadian telecommunications", http://dx.doi.org/10.22230/cjc.1995v20n2a863; OECD (2004[40]), Document of the OECD "Working Party on Telecommunication and Information Services Policies", OECD, Paris; OECD (forthcoming[41]), "Bridging connectivity divides", OECD Going Digital Toolkit Policy Note, OECD, Paris.

Figure 5.3. Households without Internet by urban/rural location

Share of households reporting not using the Internet, 2017 or earliest year available



Note: For European countries, data on Internet uptake by "households living in densely populated area" was used for the "urban" category and on "households living in a sparsely populated area" was used for the "rural" category, and correspond to 2016, with exception to Iceland (2014); while data on "households living in an intermediate urbanised area" was disregarded. International Telecommunication Union (ITU) data was used for non-European countries and corresponds to 2014-15, and national household surveys were used for Chile (2015), New Zealand (2012), Turkey (2013) and the US (2015).
Source: (OECD, 2018[36]), "Bridging the rural digital divide", OECD Digital Economy Papers, No. 265, OECD Publishing, Paris, https://doi.org/10.1787/852bd3b9-en (accessed on 12 August 2020).

StatLink https://doi.org/10.1787/888934226747

Mobile broadband subscriptions have grown rapidly since 2010. They now account for 77% of all the broadband access pathways across OECD countries, with 1 subscription for every citizen and even 3 subscriptions for every 2 inhabitants in Finland and Japan (OECD, 2019[35]). As of 2018, mobile broadband based on 4G (LTE) technology was available to 98.9% of all households, including 96.1% of rural households, in the EU27+UK (IHS Markit and Point Topic, 2019[37]). Mobile broadband is typically used for smartphones, the contracts for which generally include voice calls and monthly data usage caps. Around 90% (December 2019) of OECD mobile subscriptions include voice calls, meaning they are likely used in conjunction with a telephone. Relatively low data usage rates for mobile subscriptions (5.8 gigabyte [Gb] per month, on average, across the OECD in 2019; (OECD, 2020[42])) suggest this connectivity is lightly used by many at the moment. For context, streaming 1 hour of 4K high-definition video over Netflix consumes around 7 Gb of data. Use cases for service delivery, for example, remote consultations between doctors and patients, could consume large amounts of data (to support two-way high-definition video), so the role that data usage limitations might play is something policymakers may need to consider when designing service offerings.

While data consumption patterns suggest mobile broadband is not widely used for data-intensive applications (like Netflix) at the moment, with sufficient tower capacity it can be used that way. There is some evidence of that happening, notably in Finland. Finland's mobile data usage is much higher than average (23.5 Gb per month in 2019) and includes a higher proportion of data-only contracts. Relative to other OECD countries, Finland has a very high level of mobile broadband subscriptions and a relatively low level of fast fixed broadband connection availability in rural areas, with around 8% of rural Finnish households having access to a fixed broadband connection of 30 Mbps or more in 2017.

Box 5.5. Broadband terminology

A discussion of broadband provision involves the use of several terms that are important to understanding the issues and technologies. Here is a brief overview of the key terms:

- **Download speed** – The rate data moves from the Internet to the user's device. Higher is better.
- **Upload speed** – The rate data moves from the user's device to the Internet. Higher is better.
- **Mbps/Gbps and Gigabits** – These are measures of speed. Mbps = Millions of bits (digital ones and zeroes) per second. Gbps and Gigabit both refer to speeds in the range of billions of bits per second or 1 000 Mbps and higher.
- **Latency** – Latency is the time delay between when a user requests data and when they begin to receive it (for example, requesting to visit a website). Lower is better.

Multiple factors affect latency but a critical one for broadband provision in rural areas is the distance between the user and their Internet provider. Among present-day connectivity technologies, geosynchronous satellite-based services typically suffer the highest latency because the distance from the user to the satellite is large. A connection with a high latency might feel slow to a user, even if the download speed is high.

- **Symmetric/Asymmetric** – Describes the relationship between upload and download speed. Symmetric means the flow of data moves at the same speed in both directions. Asymmetric means the rate of data flow in each direction differs. In most cases, an asymmetric broadband connection means that the download speed is faster than the upload speed.
- **Data cap** – Some Internet providers impose limits on their subscribers, capping the maximum amount of data they may use in a given period (typically per month). These limits usually apply to mobile and satellite-based technologies. Whether users face data caps or not is an important consideration when designing digital services since they will affect usage patterns irrespective of speed, latency and other factors.
- **FTTH** – Fibre to The Home – meaning a fibre optic connection that stretches directly to the point of use. This is currently the gold standard in wired Internet service provision. It is also sometimes referred to as Fibre to the Premises (FTTP), to be sufficiently general to capture business users as well as residential users.

How close a fibre connection gets to the point of use varies and several similar terms exist for different situations, these include Fibre to the Node (FTTN) and Fibre to the Curb (FTTC). These refer to situations where the fibre connection gets close to the point of use but does not stretch all the way. FTTN and FTTC connections typically get to within a few hundred metres of the point of use. The remaining stretch between where the fibre ends and the user's location is usually filled by a pre-existing network technology such as a twisted-pair telephone line or a coaxial cable TV connection.

- **DSL/ADSL/VDSL** – Digital Subscriber Line – the technology used for broadband connectivity over traditional twisted-pair telephone network wiring. ADSL refers to an asymmetric version that offers faster download speeds than upload speeds and which is the most common residential form of DSL broadband. VDSL, or very-high-speed DSL, is an advanced version of ADSL.
- **DOCSIS** – Data Over Cable Service Interface Specification – the standard for broadband connectivity over traditional coaxial cable TV wiring. The standard has continually evolved over time, with its latest iteration considered a next-generation technology given the speeds it is able to support.

Barriers to higher broadband connectivity in rural areas

Whether fixed (wired, fixed wireless and satellite) or mobile, the business of providing connectivity involves an upfront cost to build the necessary infrastructure followed by revenue potential over time from the customers who make use of that infrastructure. Variables include the type of infrastructure deployed and the amount of it required, with higher costs for the latest/fastest connection technologies and with greater physical distances respectively. With fewer potential customers per kilometre of wiring, or per radio tower, rural regions encounter a distance penalty. Consequently, achieving connectivity investment in low-density regions has always been a challenge, one that predates digital technology. Across 26 OECD countries, just 64% of rural households had access to fixed broadband with a minimum speed of 30 Mbps in 2018 (2019 for the United States and Canada), compared to 87% of households in all areas (OECD, 2020[43]).

The rollout of broadband differs from traditional telephone connectivity in that the technology is rapidly improving and several competing approaches – whether through wires or wireless, satellite or other solution – exist to achieve the same ultimate objective of connecting people. This creates both new opportunities and also some additional risks for investors and policymakers. While in the past it was possible, given enough time, to achieve universal, equitable access to telephones across the national terrain, broadband is a moving target and the rapid pace of change means the quality of the connection available continues to vary significantly in ways that leave people and firms in rural regions disadvantaged.

While policies that promote competition and private investment, as well as independent and evidence-based regulation, have been tremendously effective in extending broadband coverage in OECD member countries (OECD, forthcoming[41]), there remain some areas, typically low-density rural and remote areas, that are underserved. Today, low-density rural and remote areas across the OECD remain more likely to encounter:

- **Lower speeds and older technologies** – Network operators face a never-ending investment cycle, with each new technology being deployed first in the densely populated urban areas where the high upfront cost is most easily recouped. The latest fixed and wireless broadband technologies, Fibre to the Home/Premises (FTTH/ FTTP) and 5G respectively, are currently being rolled out in cities, while older, slower technologies (e.g. DSL) remain dominant in low-density rural regions (OECD, 2019[44]).
- **Fewer options and less value** – Market competition has spurred investment and helped lower prices for consumers but the level of competition is not consistent across the terrain. New entrants tend to focus on urban areas, providing residents in these areas with higher levels of competition, earlier access to the newest technologies and better value for money. The available performance varies widely between technologies, (e.g. from 1 Mbps to over 1 000 Mbps) but pricing tends to be much less elastic and since rural areas are where the maximum available speed is lowest, rural dwellers are therefore disproportionately paying more per Mbps than their urban counterparts. In June 2019, 98% of urban Americans had access to 3 or more broadband providers, while for rural dwellers the proportion was 79% (FCC, 2019[45]). In 2018, the average lowest-cost monthly bundle for a 12-30 Mbps package of Internet, telephony and television across the EU27+UK was EUR 40.12 while the same package with 100+ Mbps access, cost EUR 53.22: 32% more money for at least 333% more bandwidth (Empirica, 2019[46]). Another important factor is the distinction between advertised speed and the speed actually experienced by users. Distance from the exchange being one of the factors determining the speed experienced by the user at the point of use, rural dwellers may be more likely to see shortfalls in the speed they experience compared to the maximum advertised speed of the connection they pay for.
- **Other limitations** – When comparing connectivity offerings, the commonly used metric is the maximum download speed though this is but one of a range of factors. Download speed is critical for content consumption (e.g. streaming Netflix) but it does not capture the full picture and not all broadband technologies are equal.

- **Data caps** – Fixed satellite Internet services and mobile broadband contracts commonly include caps on the total amount of data a subscriber may use each month, or will otherwise restrict consumption, for example by offering the full-speed connection only for an allocated amount of "priority data", with a lower speed for any usage beyond that.
- **Latency** – Another limitation of satellite-based Internet services is latency times. Latency is the period between requesting information and beginning to receive it. Given the distances involved for signals to reach satellites in geosynchronous orbit, this technology can feel slow even though the download speed may be comparable with other technologies. For example, if someone using a high-latency connection is participating in a video chat, it is likely they would have to pause between sentences or else the participants would end up speaking over each other.
- **Speed asymmetry** – Connection speed asymmetry may be an issue in some circumstances. The most common fixed connection technologies in rural areas, DSL and satellite, both typically offer asymmetric connections, prioritising download speed over upload speed. This makes sense for content consumers but, for those creating and transmitting data, uses that include businesses and public services, it may restrict usability. For example, in a two-way video-call between a student and teacher, a high download speed would permit a smooth, high-definition inbound video stream, while the lower upload speed might deliver only a low-resolution, laggy stream in the other direction. Speed asymmetry is common in several broadband technologies, which makes sense given that content consumption is the common use-case for consumers. While symmetric DSL lines are available, these can cost more and are usually marketed towards businesses not households – an important consideration if digital services are intended to be delivered to the home.

Driven by market forces, broadband provision in lower-density areas has improved and will continue to do so thanks to innovation in connectivity technologies. However, the same market forces that have delivered improvements in the past decade will also likely ensure that geographical inequities remain. These inequities may even widen, at least initially, with the arrival of next-generation connectivity. The next section reviews current and emerging technologies and their implications for lower-density areas, particularly on service delivery.

Technology options to boost provision in low-density rural and remote areas

Several wired, wireless, fixed and mobile technologies are used to deliver broadband connectivity but none offers a perfectly cost-effective solution for low-density and remote areas. Some are already widespread (e.g. DSL) while some technologies are in the process of being rolled out in low-density regions (e.g. VDSL, Cable DOCSIS 4.0, Fibre, 5G, LEO). Among the emerging technologies, some require new networks to be built (e.g. Fibre, 5G, LEO) while others are designed to make use of existing network infrastructure (e.g. VDSL, Cable DOCSIS 4.0). New technologies tend to be more "future-proofed", with headroom to grow in the years ahead, while others aim to squeeze performance from legacy infrastructure that is nearing the end of its useful life. Older technologies are more common outside cities and the relatively higher cost of installation and lower level of competition that exists in these areas means that when network upgrades do happen, they are more likely to leverage legacy infrastructure. Table 5.3 provides an overview of current and emerging technologies.

Table 5.3. General overview of current broadband technologies in OECD countries

	Maximum download/ upload speed (Mbps)	Latency (milliseconds)	Range (km)	Notes
Currently available in low-density regions				
DSL (F)	24/3	Medium	5	• Runs on the traditional telephone network (twisted-pair copper wiring) • The most widely available fixed broadband technology in rural areas in European Union (EU) countries • Speed declines with distance from street-cabinet
Cable (DOCSIS 1.0-3.0) (F)	1 000/200	Low (varies)	100	• Runs on existing coaxial cable television networks • Less widely available than DSL in low-density and remote regions • Bandwidth is shared with other users on the line, so speed may decrease and latency may increase at peak times
Geosynchronous satellite (F)	50/10	Very High	N/A	• Uses geosynchronous orbit satellites to provide universal coverage across all parts of a national terrain • High latency and other limitations restrict its appeal to only those areas that lack alternatives • More information: Lee González Fanfalone et al. (2017[47])
4G/LTE (M)	100/50	Medium	3-6	• Widely available and increasingly affordable but with limited tower capacity • While peak speeds can reach 100 Mbps, this is only possible under perfect conditions. Real-world connectivity is much slower, typically <20Mbps
Emerging				
VDSL (F)	300/100	Low	1	• A more advanced DSL, it continues to use traditional telephone wiring • Has short range, with speed declining rapidly with distance from the base
Cable (DOCSIS 4.0) (F)	10 000/6 000	Low	100	• Fast with good range but only feasible where existing cable TV networks exist
HAPS/LEO satellite/ broadband balloons	50-1 000/10+	Medium	N/A	• HAPS: High-altitude pseudo-satellite LEO = Low earth orbit • These technologies are premised on addressing the latency issue of traditional geosynchronous satellites by bringing the satellite (or pseudo-satellite aircraft, or high-altitude balloons) closer to the earth
Fibre (F)	10 000+/10 000+	Very Low	60	• Fibre is the leading next-generation fixed technology, offering symmetric connectivity with very low latency and huge potential for future growth • The technology is expensive because it requires building an entirely new network, replacing existing twisted pair

	Maximum download/ upload speed (Mbps)	Latency (milliseconds)	Range (km)	Notes
				and coaxial cable networks
5G (M)	30-10 000/30-10 000	Very Low	0.5 – 6	• 5G is highly scalable, with extremely-fast, fibre-like connectivity available over short ranges, while over longer distances it will deliver more moderate improvements on 4G speeds

Note: F = Fixed, M = Mobile.
Source: OECD elaboration based on multiple sources, primarily EC (2018[48]), "Comparison of wired and wireless broadband technologies", https://ec.europa.eu/information_society/newsroom/image/document/2018-17/comparison_of_broadband_technologies_table_75B12AE2-FC37-D44B-C75B5885D383A0FE_51503.pdf (accessed on 13 August 2020).

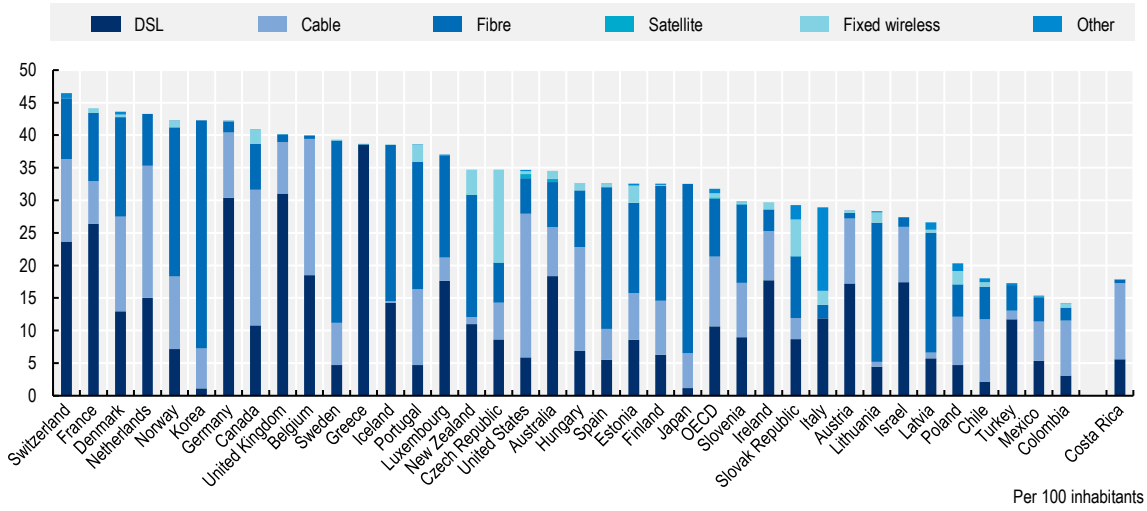
Among the technologies still emerging in low-density and remote regions, VDSL and Cable's DOCSIS 4.0 are advanced forms of connectivity yet they are transitory, a bridge between current and future technologies designed to squeeze performance from networks built long ago. In many cases, networks offering these technologies are already busy upgrading their network backbone and will replace the last mile to people's homes and places of business as a final step in the renewal of their networks. These transitory technologies are not without trade-offs: VDSL's range is short and its speed declines rapidly the further the user is from the line's point of origin. This is because interference along the unshielded copper wiring increases with its length. Cable Internet uses a shielded coaxial network, so interference is less of an issue, however cable bandwidth is shared between all the users connected to the same line, so speed may decline at peak times and latency may increase.

Both traditional telephone companies and cable companies are replacing their older networks with fibre, a true next-generation technology that offers symmetric connectivity, extremely low latency and which can achieve unparalleled speeds. However, there is evidence that some countries where legacy networks were poorly developed are leapfrogging ahead in their fibre rollout. In 2019, fibre represented an average of just 28% of all fixed broadband subscriptions in OECD countries (Figure 5.4), while in China, this number tops 70%. China and Russia currently have around twice as many fibre subscriptions per 100 inhabitants as Canada and the US, 2 countries where fibre penetration remains low (with 5.5 and 7.0 fibre subscriptions per 100 inhabitants respectively) (OECD, 2019[35]), yet also 2 countries with well-developed legacy networks for both telephone and cable TV and above-average broadband coverage generally.

Market forces may encourage network operators to focus on deriving value from their legacy assets while avoiding the large investments necessary to put fibre in the ground but this is likely a medium-term solution at best, especially for those networks based on traditional twisted-pair telephone wiring, one that may ultimately impede future development. With regard to spatial distribution, fibre is more concentrated in cities. For example, in Europe, twice as many urban households than rural households had access to fibre in 2018 (approximately 30% vs. approximately 15% respectively) across the EU27+UK (IHS Markit and Point Topic, 2019[37]) (see Box 5.6 for an explanation on rural area definitions).

Figure 5.4. Fixed broadband subscriptions, by technology

Subscriptions per 100 inhabitants, December 2019



Note: Australia: Data reported for December 2018 and onwards is being collected by a new entity using a different methodology. Figures reported from December 2018 comprise a series break and are incomparable with previous data for any broadband measures Australia reports to the OECD. The OECD definition of fibre differs substantially from fibre classifications commonly used in Australian reporting. These figures treat connections known in Australia as "Fibre to the Node" and "Fibre to the Curb" as DSL connections, while "Fibre to the Premises" and "Fibre to the Basement" are treated as fibre connections. Data on technology type prior to Q2-2016 should be treated as indicative until further notice.
Data for Switzerland and the US are preliminary.
Canada: Fixed wireless includes satellite.
France: Cable data include VDSL2 and fixed 4G solutions
Italy: Terrestrial fixed wireless data includes WiMax lines; other includes vDSL services.
Source: OECD (2020[42]), *Broadband Portal (database)*, https://www.oecd.org/sti/broadband/broadband-statistics/ (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226766

Box 5.6. Rural definitions used on broadband statistics

This chapter makes several references to urban and rural households and populations. A limitation on the comparability across countries and reports is that rurality is defined in different ways by different organisations. This section uses OECD definitions developed by the Directorate for Science, Technology and Innovation. In addition, it references two other sources:

- **FCC definition (United States data)**

  References to the availability of broadband in the US are sourced from the Federal Communications Commission (FCC) (FCC, 2019[45]). The FCC's urban-rural definition is derived from the US Census Bureau, which defines urban in two ways:

  - Urbanised Areas (UAs) of 50 000 or more people.
  - Urban Clusters (UCs) of at least 2 500 and less than 50 000 people.

  The US Census Bureau considers rural all locations not considered urban (Ratcliffe, 2016[49]).

- **EU27+UK households**

  References to the availability of broadband to households in the EU27+UK are sourced from an EC report *Study on Broadband Coverage in Europe 2018*. This report was prepared for the EC

by IHS Markit Ltd. and Point Topic (2019[37]). Rural in this data is defined as follows: "the research team uses a methodology first developed by Point Topic in 2012, which defines rural areas using the Corine land cover database, and creates a database of population and land type in every square kilometre across Europe. Households in square kilometres with a population of less than 100 are classified as rural. This granular approach based on population density identifies the truly rural areas likely to be unserved or underserved by broadband operators. According to an updated estimation of the rural population in individual NUTS 3 regions, approximately 15% of households in the study countries were rural in 2017. Combining this information with updated population and household data from Eurostat, the EU statistical office, allowed the research team to create new estimates for the numbers of rural households across each market and NUTS 3 area".

Source: IHS Markit and Point Topic (2019[37]), "Digital single market fixed broadband prices in Europe 2018", http://dx.doi.org/10.2759/94991; FCC (2019[45]), *Area Comparison - Fixed Broadband Deployment Data*, https://broadbandmap.fcc.gov/#/area-comparison?version=jun2019&tech=acfosw&speed=25_3&searchtype=county (accessed on 12 August 2020); Ratcliffe, M. (2016), *Defining Rural at the U.S. Census Bureau*, http://dx.doi.org/10.13140/RG.2.2.16410.64969 (accessed on 10 May 2020).

Fibre also plays a key role in the future of mobile connectivity, so much that, going forward, mobile and fixed networks are expected to converge. With previous generation mobile technology, the cellular towers could connect to each other and the wider world (known as backhaul) through copper cabling (e.g. using DSL-based technology), wirelessly (e.g. using microwave antennae) or with fibre. However, the demands of next-generation 5G mobile technology are such that fibre connectivity is expected to be necessary at the towers to support the high-speed, low-latency connectivity the technology is capable of. The need for fibre at the towers may slow the deployment of 5G to rural areas where such fixed networks are scarce.

Another issue that may prove problematic for the delivery of 5G in rural areas is the technology's wireless range. In order to deliver gigabit+ transfer speeds, this technology can make use of very short wavelengths but these waves only travel a short distance, meaning 5G cells must be smaller than previous generation technologies in order to deliver the promised speed increases. Whereas a 4G tower might reliably cover a radius of approximately 5 km, a 5G tower may only provide its maximum potential speed within a few hundred metres. While 5G technology can still be deployed in larger cells, at distances similar to those covered by a 4G tower, a 5G tower may only deliver moderately faster speeds, not the quantum leap its proponents highlight. This limitation, coupled with the need to connect the towers to fibre represent significant challenges to bringing true next-generation connectivity to rural and remote areas, and the level of investment needed to provide equitable access may be higher than that of earlier technologies. If successful, new low Earth Orbit (LEO) satellite technology may become part of the solution (Box 5.7).

Box 5.7. Satellite technology to connect rural areas

LEO satellites may offer a new solution to rural connectivity (Lee González Fanfalone et al., 2017[47]). This technology has the potential to provide both fixed connectivity directly to rural and remote households and to serve as the backhaul for terrestrial 5G towers (negating the need for fibre). This would mean a mobile network operator could build a 5G tower in a remote area to serve that community, with the data flowing to the outside world via satellite. Existing geostationary satellites suffer from high latency due to their altitude, some 35 000 km above the earth. These satellites remain above the same fixed point on the earth's surface, such that only one satellite is needed to cover a whole country or group of several countries like the EU. LEO satellites address the latency issue by orbiting much closer, at around 500 km, but this means they are constantly moving in relation to the planet. The same satellite

that provides connectivity in Canada might, a short while later, provide connectivity in Russia or Sweden. A constellation of several hundred of these satellites is therefore needed to blanket the planet with continuous coverage. There is currently much private-sector interest in this technology, with major names like SpaceX investing heavily to develop it, though the business model remains in question (McKinsey, 2020[50]) given the high cost of building and launching so many satellites. Due to the inherently global nature of the technology, global co-ordination for its development and deployment (for example to deal with regulatory issues like foreign ownership of connectivity providers) may be helpful. As of November 2020, SpaceX has launched 955 of their Starlink Internet service satellites with beta testing of the technology now underway in parts of Canada and the US.

Several other technologies have been proposed and trialled, including high-altitude pseudo-satellites (HAPS), such as the Airbus Zephyr solar-powered autonomous drone (Airbus, n.d.[51]), broadband balloons, such as those being developed by Loon, a division of Alphabet/Google (Loon[52]), and free-space optical communication systems (FSOs). FSOs transfer data with a beam of light, much like a fibre connection, except with an FSO there is no fibre; the light is beamed point-to-point through the air. These systems can theoretically achieve speeds and latency similar to fibre at a fraction of the installation cost, the major downside being that obstacles blocking the beam (e.g. precipitation and pollution) can slow or break the connection. An LED-based installation was built and operated successfully for many years in the Czech Republic beginning in 2001 (Twibright Labs, n.d.[53]) and a much more ambitious laser-based system is currently being deployed in Bengaluru, India (Wifi Dabba, n.d.[54]). All of these systems have different advantages and disadvantages and none is perfect. The best solution for any given location will depend on the circumstances of that location, indicating the need for a technologically agnostic, place-based approach, with the need to find solutions for rural and remote places becoming more urgent as fibre and 5G become more widespread in cities.

Source: Lee González Fanfalone, A. et al. (2017[47]), "The evolving role of satellite networks in rural and remote broadband access", https://doi.org/10.1787/7610090d-en (accessed on 2 October 2020); McKinsey (2020[50]), "Large LEO satellite constellations: Will it be different this time?", https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/large-leo-satellite-constellations-will-it-be-different-this-time# (accessed on 17 August 2020); Airbus (n.d.[51]), *Zephyr - UAV - Airbus*, https://www.airbus.com/defence/uav/zephyr.html#capabilities (accessed on 19 August 2020); Loon (n.d.[52]), *Connecting People Everywhere*, https://loon.com/ (accessed on 19 August 2020); Twilight Labs (n.d.[53]), *RONJA*, http://ronja.twibright.com/ (accessed on 19 August 2020); Wifi Dabba (n.d.[54]), *Homepage*, https://www.wifidabba.com/ (accessed on 19 August 2020).

As governments look at using digital tools to deliver public services to areas outside cities, a place-based approach will also be an important factor in service design, one that includes consideration for the locally prevailing connectivity technologies. For example, an educational service that includes a unidirectional video feed of the teacher, with students asking questions via text message, would likely work better for communities dependent on an asymmetric technology like ADSL, than one that requires significant bi-directional flows of data, such as a video conference between both the teacher and the students.

Services where bi-directional data flows are essential, such as a teleconsultation between a doctor and patient, may require that the government create locations outside cities equipped with a symmetric connection that residents can then visit to use the service since they are unlikely to have such connectivity at home. Looking ahead to more advanced applications like remote surgery, next-generation speeds with low latency and extremely high reliability will be needed to enable these. Other services that require low latency, such as real-time monitoring/response for health care purposes, are already being delivered in some areas. One example is in Sweden, where doctors are offering patients a wearable real-time, remote cardiac and respiratory monitoring device that leverages cloud computing to enable physicians to remotely detect murmurs and auscultate heart and lungs during their patient's daily life. Services like these may not work for areas dependent on traditional satellite connectivity or other high-latency technology, or that lack mobile coverage. Until these issues are addressed, these areas may be better suited to "store and forward"

telehealth services. The US Veterans Administration currently delivers one such telehealth initiative. Through VA Telehealth, patients can have medical data such as their blood oxygen levels, pulse, blood sugar, heart and lung sounds, collected and monitored remotely, on a regular basis (e.g. a daily check of a patient's vitals), albeit not in real-time.

With so many technological options available, each with advantages and disadvantages, it is not obvious which to pursue, nor would it be wise to prescribe specific solutions since the constant innovation taking place means the best fit for any given part of the terrain is fluid. In light of this, many governments have today taken a technology-agnostic approach to promoting broadband, yet pure agnosticism may miss important distinctions. A 100 Mbps VDSL connection, from the policymakers' perspective, is not the equal of a 100 Mbps fibre connection, though the experience of using it might feel the same to a consumer since one is at the height of its potential while the other is only at the beginning. The next section examines several of the ways governments are working to expand broadband to low-density rural and remote areas to review how these challenges are being dealt with.

Current approaches to closing connectivity gaps

Governments across the OECD have recognised the important role of connectivity in driving future prosperity, cohesion and well-being. All member governments, with the exception of Japan, have identified specific goals for broadband availability. Japan has already achieved universal access to the connectivity of at least 30 Mbps and half of all Japanese households already have access to at least 100 Mbps, so it has chosen not to set additional goals (OECD, 2018[36]). For all other members though, targets have been set for broadband speeds and the continued expansion of its availability, along with timelines.

As discussed above, the technology continues to improve, as do the demands of connected applications and services, so the definition of what constitutes broadband continues to evolve. When the OECD first defined broadband in 2001, the minimum speed required to qualify was approximately 0.25 Mbps, a speed that would not meet anyone's idea of a fast connection today, insufficient to stream even the most basic video. Most OECD governments have targeted a download speed over 100x faster than that early definition, of at least 30 Mbps and in several cases 100 Mbps, to be achieved in most cases for all households by 2020. Where upload speeds are also targeted, asymmetry is embedded into the targets, with targeted speeds for uploads generally half or less those targeted for downloads, reflecting the ongoing reliance on older network technologies in most countries. In support of these targets and timelines, governments have taken a wide variety of approaches, to reduce regulatory barriers and improve competition, to facilitate demand aggregation models and in many cases to invest public funds. This section reviews several of these to examine potential lessons.

Supporting the business case through demand aggregation models

In some low-density communities, the deployment of broadband might make sense for a communications company if it could be confident in advance of building the network that it would secure sufficient subscribers to achieve an adequate return on the investment. Demand aggregation models are intended to help give investors this confidence, by essentially signing up customers in advance (OECD, forthcoming[41]). For example, a company may require that a certain percentage of households in a given community commit to using their broadband service for a certain period before they proceed with the deployment. In some countries, the risks for the private sector are further reduced when a local organisation (i.e. a municipality or co-operative organisation) handles the demand aggregation process, securing commitments from residents to subscribe to the service then contracting the private-sector operator to develop the network (OECD, forthcoming[41]). Thus, demand aggregation can be a tool that is used either directly by the private sector (likely in cases where the investment decision was on the margin) or in combination with other approaches described here.

Putting the community in control through locally owned co-operatives

In the early part of the last century, mutual and co-operative organisations at the local level played a key role in bringing electrical and telephone service to the rural US. In the 21st century, many of these same organisations are now working to do the same with broadband. Across the US, there are now more than 200 rural co-operatives building advanced broadband networks, many of them providing FTTH, in rural communities. Research has shown these networks typically provide connectivity that is cheaper than that of private-sector incumbents (Talbot, Hessekiel and Kehl, 2018[55]), with prices for an entry-level broadband connection (25Mbps) priced between 3% and 50% lower than the same service from a private provider in 23/27 surveyed communities where comparisons were possible. In many cases, the connectivity provided by rural co-operatives is also faster.

Dakota Carrier Network

One particularly successful example is in North Dakota. The state is highly rural and sparsely populated, with a density of just 4.1 persons per square kilometre. Out of the 50 states plus Puerto Rico and the District of Columbia, North Dakota ranks 49th in population density. Despite this, 70% of rural residents have access to gigabit-speed fibre connectivity (FCC, 2019[45]), a level that far exceeds the current average level of fibre provision in both rural (12%) and urban (24%) areas nationwide (as of June 2019). This was achieved in large part thanks to a consortium of small, independent rural companies and co-operatives that came together in 1996 to purchase the 68 rural exchanges of the incumbent telephone company, US West (now named Century Link). In doing so, these small organisations formed the Dakota Carrier Network (DCN), a state-wide umbrella organisation that covers 90% of the state's land area and 85% of its population (Sousa and Herman, 2012[56]). Federal support for their fibre-building efforts came from the Broadband Technology Opportunities Programme (BTOP), which provided USD 10.8 million for a project to construct 272 km of new fibre in the state, with backhaul speeds as fast as 1 Gbps to enable last-mile service. The project also enhanced e-health in the state by deploying a dedicated 10 Gbps healthcare network to over 200 hospitals, clinics and other healthcare providers to enable telemedicine, teleradiology, telepharmacy and electronic health information exchange (NTIA[57]).

B4RN

Broadband for the Rural North (B4RN) is a non-profit community benefit society that operates a broadband network dedicated to providing fibre to the home/premises in North West England. B4RN offers 1 Gbps symmetrical fibre broadband to every property in their coverage area. Subscribers are charged an initial GBP 150 installation cost then GBP 30 per month for their service. For a premium price of GBP 360 installation and GBP 150 per month, the organisation offers its subscribers 10 Gbps connectivity, leading B4RN to describe their offering as the world's fastest rural broadband connection. B4RN supports public services and community development in its region by offering free connections to religious institutions and discounted access to schools (B4RN[58]). Anyone who hosts one of their nodes on their land is given free service for life. Like the community organisations in Finland and Sweden, B4RN relies heavily on voluntary support from the community. It also raises money from investors and through crowd-sourced bond issues. When a new community on the edge of the existing coverage area wishes to be connected, B4RN asks them to raise investment and gain support from local volunteers and landowners. The government has provided indirect support by providing tax relief to investors via the Enterprise Investment Scheme and the organisation has also received support as a registered supplier of the government's Gigabit Broadband Voucher Scheme, discussed in more detail below.

Simplifying subsidies using vouchers for consumers and businesses

Several countries have established voucher programmes to assist consumers in getting connected. In some cases, these are to help low-income households pay the subscription fee, while in others they intend

to encourage service providers to expand their networks and to encourage communities to work together on the issue. These vouchers are a relatively new form of subsidy programme, with the advantage that they permit recipients, rather than the government, to decide which provider and broadband technology are best suited to their needs. Vouchers may also be more accessible to smaller entrants like B4RN than a more traditional project or auction-based subsidy programmes since these typically require that the provider participate in a state-administered application and/or bidding process.

The UK Gigabit Broadband Voucher Scheme (GBVS) and the Scottish Broadband Voucher Scheme (SBVS) are examples. Under the GBVS, homes and businesses in rural areas of the UK are eligible for funding towards the cost of installing gigabit-capable broadband when part of a group scheme. Group projects are when two or more residents and/or small- and medium-sized enterprises (SMEs) get together to combine their vouchers towards the shared cost of installation. Single connections are not eligible for additional funding. Rural premises with broadband speeds of less than 100 Mbps can use vouchers worth GBP 1 500 per home and up to GBP 3 500 for each SME to support the cost of installing new fast and reliable connections. The voucher funding is transferred directly to the consumer's selected supplier on verified completion of the line installation. There are more than 450 registered suppliers, participating in the programme, including major national companies like BT, Virgin Media and TalkTalk, and also small co-operatives like B4RN.

The SBVS has been introduced as a supplement to the Scottish Government's main national broadband project, which is known as the Reaching 100% or R100 programme. Through R100, the government is investing GBP 579 million to install Fibre to the Node (FTTN) broadband nationwide. This network design is intended to fulfil a commitment to provide access to broadband of 30 Mbps to every home and business in Scotland. Despite the investment however, some homes and businesses in the most remote areas are expected to remain out of the scope of the programme, while for others, it will take several more years before the network upgrades are built in their area. The SBVS, therefore, provides 2 distinct levels of subsidy: a voucher worth up to GBP 5 000 to help deliver a permanent broadband connection to those properties which are out of the scope of the R100 plan; and a voucher worth up to GBP 400 to help deliver an interim connection to those properties for which R100 broadband is planned but not until 2022 or later. Properties in more difficult-to-reach locations may be eligible for an additional subsidy of GBP 250. Funding for both voucher programmes comes from the respective governments.

Project and auction-based subsidy programmes to drive change at scale

Several governments have used subsidies as a tool to encourage service providers to expand their networks into areas where they would not otherwise invest. As a relatively minor market intervention (as compared to public options and other interventions covered here), these programmes can quickly deliver connectivity upgrades. In most rural communities across the OECD, the incumbent provider and therefore a likely subsidy recipient, is a privately owned for-profit company; in many cases, it is the country's largest telecommunications corporation. The use of public funds to build what then becomes private assets can attract controversy. To address this, several governments have tied public subsidies to requirements for open access, such that incumbent providers must make their lines available to new entrants. However, the success of these efforts in creating competitive marketplaces may be somewhat tied to the technology used. If open access is applied to true next-generation technologies like fibre (FTTH), it may lead to competition that delivers continuous improvements well into the future. On the other hand, if it is applied to technology leveraging legacy infrastructure, like VDSL, then the business case for upgrading the legacy infrastructure may be further weakened.

Spain

In recent years, Spain has emerged as a connectivity leader in Europe, with the country's regulatory environment a key driver of private sector-led investment in fibre networks. Two regulatory measures have been key:

- Third-party network access obligations on the formerly state-owned incumbent, Telefónica, were capped at 30 Mbps, meaning that new entrants could use Telefónica's network to deliver connectivity at up to those speeds, with Telefónica obligated to sell them wholesale access at regulated pricing.
- Telefónica was obligated to permit new entrants to use their ducts to build their own networks.

Together these rules provided incentives for Telefónica and others to install fibre, since at speeds above 30 Mbps they would not have to provide access to competitors, strengthening the business case for their investment by reducing the time needed for them to achieve positive returns. The result has been a rapid rollout of FTTH connectivity across the country, with fibre as a percentage of total fixed broadband connections growing from 35% in 2016 to 67% in 2019 ((OECD, 2020[42])). Telefónica claims that Spain now has more installed fibre than France, Germany, Italy and the UK combined (Telefónica, 2020[59]). The supportive regulatory environment is bolstered by subsidies outside of the cities. Backed by funding from the European Regional Development Fund, Spain has delivered two major programmes to subsidise connectivity investment in these areas:

- Next Generation Broadband Expansion Programme (NGBEP) – This programme is intended to support the investment effort of private operators, with the aim of extending the deployment of high-speed broadband networks (more than 100 Mbps) to the most rural areas. From 2013 to 2020, the programme held annual application windows for providers to propose projects through a competitive application process. Funding was a mixture of grants and repayable loans. Beneficiaries of the aid are obliged to offer wholesale access to the subsidised infrastructure for a minimum period of seven years from the date of entry into service. Funding over the 7 years totalled approximately EUR 540 million, around 80% of it in loans and 20% grants.
- The 300x100 Project – Following on from the NGBEP, this 300x100 project aims for even faster connections, targeting connectivity of at least 300 Mbps to 100% of premises nationwide. The project is distributing up to EUR 525 million to fund specific projects in rural areas.

United States

The US Department of Agriculture (USDA)'s ReConnect programme is a pilot initiative aimed at increasing broadband development in rural areas through the provision of federal grants, loans and combinations thereof. Eligible applicants include for-profit companies, non-profit entities, and state and local governments. Up to USD 600 million is being made available through the current allocation, approximately 50/50 grants and loans (USDA, 2019[60]). Applications will be assessed against criteria such as the rurality of the location, the number of farms, businesses, educational and medical facilities and the number of essential community facilities (e.g. emergency centres) that are included in the proposed service area. A minimum bandwidth of 10 Mbps download and 1 Mbps upload is required, though bonus points are available during assessment for connections that can sustain a symmetric 100 Mbps.

In 2019, the Federal Communications Commission (FCC) proposed to establish a USD 20.4 billion Rural Digital Opportunity Fund (RDOF) that will, through a series of reverse auctions, distribute funding to service providers with the aim of improving connectivity in rural areas. The programme is targeting over 6 million homes. The first auction is expected to take place in October 2020 and the criteria include consideration for both speed (upload and download) and latency.

In addition to these programmes, the US government has an American Broadband Initiative (ABI) that aims to increase the transparency and responsiveness of federal processes with regard to broadband and to better leverage federal assets in its provision. Among the objectives of the ABI is to increase co-ordination between the USDA and the FCC to ensure their respective programmes are complementary and not overlapping.

Canada

Given its size, challenging terrain and low population density, rural and remote broadband provision in Canada has been a key challenge for the government for many years. Several different federal programmes have provided subsidies to service providers in an effort to have them improve the connectivity in these areas (Table 5.4). The government of Canada currently targets making a minimum speed of 50/10 Mbps (download/upload) available to at least 90% of households and businesses.

Table 5.4. Major federal broadband programmes in Canada

Programme	Department responsible	Description
Connecting Canadians	ISED	Since 2015, the Connecting Canadians programme has helped households in rural and remote areas get access to high-speed Internet and participate in the digital economy. Connecting Canadians projects are expected to provide up to 350 000 households with improved connectivity. The programme ends in 2020.
Connect to Innovate	ISED	Launched in 2016, the Connect to Innovate programme is supporting over 220 different projects across Canada, which have the potential to impact 390 000 households. When completed, these projects will bring high-speed Internet access to approximately 975 rural and remote communities, including 190 Indigenous communities. Most projects are currently in the building phase and many are expected to be completed in 2020.
Universal Broadband Fund	ISED	The Universal Broadband Fund will provide up to CAD 1 billion over 10 years to support broadband projects across Canada. The fund is still in development and details of the funding mechanism have not yet been announced, however, it is intended to address the needs of rural and remote communities, and it is expected to launch in 2020.
CRTC Broadband Fund	CRTC	The CRTC is providing a CAD 750 million fund to support projects that will provide broadband Internet and mobile wireless services in eligible underserved areas of Canada.
CIB Broadband Funding	CIB	The Canada Infrastructure Bank plans to invest up to CAD 2 billion to accelerate connectivity in underserved communities by focusing on the development and execution of large, high impact projects. They will provide low-cost, flexible financing, in co-operation with Internet service providers and potentially other governments (e.g. provincial, municipal). Aims to connect more than 750 000 households, businesses and institutions.

Note: ISED = Innovation Science and Economic Development Canada; CRTC = Canadian Radio-television and Telecommunication Commission; CIB = Canada Infrastructure Bank.
Source: ISED (2020[61]), *Homepage*, http://www.ic.gc.ca/eic/site/icgc.nsf/eng/home (accessed on 15 May 2020); CRTC (2020[62]), *Homepage*, https://crtc.gc.ca/ (accessed on 15 May 2020); CIB (2020[63]), *Homepage*, https://cib-bic.ca/en/ (accessed on 15 May 2020).

In addition to these major programmes, specific funds are available for remote communities in the far north and Indigenous communities, through the rural and northern communities' stream of the Investing in Canada Plan and the First Nation Infrastructure Fund respectively. Connectivity in the Arctic region is particularly challenging, yet the importance of achieving it was recently highlighted in a report by the Arctic Council Taskforce on Improved Connectivity in the Arctic (Artic Council, 2019[64]). In addition to other issues highlighted in this report, the council report noted the importance of redundancy in the connection, especially for health clinics, schools and other services where network reliability is critical for these services to be delivered effectively.

Funding through all of these programmes is distributed on a project basis to selected applicants following a competitive process. Applicants are asked to provide detailed information such as the specific communities involved and the number of people/households impacted, the speeds that will be achieved and the technology used. ISED programmes are funded through general government revenue, while the CRTC's Broadband Fund is funded through a universal service contribution levied on telecommunication service providers. The Canada Infrastructure Bank makes use of federal funds but also seeks private investors.

Canada's major telecommunication companies are significant recipients of these subsidies: for example, Telus Communications received CAD 23.5 million from the Connecting Canadians programme (ISED[65]) and with the Connect to Innovate programme, 48% of the approved projects (106 of 219) have been with Bell Canada, which has received over CAD 50 million (ISED[66]) towards those efforts. Funds provided typically do not need to be repaid, nor does the government take equity in the provider.

Driving competition through the creation of publicly owned market entrants

Ensuring the adequate and equitable provision of connectivity is an issue that is often taken into public hands. While public monopolies are uncommon today in the communications sector, much more common is the establishment of public providers that compete with the private sector, this is particularly true at the local and regional levels.

SaskTel

SaskTel, first established in 1908 to provide telephone services, is a provincially owned company that today offers mobile and fixed broadband in one of Canada's most rural provinces, Saskatchewan. With the guiding principle that rural and remote residents should have access to quality, advanced services at rates reasonably comparable to urban residents, the company has built the most comprehensive network in the province, with better coverage in rural and remote areas than any private provider. This has included working with the federal government to provide fibre broadband to health centres and schools in Indigenous communities. The company competes in the market alongside Canada's major private providers (i.e. Bell, Rogers, Telus), offering a public option that helps to boost competition. In 2017, Canada's Competition Bureau found that the presence of strong regional players in the Prairie Provinces had led to substantially lower pricing for mobile subscriptions in this region of Canada, and that data usage by residents was also substantially higher (Competition Bureau Canada, 2017[67]). The company operates profitably, paying for its network development with its revenues as well as paying dividends to the provincial treasury.

Reykjavik Fibre Network

Another example is found in Iceland, where one of the world's highest rates of fibre connectivity has been achieved thanks in part to the municipally-owned Reykjavik Fibre Network (known locally as Gagnaveita Reykjavikur). The fibre network has been developed by Reykjavik Energy, a for-profit utility that is owned by the Icelandic capital's municipal government. The utility provides electricity, water and waste-water treatment services in addition to fibre connectivity. Though the network began in the capital city, it has since been expanded to neighbouring regions and is continuing to expand.

The network is based on a wholesale open-access model, with subscribers able to select between multiple providers for the services they receive. The construction of the municipally-owned network has not displaced the private sector; Iceland's major telecommunications company continues to own and built its own network in competition with the Reykjavik Fibre Network. To minimise the disruption associated with construction (trench digging, road closures, etc.), the private and public network builders signed a co-operation agreement in 2018 such that whenever one of them installs a new section of fibre, it will install two independent lines in the trench at the same time so that the ground need only be dug up once (Iceland

Competition Authority, 2018[68]). Combined, these 2 fibre networks now connect more than 120 000 Icelandic homes, 82% of all homes. As of April 2020, 65.9% of Icelandic households were making use of the connection, the highest proportion in Europe (Ljósleiðarinn, 2020[69]).

While the Reykjavik Fibre Network is being built by Reykjavik Energy on a commercial basis, in the most remote areas of the country, some national government subsidies have been made available to connect outlying premises. This funding, through the Iceland Connected to Light initiative, is provided to municipal governments to co-fund their network development activities. Iceland considers local government participation vital to bringing fibre networks to rural areas. Three project application rounds took place between 2016 and 2019, each distributing ISK 450 million with the objective of connecting up to 6 000 premises.

Sunet and municipal fibre in Finland and Sweden

Other examples have been considered in previous OECD documents, such as municipal fibre in Sweden (OECD, 2018[36]). Swedish municipalities began building their own fibre networks in the mid-1990s following the liberalisation of the telecommunication market. Within a few years, these networks grew to cover entire communities, serving homes and businesses and connecting cell towers. Similarly, to SaskTel, these networks have not displaced private operators; rather, they offer effective competition that exerts pressure on the private operators' prices and service levels.

In rural and remote areas, municipal community co-operatives have been formed to build these networks in Finland, Sweden and other countries. Sunet, a non-profit municipality-owned fibre network that connects 55 villages in rural western Finland, is an example of this concept. Sunet is an open-access network that is used by a variety of private-sector service providers to offer connectivity packages to consumers. Sunet however does not charge for this access, opting to bill consumers directly a fixed fee for the network's maintenance. This lowers the barrier to entry for service providers and encourages greater competition. These community projects are made possible through streamlined regulatory approvals at the local level (which reduces costs), voluntary work contributed by local residents and with funding support from the government. In the case of Sunet, a portion of this funding was in the form of a bank loan guaranteed by the local municipalities, coupled with a contribution from the national government (FTTH Council, 2013[70]).

Gaining expertise and sharing risk through public-private partnerships

While all the models examined include roles for public and private actors, those that follow bring these two together in more explicit partnerships aimed at sharing the investment cost and risk of broadband projects. While these examples are not explicitly aimed at rural areas, they may be applied in such settings.

Community Fibre Partnership

British broadband network operator Openreach offers a Community Fibre Partnership (CFP) initiative whereby communities can register their interest in improved connectivity and then work with the company to build a customised fibre solution to bring fibre broadband to the community's homes and businesses. These projects involve a cost-sharing contract between Openreach and the local community which sees the company paying part of the cost and the community paying the rest. Sources of funding for the public contribution at the local level can include the national government's GBVS. As of 2019/20, Openreach has signed 1 330 partnerships connecting 122 000 homes and businesses to fibre through this approach (Openreach[71]).

Westminster, Maryland

The town of Westminster, Maryland, with a population of approximately 18 000 inhabitants, is a community on the outskirts of Baltimore that has traditionally experience weak broadband connectivity. In 2010, the

state of Maryland received a large award from the federal government to deploy a regional fibre network called the Inter-County Broadband Network (ICBN) that included infrastructure in Westminster. Seizing on the opportunity that the ICBN project offered, the town launched an initiative to improve its connectivity through a middle-mile fibre network (Hovis et al., 2014[72]).

With the ICBN project, the city saw an opportunity to expand the last mile of the network to serve residents but it was not well equipped to accomplish this, lacking a municipal organisation with the expertise necessary to tackle this technical challenge. Since Westminster did not have the resources or expertise to develop a municipal fibre network of its own, they decided to take an innovative approach based on a public-private partnership. Westminster would build, own and maintain a fibre network but it would look to a private-sector partner to light the fibre, deliver services and handle relationships with customer residents and businesses. This approach meant the city did not need to have any involvement in the network's operations. The city sought a partner via a request for proposals (RFP) and eventually selected Ting Internet, a Canadian company headquartered in Toronto (Hovis et al., 2014[72]).

Under the terms of the partnership, Westminster is building and financing the fibre network through a bond offering, while Ting leasing the fibre through a two-tier lease payment. Ting was also required to commit to building an open-access network by opening its operations to competitors through wholesale within two years so that other providers can then enter the market. The two-tiers on the lease payments include one based on the number of premises the fibre passes and another based on the number of subscribers Ting enrols. The model shares the risk between the town and Ting. While Westminster took on the bond to build the network, the payment structure with Ting requires that it pay the town a monthly fee for every premise the fibre passes, irrespective whether those premises are subscribers; thus Ting was financially obligated to the city even if it had no customers. This ensured that Ting would be motivated to sign up as many subscribers as possible. An additional mechanism built into the partnership deepened this risk-sharing. In any quarter where Ting's financial obligations to the town were less than Westminster's debt service costs, Ting was obligated to pay 50% of the shortfall, while, in quarters where the company's contributions were larger than the debt service, Ting would be reimbursed an equivalent amount (Hovis et al., 2014[72]).

National Broadband Ireland (NBI)

The government of Ireland has embarked on a major project to provide nationwide access to fibre connectivity. Two features of the NBI initiative are of particular interest:

- The new fibre network is being built with state support only in those areas of the country where the private sector would not invest (i.e. the government's intervention will not apply in the major urban areas where the private sector is providing connectivity).
- The network is being built using a public-private partnership (PPP) model, which reduces the government's costs and exposure to risk, but also means that the new network that is built will be privately owned, operated and maintained.

This process began in consultation with the private sector to determine which areas of the country would be connected on a purely commercial basis. The major incumbent provider, eir (Eircom Limited), a formerly state-owned telecommunications company, indicated which parts of the country they had already connected and which they planned to connect in the near term, and the remaining territory was deemed an intervention area, where state support would be needed. The intervention area is home to about 1.1 million people and 540 000 premises, in rural and remote areas of the country. Having determined the intervention area, the government then partnered with a private-sector investor through a PPP. NBI is a privately owned company that aims to deliver advanced connectivity to all premises in the intervention area, installing up to 146 000 km of new fibre. NBI's investment will be backed by state subsidies of up to EUR 3 billion (over the 25-year term of the agreement). Through the PPP, NBI will own the network and will generate income by selling wholesale access to service providers; however, NBI will also carry risk, as

the government's support is capped so any cost overruns will be borne by the private investors (Department of Communications, Climate Action & Environment, 2019[73]).

With the construction of the new fibre network expected to take up to seven years, an additional feature of Ireland's broadband plan is the inclusion of interim measures for those areas where fibre installation is still some time away. Through the designation of 300 broadband connection points (BCPs), the government and NBI are working to bring connectivity to rural and remote regions more quickly – with temporary wireless connections to these facilities to be installed within the first 12 months. BCPs will be located in buildings such as community centres and sports clubs. These facilities will be provided with a wireless broadband connection (up to 150 Mbps) as a temporary measure until the fibre connectivity arrives in the community and will make access to that connectivity freely available to the public onsite. Some locations will also have additional facilities, such as hot-desking, and may be used as hubs to support local economic and social development initiatives, including digital service delivery. The intent is that these will form an important element of the local digital strategy developed by local authorities to increase adoption and usage of digital technologies by businesses and communities.

Rural hubs like Ireland's BCPs have been used with some success in other countries, including France and the UK, where they are similarly used not only to provide connectivity but to combine that with training and support to develop rural skillsets and foster the uptake of digital tools by local firms and residents (ENRD, 2017[74]).

The complex public wholesale monopoly

The final example demonstrates the creation of a publicly owned wholesale monopoly. The national telephone network in Australia began similarly to that of many other countries as a publicly owned entity within the national postal service. In common with a pattern seen in many countries, Telecom Australia, which became Telstra, was privatised in the 1990s and the market was opened to competition, though in the Australian case, Telstra retained a dominant position in the market. In 2009, the government identified the need to upgrade the country's network infrastructure as a priority and wanted to achieve that in a way that did not re-enforce the already dominant position of Telstra. Estimates at the time indicated that 700 000 households in rural and remote areas had no broadband coverage of any kind and there was a lack of incentive for continued investment. The government decided to use the federal capacity for low-cost borrowing to finance the development of a new national broadband network, one that would support further growth in capacity in the network as a whole as well as pursuing equitable connectivity for rural and remote areas in so far as was technologically possible.

The National Broadband Network (NBN) is one of the country's largest-ever public infrastructure project, funded with AUD 29.5 million of equity and AUD 19.5 billion in debt. Under this initiative, the government is progressively transforming the country's fixed connectivity infrastructure into a for-profit, publicly owned monopoly wholesaler. As a wholesaler, NBN does not sell services directly to the public, rather it sells access to its network to retailers such as Telstra, Optus and TPG telecom, as well as new entrants, on a level playing field basis, making it an open-access network. For those households that were already receiving services over Telstra's voice and ADSL-capable copper, they are notified when NBN has completed its upgrades to their home's connection and they are then transitioned from Telstra's copper to the NBN (they may have a choice of several different providers). Residents are given an 18-month transition period during which they must choose a new NBN-based provider, after which the old cabling is logically disconnected (Department of Infrastructure, Transport, Regional Development and Communications[75]).

The original plan called for 93% of all households and businesses to be connected with fibre to the home/premises, with the new NBN company replacing the old copper wires, but re-using the ducts and exchanges of Telstra for this purpose where possible (something they pay Telstra for permission to do). Of the remaining 7%, fixed wireless technology would be used for 4% and satellite service would be

provided for the remaining 3% (Morrow, 2018[76]). The country launched two geosynchronous satellites named Sky Muster 1A and 1B in 2015 and 2016 to provide satellite coverage. These offer download speeds of 25 Mbps and 5 Mbps upload speeds, albeit with the same latency issues of other geosynchronous offerings. In 2013, the plan was significantly modified to reduce cost and speed up implementation by making use of existing telephone and cable TV wiring for the final section of wiring into people's homes and business premises. Completion of the initial network is expected in 2020 and is intended to deliver speeds of 25 Mbps to all premises, and at least 50 Mbps to 90% of fixed-line premises.

The initial construction cost of NBN has been financed by the government through AUD 29.5 billion in contributed equity and a further AUD 13.1 billion in loans as of 30 June 2019 (NBN Co., 2019[77]). These costs are expected to be repaid through the revenue the network generates in the years ahead. To foster greater equity and inclusion across the country, NBN charges the same wholesale rates to all service providers regardless of their size and it charges the same rates nationwide for each of its delivery technologies (fixed line, fixed wireless and satellite), including in rural and remote areas, where the infrastructure installation costs were said to be higher. While in many parts of the country NBN will be the only fixed-line operator, it does not have legislative monopoly protections and is subject to competition from fixed-line and wireless competitors. Companies including Telstra have indicated they intend to leverage the 5G networks they are building to compete with NBN in the future. This is, however, likely to happen only in the most densely populated urban areas rather than in low-density rural and remote areas.

Unlike Ireland's NBI, which focuses only on the underserved parts of the country, the Australian NBN set out to connect the whole country, including in its densely populated urban areas (which also suffered from underinvestment prior to the creation of the NBN). In the early phase of the rollout, NBN was instructed to deliver its network to areas that were "underserved". This decision has meant NBN delivered high-speed broadband to areas of the country that were most lacking first and has also meant that a uniform standard of broadband has been able to be delivered across the whole Australian continent. This ambitious project has proved very large and very complex.

COVID 19 responses

Across the OECD, response measures during the COVID-19 crisis have included efforts to close the digital divide and accelerate efforts to better connect rural and remote areas. These efforts took on new urgency during lockdown periods where populations came to rely more heavily than ever before on digital connectivity and services while states also sought to leverage technology to maintain delivery of public services such as health and education. Demand for broadband communication services has soared since the crisis began, with some operators experiencing as much as a 60% increase in Internet traffic (OECD, 2020[78]).

The United States' Coronavirus Aid, Relief and Economic Security (CARES) Act allocated an additional USD 100 million to the USDA's ReConnect programme along with USD 25 million for the department's distance learning and telemedicine programme. The FCC also received USD 200 million for a new COVID-19 Telehealth programme. In August 2020, a new bill before congress, the Accelerating Connected Care and Education Support Services on the Internet (ACCESS the Internet) Act, proposed an additional USD 400 million for the FCC's telehealth programme, after it quickly exhausted its original allocation. The programme provides immediate support to eligible healthcare providers responding to the COVID-19 pandemic by fully funding their telecommunications services, information services and devices necessary to provide critical connected care services. The new bill also proposes USD 100 million for the Department of Veterans Affairs to expand its connected health access for veterans in rural and underserved areas after the department reported a 1 000% increase in demand for this service during the pandemic. The bill also includes USD 1.3 billion for the Department of Education to boost distance learning.

In Korea, the government has announced plans to invest a total of KRW 1.3 trillion in the digital transformation of education infrastructure for all elementary, middle and high schools, universities and

vocational training institutions by 2025. This includes plans to deploy high-speed Internet services in all classrooms of elementary, middle and high schools nationwide by 2022, the replacement of 200 000 old personal computers and laptops for teachers and the provision of 240 000 tablet PCs at 1 200 schools designated as Pioneers for Online Textbooks. The government will also establish an Integrated Platform for Online Education that can offer a variety of customised educational materials. Online education provided at universities and vocational training institutes is also being enhanced.

In Canada, part of the federal government's COVID-19 response has been to accelerate delivery of its existing rural and remote connectivity programmes, pushing the funding out more quickly than originally scheduled to connect more communities more quickly. At the subnational level, the Ontario government announced a CAD 315 million initiative to improve rural fixed and mobile broadband services, some of which may be co-invested in projects with the federal government. In an effort to tackle not just the accessibility but also the affordability aspect of getting connected, Ontario also announced a partnership with Apple and Rogers Telecommunications to provide low-income students with iPads and free mobile data plans so they could continue their education during school closures.

Conclusions

Digital services like distance learning and telemedicine have moved to the forefront of public discourse during the COVID-19 pandemic. The potential of these technologies to deliver services that are efficient, effective and resilient is increasingly recognised, as is the understanding that over time these tools will continue to evolve with the ever-increasing capability and transformative effects. Just as was the case with the PLATO system 60 years ago, connectivity is key. Without it, these technologies, with all of their promise, cannot function. Equitable access to connectivity across terrain is, therefore, a priority for national development and cohesion throughout the OECD, yet some disparities remain. In developing digital services, the connectivity available in the targeted rural areas is, therefore, a key consideration, with latency, symmetry, data caps and upload speed all important factors in addition to download speed. Awareness of digital tools and the skills necessary to use them among the local population may also be an issue in rural areas. The government can tackle both these challenges by providing facilities in rural locations with the necessary connectivity and then using those facilities to provide hands-on support to local residents and businesses to help them understand the potential of the new technology and make the most of it.

Some of the most successful initiatives to bring broadband to rural and remote places have been locally-led, driven by municipalities, small-scale co-operative organisations and, in many cases, with the help of volunteers. While major telecommunications companies are occasionally accused of neglecting rural areas, locally-led initiatives benefit from the commitment of the people who live there, who are likely more deeply invested in their community's success. Local control brings real benefits beyond emotional commitment. Planning permission, construction permits and other regulatory instruments necessary to dig trenches are typically within the responsibilities of local governments. These initiatives also benefit from voluntary labour and greater public support, which has been seen to both lower the cost of building the networks and lead to higher uptake of service once it is built.

Some rural areas have benefitted from the longstanding expertise of their local public or co-operative telephone company. These organisations stood ready to provide the necessary expertise that would permit them to build their own broadband networks without the involvement of major telecommunication companies. In areas where such expertise is not available at the local level, a PPP may offer an alternative approach to attain the necessary skills while reducing the community's risk. PPPs have also been leveraged for broadband development at the national level with the same risk-mitigating benefits.

Project- and auction-based subsidy initiatives enable central governments to quickly deliver a large number of connectivity upgrades in many low-density rural and remote places, though these may only offer a short-term solution. Without fixing the underlying market failures that brought about the lagging connectivity in

the first place, any upgraded capacity may fall into obsolescence as technology continues its inexorable march, necessitating further rounds of subsidy in future years. In some areas, governments have sought to fix these underlying market problems. Voucher initiatives are a relatively recent form of subsidy which can deliver local control by letting users decide which provider to buy from and which technology to deploy, these may be simpler to administer for the government and also simpler to access for providers. The cost of connecting different places can vary in relation to terrain, remoteness and other factors however, an important consideration in relation to vouchers that offer a fixed amount of support.

In terms of technology, a nuanced agnosticism that prescribes no particular approach yet which leans towards those technologies with the greater potential for future growth may be helpful in driving necessary investment in places where incumbent providers are reliant on legacy networks.

Since national governments cannot force community groups to take the lead and since community-led initiatives alone might deliver wide geographical disparities in outcomes, an approach that combines national initiatives that prioritise access equity, with initiatives like voucher schemes that promote greater local control, offer an approach towards sustainable and inclusive connectivity.

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Notes

[1] Speech of Andreas Schleicher, OECD Director for Education and Skills, and Special Advisor on Education Policy to the Secretary-General, to the OECD Forum (https://www.oecd-forum.org/rooms/oecd-forum-virtual-event-schooling-in-times-of-covid-19).

[2] The Australian health system is a complex mix of programmes and services. It includes public and private hospitals, primary healthcare services and referred medical services. Founded on the principles of universal health coverage, free access to public hospital services and partially or completely subsidised access to medical services (through the Medical Benefits Schedule, MBS) and medications (through the Pharmaceutical Benefits Scheme, PBS), are available to all Australian residents and certain categories of visitors to Australia. More information can be found at https://www.health.gov.au/health-topics/medicare.

[3] The *Ségur de la santé* follows a decree of the French government published on 10 March 2020 which aims to relax the conditions of access to teleconsultation for the duration of the pandemic, such as prior knowledge of the doctor by the patient, which implies that the patient has had at least one face-to-face consultation with the doctor in the 12 months preceding the teleconsultation.

[4] A legal notice published on 3 September 2020 in the *Journal officiel de la République française* (Official Journal of the French Republic) questioned the government's provisions on telemedicine during the pandemic. The notice aims to recover the requirement of prior knowledge of the teleconsultant and prevent telemedicine from leaving the co-ordinated care path (which consists of entrusting the attending physician with the co-ordination of care for the medical follow-up of patients). Link to the legal notice: www.legifrance.gouv.fr/jorf/id/JORFTEXT000042302716/.

6 The governance of public service delivery across territories

The provision of health and education services has become increasingly decentralised in OECD countries, affecting how public services are delivered across territories. This chapter analyses the relationship between decentralisation and the provision of public services, while discussing the challenges of decentralisation and multi-level governance, such as overlapping responsibilities and coordination. It also examines how subnational governments and schools organize the provision of education services and looks at strategies to make this provision more effective through governance solutions. Finally, the chapter assesses the benefits and challenges of decentralising the diverse health systems in OECD countries and the quality of health care according to the degree of decentralisation.

Introduction

Public social, education and health services have expanded in the last century, including those with universal access. The increasing expenditures on social and health care provision place governments in a challenging position, particularly where there is a tandem decline in tax revenue due to a smaller working-age population. How should decisions about the location of these services be made and what types of evaluative frameworks can be used to help guide these decisions? Even in countries where the national government is not responsible for health, social services or education, the nature of fiscal relations, in turn, structures the ability of subnational governments to respond. Chapters 3 and 4 discussed territorial approaches to the provision of education and health care. The present chapter focuses on the question of how governments organise the provision of education and health care services across national territories.

The scope of services provision and the role of the government in providing them have not been constant. Over the past decades, there is a discernible trend towards decentralisation across many OECD countries. Subnational governments play an increasingly critical role in the delivery of many essential public services and this has affected how public services are delivered across different territories. Decentralisation, devolution, regionalisation and privatisation have taken place to varying degrees. While some view this as the "hollowing out" of the state, others describe it as public management efficiency and needed reform (Rhodes, 1994[1]). Debates about public services are thus fundamentally linked to debates about the role of the government.

The arguments for and against decentralisation play out in public policy across OECD member countries. Where public services have been decentralised, upper-level governments (national or regional depending on whether it is a unitary or federal state) generally continue to play a role in defining, monitoring and assessing the quality of public services. They are also centrally concerned with addressing equity – this may include equity of access to public services for different populations (e.g. those that are deemed marginalised and at risk) and equity of access and quality across different territories. There, redistributive fiscal policies are important. Conditional intergovernmental transfers can be used to ensure that subnational governments design their programmes to national standards. Equalisation mechanisms can also be used to reduce territorial inequalities. These can be structured in a number of ways and may or may not account for population characteristics and population density, fiscal and institutional capacities. This chapter elaborates on these aspects in greater detail.

The first part of this chapter discusses the relationship between decentralisation and public service provision and outlines the challenges of multi-level governance in the context of public service provision. The second part discusses the role of subnational governments and schools in education-related decision-making and outlines strategies to increase the efficiency of education delivery through governance solutions. The third part discusses the decentralisation of health systems in OECD countries and discusses the possible effects of higher decentralisation on the quality of healthcare.

Decentralisation, multi-level governance and service provision

The OECD defines decentralisation as a set of measures that transfer a range of powers, responsibilities and resources from the central government to subnational governments. In a decentralised system, subnational governments are governed by political bodies with assemblies and executive bodies and have their own administrative staff. In a decentralised setting, subnational governments can raise own-source revenues, such as taxes, fees and user charges and they manage their own budget.

Decentralisation can take different forms: i) delegation wherein the central government transfers decision-making and administration to regional or local governments; and ii) devolution wherein the central government transfers authority for decision-making, finance/taxation and administration to regional or local governments. The degree of decentralisation also depends on the extent of political, administrative and

fiscal autonomy of subnational units. See Box 6.1 for an explanation on the difference between these concepts and deconcentration.

Decentralisation reforms can be motivated by various political, administrative and fiscal reasons (Rondinelli, Nellis and Shabbir Cheema, 1983[2]). From an economic and fiscal perspective, decentralisation has been a method to improve the efficiency of public services and curb the growth of government spending. From a political viewpoint, decentralisation of authority is often expected to result in more accountable and transparent public governance, lower corruption, higher political participation and policy innovation (OECD, 2019[3]). Any decentralisation discussion should have clarity on the difference between devolution, delegation and deconcentration.

Box 6.1. Devolution, delegation and deconcentration

Important differences between these concepts

Devolution and delegation form the two main degrees of decentralisation (Rondinelli, Nellis and Shabbir Cheema, 1983[2]). In devolution, national governments transfer functions to a subnational government with decision-making powers. Compared with delegation, devolution is a stronger form of decentralisation because devolution assigns real powers from the central government to lower-level autonomous governments, which are legally constituted as separate levels of government. In contrast, delegation transfers limited decision-making and administrative authority for specific tasks from the central government to subnational governments. In delegation, subnational governments act merely as agents for the central government and remain under the direct or indirect control of the central government. In fact, the delegated tasks may be withdrawn or altered by the central government. Regulations and contracts allow delegating tasks from the central government to a subnational government.

Decentralisation should not be confused with deconcentration. Deconcentration is a governance model, which alters the responsibilities within levels of organisation. For example, tasks may be shifted within the central government organisation from the ministry to central government-led offices in regions. In most countries, the central government has established regional offices for planning, monitoring and co-ordination purposes and for granting permits and licences. Deconcentrated central government tiers may co-exist with fiscally and legally self-governing regional or local governments. From this perspective, then, it is a mistake to consider reorganisation of health care into smaller units as decentralisation. It is not uncommon that health sector reforms have been labelled “decentralisation”, even when it is not clear that the term applies (Saltman, Bankauskaite and Vrangbæk, 2007[4]).

Source: Rondinelli, D., J. Nellis and G. Shabbir Cheema (1983[2]), *Decentralization in Developing Countries A Review of Recent Experience*, World Bank.

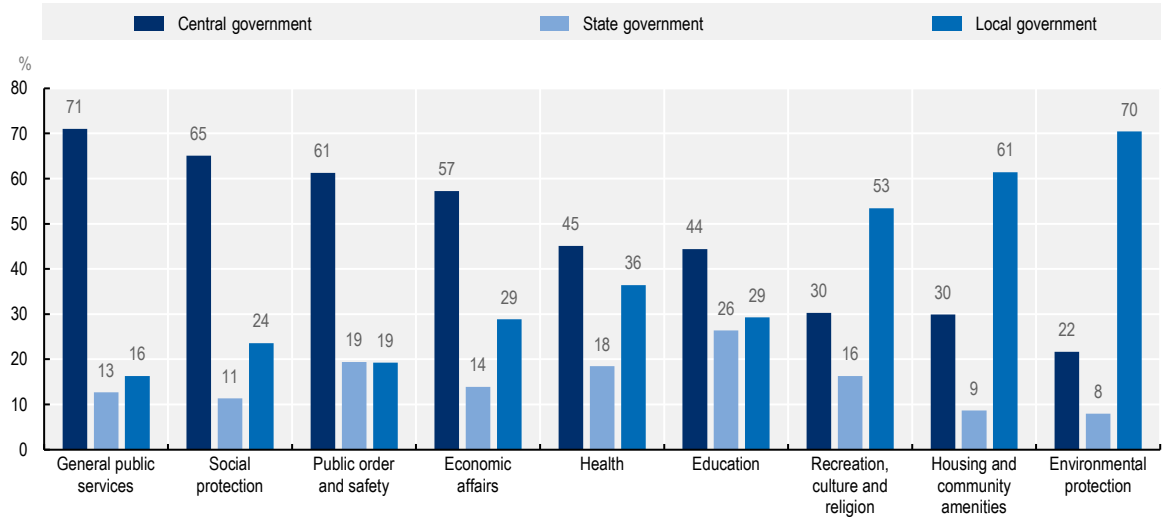
Overall, there are no clear-cut frontiers within decentralised governance systems. Rather, there are different degrees of decentralisation, depending on the extent of political, administrative and fiscal powers that have been assigned to lower levels of government. In this framework, full devolution of health services is a relatively rare phenomenon (this will be discussed in more detail in a later section). In social services or education, decentralisation is much more common and widespread.

Expenditures are another way of characterising who does what and the level of centralisation versus decentralisation of public services in a country. Across the EU28, central government expenditures consisted of around 60% of all expenditures in 2017 while the state (regional) and local governments were responsible for around 15% and 25% of total expenditures across all functions (including spending on

defence) (Figure 6.1). Across the various functions, EU28 central governments had the highest expenditures in general public services, social protection, and public order and safety (at 71%, 65% and 61% respectively within each function category).

Figure 6.1. Government expenditure by function and level of government, EU28

Percentage out of total expenditure by function, 2017



Note: Chart excludes defence spending which is almost entirely the purview of central governments. Data excludes social security funds. Government function according to the Classification of the Functions of Government (COFOG).
Source: Eurostat (2020[5]), *General Government Expenditure by Function (COFOG)*, https://ec.europa.eu/eurostat/web/products-datasets/-/gov_10a_exp (accessed on 15 May 2020).

StatLink https://doi.org/10.1787/888934226785

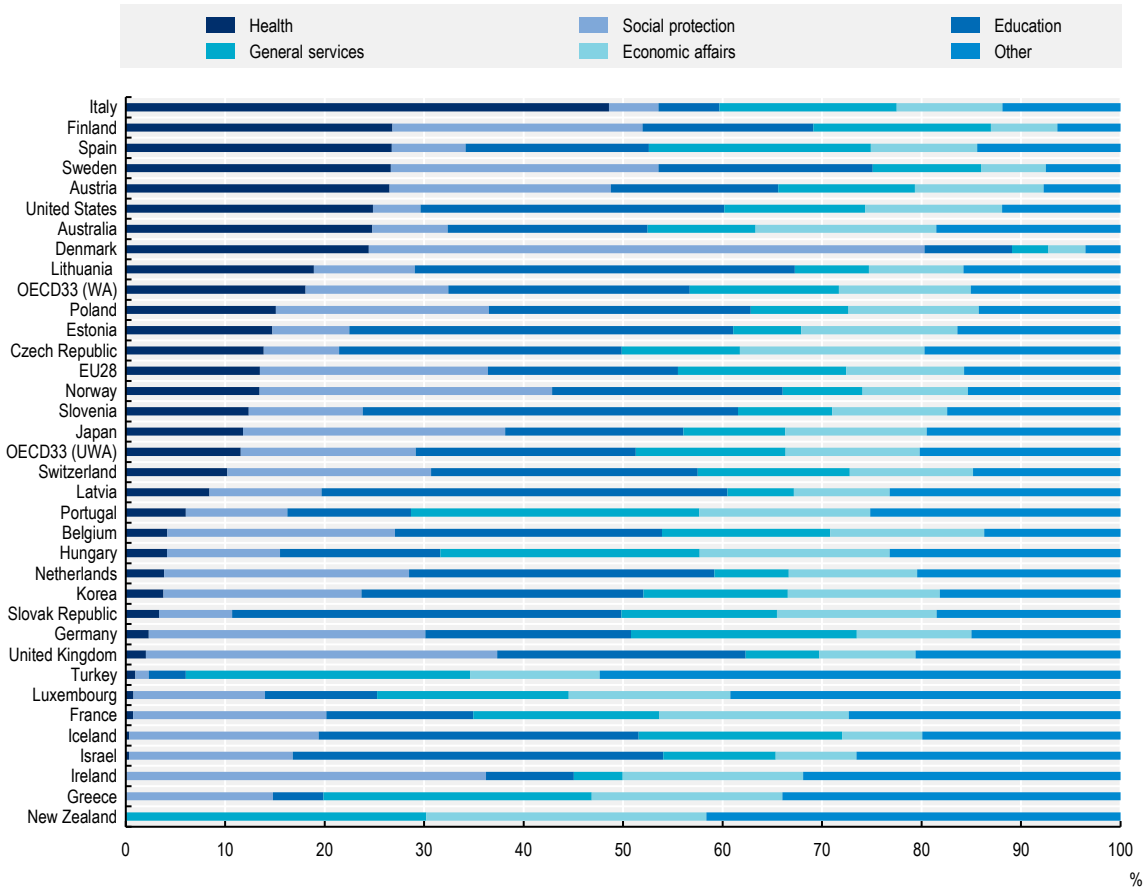
In contrast, local governments held the highest share out of total expenditures in environmental protection, housing and community amenities and health respectively (at 70%, 61% and 36% respectively out of each function category). State/regional governments do not dominate any category of expenditure by function. However, they are most active in the area of education, accounting for 26% of all expenditures in that category among levels of government. In the OECD, education, social protection, general services and economic affairs form the most important service categories for subnational governments (Figure 6.2).

Spending and revenue assignments to subnational government

Decentralisation consists of decentralised spending and revenue assignments, transfer system and well-functioning local democracy. For example, an effective accountability mechanism of decentralisation requires that local residents have a strong incentive to evaluate the efficiency of their local administration. Such incentive exists if a considerable share of local public services is financed with local taxes. If local residents must finance additional spending by paying more local taxes, they will have a strong incentive to monitor their local administration and, if needed, punish them for poor performance (OECD, 2019[3]). Obtaining the full benefits from decentralisation requires careful implementation of the decentralised system, as explained in more detail in Box 6.2.

Figure 6.2. Subnational government expenditure, sectoral spending shares

2017, Classification of the Functions of Government (COFOG) classification



Note: Category "Other" is the sum of categories Defence, Public order, Environment, Recreation, Culture and Religion, and Housing and community. No data for Canada, Chile and Mexico. For the United States (US), data showed in the function "Housing and community amenities" include the "Environment protection" function data. OECD7 and OECD26 refer respectively to the averages for OECD federal countries and OECD unitary countries. (WA) denotes weighted average and (UWA) means unweighted average of countries included.

Source: OECD (2020[6]), "The territorial impact of COVID-19: Managing the crisis across levels of government", https://doi.org/10.1787/d3e314e1-en; OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020); estimates from IMF Government Statistics for Australia and Chile; OECD (2020[8]), *Regions and Cities at a Glance 2020*, https://doi.org/10.1787/959d5ba0-en; OECD (2020[9]), *Regional Statistics*, https://www.oecd.org/regional/regional-statistics/.

StatLink https://doi.org/10.1787/888934226804

Box 6.2. Current debates on the benefits of decentralisation

Is more decentralisation always desirable?

Decentralisation has been associated with a number of economic, political and administrative benefits, such as better efficiency of public service delivery, improved accountability and transparency of public decision-making, and strengthened citizen participation in government. Decentralisation has also been found to constrain rent-seeking and corruption in the public sector (OECD, 2019[3]). Moreover, decentralisation can provide a platform for experimenting and bottom-up policy innovation.

Decentralisation has also been found to associate with enhanced overall and regional economic growth as well as lower regional disparities in economic growth (Bartolini, Stossberg and Blöchliger, 2016[10]). While a positive correlation with decentralisation and economic growth does not imply causality, there is evidence that decentralisation contributes to economic capacity in ways that can lead to faster growth. It has been argued that subnational fiscal power is associated with higher economic activity through productivity and human capital improvement, for example, because investment in physical and human capital increases with decentralisation (Blöchliger, 2013[11]). Furthermore, decentralisation can lead to better-performing education systems, which in turn may contribute to growth (Blöchliger, Égert and Fredriksen, 2013[12]). Regionalisation may as well correct inter-regional disparities and give local actors the means to implement better regional development policies such as EU funds management in the European Union (EU) (Morgan, 2006[13]).

The opponents of decentralisation doubt such positive effects of decentralisation and instead emphasise the risks and challenges of decentralisation. The potential problems of decentralisation mentioned include especially diseconomies of scale, inability to deal with externalities, weaker stabilisation policy, increased inequity and corruption. Many of the potential issues of decentralisation can, however, be solved with careful design and implementation.

Source: OECD (2019[3]), Making Decentralisation Work: A Handbook for Policy-Makers, https://dx.doi.org/10.1787/g2g9faa7-en; Bartolini, D., S. Stossberg and H. Blöchliger (2016[10]), "Fiscal Decentralisation and Regional Disparities", https://dx.doi.org/10.1787/5jlpq7v3j237-en; Blöchliger, H. (2013[11]), "Decentralisation and Economic Growth - Part 1: How Fiscal Federalism Affects Long-Term Development", https://dx.doi.org/10.1787/5k4559gx1q8r-en; Blöchliger, H., B. Égert and K. Fredriksen (2013[12]), "Fiscal Federalism and its Impact on Economic Activity, Public Investment and the Performance of Educational Systems", https://doi.org/10.1787/5k4695840w7b-en; Morgan, K. (2006[13]), "Devolution and development: Territorial justice and the North-South divide", http://dx.doi.org/10.1093/publius/pjj003.

Spending assignments: Theory and practice

The economic theory divides public functions into three branches: allocation, redistribution and stabilisation (Oates, 1972[14]; Musgrave and Musgrave, 1980[15]). In this framework, the stabilisation function is considered to be mostly the responsibility of the central government as it is best suited to deal with monetary and fiscal policies. Also, the redistribution function is regarded mostly as the central level's responsibility because the central government is much better positioned to carry out income redistribution from the rich to the poor and in establishing minimum standards of public services across regions.

The allocation function – i.e. public services provision – can be the responsibility of both the central government and subnational governments. In allocation, the central level of responsibility is best applied when the services have no specific local interest. Subnational government responsibility is justified when the benefits of the goods or services are spatially limited and if the preferences for the service-tax mix are heterogeneous. Moreover, according to "Decentralisation theorem" (Oates, 1972[14]), the subnational level is the most suitable level to provide public services, unless the central government has a clear advance in service provision. This could be, for example, if the central government is clearly better able to utilise economies of scale in public service provision.

The services with mostly local effects, such as local infrastructure, sewerage, local land use, housing or basic education, are usually considered best suited for subnational government provision. For such public services, both *direct* and *indirect* benefits can be obtained from decentralised service provision. Probably the most important direct benefit from decentralisation is the ability of regional and local governments to tailor the services to meet residents' needs, the so-called allocative efficiency effect. The basis of this argument is that subnational governments often hold valuable information on local demands and conditions. Obtaining such information would be costly for the central government and therefore the central level is likely to provide a uniform level of public output in all jurisdictions. Therefore, if the preferences and

needs between local jurisdictions differ in these services, the subnational governments have the potential to outperform central government in allocating public sector resources (OECD, 2019[3]).

The central government usually has a strong interest in ensuring equity for citizens in different parts of the country, especially in the event of decentralised redistribution. Therefore, central governments tend to retain responsibility for *designing and planning the policy, setting the standards and carrying out the oversight* (the first column of Table 6.1). Even in the case of strong central government steering and monitoring, it is justified that regions and local authorities are involved (or at least heard) in planning policies and service standards because subnational governments hold important information on local conditions. For public services with mostly local effects, the regions and local government can more freely design their own policies and service delivery methods.

As for *service provision and administration* (second column of Table 6.1), the responsibility of regions and local governments is justified in particular in case of services with mostly local of regional benefits, such as local and regional land use planning, water and sewerage, solid waste disposal, fire protection and police. Regional governments should be responsible for services with regionwide benefits such as regional economic development or transportation. It should also be noted that in the case of some services, central government responsibility for service delivery can also be justified if considerable externalities are involved. Examples of such services include roads of national importance, services dealing with natural resources, specialised health, higher education and social welfare. In these cases, shared responsibility across levels of government is often justified, as the externalities may vary in scope.

Table 6.1. Assigning spending responsibilities in a multi-level government framework

	Policy, standards, oversight	Service provision, administration	Production, distribution	Comments
Local land use planning, building permits	N, R, L	L	L	Mainly local benefits
Regional land use planning	N, R, L	R	R	Externalities, mainly regional benefits
Water and sewers	N, R, L	L	L, P	Mainly local benefits
Solid waste	N, R, L	L	L, P	Mainly local benefits
Fire protection	N, R, L	R, L	R, L	Mainly regional or local benefits
Police	N, R, L	R, L	R, L	Mainly regional or local benefits
Parks, recreation	N, R, L	R, L	R, L, P	Benefits vary in scope
Public transport	N, R, L	R, L	R, L, P	Externalities vary in scope
Economic development	N, R, L	R, L	R, L	Externalities vary in scope
Roads	N, R, L	N, R, L	R, L, P	Benefits vary in scope
Natural resources	N, R, L	N, R, L	N, R, L, P	Benefits vary in scope
Environment	N, R, L	N, R, L	N, R, L, P	Externalities vary in scope
Education	N, R, L	N, R, L	R, L, P	Externalities, transfers in kind
Health	N, R, L	N, R, L	R, L, P	Externalities, transfers in kind
Social welfare	N, R, L	N, R, L	R, L, P	Redistribution

Note: N = National; R = Regional; L = Local; P = Private or non-governmental.
Source: Author's modification and extension of the material presented in Bahl, R. and R. Bird (2018[16]), *Fiscal Decentralization and Local Finance in Developing Countries*, https://www.e-elgar.com/shop/gbp/fiscal-decentralization-and-local-finance-in-developing-countries-9781786435293.html.

While in general, these theoretical principles seem to correlate with the policy practices observed in different countries, there are also important differences between countries in the implementation of spending assignments. In some unitary countries, such as the Nordic countries, subnational governments have exceptionally wide-ranging responsibilities, as the regions and municipalities in the Nordic countries provide most redistributive services (education, health and social services). In other countries, like in Chile, France, Italy, New Zealand and Portugal, education and health services are largely provided by the central government, or, even if services are partially decentralised, the delivery is strictly regulated (OECD, 2019[3]; OECD/UCLG, 2019[17]).

In practice, spending assignments across levels of government depend not only on economic efficiency arguments but also on historical, cultural and political factors. The question is how to manage the shared assignments and responsibilities so that each level of government can focus on its own tasks and that there are no incentives to shift costs to other levels of government. In recent years, many countries have attempted to reform spending assignments. For example, in Denmark, an important goal of the subnational government reform in 2007 was to reduce the shared responsibilities and to diminish incentives for cost-shifting between government levels. At the same time, the number of municipalities and counties was reduced and the spending assignments were reorganised between levels of government. Counties were assigned the responsibility for most demanding healthcare services including hospital services. Municipalities gained responsibilities for health promotion, social welfare and education. In the Netherlands, the decentralisation reform of 2012-15 focused on reallocating competencies between the different levels of government and establishing a simpler and clearer division of responsibilities between the different public actors (OECD, 2019[3]).

Assigning subnational government revenues: The "finance should follow function" principle

The usual recommendation for decentralising revenues is that finance should follow function. In other words, the spending assignments should be defined before making decisions on subnational government revenue sources. More importantly, the spending assignments should largely define the subnational government own revenue assignment (and not vice versa) and the design of the transfer system (Boadway and Tremblay, 2012[18]).

There are two key decisions to be made with respect to revenue assignment to subnational governments: first, given the spending assignments, which revenue bases should be allocated to subnational government levels and second, how much responsibility the subnational governments should have in financing their own expenditures. Table 6.2 summarises the appropriate subnational government revenues for different expenditure categories. *User charges* are considered the most efficient local financing instruments, provided that two conditions are fulfilled: i) the benefits of local public services and goods in question are spatially limited within the borders of the jurisdiction; and ii) the exclusion principle[1] can be applied in pricing. As is summarised in Table 6.2, user charges can form the primary source of funding in public utilities, such as water, sewerage, public housing and public transport (Bahl and Bird, 2018[16]).

Local taxes should be the primary revenue source for most other local public spending categories, provided that the benefits of these services accrue mostly to the local population. This would secure the principle that those who bear the local tax burden will also receive the benefits from the expenditures that are financed by the local taxes. Such services include general administration, primary education, local streets, lightning, drainage, garbage collection, public parks, fire protection, police and recreation services (Bahl and Bird, 2018[16]).

For the services with major externalities and benefit spill-overs to other jurisdictions or the whole country, like major roads and highways, health services or higher education, intergovernmental transfers should be the primary source of local revenue. This is because local authorities are likely to neglect the potential benefits received by users in other jurisdictions, which would lead to under-provision of these services from wider (national and regional) perspective (Bahl and Bird, 2018[16]; King, 1984[19]).

Table 6.2. Appropriate subnational government revenue by category of expenditure

Service	Local taxes	User charges	Transfers	Borrowing
General administration	P	..	..	..
Education	P	S	P	(A)
Health	S	S	P	(A)
Welfare	S	..	P	..
Water supply	S	P*	..	A
Sewerage	S	P*	..	A
Drainage	P	P*	..	A
Markets and abattoirs	S	P*	..	(A)
Housing	S	P	S	A
Land development	..	P*	..	A
Streets	P	S*	..	A
Motorways	S	P*	P	A
Public transportation	S	P	..	A
Garbage collection	P	P	..	(A)
Garbage disposal	S	P	S	A
Parks and recreation	P	..	..	(A)
Fire protection	P	..	..	(A)
Police	P	..	..	..

Note: P= Primary source funding; S = Secondary source; A = Borrowing appropriate for major capital expenditures; (A) = Borrowing appropriate for capital expenditures but likely to account for a small share of spending.
* = Development charges (special assessments, valorisation charges, etc.) are appropriate where benefits are spatially well defined within a jurisdiction. ** Transfers may be from regional or central government.
Source: Author's modification and extension of the material presented in Bahl, R. and R. Bird (2018[16]), *Fiscal Decentralization and Local Finance in Developing Countries*, https://www.e-elgar.com/shop/gbp/fiscal-decentralization-and-local-finance-in-developing-countries-9781786435293.html.

It is generally agreed that the efficiency and accountability of local service provision are best secured if subnational governments finance a considerable share of their spending with own revenues (OECD, 2019[3]). While the literature does not provide a blueprint on the target share of own revenues, it is widely accepted that subnational governments should finance their spending with own revenues at the margin. Such a principle would help ensure that decisions to expand public programmes are made keeping in mind the additional costs (Oates, 2008[20]). Moreover, when local residents self-finance the local services through local taxes and charges, they have an incentive to evaluate the costs and benefits of local service provision and benchmark local government performance against neighbouring jurisdictions. Such "yardstick competition" can encourage local politicians to maximise the welfare of local residents instead of promoting their own self-interested goals.

As for the question of tax assignment, the usual recommendation is that subnational government tax revenues should be mainly based on land or property taxes and user fees (Boadway and Tremblay, 2012[18]; Bahl and Bird, 2018[16]). But if the service menu consists of services with high spending needs and if subnational governments are expected to finance a considerable share of their spending from their own revenue sources, it is likely that property tax bases and other user charge type of revenues are not enough to cover adequate levels of own revenue. In that case, subnational governments should be given some broad residence-based tax bases such as income tax, payroll tax or sales tax. Each of these taxes, if given to subnational governments with some power to decide tax rates, can have side effects on the mobility of households, business location and shopping.

To avoid unwanted effects, it is usually recommended that subnational governments are given powers to choose rates but not tax bases. If subnational governments are able to choose both tax bases and tax rates, the national redistributive objectives and equity of taxpayers in different subnational governments could be compromised. There would also be potential problems with vertical tax externalities (Boadway and Tremblay, 2012[18]). Other taxes suitable for subnational governments include resource royalties, conservation charges, sin taxes, motor vehicle registration taxes, frontage charges and poll taxes (see also Table 6.3). In addition, subnational governments may be allowed to piggyback on national taxes on personal income (residence-based), wealth and carbon taxes (OECD, 2019[3]).

Table 6.3. Tax assignment across levels of government

National	National/Provincial	State/Provincial	Local	All levels
Customs Value added tax (VAT) Corporate income tax (CIT) Resource rents/profits Wealth/Inheritance Carbon	Personal income taxes (PIT) (residence-based) Payroll taxes Excises on alcohol and tobacco	Single-stage sales taxes Motor vehicle registrations Business Royalties Conservation charges	Property taxes Land taxes Betterment/Frontage charges Surcharge on PIT Parking fees	Sin taxes Taxation of bads (environmental pollution) Poll taxes User charges

Source: OECD (2019[3]), *Making Decentralisation Work: A Handbook for Policy-Makers*, https://dx.doi.org/10.1787/g2g9faa7-en.

Transfer systems to reduce fiscal disparities

Transfer systems form an important element of subnational government financing. Transfer systems ensure that different subnational governments are able to provide at least the minimum level of services. In general, transfers are used to reduce fiscal disparities at two levels: i) between the central government and subnational governments (vertical fiscal gap); and ii) between subnational governments (horizontal fiscal gap). The vertical fiscal gap can be diminished by paying lump-sum transfers to subnational governments. The horizontal fiscal gap is usually tackled with equalisation system, which is based on indicators and formulae that take into account differences between subnational governments in tax bases (tax base equalisation) and in service needs and special circumstances (expenditure equalisation).

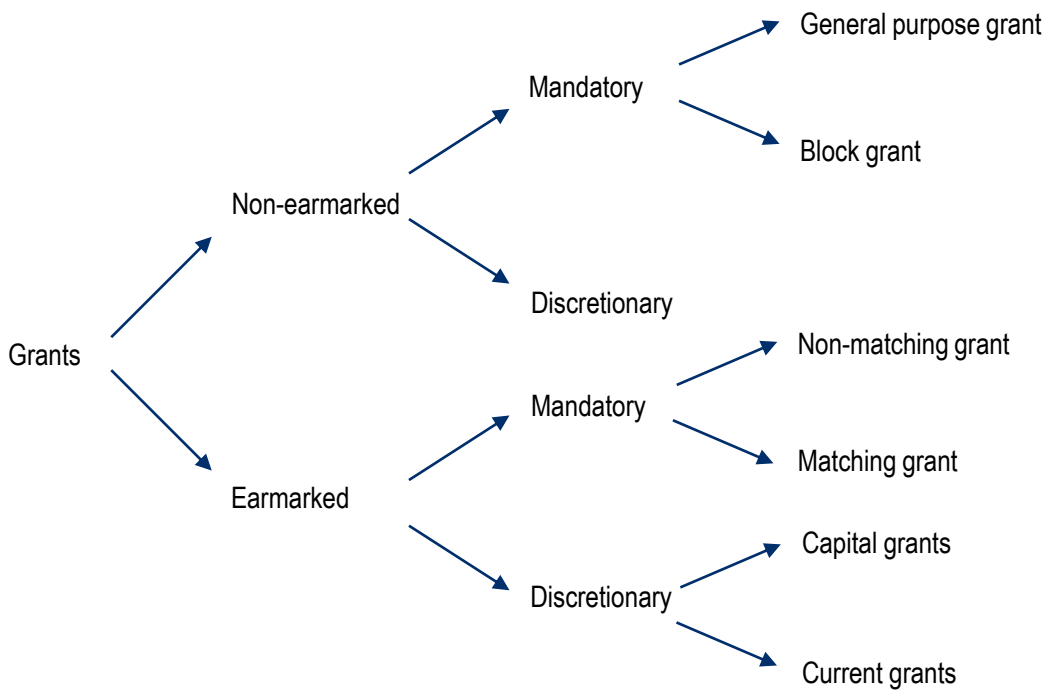
A well-working transfer system ensures that subnational governments can provide a comparable level of public services at comparable tax rates. Comparability is important mainly for two reasons: first, the central government can better monitor the subnational governments using indicators on service availability and quality and, second, local residents can compare local public services and tax rates of their own jurisdiction to situations in their neighbouring jurisdictions.

To classify the different types of transfers, the OECD Fiscal Federalism Network has developed a taxonomy of grants (Figure 6.3) (Blöchliger and King, 2006[21]). The main separation is between *earmarked* and *non-earmarked grants*. Subnational governments must use earmarked grants for a specific purpose whereas they can spend non-earmarked grants freely. Both main types of transfers are further divided into *mandatory* and *discretionary transfers*. Mandatory transfers are defined in the law, whereas discretionary transfers do not have such clear base. Discretionary grants are generally not recommended in wider use, as they diminish the transparency of the transfer system and are prone for lobbying and even corruption.

Earmarked grants may be further subdivided into *matching* and *non-matching grants*. Matching grants (a certain percentage of subnational government expenditure in specific service, say in education) can be useful especially when a new public service is launched. Wider use of matching grants and use for a long time is not advisable, because matching grants tend to boost spending growth. Moreover, matching grants favour richer municipalities, although tax base equalisation or using differentiated matching rates for rich and poor municipalities, can diminish risks of inequity created by such effects. The non-earmarked grants

can be divided into block and general-purpose grants. Block grants and general grants are typically defined using formulae, and they are usually recommended for financing subnational governments because they come with no strings attached. It is recommended that the formulae used for determining central government transfers should be transparent and non-discretionary. Block grants are usually meant for specific services but there is no strict regulation for the eventual use. General grants are the least restrictive of all transfers, as they are basically pure income support for subnational governments and there is no regulation on how the moneys should be used. Finally, the transfers can be divided into grants for *capital expenditure* and grants for *current expenditure* (Blöchliger and King, 2006[21]; Bahl and Bird, 2018[16]).

Figure 6.3. The OECD taxonomy of grants



Source: OECD (2019[22]), *OECD Fiscal Decentralisation Database*, https://www.oecd.org/tax/federalism/fiscal-decentralisation-database.htm#A_1 (accessed on 30 August 2019).

Box 6.3. Administrative federalism versus decentralisation and centralisation

The theoretical research literature on administrative federalism argues that there is a third alternative between a fully centralised and a fully decentralised system (Schwager, 1999[23]). Administrative federalism means a situation where subnational governments act mostly as agencies that respond to central government directives (Oates, 2005[24]). The proponents of administrative federalism argue that decentralised decisions are inefficient because of the spill-overs between jurisdictional borders. On the other hand, a centralised system is also inefficient because the centre often acts as a non-benevolent planner, favouring one or few regions over all regions (Schwager, 1999[23]). In such a setup, administrative federalism can be a safeguard against the central government with regionally biased preferences. It is also argued that administrative federalism can solve the benefit spill-over problem occurring in decentralisation because local jurisdictions are fully controlled by the central government.

The critics of administrative federalism argue that administrative federalism does not acknowledge the benefits from the electoral and fiscal autonomy associated with truly decentralised spending and revenue decision/making. Perhaps the biggest loss resulting from the "principal-agent model" type of administrative federalism, compared with decentralisation, is the reduced accountability of local governance operating under central control. Also, it has been shown both in theory and in practice that benefit spill-over problems can be solved in a decentralised system with central government matching grants or with co-operation between local jurisdictions. Furthermore, in the case of major externalities, centralisation can be an effective way to organise the services.

In practice, administrative systems are usually mixed and the degree of decentralisation or centralisation depends on political, historical, cultural factors along with the economic motives. The Nordic countries provide one example of such a mixed approach, sometimes called the Nordic application of administrative federalism (Borge and Rattsø, 2012[25]). Denmark, Finland, Norway and Sweden have each developed their own model of fiscal federalism characterised by local responsibility for welfare services, local tax financing through an income tax and extensive equalisation systems. At the same time, central governments are actively involved in policy, standards and oversight because subnational governments have been assigned many services with redistributive effects (health, social services, education).

Source: Schwager, R. (1999[23]), *Administrative Federalism and a Central Government with Regionally Based Preferences*; Oates, W. (2005[24]), "Toward a second-generation theory of fiscal federalism", *International Tax and Public Finance*, http://dx.doi.org/10.1007/s10797-005-1619-9; Borge, L. and J. Rattsø (2012[25]), "Fiscal federalism: International experiences and the Nordic response", https://www.doria.fi/handle/10024/148896.

Addressing the challenges of decentralisation to improve service provision

Decentralisation reforms should be carefully planned and implemented because decentralisation is not without its challenges and shortcomings (OECD, 2019[3]). Some of these challenges relate to decentralisation in general but often problems arise because of unsuccessful implementation of decentralisation reforms. Examples of general problems of decentralisation include risks of diseconomies of scale and benefit spill-overs of subnational government service provision. Problems of implementation include overlapping responsibilities between the central government and subnational government tiers, unfunded mandates, partial decentralisation and lack of capacities of subnational governments to deliver the tasks assigned to them. These problems and the solutions to tackle the issues are discussed briefly below.

Benefit spill-overs and externalities

Benefit spill-overs across jurisdiction borders form a typical challenge of decentralisation. Benefit spill-overs exist in decentralised systems because it is often difficult to ensure that jurisdiction's administrative boundaries coincide with the service benefit areas. These spill-overs mean that residents in neighbouring jurisdictions benefit from services paid by other jurisdiction's taxpayers (like roads/streets, parks, sports facilities, theatres). This can be a problem if it leads to under-provision of public services, notably if subnational governments do not take into account the benefits received from the service by residents in other jurisdictions. While "internalising" such externalities is not easy, mainly because information on the size of externalities is usually scant, the potential solutions are relatively straightforward. Central governments may intervene using earmarked transfers to subnational governments to encourage extended service delivery that also takes into account non-resident users. Another potential solution is co-operation between subnational governments. Joint service delivery enlarges the service area and helps divide the cost among the services users (see Box 6.4). A third potential solution could be to move service responsibility from lower to upper level of government.

Box 6.4. Is bigger always better? Results on economies of scale and optimal subnational government size

While the research evidence on the economies of scale in the provision of public services seems to be mixed, policymaking often departs from the assumption that "bigger is better". Thus, the policy trend in recent decades has been towards increased size in public services by amalgamations of local governments, mergers of service units and closures of facilities (Kortelainen et al., 2019[26]).

Economies of size arise for two main reasons: first, spreading large fixed costs (for example big investments on utilities) over a larger user base ensures lower unit cost and prices of service. Second, a larger local government unit may be better able to hire skilled workers, which can help to maintain a higher quality of services (Bahl and Bird, 2018[16]).

But there is no strong empirical evidence of economies of scale once localities exceed relatively small population levels. Moreover, the biggest local government units are often among the most inefficient. In fact, a U-shaped cost curve is often found for local public services (except the most capital-intensive ones), that is, costs decrease up to some point and then increase as population size increases (Bahl and Bird, 2018[16]).

The results on the optimal size can be summarised as follows (Holzer et al., 2009[27]):

- There is little overall correlation between size and efficiency for municipalities with populations between 25 000 and 250 000.
- The literature does suggest that smaller municipalities (population under 25 000) are less efficient, but details are important.
- Much of the literature argues that small municipalities are not less efficient, except in specialised services.
- Increasing size is related to increased efficiency in capital-intensive services such as utility systems or public works.
- For labour-intensive services, such as police work, an increase in size is related to a decrease in efficiency − smaller units are more efficient than larger units.
- Larger municipalities with populations over 250 000 are clearly less efficient.
- The literature suggests that cost per capita may not be a good measure of efficiency or performance because of the distorting effect of other factors. Yet, studies use this measure commonly.

Source: Holzer, M. et al. (2009[27]), *Literature review and analysis related to optimal municipal size and efficiency*, School of Public Affairs and Administration (SPAA) at Rutgers University; Bahl, R. and R. Bird (2018[16]), *Fiscal Decentralization and Local Finance in Developing Countries*, https://www.e-elgar.com/shop/gbp/fiscal-decentralization-and-local-finance-in-developing-countries-9781786435293.html; Kortelainen, M. et al. (2019[26]), *Effects of Healthcare District Secessions on Costs, Productivity and Quality of Services*.

Lack of scale economies

Decentralisation may result in a loss of economies of scale and fragmentation of public policies (OECD, 2019[3]). Determining the efficiency maximising subnational unit size and designing policies that help approach the optimum are highly important. It is not straightforward to determine the optimal subnational unit size, however, notably because the best subnational unit size depends largely on the policy area. For example, basic health services, child day-care, waste disposal and sewerage, regional planning and primary education all have different optimal population sizes (see Box 6.5). While there is only little empirical evidence on the optimal municipal size, some studies have concluded that the optimal municipal

size could be somewhere between 20 000 and 50 000 inhabitants (Bahl and Bird, 2018[16]). Despite problems in defining the optimal subnational unit size, it can nevertheless be argued that larger subnational governments are often stronger financially, have a better investment capacity and are in a superior position for recruiting skilled personnel. But as the distance between local or regional decision-makers grows, so increases the risks of allocative inefficiency.

Economies of scale can be generated with municipal mergers and with inter-jurisdictional co-operation. In some cases, services may also be outsourced to private entities. Municipal mergers can, however, be problematic if they create economies of scale for some services but diseconomies of scale in others. Moreover, there is no evidence that municipal mergers automatically lead to costs savings. In fact, the mergers often result in faster growth of expenditure especially during the first years after the merger but also on the longer run (Moisio and Uusitalo, 2013[28]; Blom-Hansen et al., 2016[29]). Compared with mergers, inter-jurisdictional co-operation can be a more flexible alternative because it enables utilising economies of scale where it is most beneficial. The problem with inter-municipal co-operation is the risk for "democracy deficit", because the decision-makers of the co-operative units are usually nominated and not elected (OECD, 2019[3]).

National governments play an important role in establishing legal, regulatory arrangements and incentives to foster voluntary mergers and co-operation across jurisdictions. In countries with small subnational government units, such as the Nordic countries, but also in France, the Slovak Republic and Spain, central governments have been active in promoting merger reforms and inter-jurisdictional co-operation.

Box 6.5. The rationale, benefits and challenges of inter-jurisdictional co-operation

Inter-municipal co-operation means that two or more municipalities work together to provide some specific task or several tasks. There are both voluntary and compulsory types of co-operation. In the former, the municipalities are free to establish long- or short-term co-operation and also to withdraw from co-operation. Mandatory co-operation is defined by law and compliance is monitored and sanctioned by the central government.

Inter-municipal co-operation is usually understood as expenditure sharing. In this case, municipalities provide joint services and share the costs associated with the delivery of the service. Inter-municipal co-operation can also include joint efforts on the revenue side, although this is less common than expenditure co-operation (Slack, 1997[30]).

There can be various motivations for voluntary inter-municipal co-operation but often the rationale is simply to enable more efficient service delivery and better services for the local inhabitants. In order to reach these ultimate goals, utilising economies of scale and creating better capacity for know-how or human resources is essential.

Inter-municipal co-operation is not the only way to utilise economies of scale in municipal service delivery, however. Municipal mergers, or outsourcing service production to private companies, can also lead to a bigger scale of production and cost savings. Municipal mergers can be politically difficult to accomplish though. Besides, based on research evidence, it is not clear that municipal mergers will automatically lead to costs savings (Blom-Hansen et al., 2016[29]; Moisio and Uusitalo, 2013[28]). It should also be noted that municipalities usually provide a wide variety of services and the optimal production size varies by service. Municipal mergers may then lead to economies of scale in some services but diseconomies of scale in others.

Furthermore, outsourcing is not always a feasible alternative because of legal reasons or lack of private markets. Regions and municipalities are also in a very different position in ability to utilise private

markets. Often the need to enhance economies of scale is greatest in small and remote regions and municipalities, where little suitable private provision may be available.

Compared with municipal mergers, inter-municipal co-operation seems an attractive option especially because it is relatively straightforward to establish. Voluntary inter-municipal co-operation involves a sort of a "minimal" government restructuring and this probably explains why it has been so popular in many countries (Slack and Bird, 2010[31]; OECD, 2019[3]). Due to the simplicity of the arrangement, a municipality can easily engage in many different co-operative deals at the same time without high administrative costs.

Inter-municipal co-operation is also a flexible solution. As times change, co-operation can be strengthened, scaled back or ended according to the needs of co-operating partners. Joint service provision can lead to a deeper engagement: a successful inter-municipal co-operation in one service area may lead to widened co-operation in other services and in some cases even to a later voluntary merger.

Economies of scale undoubtedly form the major benefit of inter-municipal co-operation. Especially capital-intensive public services (e.g. utility systems such as water, waste, energy) often require a certain minimum size for efficient service delivery. In such a framework, inter-municipal co-operation can be a feasible solution because it enables both improved economies of scale and tailoring of services to local needs.

Inter-municipal co-operation may also help secure local democracy because the number of elected local politicians does not diminish as a result of co-operation. Inter-municipal co-operation is not without its challenges, however. Perhaps the main disadvantage is that an extra tier in the hierarchy is introduced. Adding hierarchical layers may increase administration and monitoring costs. Inter-municipal co-operation may also result in "democracy deficit", as inter-municipal organisations are usually governed by representatives that are nominated by the member municipalities. This may reduce the accountability and transparency of local decision-making, compared with municipalities' own production (and with directly elected councils).

An important challenge of inter-municipal co-operation is also that the member municipalities engaging the co-operation inevitably have less power to affect the services than if the service was provided by their own organisation.

It has also been argued that inter-municipal co-operation may create a harmful common pool, which can lead to increased costs and inefficiency. Depending on the size of the pool, monitoring of inter-municipal co-operation by member municipalities may be lower if a common pool creates a disincentive to do so (Allers and van Ommeren, 2016[32]).

Source: Slack, N. (1997[30]), "Intermunicipal cooperation: Sharing of expenditures and revenues"; Blom-Hansen, J. et al. (2016[29]), "Jurisdiction size and local government policy expenditure: Assessing the effect of municipal amalgamation", http://dx.doi.org/10.1017/S0003055416000320; Moisio, A. and R. Uusitalo (2013[28]), "The impact of municipal mergers on local public expenditures in Finland", https://www.researchgate.net/publication/272795680; Slack, N. and R. Bird (2010[31]), "Merging municipalities: Is bigger better?", http://www.doria.fi/handle/10024/148891; OECD (2019[3]), *Making Decentralisation Work: A Handbook for Policy-Makers*, https://dx.doi.org/10.1787/g2g9faa7-en; Allers, M. and B. van Ommeren (2016[32]), "Intermunicipal cooperation, municipal amalgamation and the price of credit", http://dx.doi.org/10.1080/03003930.2016.1171754; OECD (2017[33]), *Multi-level Governance Reforms: Overview of OECD Country Experiences*, https://dx.doi.org/10.1787/9789264272866-en.

Unbalance between spending and revenue assignments

From the implementation aspect, the challenges of decentralisation are often associated with the ratio of expenditure to revenue decentralisation, i.e. the so-called vertical fiscal gap. While in all countries spending is more decentralised than revenues (OECD, 2019[3]), problems are often linked with situations where

spending is highly decentralised but subnational governments' own revenue is very limited (Oates, 2008[20]). In such situations, a large share of subnational government expenditures is financed with central government transfers.[2] A considerable unbalance with spending and revenue assignments is likely to reduce incentives for efficient service delivery, for instance, because the local decision-makers are less compelled to justify additional spending to their own voters who bear the tax burden. At worst, a high degree of transfer dependency of subnational governments may lead to a soft budget constraint problem, which can destabilise total public sector finances (Rodden, Eskeland Gunnar S. and Litvack, 2003[34]). The risk of inefficient outcomes is smaller if subnational governments rely on their own revenues for financing their services at the margin (OECD, 2019[3]).

Unfunded or underfunded mandates

One of the most frequent challenges of decentralisation is the misalignment between responsibilities allocated to subnational governments and the actual resources available to them. If the central government delegates or devolves tasks to subnational governments, the central government should also ensure that such mandates can be financed also in practice. Transfer systems should support especially local governments with low own-source potentials and/or higher costs due to greater service needs or unfavourable conditions. Access to finance should be consistent with functional responsibilities. Unfunded mandates are meaningless and underfunding is a source for disparities between subnational governments.

Insufficient capacity of subnational governments

Successful implementation of decentralisation requires certain economic, administrative, institutional and strategic capacities from the subnational governments (OECD, 2019[3]). The capacities required from the subnational governments depend largely on tasks assigned to them and the regulation concerning the provision of tasks. There can be significant differences between subnational governments in their capacities and skills. Unless the capacity challenge is addressed, there is a risk that decentralisation intensifies differences between jurisdictions (OECD, 2019[3]). On the other hand, decentralisation can create responsibility and ownership of public programmes, which may help in building public sector capacity.

Capacity building at the subnational level requires a long-term commitment from both central and subnational governments. Addressing capacity gaps consist of several measures, which go well beyond simple training and technical assistance schemes. At best, capacity development programmes are based upon a careful assessment of local strengths and weaknesses and then tailored to the needs of individual local government units.

Overlapping responsibilities

One potential challenge of decentralisation is formed by overlapping assignments among levels of government. In this respect, much depends on how the service assignments have been planned. A explained above, in theory, the designing of spending assignments depends on three aspects: the beneficiaries of the services; the externalities involved; and whether or not the service includes redistribution. According to that view, in a decentralised system, the central government's role is mostly in policy design, standards-setting and oversight. While regional and local governments could also have a role in these, their main focus should be in providing, administrating and producing the decentralised public services. Furthermore, the division of tasks between regional and local levels depends on the economies of scale, distribution of benefits and size of externalities.

In reality, such optimal assignment of tasks may not materialise and several tiers of government may engage in the provision of the same services. Such situations risk that incentives for cost transfers between levels of government ("passing the buck") arise, leading to inefficiency, lack of transparency and higher costs of service provision. In addition, without a clear assignment of responsibilities, it may become

impossible for citizens to hold the decision-makers accountable for shortcomings or policy failures. Such a situation may hinder efforts at transparency and citizen engagement, leading to democratic deficit.

Intermediary institutions and cross-border services

A previously noted, there has been a growth of intermediary institutions across OECD member countries – that is, forms of service provision that exist below the regional scale but above the local one. Special purpose bodies for transportation and transit services are one such example. Here the logic for the right scale of the service is determined by how the area is functionally connected – e.g. the areas across which people live, work and commute. There are economies of scale to be gained where one service provider can deliver across the functionally connected territory. These types of institutions are most common in metropolitan areas, connecting the city to the suburbs, but less so in rural ones. They can take a variety of forms: public bodies, public entities, regional co-ordinating bodies, transport associations, public benefit corporations, intercommunal authorities or regional transportation partnerships.

The intermediary scale makes sense for transportation and transit planning because the service being delivered is a network. But what of point services such as education and health care? The types of services and the characteristics of the population are an important consideration. For example, it may not be appropriate for young children to have to travel long distances in order to access education but it may be possible for older students. As such, education provision in many countries is scaled such that younger cohorts attend smaller neighbourhood schools but high school is provided at a larger scale.

One unique and emerging scale for public services is cross-border services. It can be extremely challenging to provide certain services across borders even where they are functionally closely connected or where economies of scale would make that the logical and most cost-effective choice. With free movement between borders, EU countries have spearheaded such co-ordination. The EU Directive No. 2011/24 – which stipulates that EU citizens have the right to access healthcare in any EU country and to be reimbursed for care abroad by their home country – has raised this issue on the policy agenda. This directive, combined with a number of EU financial instruments has been used to promote border-region projects alongside facilitating legal frameworks to enhance collaboration. However, despite these incentives, a study on the desirability and feasibility of cross-border hospital collaboration in Europe has found that such collaboration encounters a number of impediments such as the challenge of navigating distinct regulatory regimes (Glinos and Baeten, 2014[35]).

Decentralisation and education services

From the political perspective, equity aspects often form an important motivation for the central government to steer subnational governments. Education is not an exception in this. Regulation of education services can be divided into three main categories: normative steering, resource control and information steering. In education, the typical forms of normative guidance include staff (teacher) qualifications, the curricula and the number of personnel (class size). Resource control involves the transfer system, in particular the use of earmarked and/or conditional grants to finance education. Information steering is a milder form of steering. It involves, for example, providing the municipalities, school boards and teachers the relevant information on good practices and the tools for preparing the curricula and teaching practices that can still be tailored to local conditions. In Finland, the central government steering in education was shifted at the end of 1990s from strict normative guidance to “information steering”, reflecting the general view that excessive guidance was detrimental to good education outcomes.

Since the early 1980s, a key aim of education reform has been to place more decision-making authority at lower levels of education systems. At the same time, many countries have strengthened the influence of central authorities in setting standards, curricula and assessments (OECD, 2018[36]). Less decentralised education systems may rely more on performance measurement and on rewarding good performance and

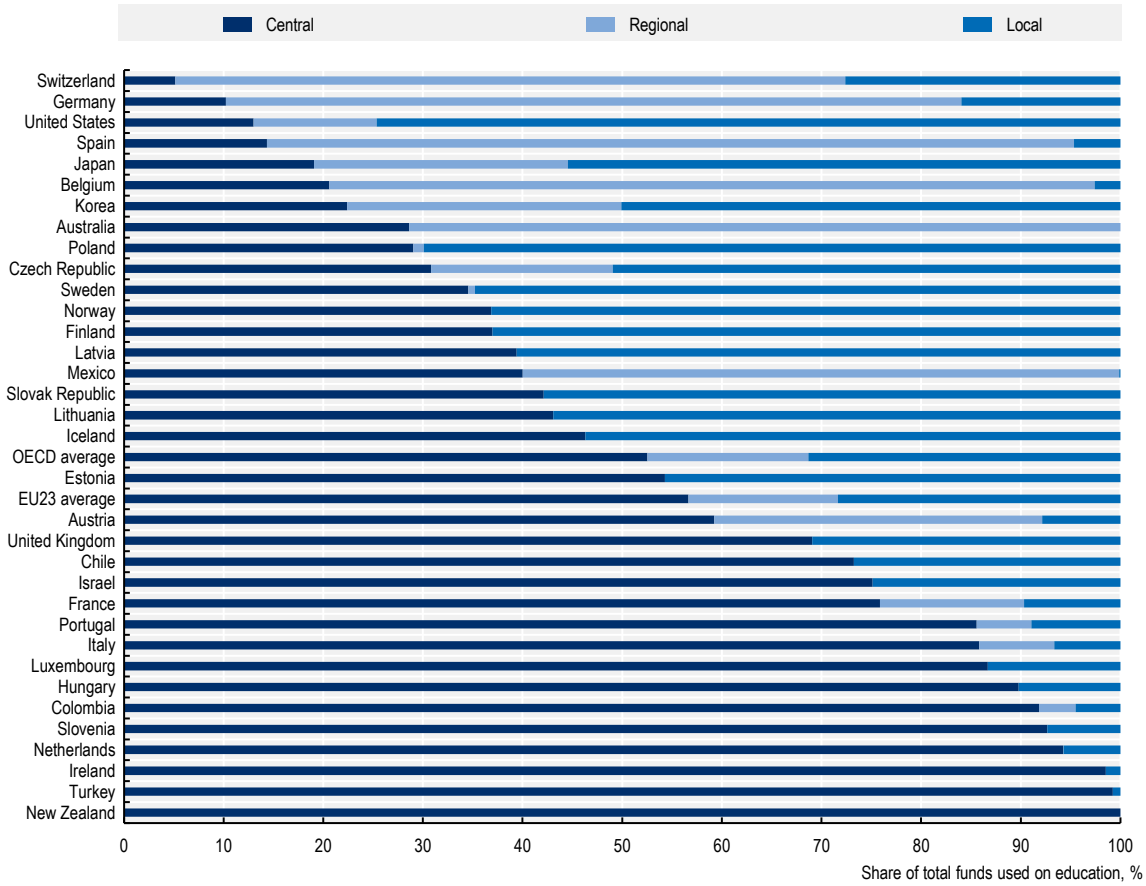
sanctioning "underperformance". Such systems are typically built on financial incentives for schools and teachers to provide good student achievement. While such models may suit certain conditions, it is likely that in situations where differences between schools are small, the application of performance funding is less useful or even counterproductive.

Education is the main spending item of subnational governments

While central governments have the main responsibility of financing education in the OECD, in many countries also subnational governments play an important role in education[3] spending (Figure 6.4). In the OECD, the central government is on average responsible for 52% of funds used on education, after transfers between levels of government have been taken into account, whereas regions are responsible for 16% and local governments for 32%. From this "use of funds" perspective, the most decentralised countries in education are the federal countries (Germany, Spain, Switzerland, the United States, and also Australia and Belgium are high in the country list) followed by unitary countries like the Czech Republic, Japan, Korea, Poland and Sweden. The least decentralised countries include Colombia, Ireland, the Netherlands, New Zealand, Slovenia and Turkey.

Figure 6.4. The role of different levels of government in the use of public funds devoted to education

Shares %, 2016



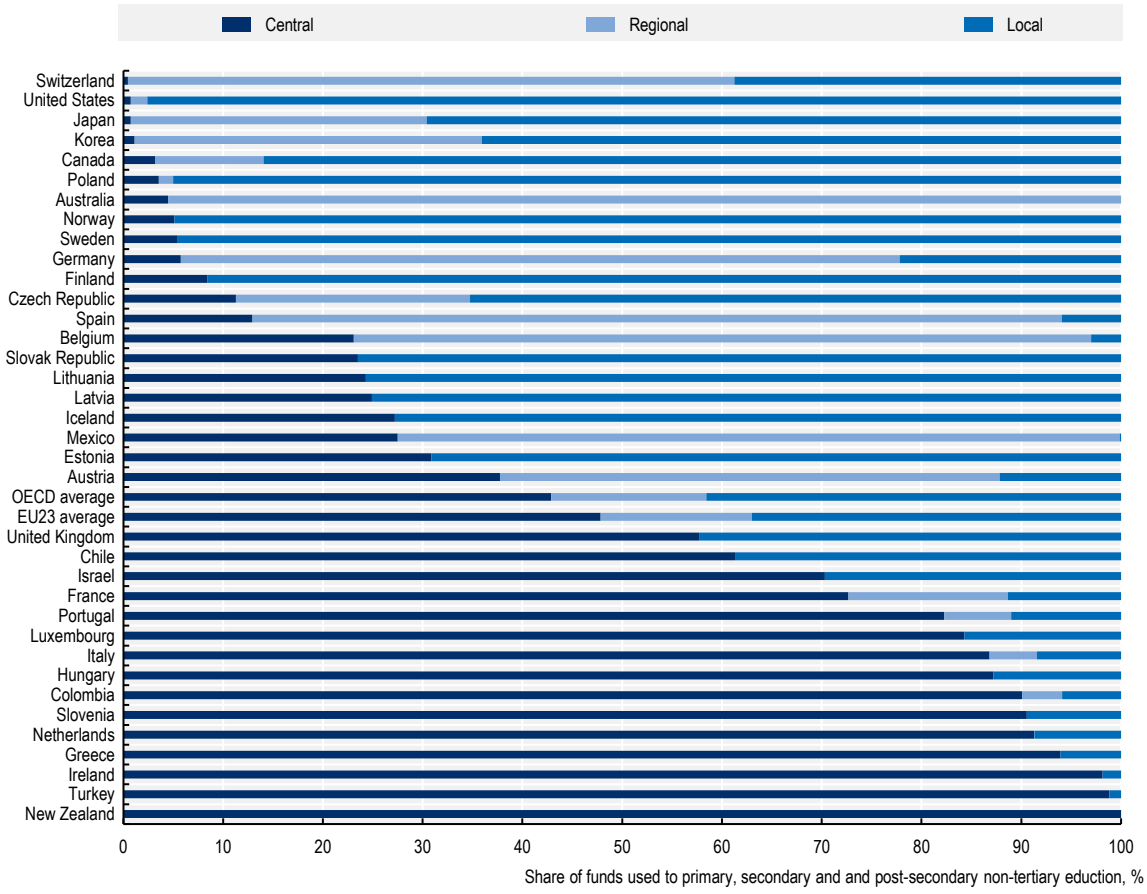
Note: The data covers education funds from primary to tertiary levels. No data was available for Denmark and Greece.
Source: OECD (2019[37]), *Education at a Glance 2019: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/888934226823

In non-tertiary[4] education, the role of subnational governments, in particular the local governments, is emphasised. In the OECD, the central government share of non-tertiary education is 42.9%, whereas regional level is responsible for 15.6% and local governments for 41.6% of expenditure (Figure 6.5). The most decentralised non-tertiary education systems are in Australia, Canada, Japan, Korea, Poland, Switzerland and the US. The least decentralised systems are Colombia, Greece, Ireland, the Netherlands, New Zealand, Slovenia and Turkey.

Figure 6.5. The role of government levels in the use of public funds devoted to primary secondary and post-secondary non-tertiary education

Shares %, 2016



Note: The data covers education from primary to secondary and other non-tertiary levels. No data was available for Denmark.
Source: OECD (2019[37]), *Education at a Glance 2019: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/888934226842

Education forms the most important expenditure category for subnational governments in OECD countries (Figure 6.2). In 2017, education accounted for 24.3% of subnational government expenditure in the OECD. Education's share of subnational government expenditure was particularly high in Latvia, 40.8% of total local government spending in 2017. The share was high also in the Slovak Republic (39.1%), Estonia (38.6%), Lithuania (38.2%), Slovenia (37.7%) and Israel (37.2%). The data shows also that education forms a bigger share of subnational government expenditure in federal countries compared with unitary

countries in the OECD. Among unitary OECD countries, education forms a bigger share of expenditure in the small country group (by population).

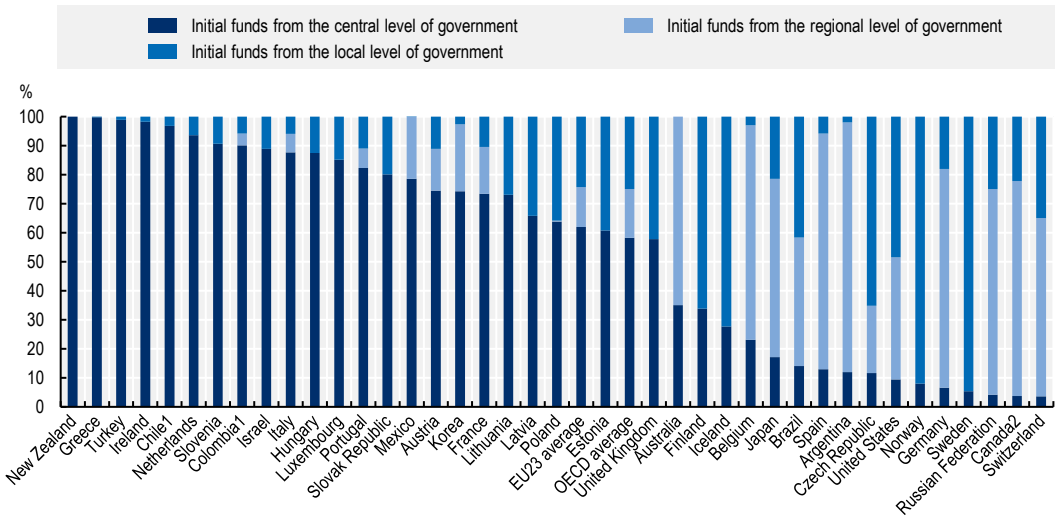
In many countries, transfers form a major source of education funding for subnational governments

Transfers are an important source of education funding for subnational governments. From local autonomy perspective, however, a major role of central government grants in subnational government education financing may mean weaker decision-making autonomy of subnational governments. Consequently, education funding should be analysed both at the level of government where the funds originate (the initial level) and at the level of government at which they are ultimately spent (the final level). At the initial level,[5] decisions are made about the size of the funding, the allocation mechanism (transfer system) and the regulation, i.e. the restrictions on how the transfers can be spent. Some education financing systems are mixed so that the higher level of government pays directly for educational resources (e.g. teachers' salaries) and subnational governments are responsible for other spending.

The division of responsibility for public funding in non-tertiary levels of education varies greatly among countries (Figure 6.6). In countries such as Chile, Colombia, France, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, the Netherlands, Portugal, Slovenia, Turkey and the United Kingdom (UK), the central government is the source of the majority of initial funds and the main final purchaser of educational goods and services. In New Zealand, the central government is solely responsible for the source of funds and for purchasing educational services. In Australia, Belgium, Canada, the Czech Republic, Finland, Germany, Iceland, Japan, Norway, Spain, Sweden, Switzerland and the US, the subnational government level has the main role in financing education.

Figure 6.6. Distribution of initial sources of public funds for education, by level of government

2016 values



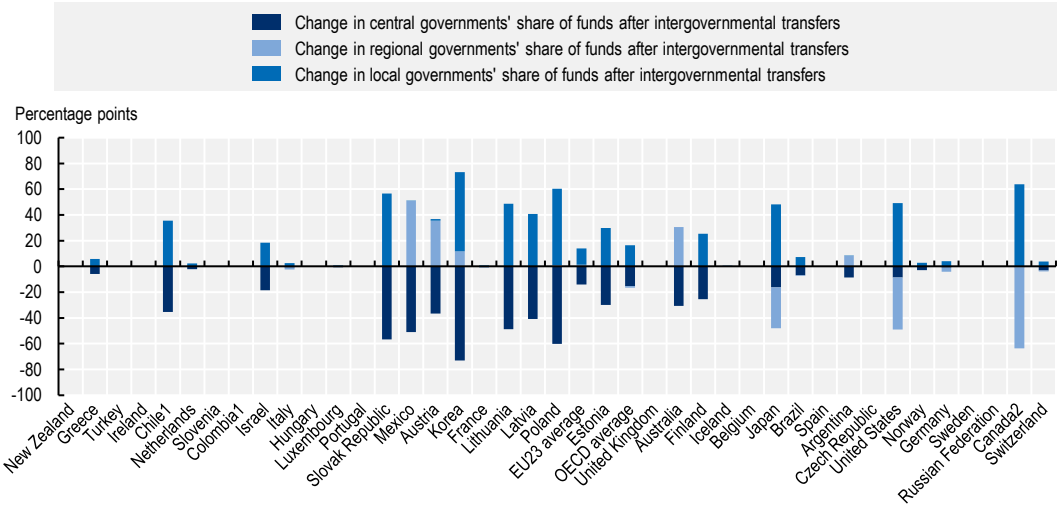
1. Year of reference 2017.
2. Primary education includes pre-primary programmes.
Source: OECD (2019[37]), *Education at a Glance 2019: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/9d5314e3-en

Another way to approach the effect of transfer financing is to look at how to transfer financing changes the resources available for education services (Figure 6.7). In the OECD, transfer systems increase the subnational share of public funds available to education by 15 percentage points. Transfer systems are particularly important in Korea (change in subnational share of funds is 73.2%), Canada (63.2%), Poland (60.3%), the Slovak Republic (56.6%), Mexico (51%), Lithuania (48.8%) and Latvia (40.8%). Regional transfers vary considerably across countries: in Japan and the US, the regions – in addition to central government – pay transfers to local governments, while in Australia, Austria, Korea and Mexico, regions are considerable recipients of central government transfers. In between, there are countries like Canada, where only regions pay transfers to local governments.

Figure 6.7. Change in government levels' share of funds after intergovernmental transfers

2016 values



Notes: 1. Year of reference 2018. 2. Primary, secondary and post-secondary non-tertiary education includes pre-primary programmes. Countries are ranked in descending order of the share of initial sources of funds from the central level of government.
Source: OECD (2019[37]), *Education at a Glance 2019: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/9d5314e3-en

Looking at the share of subnational government of public funds together with the role of transfer system shows that in countries like Canada, the Czech Republic, Germany, Norway, Spain Sweden and Switzerland, the subnational government share of public funds devoted to non-tertiary education is high and the role of the transfer system is low (Figure 6.8). In these cases, the degree of decentralisation appears to be higher than average. On the other hand, in countries like Australia, Finland, Korea and Poland, although subnational governments use a major share of public funds available to non-tertiary education, they are reliant on central government transfers, possibly reducing their degree of decision-making autonomy.[6]

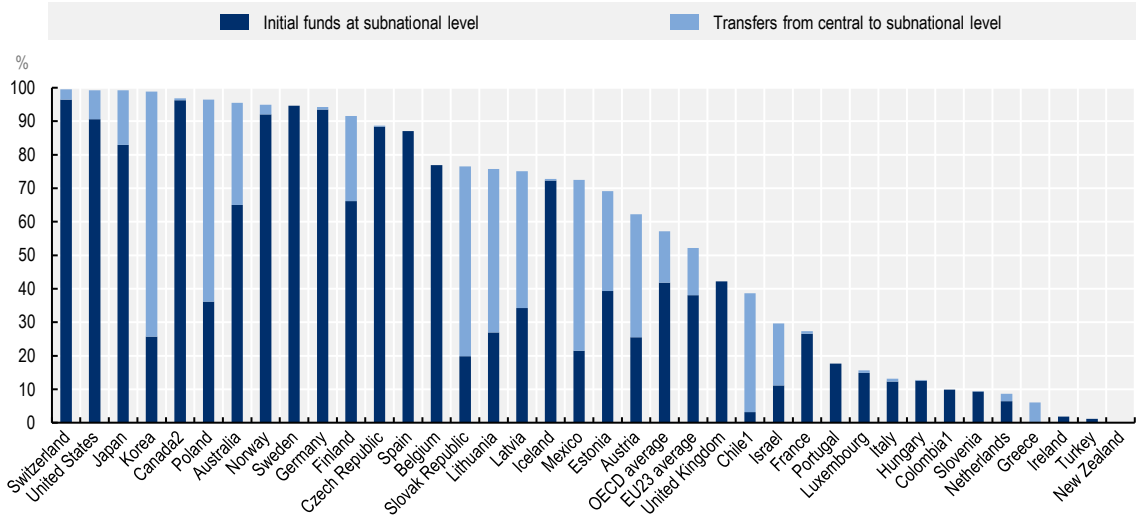
About half of the education decision-making is done at school or subnational government level

The data collected for *OECD Education at a Glance* shows where key decisions are made in public institutions at the lower secondary level of education (OECD, 2018[36]).[7] In 16 of 38 countries covered by the study, education-related decisions are most often taken at the school level. In ten of these countries,

half or more of the decisions are taken at the school level. In the Czech Republic and the Netherlands, two-thirds or more of decisions are taken at the school level (Figure 6.9). In 11 of 38 countries, decisions made at the state or central level were the most prevalent. Luxembourg, Mexico and Portugal are the OECD countries and economies with the most centralised decision-making (more than three-quarters of decisions are taken at the central or state level).

Figure 6.8. The composition of the share of public funds available for primary, secondary and post-secondary non-tertiary education at subnational government level

2016 values



Note: Data on Denmark was not available.
1. Primary education includes pre-primary programmes.
2. Year of reference 2017.
Source: Table C4.2. Total public expenditure on education as a percentage of total government expenditure, by source of funds (2016), OECD (2019[37]), *Education at a Glance 2019: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

StatLink https://doi.org/10.1787/888934226861

There are large differences between countries on how decisions on teaching in lower secondary education are made. While in most countries such decisions are made by schools or the local government level, for example in Germany, two out of three decisions are taken at the central or state level. Most decisions on personnel management and the use of resources are taken at the local or school level in around one-half of countries. Decisions on planning and structures are mostly taken at one of the more centralised tiers of government (OECD, 2018[36]).

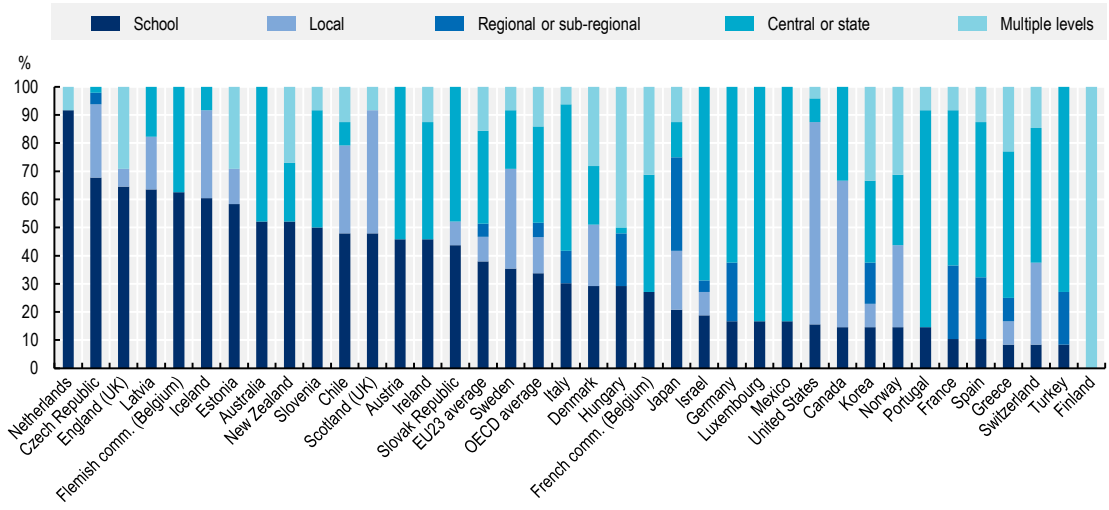
In some countries all or almost all levels of government are involved in a wide range of decisions concerning education. In Denmark, Hungary and Korea, multiple levels are involved in decisions on some or all subjects covered in the four domains (organisation of instruction, management of teachers, management of principals, planning and structures) (OECD, 2018[36]). In Finland, all decisions are taken by multiple levels, as local and school levels are involved in all decisions, even when a more general framework is set at a higher level of government for some subjects (OECD, 2018[36]).

There are considerable differences between countries in the ways in which decisions are taken. On average across OECD countries, nearly one-third of the decisions taken at the school or local levels are taken in full autonomy and two-thirds are within a framework set by a higher authority (Figure 6.10). A

single level of authority rarely decides with full autonomy, however. Decisions are often made after consulting with other bodies or within a framework set by a higher level of authority. On average across OECD countries, nearly half of all decisions are made at the school or local level. About one-third of these decisions are made in full autonomy, whereas most are made within a framework set by a higher authority (OECD, 2018[36]).

Figure 6.9. Percentage of decisions taken at each level of government in public lower secondary education

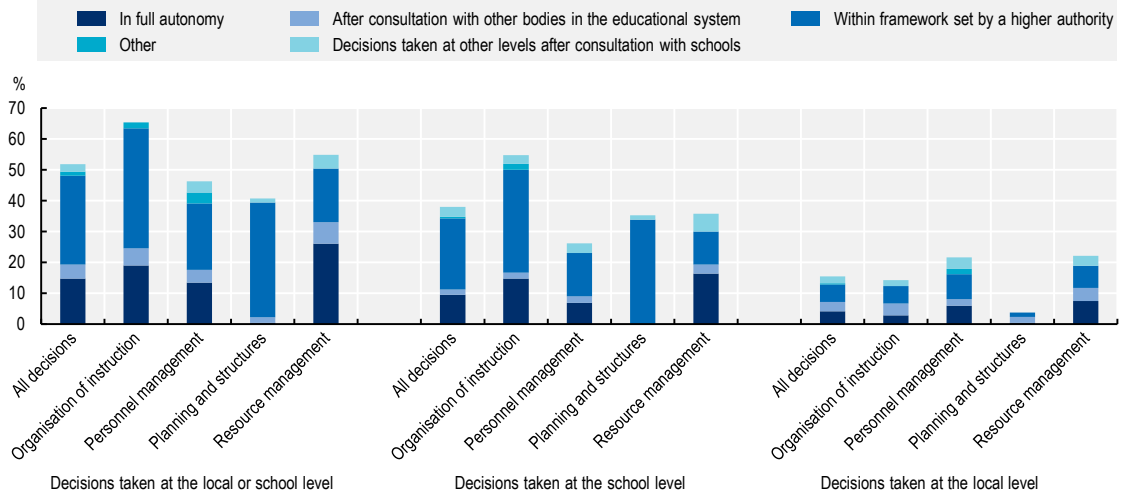
2017 values



Source: OECD (2018[36]), "Sources, Methods and Technical Notes", https://dx.doi.org/10.1787/eag-2018-36-en.

Figure 6.10. Percentage of decisions taken at the local or school level in public lower secondary education in OECD countries, by mode of decision-making and domain

2017 values



Source: OECD (2018[36]), "Sources, Methods and Technical Notes", https://dx.doi.org/10.1787/eag-2018-36-en.

StatLink https://doi.org/10.1787/eag-2018-graph213-en

Effects of decentralisation on student achievement

The empirical evidence on the effects of decentralisation reforms in education seems largely positive (Lastra-Anadón and Mukherjee, 2019[38]). An important caveat is that decentralisation and school autonomy may have different effects depending on countries' level of development (Hanushek, Link and Woessmann, 2013[39]). Decentralisation at subnational government and school levels can also have positive effects on student achievement. A recent OECD Fiscal Federalism Network paper found a consistent positive relationship between fiscal and administrative decentralisation and Programme for International Student Assessment (PISA) scores on the average study (Lastra-Anadón and Mukherjee, 2019[38]). For the main measure of fiscal decentralisation – the share of revenues collected sub-centrally – 10 percentage points more revenue collected sub-centrally was associated with about a 6-point increase in PISA scores. The study also found a positive relationship between school autonomy and average PISA outcomes.

Decentralisation of the health systems

Most OECD countries aim to ensure universal access to health care for their citizens and to control the growth of public health expenditures. Various models are used to accomplish these two main goals. Some health systems are mostly publicly funded and provided, others combine market mechanisms and extensive public funding and regulation, and some health care models are mostly based on private health insurance.

While many OECD countries have shifted responsibilities for their health systems to subnational government levels during the past decades, decentralisation is by no means the only or even the most common way to organise healthcare. In 2017, subnational governments were responsible on average for about 23% of total general government health expenditure in 32 OECD countries.[8] Moreover, this share has slightly decreased since 2008/09, suggesting that some governments have in fact opted to centralise health care in response to the economic and financial crisis.

Decentralisation of health care has benefits and challenges. From the benefit aspect, decentralisation can improve the "allocative efficiency" of health services because local decision-makers are well informed about local needs and circumstances, and this enables effective and timely responses to local demand. Therefore, locally managed health services have the potential to improve access to health services and contribute to better overall health (Jiménez-Rubio and García-Gómez, 2017[40]). Decentralisation may also help reduce health inequalities both within and between regions. Health inequalities within regions may be diminished because local authorities are better placed to respond to the needs of vulnerable groups. Inequalities between regions may diminish if decentralisation promotes policy innovation and more diffusion of new ideas (Costa-Font and Turati, 2018[41]).

As for the challenges aspect, it has been argued that, compared with centralised service provision, decentralisation may generate the inefficient location of healthcare facilities (e.g. hospitals) and possibly also service duplication (Jiménez-Rubio and García-Gómez, 2017[40]). The risk for such an outcome would be particularly high in the case of a large number of very small subnational governments responsible for health services. This is rarely the case, however, and even in such a situation, subnational governments may utilise economies of scale by engaging in co-operative arrangements. For example, in Finland, where municipalities are responsible for both basic and specialised health care, municipalities are mandated to arrange hospital services through inter-municipal co-operative units, and in basic health services, voluntary co-operation is common. It has also been argued that decentralisation may lead to more inefficient pricing of inputs and higher and more complex levels of administration than a centralised health system. Also, in this case, co-operation or outsourcing can help tackle the problems of inadequate scale.

How, then, to reap the benefits and avoid the pitfalls of health care decentralisation? Much depends on the governance quality at both central and subnational government levels. Decentralisation reforms in public services provision should be looked at as an entity and successful implementation of decentralisation requires as a set of well-co-ordinated political, administrative and fiscal measures.

Financing of health systems across OECD countries

Universal health coverage is a common policy goal across the OECD countries but international practices show that, from a financing perspective, there is no single way to approach this objective. While each country is a special case, the health systems in OECD countries can be roughly classified as tax-funded (sometimes also called the Beveridge model) and health insurance systems (sometimes called the Bismarck model) (OECD, 2015[42]) (Table 6.4).

Table 6.4. Several ways to organise health care among OECD countries

	Main source of health care coverage	Country examples
Tax-funded health system	National health system	Australia, New Zealand, Portugal, UK
	Subnational level health system	Finland, Sweden
Health insurance system	Single-payer	Estonia, Korea
	Multiple insurers, no choice of insurer	Austria, Belgium, France
	Multiple insurers, with choice of insurer	Chile, Germany

Source: Author's elaboration based on Auraaen, A. et al. (2016[43]), "How OECD health systems define the range of good and services to be financed collectively", https://dx.doi.org/10.1787/5jlnb59ll80x-en.

Tax-funded health systems can be further divided into national health systems and decentralised systems. Tax funding can be based on central government tax revenues, subnational government taxes or both. Examples of national health systems include the National Health Service (NHS) in the UK. Examples of decentralised health systems include the Nordic countries, especially Finland and Sweden, where all healthcare is organised and mostly financed by subnational governments. Further examples include Italy and Spain, where the regions have the responsibility of health services, and health care is financed both by national and regional taxes. Responsibility can also be shared with national and regional governments, each responsible for different parts of the system (e.g. regional control of hospital organisation and national control of hospital reimbursements). In the context of regional health, understanding this balance of power is an important step in implementing effective policy.

Health insurance systems are usually financed by employers and employees with fees collected from payroll. Health insurance systems can be based on single or multiple-payer models. The "single-payer" health insurance models are usually based on the government-run insurance programme which every citizen pays into. The "multiple-payer" models are usually private insurance companies from which citizens can choose. Multiple-payer models are usually tightly regulated by the state. Both single-payer and multiple-payer models usually contract with private health care producers (Stabile and Thomson, 2014[44]; Kutzin, 2011[45]).

The proponents of the tax-financed model argue that tax-based systems can benefit from scale economies in administration, risk management and purchasing power (Savedoff, 2004[46]). Moreover, since payment is mandatory, the system avoids many problems that are common especially to voluntary insurance markets. Tax-financed models are also claimed to enable more efficient income redistribution through health service provision and financing.

Supporters of health insurance emphasise the benefits of separating the purchasing and provision of healthcare and the possibility of selective contracting between providers. It has been argued that such

features can lead to better quality healthcare at a lower cost compared with tax-financed health systems (Wagstaff, 2009[47]). While no two systems are alike, there are key differences between the tax-financed and insurance-based model (Table 6.5).

Table 6.5. Health insurance vs. tax-financed health care financing models

	Health insurance model	Tax-financed model
Entitlement basis	Contribution	Citizenship/residence
Funding base	Wages	All public revenues
Insurer/payer	Occupational	State
Benefit package	Explicit	Implicit
Management	Independent	Government
Providers	Privately contracted	Publicly contracted

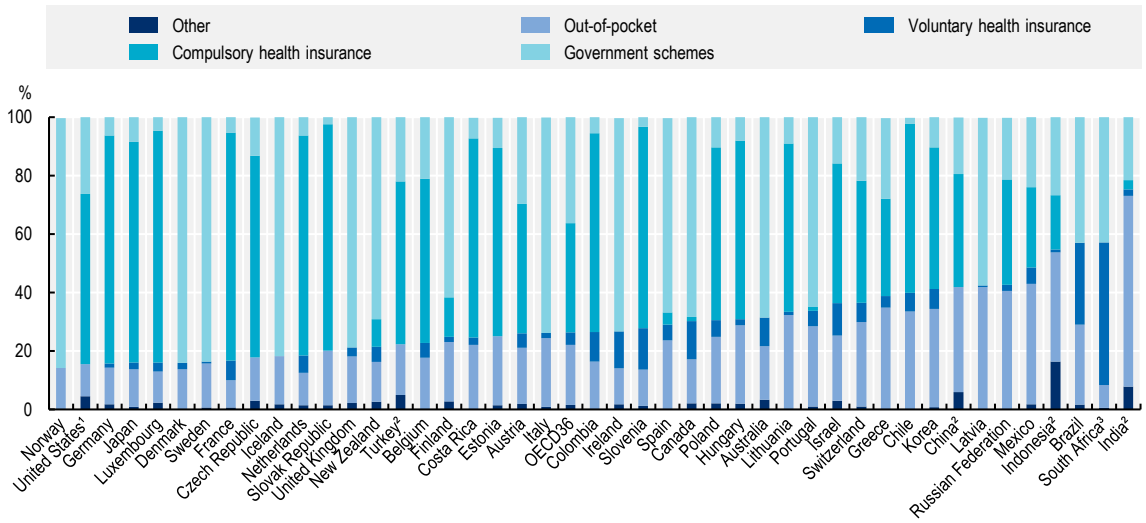
Source: Author's elaboration based on Kutzin, J. (2011[45]), "Bismarck vs. Beveridge: Is there increasing convergence between health financing systems?", https://www.oecd.org/gov/budgeting/49095378.pdf (accessed on 26 June 2020).

Health care financing systems in OECD countries and beyond are usually a mix of various financing models. For instance, in countries with mostly tax-financed health systems, there are often some elements of insurance models and out-of-pocket payments. In the same vein, countries relying mostly on an insurance model usually have at least some government schemes in place. Furthermore, the systems are far from "set in stone". Over the past decades, some countries have shifted emphasis from tax-financed to insurance-based models, or vice versa (Wagstaff, 2009[47]; Auraaen et al., 2016[43]).

The average shares of government schemes and health insurance-based systems across OECD countries are almost the same, 36% and 37% respectively (Figure 6.11). Government schemes (tax-financed models) have an important role in health care provision in Australia, Canada, Denmark, Finland, Iceland, Ireland, Italy, Latvia, New Zealand, Norway, Portugal, Spain, Sweden and the UK.

Figure 6.11. Health expenditure by type of financing

2017 (or nearest year)



Note: 1. All spending by private health insurance companies in the US is reported under compulsory health insurance; 2. Health payment schemes unable to be disaggregated into voluntary health insurance, NPISH and enterprise financing are reported under other; 3. Voluntary payment schemes unable to be disaggregated are reported under voluntary health insurance.
Source: OECD (2019[48]), "Health expenditure by type of financing, 2017 (or nearest year)", https://doi.org/10.1787/1e3c9dd7-en.

Why do countries decentralise their health care?

The most common reasons for health care decentralisation are related to the objectives of increasing the technical and allocative efficiency of health service provision. Table 6.6 summarises the main motivations and the issues associated with the decision to decentralise. Decentralisation has often been implemented in hope of improved political and fiscal accountability, leading to improved efficiency, enhanced cost-consciousness and constrained growth of health expenditure (Saltman, Bankauskaite and Vrangbæk, 2007[4]; Costa-Font and Turati, 2018[41]).

From the service quality and availability aspect, decentralisation is expected to help establish more patient-oriented systems through greater local participation and better information on local needs. The motivation to decentralise also often arises from the need to ensure government accountability to citizens and to comply with heterogeneous needs and preferences (Jiménez-Rubio and García-Gómez, 2017[40]).

The risks of healthcare decentralisation are mostly the same as the risks of decentralisation in general. In particular, without special measures, the increasing efficiency in delivering health care may come at the expense of higher disparities in health outcomes. At worst, decentralisation may benefit only the subnational governments with a strong fiscal base (Costa-Font and Turati, 2018[41]). Therefore, equalisation systems that take both expenditure needs and differences in subnational government revenue bases into account are usually needed in decentralised models (OECD, 2019[3]).[9] For example, in Sweden, where health care provision and financing are decentralised to counties and where most of the health expenditure is financed by counties' own tax revenues, subnational governments' own financing is complemented with strong equalisation system (Box 6.6). Other potential risks of decentralisation, although manageable with the right implementation, include benefit spill-over effects and diseconomies of scale. The former can be dealt with earmarked grants and the latter with inter-municipal or inter-regional co-operation, as discussed previously.

Box 6.6. Sweden's health expenditure equalisation model

Healthcare equalisation is part of the overall expenditure equalisation model

Cost equalising grant system is based on "standard costs" which are calculated using formulae for each mandatory subnational service. There are ten formulae, one for each service taken into account in the equalisation. The formulae are based on research results highlighting factors that affect subnational costs. The models include indicators describing different aspects of subnational costs, such as demographic structure, ethnicity, socio-economic situation and geography. The indicators used in the formulae are selected so that subnational governments themselves cannot affect the equalisation. Only differences between estimated costs and the average standard cost are taken into account. Contrary to income equalisation, which is mostly centrally funded, Swedish cost equalisation is strictly between municipalities/counties, though there is a different system of each of these subnational government levels.

Healthcare expenditure equalisation is based on a formula

Healthcare is solely a county responsibility in Sweden and health care of forms the main task of counties. The health care cost equalisation system aims to compensate the counties which have higher health costs, because of demand or special circumstances for example. As stated above, to avoid a situation where the recipient county could affect the equalisation it receives, the indicators used are relatively general. The health care formula describes the population for each county using the following variables: gender (2 groups), age (13 groups), civil status (3 groups), employment status (3 groups), earned income (3 groups), type of housing (2 groups). In addition to these variables, additions or deductions to the standard costs are calculated using the differences in the incidence of human

immunodeficiency virus (HIV), population sparsity and wage levels. All in all, in 2018, the model redistributed SEK 3.7 billion between counties, which is approximately 1.5% of the total health expenditure in the country.

Source: Finansdepartementet (2018[49]), "Lite mer lika. Översyn av kostnadsutjämningen för kommuner och landsting", https://www.regeringen.se/4a78db/contentassets/484eed9ac52944b18eea995eb2f6c178/lite-mer-lika.-oversyn-av-kostnadsutjamningen-for-kommuner-och-landsting-sou-201874.pdf; OECD (2017[50]), *OECD Territorial Reviews: Sweden 2017: Monitoring Progress in Multi-level Governance and Rural Policy*, https://dx.doi.org/10.1787/9789264268883-en.

Table 6.6. Examples of objectives, rationale and issues related to health care decentralisation

Objectives	Rationale	Issues and controversies
To improve technical efficiency	• Through fewer levels of bureaucracy and greater cost-consciousness at the local level	• Implementation is the key. • Right incentives are needed for providers.
To increase allocative efficiency	• Through better matching of public services to local preferences • Through improved patient responsiveness	• Risk of increased inequalities among subnational governments. • Need to decentralise both the spending and revenue side.
To empower local governments	• Through more active local participation • Through improved capacities of local administration	• Need to ensure that subnational governments have adequate capacities.
To utilise the local innovation potential in service delivery	• Through experimentation and learning by doing • Through increased fiscal autonomy of local governments and institutions	• Increased inequalities may result if capacity issues are not solved.
To increase accountability	• Through elected decision-makers	• Nominated decision-makers, which are often used in co-operative bodies, may not fulfil an accountability requirement.
To increase the quality of health services	• Through improved information on local conditions and needs • Through improved access to health services for vulnerable groups	• Equalisation system is needed to ensure a level playing field. • Economies of scale should be utilised to ensure quality potential, for example with co-operation, mergers and outsourcing.
To increase equity	• Through equalisation systems that take into account local needs and circumstances • Through normative regulation and steering by central government (vertical co-ordination) • Through capacity building schemes and co-operative mechanisms (horizontal co-ordination)	• Need to ensure that local autonomy is not limited because of upper-level government steering. • Decentralisation may improve some equity measures but may worsen others.

Source: Author's elaboration and modification of the material presented in Saltman, R., V. Bankauskaite and K. Vrangbæk (eds.) (2007[4]), *De centralization in Health Care: Strategies and Outcomes*, https://www.euro.who.int/__data/assets/pdf_file/0004/98275/E89891.pdf.

Healthcare decentralisation in OECD countries

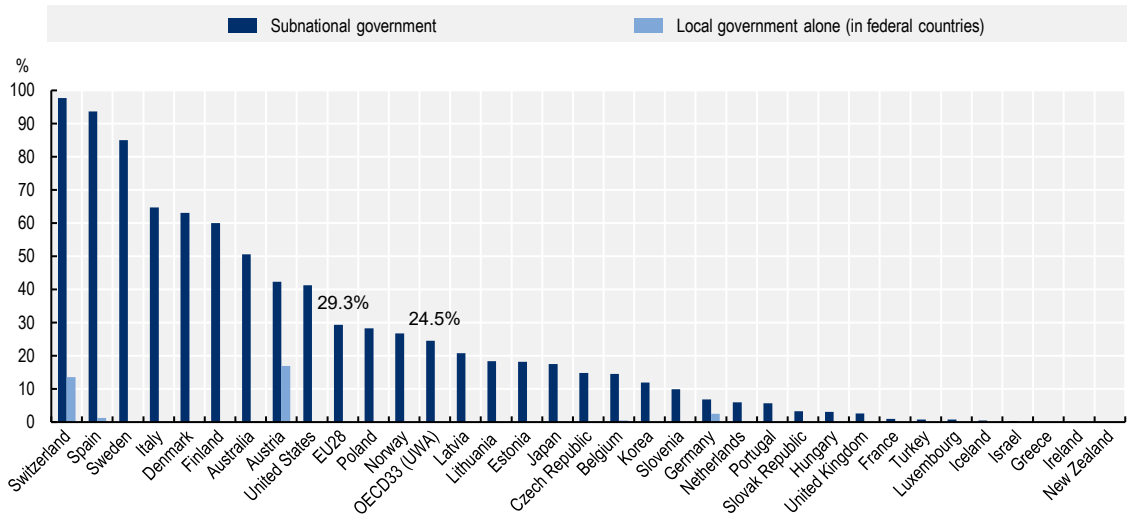
While the scope of decentralisation differs a great deal between OECD countries, subnational governments usually play at least some role in health care provision. There are two main ways to measure the degree of decentralisation: quantitatively and qualitatively. Quantitative indicators typically use fiscal data to

describe decentralisation. Qualitative approaches rely on questionnaires and expert interviews to collect information. While this section uses fiscal indicators constructed from OECD National Accounts data (OECD, 2020[7]) to describe decentralisation in health care, at the end of the section, there is a short discussion on current qualitative indicators, notably the OECD Fiscal Federalism Network's work on health decentralisation.

Although it is often argued that decentralisation is a general trend in both developed and developing countries, this does not seem to be the case for health care, at least from a fiscal data point of view. The subnational government share of general government expenditure suggests that in Denmark, Finland, Italy, Spain, Sweden and Switzerland, the subnational government share of general government health expenditure is the highest of all OECD countries, ranging between 60% and 98% (Figure 6.12). However, health expenditure decentralisation has been on the decline over the past two decades or so, especially after the economic and financial crisis in 2008/09 (Figure 6.13).

Figure 6.12. Subnational government share of general government health expenditure

2017 or the latest year



Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020).

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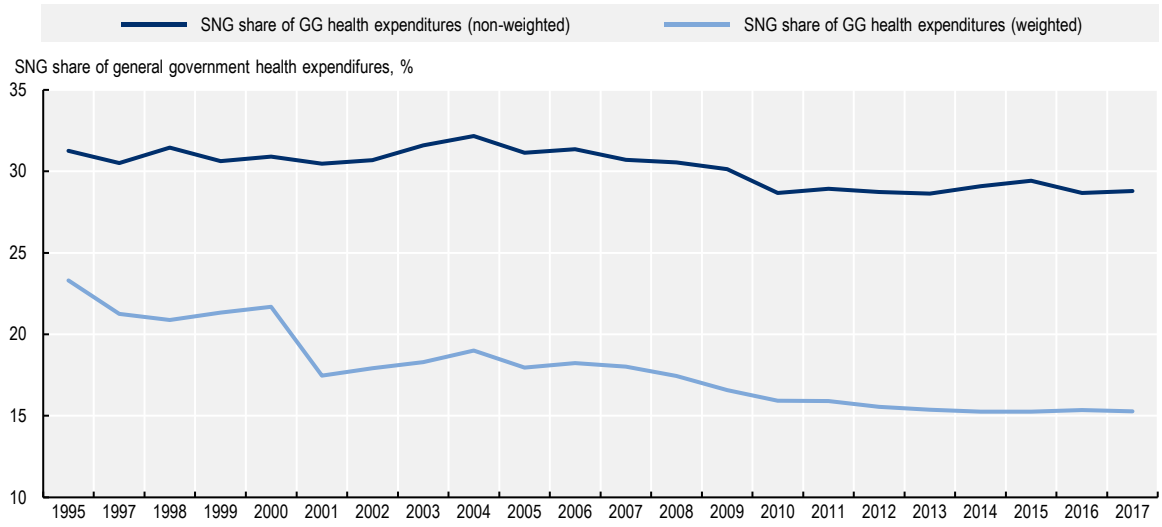
The trends of health expenditure decentralisation also vary considerably between countries (Figure 6.14). For instance, whereas in Denmark, Greece, Ireland, Korea and Norway there have been recentralisation reforms during this period, in Belgium, the Netherlands and Spain, the share of subnational governments of general government (GG) health spending has increased considerably. In many countries, the changes are less dramatic but, instead, there is a steady growth of subnational share (Australia, Austria, Latvia and Sweden) or a gradual decline of subnational government spending share (Czech Republic, Hungary, US). In the rest of the countries, the situation has been either relatively stable or the degree of decentralisation has changed from year to year, making it difficult to verify a trend.

In the case of health care, however, a simple share of subnational government expenditure of GG expenditure may not be sufficient to describe the true degree of health expenditure decentralisation. The reason is that in many countries, government schemes do not form a large share of total health expenditure (Figure 6.11) which can comprise several types of spending items, such as government schemes, compulsory health insurance and out-of-pocket payments, among others (see Chapter 5). For instance, in

Switzerland, in 2017, government schemes formed 22% of total health spending, compulsory health insurance scheme formed 42% and out-of-pocket payments 27% of total health expenditure. In contrast, the situation is very different in Spain, where government schemes formed 66% of total health expenditure and subnational government responsibility was nearly 94% of GG health expenditure. It is therefore clear that in Spain health care decentralisation is a much more important phenomenon than in Switzerland.

Figure 6.13. Trend in average subnational government share of general government health expenditure

1995-2017, 30 OECD countries



Note: SNG=Subnational government, GG=General government. The graph has been constructed using data on 30 OECD countries. No data for this period was available for Canada, Iceland, Mexico, New Zealand and Turkey. For Korea, the year 2017 data was not yet available, instead 2016 share was used twice because without Korea's data, the SNG weighted share would have been excessively high (31%).
Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020).

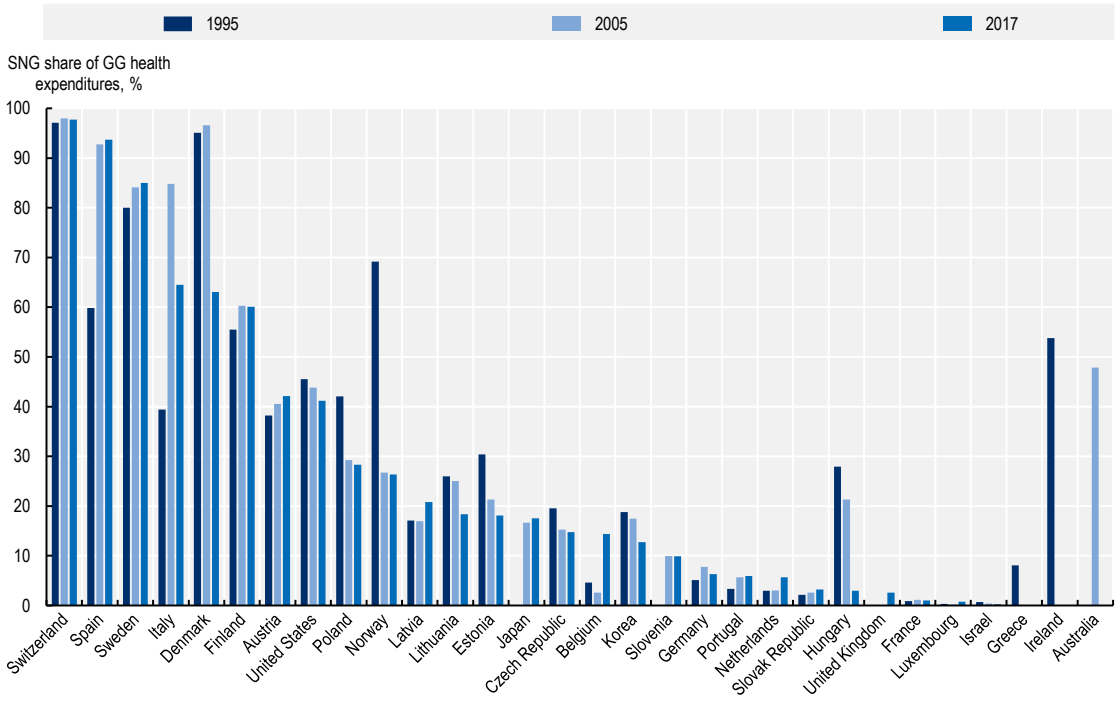
StatLink https://doi.org/10.1787/888934226899

In order to better identify countries that have higher than average degree of health decentralisation, a simple indicator on health expenditure decentralisation is composed using the share of government health schemes of total health expenditure and subnational government share of government schemes.[10] The countries listed according to this indicator (Figure 6.15) show that health expenditure decentralisation is most relevant in 6 out of the 32 OECD analysed: Australia, Denmark, Finland, Italy, Spain and Sweden. In these countries, between 30% and 70% of health expenditure is the responsibility of subnational governments. In Norway and Switzerland, the subnational government sector covers above 20% and in Austria, Latvia and the US, the share is above 10%. For the rest of the countries, subnational governments have only a small or negligible role in health care expenditure.

Countries differ also markedly in the importance of health expenditure of total subnational government expenditure. In Italy and Spain, health care is the main policy responsibility of regional governments and accounts for almost half of the total regional budgets. In Sweden, health care forms almost 90% of expenditure at the regional level. In Finland, health care is "only" about 25% of total municipal expenditure.[11]

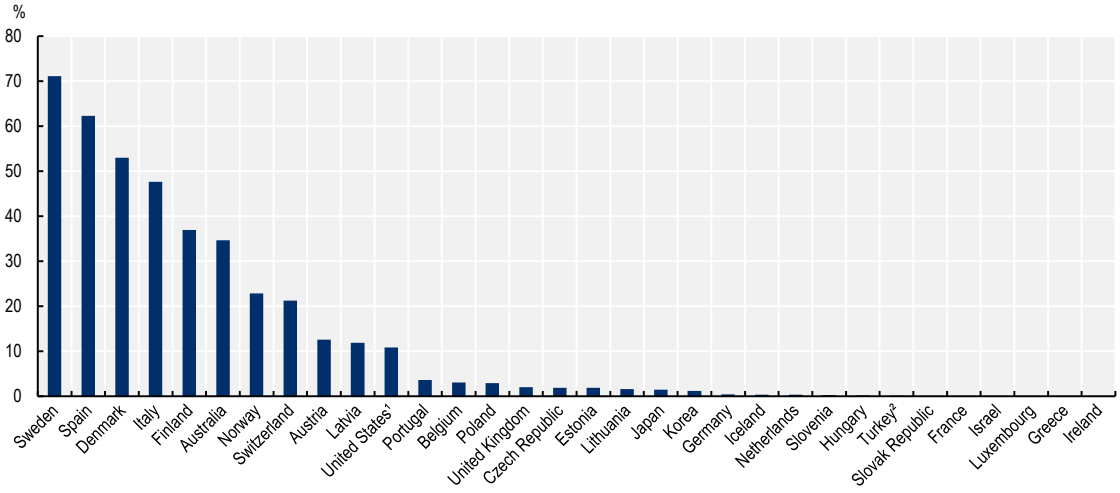
Figure 6.14. Subnational government share of general government health expenditure, OECD

1995, 2005 and 2017 in 30 OECD countries



Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020).

Figure 6.15. An indicator on subnational government share of health spending



Note: The indicator is formed as: Subnational government share of general government health expenditure × Share of government schemes of total health expenditure.

1. All spending by private health insurance companies in the United States is reported under compulsory health insurance.

2. Health payment schemes unable to be disaggregated into voluntary health insurance, NPISH and enterprise financing are reported under other.

Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020); OECD (2019[48]), "Health expenditure by type of financing, 2017 (or nearest year)", https://doi.org/10.1787/1e3c9dd7-en.

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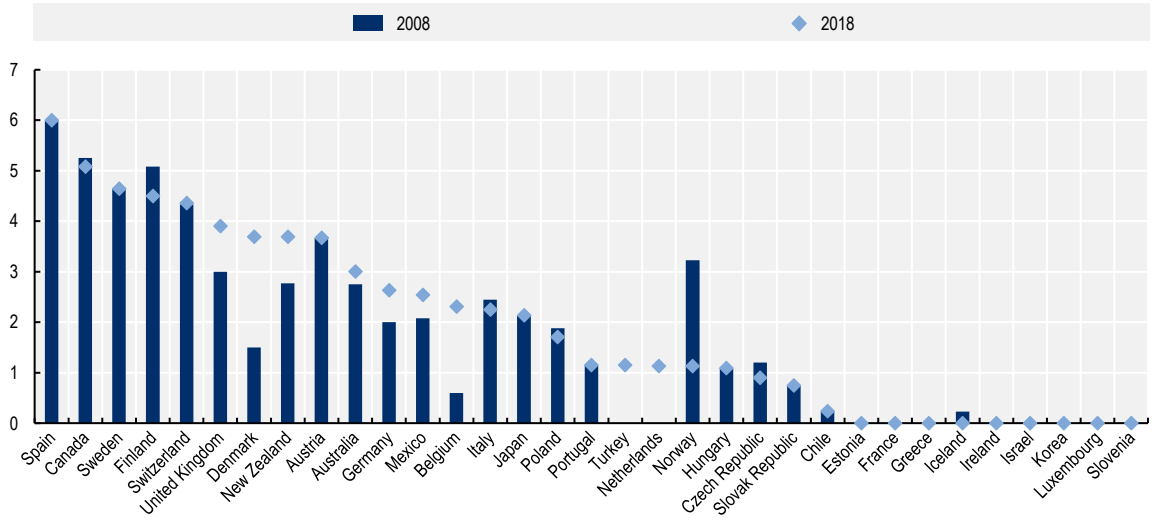
Decentralisation can be analysed also from a normative regulation point of view. Normative and fiscal regulation can constrain the decision-making autonomy of subnational governments and hence reduce the degree of decentralisation. Normative regulation cannot be observed directly from National Accounts or other statistical databases, however. Instead, such information must be collected via questionnaires directly from local experts. Examples of such approaches include the OECD work on fiscal autonomy of subnational governments (OECD, 2019[22]), the Regional Authority Index (RAI) (Marks, Hooghe and Schakel, 2008[51]) and the Local Autonomy Index (LAI) (Ladner, Keuffer and Baldersheim, 2016[52]). Like the OECD Fiscal Federalism Network's work on subnational government autonomy, the RAI and LAI are also based mostly on expert judgements and the data is either collected by questionnaires or by setting up special expert panels. The RAI and LAI are built for describing the general regional and local authority. They combine several decision-making aspects and sectors, including health, but neither of them reports decision-making autonomy in health care specifically.

The OECD Fiscal Federalism Network has published a special study on the effects of decentralisation in healthcare. For this analysis, an indicator describing decentralisation in health care was established using data collected for the OECD Health Systems Characteristics Survey (Dougherty et al., 2019[53]). In the survey, countries were asked to indicate the level of government that is responsible for 13 policy or service areas.[12] The indicator was based on grading on each 13 service areas/functions so that 3 points were given if the subnational government level and central government were jointly responsible for the function, 6 points if subnational government was responsible alone, and zero points if only central government was responsible. The indicator shows a high degree of health care decentralisation in Australia, Canada, Denmark, Finland, New Zealand, Spain, Sweden, Switzerland and the UK (Figure 6.16). This indicator, however, does not take into account the size of decentralisation.

Figure 6.16. Indicator on subnational government fiscal autonomy in health by country

2008 and 2018



Source: Dougherty, S. et al. (2019[54]), "The impact of decentralisation on the performance of health care systems", https://doi.org/10.1787/22265848 (accessed on 15 May 2020).

The effects of decentralisation on health outcomes

The scant evidence on the effects of health care decentralisation suggests that the effects of fiscal and political decentralisation are mainly positive in terms of efficiency and quality, but that the implementation matters. For Spain, for example, the evidence shows that decentralisation is associated with better health outcomes, without sizeable effects in regional disparities (Jiménez-Rubio and García-Gómez, 2017[40]). However, a study using a difference-in-differences estimation strategy on micro-data from the Spanish Health Barometer 1996-2009 finds a negative association between decentralisation reforms and citizens' satisfaction on primary and hospital care (Antón et al., 2014[55]).

A recent study utilising a natural experiment on the effects of decentralisation on infant and neonatal mortality rates in Spain finds a sizeable positive effect of decentralisation reform. The result applies to regions that are subject to both fiscal and political decentralisation. According to the results, decentralisation resulted in roughly a 1.1 reduction in the number of deaths per thousand live births of children under 1 year of age, and around a 0.8 reduction in the number of deaths of children under a month of age per thousand live births (Jiménez-Rubio and García-Gómez, 2017[40]). An older study that analyses data from the Canadian provinces during 1979-95 finds the positive and substantial influence of decentralisation on the effectiveness of public policy in improving population's health in terms of infant mortality (Jiménez-Rubio and Smith, 2005[56]).

As for the equity aspect, Zhong (2010[57]) found that increasing the degree of decentralisation was related to lower overall and within-province inequity in the use of general practitioner (GP) and hospital services, and lower between-province inequity. Similarly, Costa-Font and Turati (2018[41]) used data from decentralisation reforms in Italy and Spain, finding no evidence on increasing regional inequalities on health outcomes or outputs after decentralisation reforms. The authors argue that healthcare decentralisation is unlikely to be a concern for equity in unitary countries, provided that the reform design promotes competition and policy innovation and as long as equalisation mechanisms and framework regulation do not exert unintended effects.

A recent study found a non-linear relationship between the association between "administrative decentralisation" and health spending and life expectancy (Dougherty et al., 2019[54]). According to the study of 22 OECD countries, a moderate degree of decentralisation reduces public health spending and increases life expectancy but a high degree of decentralisation has an opposite effect. According to the authors, this suggests that there is an optimum level of decentralisation in terms of per capita expenditure and life expectancy. The study also estimated the association between decentralisation and hospital costs, finding significantly lower hospital costs for countries with high decentralisation compared to countries with no decentralisation.

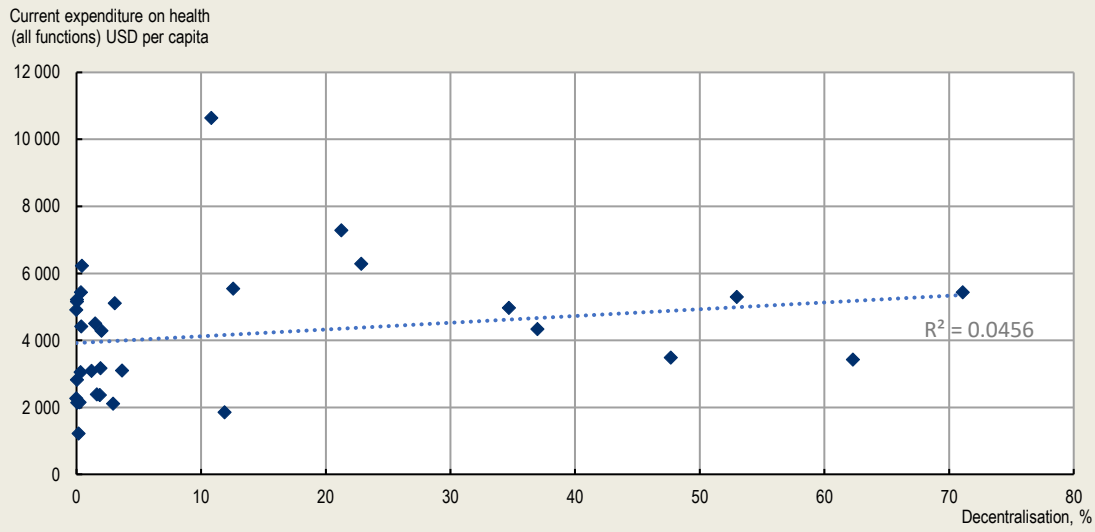
Another recent study studied the effect of the overall quality of government, focusing on the differences between countries with high-quality governance and countries with low-quality governance (Rodríguez-Pose and Tselios, 2019[58]). In the former country group, political decentralisation may result in greater satisfaction with health provision, whereas in the latter country group, decentralisation may result in overall satisfaction but not necessarily with more satisfaction in health-related services. Box 6.7 discusses some potential associations with decentralisation, expenditures and health outcomes.

Box 6.7. Potential associations with decentralisation, expenditures and health outcomes

In order to make some country comparisons using OECD data, the simple indicator for health care decentralisation developed in this paper is used to demonstrate the potential associations with decentralisation, expenditures and health outcomes. First, plotting the decentralisation indicator with per capita health expenditure (Figure 6.17), only a very weak positive association is found between decentralisation and expenditure. Plotting degree of decentralisation (2017 situation) and percentage change in per capita expenditures during 2010-18 shows no association at all. This could be because there is no correlation or because the association is non-linear (as was suggested by Dougherty et al. (2019[54])). A more careful statistical analysis would be needed to understand the relationship better although, in any case, a causal relationship could not be revealed with traditional regression analysis.

Figure 6.17. Degree of fiscal decentralisation and per capita health expenditure

2017 and 2018 values respectively



Note: Decentralisation is defined here as: Subnational government share of general government health expenditure × Share of government schemes of total health expenditure. The two rightmost data points are Spain and Sweden.
Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020), Main aggregates, PPP for Actual Individual Consumption.

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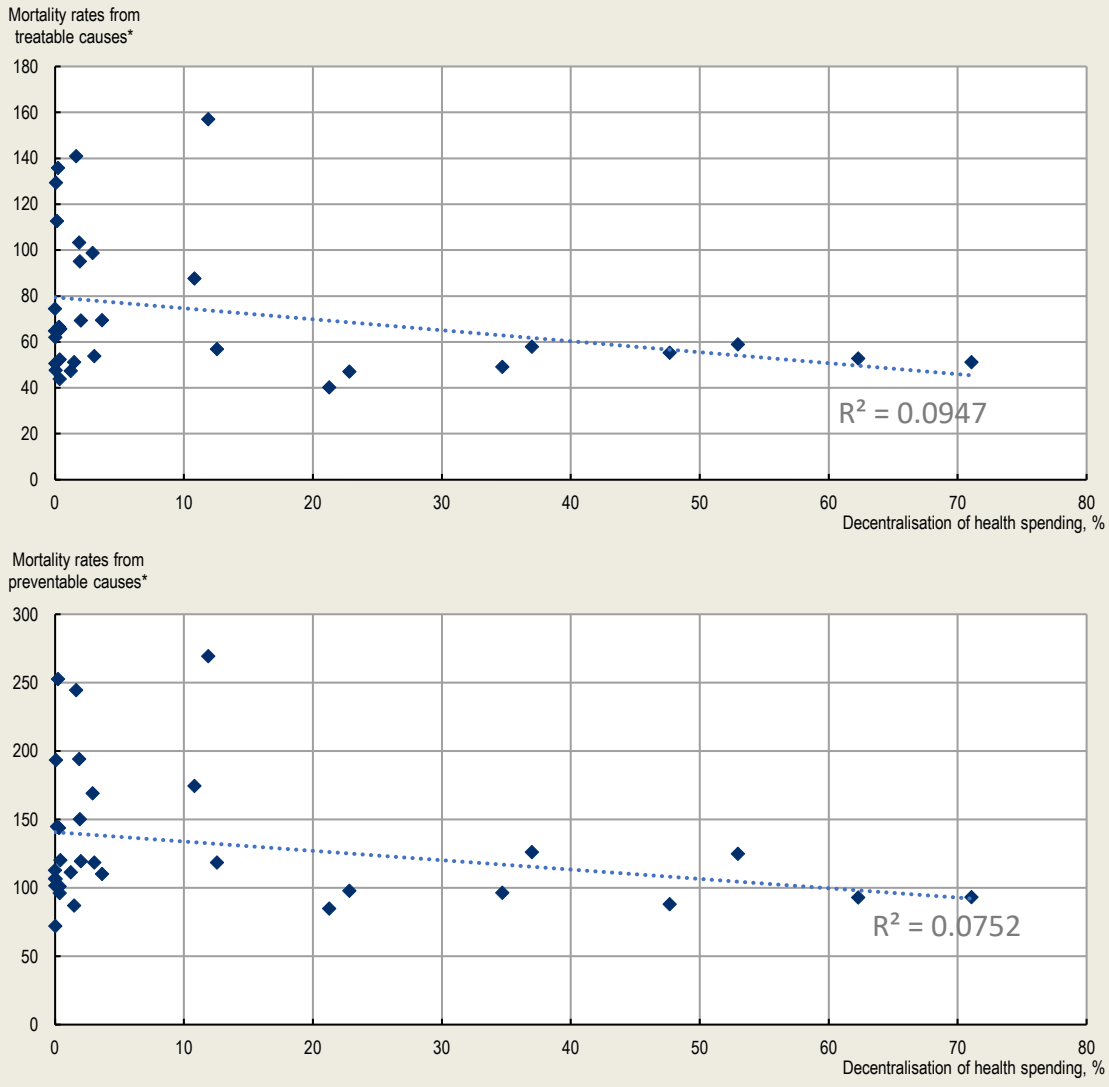
Next, the association between decentralisation and two traditional OECD health indicators, namely the mortality from preventive causes and mortality from treatable causes (Figure 6.18) is examined. In both cases, decentralisation is negatively associated with the indicators, suggesting that mortality is lower in more decentralised countries. The association is very weak, however, and more careful analysis would be needed to have a better understanding of the association. As in case of per capita expenditures, in any case, a causal inference is not possible using this approach.

Figure 6.18. Decentralisation and mortality from preventable and treatable causes



Note: Decentralisation is defined as: Subnational government share of general government health expenditure × Share of government schemes of total health expenditure. The health outcome used here is the average aged-standardised mortality rate from treatable causes per 100 000 people. The health outcome used here is the average aged-standardised mortality rate from preventable causes per 100 000 people.

* Age-standardised rate per 100 000 population.

Source: OECD (2020[7]), *OECD National Account Statistics*, https://doi.org/10.1787/na-data-en (accessed on 15 May 2020), Main aggregates, PPP for Actual Individual Consumption and OECD (2019[48]), "Health expenditure by type of financing, 2017 (or nearest year)", https://doi.org/10.1787/1e3c9dd7-en.

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Conclusion

This chapter discussed governance aspects of territorial service provision, with a focus on education and health care services. Regarding education, the economic justification for central government involvement in decentralised education systems depends on the degree of externalities involved. Local authorities may not take into account the externalities in their own decision-making, which may justify central government intervention. Education is also a redistributive service, which often explains the central governments' interest. Regarding health care, the chapter has shown that systems can be very complex and quite different across OECD countries. Commonly used elements to classify a health system include how the system is financed, the freedom to access various parts of the system, and the role of private vs. public health care providers.

The potential gains to be realised on the provision of public services from decentralisation are usually conditional on many factors, such as effective channels and incentives for voters in subnational governments to express their preferences. In addition, the local policymakers must have incentives in place to respond to local demands and needs. The basic accountability mechanisms of decentralisation can function only if local residents have relatively strong incentive to evaluate the efficiency of their local administration – and if needed, to punish their local politicians for bad performance. Such motivation depends primarily on the financing system of locally provided public services and on the information available on the service outcomes. In particular, if local residents finance a considerable share of local services by paying local taxes, they will have a strong incentive to monitor their local administration (OECD, 2019[3]).

Furthermore, the quality and strength of normative regulations matter, because true decision-making autonomy requires that decisions be made at the local level in practice and not just in principle. If service provision is only nominally decentralised, for example in the case of very strict normative regulation, and if financing comes fully from the central government, it is unlikely that decentralisation will provide the full benefits that could otherwise be obtained.

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Notes

[1] Exclusion principle means that a consumer can be excluded from using the service if he/she is not willing to pay for its use.

[2] In other words, the vertical fiscal gap is large.

[3] Taking into account education from primary to tertiary levels.

[4] Primary, secondary and post-secondary non-tertiary education.

[5] Usually, the initial level means the central government level but sometimes also the regional level.

[6] Much depends on the form of transfers. General grants or block grants are much less intrusive from a decision-making autonomy point of view than earmarked grants.

[7] The data comprises a set of 23 key decisions, organised across 4 domains. The data does not therefore capture the totality of decisions made within a school system.

[8] No comparable data was available for Canada, Iceland, Mexico, New Zealand, Turkey. For Korea, the year 2017 data was not yet available.

[9] This argument applies especially to situations where redistributive services like health of education have been decentralised.

[10] Indicator on health expenditure decentralisation = (SNG share of GG health expenditure) × (Share of government schemes of total health expenditure).

[11] In Finland, in addition to health care, all education, social services and local infrastructure have been assigned to municipalities. In Sweden, the counties (regions) focus on solely on health services and regional development, and other services are municipal responsibilities.

[12] The policy areas covered by the study included: i) setting the level of taxes which will be earmarked for health care spending; ii) setting the basis and the level of social contributions/premiums for health care; iii) setting the total budget for public funds allocated to health care; iv) deciding resource allocation between sectors of care; v) setting remuneration methods for physicians; vi) defining payment methods for hospitals; vii) financing new hospital buildings; viii) financing new high-cost equipment; ix) financing the maintenance of existing hospitals; x) financing primary care services; xi) financing specialist out-patient care; xii) financing current hospital spending; and xiii) setting public health objectives.

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PREPARING REGIONS FOR DEMOGRAPHIC CHANGE

COVID-19 has put renewed focus on the importance of addressing longstanding challenges that OECD governments face in delivering public services, especially in regions with people spread over a wider area where economies of scale are more difficult to achieve. The physical infrastructure needed to provide good quality education and health services can be more complex and expensive in rural and remote regions that also struggle to attract and retain education and health care professionals. Acute ageing trends in many rural regions and, in some cases, a shrinking population will require sustainable policy responses that will need to be coherent with pressure to drive efficiencies in public spending. This report examines the nuances specific to the delivery of education and health care to people everywhere, offering recommendations on how to better adapt provision to the realities of today and the emerging realities of tomorrow to face the challenges of distance, demographic change and fiscal belt-tightening. The report also examines digital connectivity issues in rural and remote regions, recognising the significant scope for digital delivery of services to mitigate challenges related to distance. Finally, the report looks at governance issues, including fiscal issues, through which the delivery of these critical services is administered and paid for.

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