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Primary Health Care in Brazil

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Foreword

Primary health care in Brazil has a well-organised approach which is the result of sustained commitment to providing high quality primary health care for the whole population. The Family Health Strategy, launched in 1994, has been a key pillar of the efforts to reorganise and strengthen primary health care in Brazil. Since its implementation, a growing share of the Brazilian population can benefit from free access to a community-based approach to preventive and primary health care services. An extensive body of academic research has provided evidence of the key contributions of the Family Health Strategy to the reduction of almost 18 deaths per 1 000 birth in infant mortality rate observed between 1990 and 2019 in Brazil. The programme has also been associated with reduction in mortality and hospitalisations for chronic disease. Recent estimations also show that the implementation of the Family Health Strategy was associated with a reduction of 45% of the standardised hospitalisation rates per 10 000 inhabitants between 2001 and 2016, mostly for primary care conditions such as asthma, gastroenteritis, cardiovascular and cerebrovascular diseases. However, as some challenges are overcome, new ones approach, as Brazilian population ages, population risk factors such as obesity are on the rise, and emerging pandemic threats require resilience and adaptability.

Many features of the primary health care sector in Brazil deserve to be recognised as examples for OECD countries, including the use of multidisciplinary primary care teams called family health teams, and the extensive use of community health agents, which are frontline public health workers. Brazil has also implemented a set of key reforms to improve access to high quality primary health care over the past decades, including the National Programme for Improving Access and Quality of Primary Health Care (PMAQ) and the More Doctors Programme (MDP).

Nevertheless, Brazil still needs to address a number of challenges. Most critically, only 65% of the Brazilian population are covered by family health teams and too many patients bypass primary health care and directly seek care in outpatient specialties and hospitals, notably for conditions that could be more effectively treated at community level. The expansion of primary health care has also been marked by stark disparities across states and municipalities, linked mainly to workforce shortages and imbalances in the distribution of medical doctors. There are also been a rise in the number of elderly patients and an increasing prevalence of chronic non-communicable diseases – including cancer, diabetes and hypertension, which call for effective prevention, early detection and treatment. Lastly, while Brazil has a long history of developing and investing in networks, data, interoperability and skills, progress towards effective use of digital technologies in primary health care has been slow, and fundamentally unequal.

The recent reform agenda for the primary health care sector in Brazil – the *Previne Brasil* programme – has ambitious goals toward improving access, fostering longitudinal and co-ordinated care. While primary health care is mainly a responsibility of municipalities in a decentralised health system, stronger oversight and steering from the federal government, and regional co-ordination and support from state governments will be needed to both improving access and quality, while reducing inequalities. Furthermore, as the programme is just a couple of years short of its 30th anniversary, it is in high need of innovation to get it ready for the challenges of the next 30 years, with better use of digital technology, better use of skills, modern integrated care models, backed by better performance measurements and financial incentives.

This review was prepared by the OECD Secretariat to draw on evidence and best practices from across OECD health care systems to support Brazil in strengthening its primary health care sector, and guarantee it is responsive to people's changing needs, capable of offering preventive, continuous and co-ordinated care equally across the country.

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Acronyms and abbreviations

ADAPS	Agency for the development of primary health care
APS	Atenção Primária à Saúde
ANVISA	National Agency of Sanitary Surveillance
BMI	Body mass index
BRL	Brazilian Real
CAD	Canadian Dollar
CaSAPS	Primary health care service portfolio
CFM	Brazilian Federal Council of Medicine
CGTIC	General Co-ordination of Information and Communications Technology
CHW	Community health worker
CIB	Comissão Intergestores Bipartite
CIT	Comissão Intergestores Tripartite
CQC	Care Quality Commission
CLT	Consolidation of Labor Law
CNS	National Council of Health
CME	Continuous medical education
CNES	National Register of health facilities
CONASS	National Council of State Health Secretaries
CONASEMS	National Council of the Municipal Health Secretaries
COSEMS	State Council of Municipal Health Secretariats
CPG	Clinical practice guideline
DATASUS	Informatics Department of the Sistema Único de Saúde
DENASUS	National Audit Department of Sistema Único de Saúde
DGMP	DigiSUS Gestor – Módulo Planejamento
EHR	Electronic health record
ENADE	National Exam of Student Performance
ESD 28	The Brazilian National Digital Health Strategy 2020-28
ESF	Family Health Strategy
FBG	Fasting blood glucose
FCC	Federal Communications Commission
FCM	Family and community medicine
FHT	Family health team
GESAC	Electronic Government – Citizen Assistance Service
GP	General practitioner
HPV	Human papillomavirus
HSBP	High systolic blood pressure
IBGE	Brazilian Institute of Geography and Statistics
ICT	Information and communication technologies
INCA	National Cancer Institute
INEP	Institute of Educational Studies and Research Anísio Teixeira
LAC	Latin America and the Caribbean

LDCT	Low-dose computed tomography
MACC	Modelo de Atenção às Condições Crônicas
MCTIC	Ministry of Science, Technology and Innovation
MDP	More Doctor Programme
MLA	Medical Licensing Assessment
NASF	Family health support centres
NCD	Non-communicable disease
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development
PaRIS	Patient-Reported Indicator Surveys
PACS	Community Health Agents Programme
PAHO	Pan American Health Organisation
PAPS	Planificação da Atenção Primária à Saúde
PCAT	Primary health care assessment tool
PHC	Primary health care
PMAQ	National Programme for Improving Primary Health Care Access and Quality
PLAB	Professional and Linguistic Assessments Board
PNAB	Política Nacional de Atenção Básica
P4P	Pay-for-performance
PNIIS	National Policy for Health Information and Informatics
PNS	National Health Plan
QICH	National Programme for Quality Indicators in Community Healthcare
RAS	Health care networks
RNDS	National Health Data Network
RNP	National School and Research Network
RCS	Rural Clinical School
RUTE	Brazilian Telemedicine University Network
SAEM	Accreditation System of Medical Schools
SAPS	Primary Health Care Secretariat
SMART	Sistema de Monitoramento e Avaliação de Resultados do Programa Telessaúde
SBMFC	Brazilian Society of Family and Community Medicine
SINAES	National System for the Evaluation of Higher Education
SISAB	Primary Health Care Information System
SISCAN	Cancer Information System
SISCOLO	Cervical Cancer Information System
SISMAMA	Breast Cancer Information System
SOBRAMFA	Brazilian Society for Family Medicine
SUS	Unified Health System
UBS	Basic health care units
USD	United States Dollar
WHO	World Health Organization

Executive summary

The introduction of the *Sistema Único de Saúde* (SUS) in 1990 has been a major achievement for Brazil in increasing access to health care services and reducing health inequalities. The implementation of the Family Health Strategy, starting in 1994 and aimed at the reorganisation and strengthening of primary health care, has been a key component in this success. Since its implementation, the Brazilian population can benefit from free access to preventive and primary health care services delivered by multi-disciplinary family health teams (FHTs). Over the past two decades, reforms have sought to rebalance service delivery to move away from a health system that was historically very hospital-centric. Remarkably, reforms have focussed on developing modern models of care, introducing a range of quality initiatives and tools for monitoring the activities and quality of care. The expansion of the Family Health Strategy has contributed to measurable improvements in terms of infant mortality rates, maternal health, immunisation uptake and avoidable hospitalisation for chronic conditions. Life expectancy at birth increased by 5.7 years, from 70.2 years in 2000 to 75.9 years in 2019. Infant mortality rate has decreased by 60%, from 30.3 deaths per 1 000 live births in 2000 to 12.4 deaths per 1 000 live births in 2019. The implementation of the Family Health Strategy was associated with a reduction of 45% in hospitalisation rates per 10 000 inhabitants between 2001 and 2016, mostly for primary care conditions such as asthma, gastroenteritis, cardiovascular and cerebrovascular diseases. Brazil also makes spending on primary health care a high priority. In 2019, Brazil dedicated around 16% of its financial resources to primary health care, similar to OECD countries.

Despite this progress, key indicators suggest that Brazil primary health care is not working as effectively. Brazil is facing a dual challenge with still a primary health care system with marked inequalities in access and care quality, and with acute workforce shortages. The growing burden of chronic non-communicable diseases associated with the expansion in exposure to risk factors and rapid population ageing will compound existing challenges. In this context, the Review identifies scope for Brazil to building a stronger primary health care system, and to strengthen existing policies and practices to improve both access and care quality. It provides in-depth review of four priority areas: screening and prevention for major chronic non-communicable diseases, quality of primary health care provision, workforce shortages, and the digital transformation of primary health care in Brazil.

In Brazil, some cancers, hypertension and diabetes have ***screening and prevention strategies***, but more could be done to improve depth and scope of such strategies. Breast and cervical cancer screening is opportunistic and does not happen within a population-based programme designed and managed at federal level. This contributes to low and uneven screening coverage. While breast cancer screening among the target group of women between 50 to 69 years of age increased from 15.2% to 24.2% between 2014 and 2019, it stands below all OECD countries and well below the 58% average in 2019. At the same time, mortality from breast and cervical cancer remains high and has been on the rise over the past decades, signalling shortcomings in terms of prevention, early detection and treatment at early stages. Between 2008 and 2019, breast cancer mortality increased from 19.2 to 20.8 deaths per 100 000 women in Brazil, compared to a decrease across OECD countries. Brazil should thus implement a strong national strategy for cancer prevention and screening, notably by moving towards population-based programmes, with a personalised approach to invite target populations. Improving data systems and health literacy are complementary strategies not to be underestimated to support stronger cancer prevention and screening.

When it comes to screening for hypertension and diabetes, Brazil should further develop disease management pathways with a people centred perspective, integrating all health care providers across different sectors. Family health teams will need to have the right tools, capacities, and incentives to undertake these responsibilities.

There are also clear shortcomings with regards to access to ***high quality primary health care***. Critically, only 65% of the population are covered by FHTs and too many patients bypass primary health care and directly seek care in outpatient specialties and hospitals. These give strong argument to strengthen the gatekeeping system in Brazil with a systematic registration system with FHTs, which will control and orient the patient's into specialist care. At the same time, the federal government will need to play a more prescriptive role to strengthen comprehensiveness of primary health care evenly across the country. To embed a larger range of activities and effective interventions in FHTs, it will be critical to ensure that all municipalities are able to deliver actions and services properly. Introducing economic incentives, alongside appropriate educational programme in prevention, detection, and treatment are key approaches to consider. There are also several opportunities for extending further quality strategies toward primary health care. Particular attention should be given to transparency and the collection of richer performance data. A robust accreditation system that would apply uniformly across the country could help standardise primary health care quality, and to identify areas that may require greater financial and organisational support. The new Agency for the Development of Primary Health Care could act as an inspectorate for primary health care, for example to provide independent and external verification that standards are being met, identify good practice and support weaker centres to improve their standards.

When it comes **to workforce challenges**, Brazil primary health care sector faces acute shortages and imbalance in the distribution of primary health care doctors with a North-South gradient, where North and Northeast regions show a lower density of medical doctors. In addition, little attention has been devoted to building a strong credibility of the primary health care specialty, and to promote workforce quality. In 2018, only 5 486 medical doctors had a specialty training in family and community medicine, representing 1.4% of all specialists in Brazil. Going forward, Brazil needs to implement a coherent workforce planning based on an objective assessment of present and future needs to govern health care human resources, which is currently absent. In tandem, Brazil could look at the experiences of OECD countries to train more rural doctors and to provide both wage and non-wage related financial incentives linked with a return of service obligation. Brazil should take steps to expand the role of nurses and community health workers and explore the potential of task delegation. Perhaps more crucially, there are opportunities to make the primary health care specialty training compulsory for all doctors wishing to practise primary health care, and to implement stronger requirements around continuous medical education.

Brazil's decentralised government creates challenges to digitalising primary health care. Brazil has made strides towards a ***digital transformation*** of primary health care, building on more than a decade of policies to digitalise health care and make better use of health data, and with key investments in networks, data, interoperability and skills. Yet, progress towards effective use of digital primary health care has been slow, and fundamentally unequal, with significant inequalities in the use of digital technologies and tools among health workers and citizens. In 2019, an estimated 78% of PHC units had electronic health record (EHR) systems. Adoption of EHR systems was highest in the South and Southeast regions (at 90% and 83% of facilities in those regions, respectively) compared to the Northeast and North regions (77% and 74% respectively). Other major barriers include human and technical capacities in municipalities, with potential diseconomies of scale resulting from setting responsibilities for digital health at municipal level. Tackling these challenges requires to digitalising all primary health care units and teams, while promoting inclusive connectivity for all Brazilian citizens, especially the most vulnerable. Brazil should also consider establishing a governance structure with clear well-funded mandates at the right levels of government.

Across all these areas, there is scope to strengthen oversight from the federal government and regional co-ordination and support from state governments. Better and stronger co-ordination mechanisms between levels of government have the potential to lessen regional inequalities, and prepare the health system

against systemic shocks, such as the one observed in the COVID-19 pandemic. The Brazilian unified health system (SUS) has had high aspirations since its introduction by the Federal Constitution of 1988, which was the result of a society-wide mobilisation. Primary health care has been a cornerstone of the extension of health care coverage since the beginning of SUS. Continuing to strengthen and modernise primary health care remains the essential lever for the Brazilian health system to realise its potential of effectively achieving universal coverage of high quality services for all Brazilians.

1 Primary health care in Brazil: Assessment and recommendations

Primary health care (PHC) in Brazil has a well-organised approach, the result of sustained commitment to providing high-quality PHC for the entire population. Brazil has introduced a comprehensive package of policies designed to modernise and strengthen PHC. However, a number of key challenges remain, including the increasing prevalence of chronic non-communicable diseases, large disparities across regions in the supply and quality of PHC, and a low and unequal use of digital technologies. This chapter assesses Brazil's PHC system. It considers four topics in detail: screening and prevention for major chronic non-communicable diseases, enhancing the quality of PHC provision, tackling workforce shortages and promoting the digital transformation of PHC in Brazil. It provides a set of recommendations on improving PHC in the country.

Brazil has a relatively well-functioning and well-organised primary health care (PHC) system, the result of sustained commitment to providing high-quality PHC for the whole population. The Family Health Strategy (Estratégia de Saúde da Família [ESF]), one of the largest community-based PHC programmes in the world, has successfully increased population coverage and improved key health outcomes. Since the strategy's launch in 1994, the Brazilian population has enjoyed free access to preventive and PHC services, delivered by multidisciplinary family health teams (FHTs) (Box 1). The expansion of the Family Health Strategy from 1994 has contributed to measurable improvements in infant mortality rates, maternal health, immunisation uptake and avoidable hospitalisation for chronic conditions. For example, infant mortality rates decreased from 30.3 deaths per 1 000 live births in 2000 to 12.4 deaths per 1 000 live births in 2019. Life expectancy at birth increased by 5.7 years between 2000 and 2019, from 70.2 years to 75.9 years. In addition, the Requalifica programme launched in 2011 has led to major public investment to expand the supply and equipment of PHC facilities. Still today, investment in PHC is a high priority for the federal government: in 2020, it allocated a budget of BRL 20.9 billion (Brazilian real) to PHC (USD 3.8 billion), compared to BRL 17.5 billion in 2019 (USD 3.2 billion) (CONASEMS, 2020[1]). In the context of the COVID-19 pandemic, the federal government provided punctual financial and organisational assistance to FHTs to manage COVID-19 cases, and non-COVID-19 patients. These included for example the development of special COVID-19 care centres, the development of safety standards and protocols to manage high-risk patients.

Despite this progress, important challenges lie ahead for Brazil. Only 65% of the population is covered by FHTs. Too many patients bypass PHC, directly seeking care in outpatient specialised clinics and hospitals, notably for conditions that could be more effectively treated at the community level. This is partly the result of structural challenges that make it difficult for FHTs in some municipalities to deliver PHC functions. PHC has traditionally provided few low-complexity procedures and surgeries. In addition, the expansion of PHC has been marked by stark disparities across regions and municipalities. The most vulnerable and remote municipalities of the North and Northeast regions consistently present poorer health outcomes and lower health care quality than the national average. The proportion of hospitalisations owing to conditions that could be more effectively treated in the PHC setting ranges from 24% in the South region to 40% in the North region.. Such disparities stem in part from workforce shortages and imbalances in the distribution of medical doctors in rural and remote areas. Not only does Brazil have too few PHC physicians, but they are also highly concentrated in the South and Southeast regions. Last but not least, as in all OECD countries, Brazil is experiencing a rise in the number of elderly patients and an increasing prevalence of chronic non-communicable diseases, including cancer, diabetes and hypertension (see Box 1). These call for more effective prevention and stronger PHC to manage evolving health needs, and ensure a healthy and active population across the country.

Box 1. Key features of the primary health care sector in Brazil

The Brazilian *Sistema Único de Saúde* (SUS), instituted in 1990 after the approval of the new Brazilian Constitution, is decentralised**.** The Ministry of Health is responsible for the central management of the health system, and **the 5570 municipalities are responsible for the organisation, management and delivery of PHC services**. With federal funding, municipalities have the freedom to hire family health team members according to the population needs and geographic characteristics.

The federal government finances one-third of total PHC costs (33%), with the remaining part being funded predominantly by municipalities (61%). The participation of states is the smallest. **Brazil dedicated around 16.3% of its current health expenditure to PHC**, slightly lower than OECD average (16.6%).

The Brazilian SUS offers preventive services and PHC free of charge to its population. The private sector is supplemental as health plans mainly offer specialist and hospital services, although private health plans have begun to offer access to family doctors.

Multi-professional family health teams (FHTs) are responsible for the delivery of PHC. Each FHT is assigned a geographic area, covering up to 4 000 individuals located in non-overlapping areas. FHTs are responsible for registering every family in their geographic area. As of 2019, there were 43 234 Family Health Teams in Brazil. The FHT includes physicians, nurses, and up to 12 community health workers. Other PHC workers can provide additional supports depending on local needs.

FHTs are expected to be the initial contact point for patients having new health needs, although it does not work as a "gatekeeper" and many Brazilian have direct access to outpatient specialties and hospitals. In addition, only about 65% of Brazilians are currently registered with a FHT.

In 2020, there were around 60 000 medical doctors working in PHC, alongside 50 000 nurses and 35 000 dentists in practice in Brazil. Practicing doctors per 1 000 population in 2019 were lower compared to the OECD average, at 2.3 compared to 3.5. While the specialty of family and community medicine was introduced as a clinical and licensed specialty, PHC is mostly delivered by physicians who do not have any specialty or by physicians with a specialty in internal medicine. In 2018, only 5 486 medical doctors had a specialty training in family and community medicine (1.4% of all specialists).

There is a marked disparity in the concentration of doctors in different regions and states, and between state capitals and other parts of states. The Southeast is the region with the highest medical density per inhabitant (with 2.81 per 1 000 population), against 1.16 per 1 000 population in the North and 1.41 in the Northeast.

Table 1.1. Key performance indicators in Brazil and OECD, 2019 (or latest year available)

	Brazil	OECD average
Spending in PHC (% of current health spending)	16.3%	16.6%
Doctors (per 1 000 pop)	2.3	3.5
Nurses (per 1 000 pop)	8	9.1
Life expectancy at birth (years)	75.9 years	81 years
Infant mortality (deaths per 1 000 live births)	12.4	4.2
Smoking (daily smokers, % population aged 15+)	9.8%	16.5%
Alcohol (litres consumed per capita, population aged 15+)	6.1	8.7
Overweight prevalence (age-standardized %)	56.5%	58.4%
Raised blood pressure (% of the pop)	23.3%	20.8%
Raised fasting blood glucose (% of the pop)	8.3%	6.7%
Vaccination rates for DTP 3 (% of children)	83%	94.8%
Breast cancer screening (% of women aged 50-59)	24%	58%
Cervical cancer screening (% of women aged 20-69)	37%	59%
Hospital admission due to CHF and hypertension (Age-sex standardized rate)	167 per 100 000 pop	301 per 100 000 pop
Hospital admission due to diabetes (Age-sex standardized rate)	92 per 100 000 pop	130 per 100 000 pop

Faced with these significant challenges, Brazil has introduced a comprehensive package of policies to modernise and strengthen PHC. Implemented in 2013, the More Doctors Programme (MDP) is considered the world's largest government-led initiative recruiting domestic and foreign physicians to work in PHC settings within municipalities facing difficulties in recruitment and retention. By November 2020, the MDP was responsible for the presence of 16 426 doctors in 3 837 Brazilian municipalities. It has also yielded positive results in terms of investment in PHC facilities, physician availability and health outcomes (Hone et al., 2020[2]; Netto et al., 2018[3]).

Reforms have also focused on developing new models of care, primarily through family health support centres (*Núcleo Ampliado de Saúde da Família* [NASF]*)*, which function as integrated multidisciplinary teams providing a broad range of services to the community. Health care networks (*Redes de Atenção à Saúde* [RAS]) have been developed to integrate health care across different sectors and improve patient-centred care in the country. The National Programme for Improving Primary Health Care Access and Quality (PMAQ) has been a strong tool for monitoring and improving the performance of PHC facilities. Finally, the *Previne Brasil* programme, introduced in 2019, has set ambitious goals, such as introducing a new financing scheme based on a weighted capitation model, a pay-for-performance component and incentives for strategic actions. The weighted capitation payment and associated patient registration system are welcome steps in building a profile of population health needs. The *Previne Brasil* programme has the potential to improve access to PHC and promote longitudinal, co-ordinated care while reducing inequalities between regions. But Brazil still has a way to go before the fruits of this reform are truly felt across the PHC system. First, the country must address several key persisting challenges across the PHC sector:

- Brazil's ambitious reform agenda must be accompanied by a stronger central oversight and a focus on improving health care quality and supporting the most vulnerable municipalities. Central agencies need to play a greater role in this respect, as poorer municipalities have weaker infrastructures and reduced capacities to deliver care than the best-performing areas. At the same time, Brazil needs to underpin quality monitoring and improvement with adequate mechanisms to ensure implementation at all municipal levels; this requires cross-governmental collaboration and co-ordination.
- Brazil should explicitly recognise the central role of FHTs in the prevention, treatment and management of chronic non-communicable diseases, such as diabetes and hypertension. Patients' ability to access specialist care without prior consultation with a FHT suggests that the potential of PHC to lead in health promotion, disease prevention, treatment and follow-up is not being fulfilled.
- Some key quality strategies are underdeveloped or absent from Brazil's PHC sector, including establishing requirements for accreditation, continuous medical education (CME) and compliance with clinical guidelines. Currently, payment systems only timidly reward improvements in the quality of care. Overall, Brazil lacks a support system to ensure continuous improvement in health care quality at the team or facility level.
- Despite the existence of numerous data sources, Brazil's health information systems are insufficient to provide a full picture of the effectiveness and safety of PHC. Most indicators are input and process indicators, such as the number of FHTs, the number of people registered with a FHT, the number of community health workers, or the number of pregnant women receiving prenatal care services. Regarding cancer care, there is no integrated information system based on a registry that allows assessing the effectiveness of current cancer screening protocols and cancer care delivery.
- Little attention has been devoted to enhance the credibility and recognition of the PHC specialty, as well as promote workforce quality. Within PHC, the specialty of PHC (called family and community medicine [FCM]) is the least preferred specialty among physicians. In addition, geographical distribution of medical doctors is inequitable, with acute workforce shortages in rural and remote areas.
- Brazil has made significant inroads in building a foundation for digital PHC, including essential investments in networks, data, interoperability and skills. However, progress in implementing digital technologies in PHC has been slow and fundamentally uneven across the country.

This chapter makes a detailed assessment of Brazil's PHC system and proposes a set of recommendations for improving it. It considers four topics: 1) enhancing the quality of PHC provision,

2) increasing the screening and prevention of major chronic non-communicable diseases, 3) resolving workforce shortages, and 4) advancing the digital transformation of PHC in Brazil.

Policy recommendations for improving primary health care in Brazil

Improve the quality of PHC provision

- Strengthen the gatekeeping system with systematic registration of patients with FHTs, which guide patients into specialist care as needed through a referral system.
- Encourage greater comprehensiveness of PHC by ensuring that all municipalities are able to deliver the actions and health care services defined in the Primary Health Care Portfolio, and encourage compliance with clinical guidelines. Financial incentives could be introduced through existing contracting schemes or the *Previne Brasil* programme.
- Develop educational programmes in disease prevention and early diagnosis through formal frameworks and requirements to undertake CME programmes.
- Collect a richer set of quality indicators on a wider array of preventive activities and management of chronic conditions (such as alcohol consumption, obesity, cancer screening and mental health), including quality of life and patient experiences with PHC; implement a public reporting system to allow patients to monitor the performance of individual FHTs.
- Build accreditation systems around standards of care for all FHTs in order to assess their performance, identify areas that may require improvements and provide support for such improvements. The new Agency for the Development of Primary Health Care could carry out accreditation and provide independent verification that standards are being met, ensuring continuous improvement in health care quality.
- Expand health care networks to prioritise the provision of integrated care for patients with multiple needs. Additional resources, guidelines on establishing and running community care services, and a better use of digital technology are all areas that would benefit from greater steering and oversight by the federal government.

Improve cancer screening coverage and promote early detection of cancer

- Move from opportunistic screening programmes toward population-based screening programmes for breast and cervical cancer, implementing a more personalised approach (e.g. by sending personalised screening invitations to high-risk populations).
- Develop more effective communication strategies and education programmes to improve health literacy and promote the importance of early detection among people with different socio-economic and cultural backgrounds.
- Develop and expand national registries for breast and cervical cancer in order to identify and invite people with a high risk of cancer; monitor and evaluate the effectiveness of screening programmes and cancer care delivery.
- Facilitate deeper analysis of diabetes and hypertension care through a stronger data infrastructure allowing a more comprehensive set of quality measures and feeding back data to FHTs to improve the quality of care.
- Promote the development of disease-management pathways with a people-centred perspective, integrating all health care providers across different sectors; ensure that FHTs have the skills and capacity for screening and management of hypertension and diabetes through expanding the role of other health workers, including nurses and pharmacists.
- Collect and report information on cancer screening at the individual patient level to improve the effectiveness of existing cancer screening programmes and protocols.

Address workforce shortages and reduce imbalance in the distribution of primary care workforce

- Define a clearer workforce management policy to govern human resources for health, based on an objective assessment of present and future needs.
- Increase the number of trained doctors in rural areas to encourage recruitment and retention of medical doctors in underserved areas; provide both wage- and non-wage related financial incentives linked to a service obligation.
- Address workforce gaps by changing the scope of practice for nurses and community health workers so that they help meet health care needs in more remote areas; establish a governance structure that better supports municipalities with insufficient capacities.
- Support the creation of academic FCM departments in all Brazilian medical schools to undertake research in PHC, conveying the specialty's value and promoting it among students.
- Improve the attractiveness of the PHC profession by standardising contractual arrangements for primary care workers. Ensure a more consistent salary scale across the country through stronger oversight and regulation by the federal government, notably using the new Agency for the Development of Primary Health Care
- Introduce a national test at the end of the university period to help standardise the medical curriculum in Brazil, complementing the current accreditations.
- Make specialty training in FCM compulsory for all medical doctors wishing to practise PHC; establish formal requirements for CME and recertification to secure a high-quality workforce. CME should be directed towards key challenges, such as the prevention of risk factors for health and management of chronic conditions.

Advance the digital transformation of PHC

- Set ambitious and clear targets for both reliability and speed of connections as part of existing and future collaborations between the Ministry of Health, other ministries and the National School and Research Network (Rede Nacional de Ensino e Pesquisa [RNP]) to increase Internet connectivity in PHC units.
- Expand the financial payments included in the Connect SUS pilot project in Alagoas to the entire Brazilian territory; condition receipt of financial support to participation by municipal and state officials in capacity-building workshops; develop training specifically targeting senior executives.
- Set ambitious and clear quantitative targets for adoption and use of EHR systems (such as e-SUS AB). Such targets should include the effective use of electronic drug prescribing and the exchange of clinical and administrative data across units.
- Strengthen the role of telecentres as training providers, especially in rural and remote areas, and ensure appropriate funding and technical assistance at all levels of government; develop mobile access to reach those vulnerable groups that are most likely to need PHC.
- Consider aggregating shared services and responsibilities related to digitalisation of PHC at less decentralised levels; Set up dynamic purchasing systems at the federal level, with appropriately funded agencies at the state or regional levels providing municipalities with specialised human resources, purchasing and management services for digital PHC.

1.1. Improving Brazil's primary health care quality and outcomes

1.1.1. Brazil has introduced a number of initiatives to improve the quality of care

Brazil has implemented a set of key reforms over the past decades to improve access to high-quality PHC and develop new models of PHC, primarily through family health support centres. These centres give FHTs greater flexibility in managing their practice according to population health needs, ensuring more co-ordinated and integrated care. The introduction of the health care networks (*Redes de Atençao à Saúde* [RAS]) is also an innovative approach to delivering patient-centred care. The overarching objective is to integrate the organisation, planning and provision of health care services (from PHC, mental health, public health and emergency care, to specialised care and hospital care) at the regional level. RAS are agreed by municipalities and states through interagency commissions (*Comissões Intergestores*) according to population health needs, and local capacities.

A range of quality initiatives have also been introduced since the implementation of the Family Health Strategy in 1994, including the Requalifica programme to expand the availability and equipment of PHC facilities, the PMAQ, and the MDP to recruit and retain PHC professionals. Among the new tools for monitoring the activities and quality of care, the Primary Health Care Information System (SISAB) gathers an impressive number of indicators underpinning PHC, but mostly focuses on input and process indicators such as the number of FHTs, the number of people registered with a FHT, the number of community health workers and the number of pregnant women receiving prenatal care services.

Some clinical guidelines exist. The Ministry of Health has issued several "primary health care notebooks" (*Cadernos de Atencão Básica em Atenção Primária*) to help FHTs improve the delivery of high-quality PHC (Ministério de Saúde, 2021[4]). The notebooks address specific diseases or risk factors, such as care for smokers, arterial hypertension or mental health. While such guidelines are useful, the PHC notebooks are still too narrowly defined and do not meet patients' expectations for integrated health care. Furthermore, information about their effective use is lacking. Implementation is the responsibility of the municipalities, but there is no mechanism at the federal level to monitor compliance, and no systematic incentives for guideline uptake. Given inadequate follow-up observation of diabetes control and blood pressure control for people with hypertension, compliance with clinical practice guidelines is arguably unsatisfactory (Leite Simão et al., 2017[5]; da Silva Rêgo and Radovanovic, 2018[6]). In general, Brazil lacks system-wide support for ensuring continuous improvement in the quality of health care at the team or facility level.

Brazil has also recently committed significant efforts to reforming its federal financing model. The new PHC funding model, Previne Brasil, came into effect in 2020. It includes a weighted capitation component, a pay-for-performance programme, and some incentives for strategic actions and priority areas. The new capitation formula, which allocates resources based on needs, is well-aligned with OECD member countries' policies in this area (e.g. in Chile, Israel, Portugal, New Zealand, the United Kingdom and the Netherlands). The single capitation amount will be applicable to the population registered with FHTs and adjusted for socio-economic, demographic and geographical factors, providing an incentive for FHTs to register the 50 million people who are not yet registered. This is a welcome step to better identify the people linked to each FHT, and encourage more appropriate longitudinal and co-ordinated care. Importantly, the weighted capitation component will ensure that municipalities with higher population needs owing to older populations and less favourable socio-economic situations receive the necessary resources to provide care to everyone. This will limit the risk of increasing inequalities in access to and quality of PHC services.

1.1.2. Despite progress, some concerns about quality persist, and primary health care struggles to deliver its essential functions

Prevention and treatment at the PHC level can still improve. International figures show that breast and cervical cancer screening can progress, and immunisation rates could be higher (Table 1.1). In 2018, 84% of Brazilian children around one year old were vaccinated against measles, below the OECD average (95%). At the same time, simple procedures and surgeries need to be made more widely available in PHC settings. This is both a matter of striving for better safety and care quality, and an economic necessity to avoid unnecessary use of expensive hospital services. Available data show that only 60% of FHTs performed low-complexity procedures or small surgeries – too few if Brazil wants to expand and strengthen the role of PHC.

Inappropriate preventive care and management of chronic diseases has also been highlighted by previous researches. A number of worrying indicators suggest an urgent need for better prevention, especially at a time when the burden of disease is shifting towards chronic diseases. According to the last National Health Survey, 21% of all Brazilians with diagnosed diabetes did not receive medical care in the 12 months prior to the survey. In addition, only 22% of SUS users indicated they had received some recommendations on healthy lifestyles from their family doctor, and less than 40% of public users had a preventive visit in the past two years (Guanais et al., 2019[7]). Significant differences in health care quality also exist across regions, with a north-south gradient where North and Northeast regions show higher hospitalisation rates for chronic conditions. The 2019 National Health Survey shows for example that diabetic patients have higher hospitalisation rates for chronic conditions in the Northeast than in the Southeast, raising some concerns about the effectiveness of local PHC in the North and Northeast regions.

1.1.3. Renew efforts to strengthen key functions of PHC, particularly through stronger gatekeeping and more comprehensive care

Despite clear investment in PHC, too many patients use public speciality units or emergency departments to receive health care services. This is a strong argument for strengthening the gatekeeping system in Brazil, both by enforcing systematic registration with FHTs and establishing a referral system to better control and orient patients into specialist care. This approach is taken internationally, including in Chile, Portugal, Italy and Norway, where strong gatekeeping systems are seen as a way to ensure that patients receive the best possible care for their conditions, achieving greater appropriateness and co-ordination of care. Brazil may consider such a reform in the future to expand the role and expansion of FHTs. This would help build accurate patient registers recognising the central co-ordinating role of FHTs. The implementation of the new *Previne Brasil* programme is a step in the direction of increasing patients' registration with FHTs.

In addition, the scope of PHC services needs to expand to ensure that FHTs are able to deliver essential functions, including continuous and comprehensive care focused on prevention, treatment, diagnostic follow-up and management of chronic conditions. A large range of activities and interventions should be systematically embedded in FHTs. This more comprehensive approach should be underpinned by the delivery of actions defined in the Primary Health Care Portfolio (called CaSAPS), while ensuring that all municipalities are able to deliver such actions and services properly. Incentives for primary care providers to deliver these actions could be introduced through existing contracting schemes with the municipality or the incentive structures outlined in the strategic actions of the *Previne Brasil* programme. The Ministry of Health could also use the *Previne Brasil* pay-for-performance programme to monitor and encourage more systematic compliance with clinical guidelines, in order to embed more effective prevention in FHT practice. At the same time, educational programmes covering the prevention, detection, treatment and management of diseases are key instruments to encourage primary care professionals to fully implement these tasks. Several bodies, such as the National Council of Health Secretaries (CONASS), the National Council of Municipal Secretaries of Health (CONASEMS), the Brazilian Medical Association and the Brazilian Society of Family Medicine, organise trainings, conferences and online learning.

However, a more formal framework for CME that clarifies expectations and helps FHTs meet objectives is required to provide more comprehensive care, in line with the best available evidence.

1.1.4. There exist several opportunities to extend quality strategies targeting PHC

A robust accreditation system, which would apply uniformly and consistently to the primary health care sector nationwide, could be a tool for improving the quality and performance of primary health care in Brazil. Other federalised health systems in the OECD (e.g. in Australia, Canada and the United States) have established PHC accreditation systems. Building an accreditation system for all FHTs in Brazil would make it possible to assess their performance, identify areas for improvement and provide support for such improvement. Since Brazil does not have a National Inspectorate for Health to provide accreditation and independent verification that standards are being met, the new Agency for the Development of Primary Health Care could take on this role. It could, for example, undertake quality monitoring and improvement, and review current practice and performance, and setting standards for performance and reporting. It could also develop tools such as evaluation frameworks, deploy teams to visit and support municipalities with special needs, and redistribute resources when needed. The agency could then be responsible for ensuring continuous improvement in health care quality at the local level, which is currently not – or only timidly – in place.

Perhaps more crucially, a greater transparency and richer set of performance data are needed to drive quality improvement. Brazil already collects a wide range of inputs and process indicators. As part of the new *Previne Brasil* pay-for-performance programme, the country also monitors several indicators on access to PHC, risk factors and quality covering maternal health, child immunisation, breast cancer screening, and management of hypertension and diabetes. While this is an important initiative for quality monitoring, five quality indicators are process indicators, and two indicators are intermediate outcomes measures. This is insufficient. A richer set of quality indicators on a wider array of preventive activities and management of chronic conditions, such as alcohol consumption, obesity, cancer screening, mental health and patients' experiences with PHC, should be a priority and will be critical to ensure that ongoing reforms do not adversely affect quality and outcomes of care. In this respect, Portugal and Israel offer models of comprehensive, actionable indicators supporting quality improvement in primary care.

Brazil might also want to join the OECD Patient-Reported Indicator Surveys (PaRIS) initiative to understand how the outcomes and experiences of care in the country compare with OECD countries. Under PaRIS, countries work together on developing, standardising and implementing a new generation of indicators that measure the outcomes and experiences of health care most important to people. In this regard, the International Survey of People Living with Chronic Conditions under PaRIS will be the first of its kind to assess patients managed in PHC across countries.

1.1.5. Integrated care needs better central support and direction

Given the challenges brought by demographic and epidemiological changes, Brazil urgently needs to shift the focus of health care services to addressing longer episodes of health care needs. While the country is on the right track with the development of the RAS health care networks, this integrated care model is still unevenly implemented nationwide. The challenge should not be underestimated: interactions between different health care providers about patient cases and transitions from one service to another need to be timely, safe and seamless for patients and families. PHC play a key role in achieving this goal.

A lack of guidance and national leadership has resulted in a low and uneven diffusion of RAS across the country. The federal government should consider playing a greater role in steering a more consistent development of RAS, providing additional resources, training programmes, and guidelines on developing and running community care services, and better using information and communication technology (ICT).

Exchanging good experiences and learning from the top-performing regions or facilities is another way to encourage more extensive and ambitious development of these networks.

Better information-sharing and data linkage across care levels, as well as smarter provider-payment mechanisms will be key to ensure a successful rollout of RAS. There exist good examples of payment mechanisms – such as add-on payments, bundled payments and population-based payments – in some OECD countries that incentivise providers from different health sectors to work together effectively. While it may be too early to institute such mechanisms at the moment, Brazil could certainly consider introducing add-on payments or bundled payments in the near future.

1.2. Health screening for chronic non-communicable diseases in Brazil

In Brazil, as in OECD countries, chronic non-communicable diseases (NCDs) such as cancer and cardiovascular diseases are major public health concerns. Cancer mortality is the second cause of death in Brazil. The leading cause of cancer mortality is breast, lung, colorectal and cervical cancer among women, and lung, prostate and colorectal cancer among men. In keeping with trends across OECD countries, cancer mortality rates in Brazil are higher among men than among women, which can be explained at least in part by a higher prevalence of risk factors among men. Many cancers associated with high mortality rates in Brazil – such as prostate, breast, colorectal and lung cancer – feature common risk factors, including obesity, poor lifestyle and physical inactivity.

While the incidence of cancer in Brazil is below the OECD average, cancer mortality has not decreased in recent years. Between 2009 and 2019, Brazil´s cancer mortality oscillated between 161 and 162 deaths per 100 000 people, while the OECD average decreased from 211 to 196 over the same period. The decrease in cancer mortality across OECD countries is related to early diagnosis, which makes a strong argument for building more effective screening schemes in Brazil.

The fifth cause of mortality in Brazil is diabetes, which accounts for 5% of all deaths compared to 3% in OECD countries. Diabetes mortality in Brazil reached 50 deaths per 100 000 people in 2019 – higher than the OECD average of 22 deaths per 100 000 people, and only lower than Mexico and Costa Rica. Fasting blood glucose levels significantly increased over the past decade, suggesting that the burden of diabetes will be significant in the near future. Hypertension, which contributes to the development of more serious cardiovascular problems, is a major risk factor for poor health in Brazil, if not the main one. In 2015, the average prevalence of raised blood pressure in Brazil was 23.3% – higher than the OECD average of 20.8% and the Latin America and the Caribbean average of 21.5%. While Brazil reduced this prevalence by 5.3% between 2005 and 2015, OECD countries decreased it by an average of 16.4% over the same period.

1.2.1. Improving cancer screening and prevention in Brazil

While Brazil has expanded its cancer care system, population coverage remains low

To tackle the burden of cancer, Brazil has developed its cancer care system incrementally over the past decades. It launched the first National Oncology Care Policy in 2005 and set its Strategic Action Plan for Coping with Chronic Non-Communicable Diseases 2011-22, demonstrating its commitment to reducing the burden of cancer. It introduced the National Policy for the Prevention and Control of Cancer in the Health Care Network of People with Chronic Diseases in 2013 to update the national cancer policy and improve access to cancer care. Brazil has also sought to implement quality improvements in its cancer care system by establishing in 2013 the Cancer Information System (SISCAN), which integrates the Cervical Cancer Information Systems (SISCOLO) and the Breast Cancer Information Systems (SISMAMA). Clinical guidelines for early detection of breast cancer were updated in 2015, and national

guidelines for cervical cancer screening in 2016. More importantly, Brazil introduced the PAINEL-Oncology instrument, which helps monitor Law No. 12.732 of 22 November 2012 establishing a 60-day maximum waiting time for the start of treatment for patients with proven malignant neoplasia. While PAINEL-Oncology is key to guarantee access to high-quality cancer care in Brazil, the data presented refer exclusively to users who have a national health card (DATASUS, 2021[8]). Brazil has also developed 17 population-based cancer registries, which provide crucial information about incidence, trends and survival (INCA, 2013[9]).

However, cancer screening in Brazil is opportunistic, managed by each FHT as a result of a recommendation made by a health care provider during a routine medical consultation, or through individual self-referral. Brazil needs to step up its efforts to increase breast cancer screening coverage, notably to improve early diagnosis and reduce mortality. Unlike in many OECD countries, cancer screening does not occur within a population-based programme designed and managed at the central level to reach the bulk of the population at risk. As a result, while coverage for breast cancer screening in Brazil increased from 15.2% in 2014 to 24.2% in 2019 among the target group of women aged 50 to 69 years, it remains very low compared to the OECD average of 58%. Between 2008 and 2019, breast cancer mortality increased by 8.3% in Brazil, whereas it decreased by 10% on average across OECD countries. Breast cancer takes the greatest toll on Brazilian women, with 20.8 deaths per 100 000 females, representing 16.4% of all women's cancer deaths. Moreover, breast cancer survival dropped by more than two years in Brazil between the 2005-09 and 2010-14 periods, whereas it increased by one year in the OECD region. The lack of availability of mammographs, and their uneven distribution across the country, are major problems contributing to late diagnosis of breast cancer in Brazil (Da Costa Vieira, Formenton and Bertolini, 2017[10]). In 2020, Brazil had 13 mammographs per million people, almost half the OECD average of 24.

In a similar vein, cervical cancer screening in Brazil has substantially risen (from 20.5% in 2014 to 37% in 2019), yet it remains well below the OECD average coverage (57%), and below all OECD countries except Costa Rica and Hungary. Worrying evidence points to large social inequalities: access to cervical cancer screening is particularly low among women living in the North, Northeast and Central-West regions, and those with low socio-economic backgrounds (including poorer, less educated, non-white and younger women) (Costa et al., 2018[11]). Cervical cancer mortality in 2019, for its part, was substantially higher in Brazil than the OECD average (7.4 deaths vs. 3.9 deaths per 100 000 women), and cervical cancer survival in Brazil decreased by 11.3% between 2000-04 and 2010-14.

These worrisome trends suggest large room for improvement in Brazil, including through a national strategy for cancer prevention and screening.

Towards population-based screening programmes using a more systematic and personalised approach

In the area of prevention of cervical cancer, the National Immunisation Programme instituted in 2014 the human papillomavirus (HPV) vaccination campaign for girls aged 9 to 13, then expanded to boys aged 11 to 14 in 2017. Following the same trend as in OECD countries, the vaccine is offered under Brazil's Unified Health System (SUS) in PHC facilities and in the context of school-based vaccination campaigns. Cervical cancer screening is performed through a cytopathological examination (Pap smear), offered to women aged 25 to 64 years and repeated every three years. While the three-year periodicity is aligned with World Health Organization (WHO) recommendations, Brazil could learn from OECD countries and move towards a population-based screening programme while introducing HPV-DNA primary testing. This approach is taken internationally (e.g. in Italy and Finland) and recommended by international guidelines, including the European guidelines and American Cancer Society 2020 guidelines. Its implementation would require use of reliable, validated HPV tests in qualified laboratories, accredited by authorised bodies (such as the National Agency of Sanitary Surveillance [ANVISA]) and complying with international standards. Training for health workers is crucial, along with communication strategies for women in target populations. Such a

national strategy should include quality assurance for monitoring cervical cancer screening performance, which the European guidelines define as achieving: (1) an invitation coverage of at least 95% of targeted women; (2) an examination coverage of at least 70% (85% is desirable); and (3) a participation rate of at least 70% (85% is desirable) (von Karsa et al., 2015[12]).

In the area of breast cancer, the Brazilian Ministry of Health recommends a biennial mammogram for women aged 50 to 69 years old as a screening strategy in PHC. Brazil could go beyond this recommendation and develop a population-based breast cancer screening programme, as implemented in several OECD countries (e.g. Australia, France or Portugal). In practice, this would require implementing an effective call-recall structure, devising a screening registry and safeguarding robust quality assurance at all levels. The window of opportunity is large today with the implementation of the *Previne Brasil* strategy, which will improve patients' registration with FHTs. Brazil could take advantage of the patient registration system to develop organised screening programmes that allow identifying the eligible target population in each municipality. The establishment of an organised breast cancer screening programme will require building capacity in primary care teams, including providing health professionals with guidelines and protocols on cancer signs and symptoms to improve diagnostic accuracy, giving them sufficient time to evaluate patients, and training practitioners in how to diagnose cancer and develop reliable referral mechanisms. At the same time, the distribution of mammographs across the country will need to be revisited to achieve a balanced supply matching population needs.

Population-based programmes can go hand in hand with personalised invitations. In this regard, Brazil could adopt a more systematic and personalised approach to inviting target populations. A growing number of OECD countries send a personal invitation letter for cancer screening, systematically issued through a registry, to each individual in the target group. Brazil has no such national initiative, and invitations are only issued at some local levels, depending on the initiative of individual municipalities or FHTs. By contrast, Denmark, Germany and Italy send invitation letters with a fixed appointment date for a mammography. Based on the available evidence, the most effective interventions to increase participation in organised screening programmes include postal and telephone reminders, the primary care physician's signature on the invitation letter and the provision of a scheduled appointment instead of an open appointment (Camilloni et al., 2013[13]). A cost-effectiveness analysis would need to be performed to determine the appropriate interventions in the Brazilian context.

Brazil should develop more systematic monitoring of cancer while using digital health to improve public awareness and health literacy

While Brazil has expanded its cancer information infrastructure (notably with SISCAN, PAINEL-Oncologia and the population-based cancer registry), the main challenges are low coverage, low interconnectedness and lack of feedback. Brazil needs a more comprehensive registry-based information system capable of following each patient individually, to ensure efficient management of screening programmes and cancer care delivery. Such a system is key to identifying target populations and sending personalised invitations and reminders for cancer screening. At the same time, the effectiveness of existing cancer screening protocols in Brazil – such as target groups, screening frequency, methods and cross-population groups – needs to be more systematically assessed. This entails developing integrated information systems to improve the quality of screening programmes, notably through performance benchmarking and feedback to health providers. In fact, provider assessment and feedback have been found to increase coverage for cervical, breast and colorectal cancer screening (Sabatino et al., 2012[14]).

Brazil should also develop further digital health strategies to improve public awareness of cancer prevention, cancer screening and health literacy. The Ministry of Health has implemented some actions since 2002, such as the October Pink Campaign aiming to promote prevention and healthy lifestyles, and overcome the fear or stigma associated with cancer. At the local level, municipalities promote screening through campaigns using local media and social networks. Some good initiatives are also implemented at

municipal levels through the deployment of units to reach very remote and vulnerable communities, and increase access to screening, diagnosis and treatment.

While all these strategies are valuable and should be maintained, Brazil could also develop more effective communication strategies and education programmes to improve health literacy. Local stakeholders, such as health care providers and civil society representatives, should also be consulted to identify specific barriers to screening and address specific needs, particularly among disadvantaged populations (i.e. remote, poor and less educated people). As systematic sharing of information related to cancer is limited – particularly for cancers that are not subject to screening programmes – Brazil could also develop information-sharing strategies to help patients seek care, including cancer diagnostic services. Brazil could learn from Denmark, England and Estonia, which have developed website or e-health platforms that share evidence-based information on cancer, to promote health literacy and help patients seek appropriate and timely health care, including cancer screening, diagnosis and treatment.

1.2.2. Improving screening for hypertension and diabetes

Faced with the rising prevalence of diabetes and hypertension, which are complex and costly diseases, Brazil must strengthen prevention, early detection and treatment. It should prioritise a shift towards disease-management programmes, building capacity for PHC, and improving the data infrastructure underpinning diabetes and hypertension.

Diabetes and hypertension care are improving

In Brazil, as in many OECD countries, diabetes and hypertension are leading causes of morbidity, associated with significant co-morbidities and expenditures. The total mortality of patients with diabetes and hypertension has been falling in Brazil: diabetes mortality decreased by 9.8% between 2007 and 2019, and hypertension prevalence decreased by 5.3% between 2005 and 2015. Low rates of avoidable admissions for diabetes and hypertension in Brazil also suggest relatively good management of these conditions in PHC: in 2019, the rate of hospital admissions for diabetes was 92 patients per 100 000 people (below the OECD average of 130) and 48 patients per 100 000 people for hypertension (less than half the OECD average).

These are all welcome signs of improved prevention and care for diabetes and hypertension. Nevertheless, the available evidence indicates that the diabetes mortality burden will increase by 144% by 2040, becoming the third leading cause of death (Duncan et al., 2020[15]). Hypertension also became the leading risk factor for deaths in 2017 (Nascimento et al., 2020[16]). Given these trends, more efforts are needed to strengthen diabetes and hypertension prevention in the context of PHC. In Brazil, basic health checks and risk screening for chronic diseases rely on FHTs and are predominantly done through opportunistic screenings during health visits. The Ministry of Health has issued several guidelines relating to chronic non-communicable diseases. Screening for hypertension is recommended for adults without the knowledge that they are hypertensive. It suggests screening every two years for people with blood pressure below 120/80 millimetres of mercury (mmHg) and annual screening if systolic blood pressure is between 120 and 139 mmHg or diastolic blood pressure between 80 and 90 mmHg. For diabetes, the guideline recommends screening for asymptomatic adults with sustained blood pressure greater than 135/80 mmHg, but does not apply to other screening criteria, such as obesity, family history or age range. Specific booklets (*Cadernos de atenção básica*) for the management of hypertension and a recent protocol for diabetes also provide guidance for PHC practitioners.

Brazil has sought to improve the quality of diabetes and hypertension care, notably through the PMAQ pay-for-performance system, launched in 2011. As part of PMAQ, the evaluation of FHTs included topics such as early detection of hypertension, laboratory exams for diabetes and prescription refills for users on continued care (e.g. for hypertension and diabetes), without the need to make medical appointments. However, the pay-for-performance component of the new *Previne Brasil* programme only includes two

indicators related to hypertension and diabetes; these only cover follow-up of patients who already have the diseases, and do not address prevention in PHC. It will therefore be paramount in the future to monitor how the new programme influences screening activities for hypertension and diabetes in PHC.

Brazil could learn from OECD countries such as Australia, Estonia, Korea and England that have instigated population-based screening programmes targeting high-risk populations. In Australia, for example, PHC physicians can provide a single health assessment for people aged 45-49 who present at least one risk factor (lifestyle habit or family history) for developing a chronic disease, such as type 2 diabetes or heart disease. The WHO Regional Office for Europe also recommends targeting screening in PHC for patients at risk for developing diabetes or hypertension. If Brazil wants to move in this direction, it will be important to ensure that programmes target high-risk population groups, based on the country's national epidemiology, the characteristics of the health system and a cost-effectiveness analysis.

Improved disease-management pathways and increased workforce capacity in primary health care are essential to better screening and disease management

Chronic disease-management pathways are critical to delivering seamless co-ordinated care for chronic patients. Widely used in some OECD countries to improve care integration and co-ordination, they are associated with cost reductions and better quality of care. In Brazil, the development of two clinical guidelines with explicit pathways of care to guide health professionals in PHC are the only attempts to promote care co-ordination. However, these guidelines do not integrate other care providers or stakeholders (e.g. specialists or patient-support groups) and are not produced in a patient-friendly format.

Brazil should promote disease-management pathways with a people-centred perspective to clearly establish the responsibilities of health professionals at different stages of disease, set quality expectations for chronic diseases such as diabetes and cardiovascular disease, and standardise the quality of care across Brazil. As seen in OECD countries, co-ordinated management approaches enable PHC teams and individual patients to take appropriate actions to manage diabetes and hypertension. Brazil should also ensure that pathways integrate all health care providers across different sectors.

PHC professionals should have the tools and capacities to undertake these responsibilities and tasks. There is scope in Brazil to build capacity for screening and management of hypertension and diabetes through task-shifting or expanding the role of other health workers, including nurses, nutritionists and pharmacists. Nurses could have the capacity and training to conduct an initial patient assessment, including blood-sugar testing in all practices, and collaborating with doctors and other team members in follow-up activities. The benefit of nurse-led-care has already been demonstrated (Maier, Aiken and Busse, 2017[17]; Martínez-González et al., 2015[18]).

Last but not least, integrated patient pathways require adequate payment systems to incentivise multiple health professionals to work together. Brazil could consider experimenting the use of bundled payments for chronic conditions. As implemented in several OECD countries (i.e. the Netherlands, Australia and Canada), bundled payments consist of one payment per patient with a chronic illness to cover the cost of all health care services extended by the full range of providers during a specific time period. Such a system has the potential to incentivise co-ordination of care between providers and ensure a broader range of care. While Brazil has already taken steps to improve PHC funding through weighted capitation, that payment model is not likely to spur care co-ordination and integration for diabetes and hypertension.

Improving the data infrastructure underpinning diabetic and hypertension care should be a priority

Brazil has developed Hiperdia, a specific registration and monitoring system for hypertensive and diabetic patients, which is managed by the Ministry of Health in conjunction with the State and Municipal Health Secretariats. Through Hiperdia, municipalities that are members of the National Pharmaceutical

Assistance Programme for Hypertension and Diabetes Mellitus send information on the registration and monitoring of patients with these diseases. Remarkably, all this information is processed and made available by DATASUS, the health data infrastructure and information system of the Ministry of Health. However, Hiperdia does not collect information on screening, nor is it capable of capturing the pathway of care for each patient (referrals, waiting times, consultations with specialists, laboratory tests and medications). It is also difficult for FHTs to review and act on this information as they do not receive regular feedback, and patients do not have access to their personal health data. There are also some problems linking data with other databases, such as hospitalisation and death registries.

Improving the data infrastructure by linking different data sources should therefore be a priority in Brazil, to help patients and health professionals identify shortcomings and further fine-tune prevention strategies. Health information systems should be expanded so that they provide more and better information to both PHC teams and patients, thereby improving clinical management decisions in primary care and empowering patients to take a leading role in their own prevention and control actions. Data should be systematically fed back to practitioners, and should be used to identify risks or shortcomings. Brazil could learn from OECD countries in developing a strong health information system within a data-governance framework that protects the privacy of patients' health information, as laid out in OECD (2019[19]). A stronger information system would also be crucial to streamlining efforts to identify and invite target populations for hypertension and diabetes screening.

1.3. Addressing workforce challenges in the primary health care sector

Brazil is struggling with a shortage and uneven distribution of medical doctors across regions. The ratio of practising doctors in 2019 was lower in Brazil (2.3 per 1 000 population) than the OECD average (3.5 per 1 000 population). The distribution of medical doctors followed a north-south gradient, where the North and Northeast regions show a lower density of medical doctors. At the same time, FCM is undervalued as a specialty in Brazil. In 2018, only 5 486 medical doctors (1.4% of all specialists in Brazil) had specialty training in FCM. While residents of the North and Northeast have the highest health care needs, less than 20% of all FCM specialists work in these regions. Brazil therefore needs to meet two main challenges: 1) securing a greater number and distribution of primary care doctors; and 2) securing a high-quality workforce.

1.3.1. Securing a greater number and distribution of PHC doctors across the country

The MDP has been successful in strengthening the provision of PHC services in underserved communities

Established in 2013, the MDP is a large-scale health system intervention aiming to strengthen the provision of PHC services in underserved communities. The MDP was designed by the Ministry of Health as a supply-side intervention featuring three objectives: 1) transferring funds to municipalities to strengthen the PHC infrastructure; 2) improving access to and the quality of medical school training; and 3) recruiting Brazilian and foreign physicians to municipalities struggling to recruit and retain doctors. Based on the available evidence, the programme has been successful. Good progress has been made with regard to investing in and renovating the PHC infrastructure, expanding the number of new medical undergraduate vacancies in PHC, and recruiting more than 16 000 physicians from both Brazil and abroad to work exclusively within FHTs. By its fifth year of implementation, the MDP was associated with a 12.2% increase in the number of PHC physicians, with more pronounced effects in municipalities featuring lower levels of physician availability at the start of the programme (Hone et al., 2020[2]). The evidence also mostly suggests that the MDP led to improved access to care and quality of care, as measured by reductions in avoidable hospitalisations for some chronic conditions (Fontes, Conceição and Jacinto, 2018[20]).

While these results are remarkable, the implementation of the MDP has not been without drawbacks. First, there is evidence that the MDP led to the substitution of Brazilian physicians who were already working in communities. Second, only three-quarters of priority municipalities have at least one MDP physician, meaning that community-targeting methods were insufficient to recruit physicians for all priority municipalities. Third, MDP physicians did not have to undergo recertification or revalidation to practise medicine in Brazil. It is also fair to note that despite these positive results, unfilled PHC positions are still the norm in Brazil, with persisting geographic disparities in access to medical training. The North and Northeast regions offer the lowest levels of per capita medical undergraduate positions in the country.

The new *Programa Médicos pelo Brasil*, initiated in 2020 by the federal government to replace the MDP, will continue to increase the provision of medical services in remote or highly vulnerable municipalities as well as promote the training of doctors specialising in FCM. To avoid repeating mistakes, the experience of the MDP can inform the design and implementation of the *Programa Médicos pelo Brasil*. The federal government should focus on community-targeting methods to maximise the recruitment of physicians for all priority municipalities. It should also ensure that the new programme does not lead to a substitution of Brazilian physicians. The introduction of a compulsory revalidation process for all medical licences and the establishment of a two-year specialty programme in FCM as part of the *Programa Médicos pelo Brasil* are certainly positive steps for strengthening PHC.

Complementary solutions to recruit and retain the workforce would make the Programa Médicos pelo Brasil more effective

While Brazil already has many complementary solutions to recruit and retain the PHC workforce, it could learn from international experience on health workforce policies:

- First, as part of the new *Programa Médicos pelo Brasil*, there is scope to train more rural doctors in order to boost numbers and improve retention over the longer term. Extensive international evidence shows that establishing medical education in rural locations leads to increases in the number of medical graduates who will work in rural places over the long term (McGirr, Barnard and Cheek, 2019[21]). Learning from the experiences of OECD countries such as Australia, Canada, England and Norway, Brazil could establish medical education programmes in rural localities. At the same time, it could encourage medical students to gain experience in rural areas, for example, by including a compulsory rural rotation in any medical internship.
- Second, Brazil could make financial and non-financial incentives for medical doctors contingent on practising for a time in underserved communities. As part of the *Programa Médicos pelo Brasil*, physicians in underserved areas will receive financial incentives ranging from BRL 3 000 to BRL 6 000, depending on the location. As implemented in Chile, Germany and Canada, these incentives could be contingent on a return-of-service obligation of two to four years. The federal government will also need to ensure that the various types of financial incentives are received directly by the medical doctors, and not distributed at the discretion of the municipalities. In Chile, the programme combining financial and non-financial incentives with a return-of-service obligation of three to six years has been successful, with the number of applicants exceeding the number of available positions, high satisfaction rates among applicants and high retention rates among the hired doctors (Pena et al., 2010[22]).
- The final option to redress the geographical imbalance of doctors would be to restrict the choice of practice location for PHC doctors. In this respect, Brazil could learn from Turkey, Germany, Norway or some Canadian provinces (e.g. New Brunswick and Quebec), which restrict the choice of location for newly qualified medical doctors. Such a regulatory approach requires careful and coherent workforce planning, which is far from being the case today. In Brazil, unlike in many OECD countries, there is a lack of knowledge of present and future needs for doctors and other health care professionals (Oliveira et al., 2017[23]). Health care workforce planning is not based on

an objective assessment of professionals' characteristics, work processes, the characteristics of the health system in place and the population's health needs.

Boosting the local workforce, changing its scope of practice and making greater use of technology are key levers to cope with health workforce shortages

In many low, middle and high-income countries, task-shifting is a key lever to fill the gap in PHC provision stemming from a lack of PHC doctors (Afobali et al., 2019[24]). While extensive international evidence supports the transfer of roles traditionally performed by doctors to nurses and other allied health professionals, Brazil has not yet experimented with changing the scope of practice and task-shifting among health workers such as nurses and community health workers. As implemented internationally (e.g. in Australia and France), Brazil should capitalise on its large existing nurse training network to expand and recognise the role of advanced practice nurses, who could help manage the care of patients with mild acute diseases and chronic disorders, complementing the practising PHC doctors. Alternatively, advanced practice nurses can be deployed in remote and underserved areas to enhance access to qualified health professionals. Such a policy would require a thorough analysis of current nursing curriculums to further invest in core competencies, including team practice, care co-ordination between and across health sectors, clinical and professional leadership, and quality and safety management (Cassiani et al., 2018[25]). In a similar vein, community health workers – who already play a crucial role in PHC provision in Brazil – could play a bigger role, notably by taking a patient's medical history, conducting basic physical exams, ordering tests and providing counselling on preventive care. This would certainly require investments in training, as well as improved communication between community health workers and other FHT staff.

Improved use of alternatives to face-to-face consultations could be another avenue for coping with PHC doctor shortages and geographical imbalances in Brazil. While telehealth has been used for quite some time, its development and use are patchy. For example, just under 3.5 million telehealth services across all levels of care were registered in Brazil between 2016 and 2019. Of these, 50% occurred in the Southeast, 36% in the South and only 1% in the North, the most deprived region in terms of workforce shortages. A lack of funding, training and equipment for FHTs are factors impeding the use of telehealth services to deliver safe, fast and seamless health care services in Brazil. Scaling up telemedicine in Brazil without compounding existing social divides will require new investment and funding to ensure the effective and equal use of digital technologies in PHC. Brazil will also need to establish a governance structure that better supports municipalities with insufficient resources.

1.3.2. Securing a high-quality workforce through medical education

Beyond the need to address the uneven geographic distribution of primary care physicians, Brazil should focus on three broad areas: 1) increasing the credibility and recognition of the primary care sector; 2) making FCM a mandatory requirement to be allowed to practise primary care; and 3) introducing quality measures to medical education.

Increasing the credibility and recognition of the primary care specialty is a huge challenge in Brazil

While the Family Health Strategy has made access to PHC a priority, the country has not invested sufficiently in enhancing the credibility and recognition of FCM. Several worrying indicators suggest that the FCM specialty is undervalued and is the last option chosen by physicians: in 2018, only 1.5% of recent graduates chose the FCM speciality among the 55 specialities available. The low degree of academic incorporation and low funding in this research area are factors impeding recognition of the specialty (Wenceslau, Sarti and Trindade, 2020[26]; Fontenelle et al., 2020[27]). And yet they are critical to promoting FCM and encouraging students to choose this specialty as their future career, notably by proving that PHC is not a profession that does not require many qualifications. If Brazil wishes to fill the gap in the

PHC workforce, it needs to create academic FCM departments in all medical schools, promote interdisciplinary collaboration with other specialists and encourage mutual respect.

At the same time, making specialty training in FCM compulsory for all medical doctors wishing to practise PHC would be paramount to promote excellence in Brazil, and deliver more effective and patient-centred primary care. The benefits of specialised PHC have already been demonstrated elsewhere (OECD, 2020[28]), notably to address the bulk of patient needs, and provide a stronger focus on prevention and early management of health conditions. Post-training requirements to practise PHC are currently implemented in 22 OECD countries; there is no doubt that such a professionalisation would bring benefits to Brazil.

Last but not least, standardising the contractual arrangements for primary care workers is key to improve the attractiveness of PHC as a profession. Since each municipality defines the level of salaries, bonuses and other payment mechanisms, these arrangements are widely heterogenous across municipalities. Stronger oversight and regulation by the federal government is warranted to ensure consistent salary scales across the country, and it could be important to ensure that smaller municipalities offer similar contracts as larger municipalities. The new Agency for the Development of Primary Health Care could play a role in this regard. Key examples for learning are available internationally. In Turkey, for example, the implementation of the Health Transformation Programme led to family physicians being paid according to national terms and conditions, with more generous salaries and improved working conditions.

Quality measures for medical education should be introduced without delay

While Brazil's Ministry of Health (in partnership with Ministry of Education) regulates medical education nationwide, more could be done to standardise the medical curriculum. The inadequate academic programme, and the gap in the quality of medical education among medical schools, are areas of concern. To achieve greater standardisation of the medical curriculum and teaching, Brazil could introduce a national test at the end of the university period. The national licensing examination would complement the accreditation performed by the National Institute of Educational Studies and Research Anísio Teixeira (INEP) or the Federal Council of Medicine. The national examination has been increasingly used across OECD countries. The United Kingdom is introducing a nationwide Medical Licensing Assessment, which is overseen and regulated by the General Medical Council and will test the core knowledge, skills and behaviours needed to practise medicine. Brazil could learn from the United Kingdom's example.

At the same time, Brazil could take further step to promote workforce quality through stronger requirements for CME. Unlike in many OECD countries, CME is voluntary in Brazil. Not only is this insufficient to guarantee a high standard of competencies for PHC doctors, but it also does not ensure their fitness to practise throughout their career. More needs to be done to help medical doctors maintain their competency and acquire new skills. While a number of bodies, such as CONASS, CONASEM, the Brazilian Medical Association or the Brazilian Society of Family and Community Medicine organise trainings to maintain and update competencies, it is impossible to know whether – and how many – PHC medical doctors have undertaken CME. A stronger regulatory approach is required, for example through a formal CME framework that clarifies the expectations placed on PHC doctors and helps them meet these expectations. Brazil could learn from the United Kingdom and the Netherlands, where CME for PHC doctors is compulsory and linked to recertification: PHC physicians need to demonstrate they have regularly participated in CME activities, and undergo peer evaluation of their professional skills. At the federal level, the Agency for the Development of Primary Health Care could set such requirements and monitor providers' CME compliance. Municipalities could also use the contracting arrangement to actively push PHC doctors to comply with CME requirements and encourage quality improvement. CME requirements should be directed towards the key challenges of the health care system, such as the prevention of risk factors for health (e.g. obesity) and management of chronic conditions (including diabetes).

1.4. Promoting the digital transformation of primary health care in Brazil

1.4.1. Brazil is on the right track for an effecting digital transformation of PHC

Brazil has established a solid foundation for digital PHC by developing strategies at various levels of government, and making key investments in networks, data, interoperability and skills. As a result of the country's use of digital tools and data to enhance the efficiency, transparency and responsiveness of its public institutions to citizen and business demands, Brazil scored above the OECD average on the 2019 Digital Government Index (OECD, 2020[29]).

The Brazilian National Digital Health Strategy 2020-28 (ESD28) builds on more than a decade of policies to digitalise health care and make better use of health data (Ministério da Saúde, 2020[30]), going as far back as the National Policy for Health Information and Informatics of 2004 (PNIIS). Actions within ESD28 focus on three axes: 1) build on existing programmes and initiatives to digitalise health care in Brazil, including the National Health Data Network (RNDS), the Connect SUS (*Conecte SUS*) and Primary Health Unit Computerisation (Informatiza APS) programmes; 2) develop the necessary conditions (e.g. organisational, legal, regulatory) to spur effective collaboration in digital health; and 3) establish a conceptual, normative, educational and technological forum (*espaço de colaboração*) to operationalise collaboration.

A component of the *Previne Brasil* programme, Informatiza APS provides federal funding to FHTs that collect and send data from electronic health record (EHR) systems (Harzheim et al., 2020[31]). The programme also supports training in ICT and data analysis for employees in municipal health departments. In 2020, Connect SUS ran a pilot project in the state of Alagoas that provided additional funding for digitalisation to PHC units that had been unable to digitalise, disbursing more than BRL 5.5 million (USD 1.07 million [United States dollars]) to 97 municipalities (Ministério da Saúde, 2020[32]).

Connect SUS is also seeking to expand the use of health information systems in PHC through its e-SUS APS strategy (also known as e-SUS AB), which seeks to better manage individual health and care, optimise data collection and improve health information (Ministério da Saúde, 2020[33]). The informatics department of SUS (DATASUS) has made various applications available to citizens, frontline care workers and managers. Meanwhile, municipalities are increasingly providing digital services to citizens, with 25% of prefectures allowing patients to book appointments online and consult with a doctor online. Start-ups in telemedicine are flourishing, including Brasil Telemedicina, which produces around 60 000 reports per month and has clients in more than 700 Brazilian cities, and Telelaudo, which has provided more than 4.7 million teleradiology reports to more than 450 hospitals.

As elsewhere, the COVID-19 pandemic has provided further impetus to the digital transformation of health in Brazil. On 15 April 2020, the federal government authorised the use of telemedicine during the COVID-19 pandemic (Law No. 13.989/2020) to ensure continuity of care and protect health care workers. To help PHC units access digital technologies, the Ministry of Health also instituted an exceptional incentive to be paid to municipalities and states for each health team that has not yet been digitalised, budgeting over USD 83.8 million (BRL 432 million) for 2020. The Brazilian Telemedicine University Network (RUTE) also created a special interest group on COVID-19.

1.4.2. An effective digital PHC hinges on addressing three sets of challenges

There is no doubt that Brazil has a solid basis on which to build an effective, equitable and efficient digital PHC. Achieving a successful digital transformation of PHC now hinges on tackling three sets of interconnected challenges: 1) digitalising all PHC units and teams; 2) promoting inclusive connectivity for all Brazilian citizens, especially the most vulnerable; and 3) establishing a governance structure with clear, well-funded mandates at the right levels of government.

Focus on fundamental enablers to increase the digitalisation of PHC

While pockets of excellence exist, progress towards effective use of digital technologies in PHC has been slow and fundamentally unequal: 3 600 PHC units across the nation currently have no computers, and 7 200 have no Internet access. Only 17% of PHC units have Internet speeds over 10 megabytes per second (Mbps), limiting simultaneous use of EHR systems and high-quality video consultations, not to mention remote patient monitoring. Additionally, around 18 000 health care facilities (18% of all facilities) do not have an EHR system, with large regional differences in adoption: in 2019, one in four PHC units still maintained clinical records and patient data in paper format only (CGI.br, 2020[34]). Only 40% of primary care managers consider their ICT equipment to be new and up-to-date, and only 32% believe their Internet connection suits their needs. Around one-third of nurses and physicians reported having completed capacity-building courses in health informatics. COVID-19 has likely accelerated digitalisation, but its true impact remains unclear.

A real digital transformation of PHC in Brazil will not happen without setting two foundations. First, the country must ensure a reliable energy supply and fast connectivity for all PHC units, tackling one of the main barriers to digitalisation reported by municipalities during the recent pilot project in Alagoas. Although previous programmes (e.g. Connected Brazil) have been instrumental in expanding broadband connectivity, it is crucial that these initiatives set ambitious and clear targets for both the reliability and speed of connections in PHC units. It is also important to improve co-operation among governmental entities and across the different levels of government (federal, state and municipal) in implementing broadband connectivity initiatives, building on good practices in OECD countries and beyond.

Second, financial payments included in the Connect SUS pilot project in Alagoas should be consolidated and expanded to the entire Brazilian territory. To ensure the funds are used for their intended purpose, receipt of financial support should be tied to participation by municipal and state officials in capacity-building workshops, especially targeting senior executives. Funding should be linked to explicit targets for the adoption and use of EHR systems (like e-SUS AB), including effective electronic drug prescribing and exchange of clinical and administrative data across units. As PHC units go digital, it will be vital to safeguard operational dependence on digital systems by enforcing appropriate cybersecurity.

Ensuring digital uptake and effective use among the most vulnerable and digitally excluded

Even if Brazil were to break down all barriers to the connectivity and digitalisation of PHC units, significant inequalities among citizens in the use of digital technologies and tools would persist. Nearly 47 million Brazilians did not use the Internet in 2019 (more than 20% of the population). Digital divides are clearly associated with social inequalities, with older Brazilians, those from rural areas, those with lower incomes and those with lower education levels less likely to use the Internet, and more likely to use mobile phones only. As a result, there exists a serious risk that a digital transformation of PHC will compound existing social divides.

An effective digital PHC that reaches all Brazilians is only possible if every citizen is not only connected, but also considered in the design of digital PHC services. Brazil should focus on eliminating digital divides as a foundation for effective digital PHC, strengthening the role of telecentres as providers of training – especially in rural and remote areas – and ensuring appropriate funding and technical assistance at all levels of government. Given the importance of mobile phones as a means of accessing the Internet, it should prioritise a multichannel approach focusing on mobile access among vulnerable groups. Although digital PHC content, services and applications should meet the needs of both health workers and patients, they should specifically target citizens with low digital uptake, with continued efforts to expand patients' access to their personal health information.

Moving from digital PHC strategies to implementation and monitoring

Brazil's decentralised government creates challenges to digitalising PHC. The country's single federal district, 26 states, well over 5 000 municipalities (around 44% of which have under 10 000 inhabitants) and 438 health regions have highly heterogeneous demographics, socio-economic indicators and governance structures. With only around 800 inhabitants, the municipality of Serra da Saudade has the same responsibilities in managing the digitalisation of PHC as the municipality of São Paulo, which numbers over 12 million inhabitants. Decentralisation has many benefits, but it is also creating barriers to the digital transformation of PHC in Brazil to meet the targets set in ESD28.

A major barrier to digital PHC in Brazil is human and technical capacity in municipalities. Setting responsibilities for the digitalisation of PHC at the municipal level across Brazil is likely leading to diseconomies of scale and creating challenges for small municipalities. Brazil could look to examples from New Zealand, England and Portugal for a new model of shared services and responsibilities related to the digitalisation of PHC at less decentralised levels. Building on existing institutions (e.g. Co-ordenação-Geral de Tecnologia da Informação e Comunicações/General Co-ordination of Information and Communications Technology) and experiences, Brazil could explore setting up dynamic purchasing systems at the federal level, with appropriately funded agencies at the state or regional levels providing municipalities with specialised human resources, purchasing and management services for digital PHC.

Brazil has invested significantly in connectivity (e.g. through *Governo Eletrônico – Serviço de Atendimento ao Cidadão*) and software (e.g. e-SUS AB), as well as provided municipalities with support for hardware and training (e.g. Informatiza APS). Yet the ambitious vision set out in ESD28 will likely require both larger and smarter investments, tying financial support to effective and equitable use. Taking into account the magnitude of investments made in more digitally advanced countries, Brazil could review its current investments and consider providing more funding for change management, capacity-building, and monitoring and evaluation. Financial support could be tied to specific milestones in the adoption and use of digital PHC functionalities, starting with key functionalities like ePrescribing, referral management, appointment scheduling and patient access to EHR.

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2 Health care needs and organisation of primary health care in Brazil

The expansion of PHC in Brazil has been remarkable, contributing to significant improvements in many measures of population health over the past decades. SUS prioritisation on PHC permitted to offer services free of charge to the Brazilian population, allowing an easier contact with the health system at the community level through the development of modern multi-disciplinary family health teams. But gains have not been equal across the country, with North and Northeast regions faring worse than South and Southeast regions in terms of health improvements and health outcomes. There has also been a rise in the number of elderly patients and an increasing prevalence of risk factors for health and chronic non-communicable diseases. Tackling these challenges call for more effective PHC, responsive to people's changing needs, capable of offering preventive, continuous and co-ordinated care.

2.1. Introduction

Brazil is a high-middle income country, with a population of 212 million inhabitants in 2020. The country is divided into 26 states and one federal district, with 5 570 municipalities. The states are further organised into five geopolitical regions: North, Northeast, Centre-West, Southeast and South. Health is a universal right for the whole population and a state responsibility since the approval of the new Brazilian constitution in 1988, which established the Unified Health System (Sistema Único de Saúde, SUS) in 1990. The management and financing of SUS is shared between the Federal Ministry of Health, state departments and municipal health departments. In the decentralised health care system, municipalities have the freedom to organise PHC family health teams according to the population needs and geographic characteristics.

Brazil has made investments in PHC a priority to address disparities in access to care and improve health outcomes. The Family Health Strategy, one of the largest community-based PHC programme worldwide, launched in 1994 was successful to increase population coverage and improve health outcomes. The expansion of the Family Health Strategy has contributed to measurable improvements in terms of infant mortality rates, maternal health, immunisation uptake and avoidable hospitalisation. However, PHC in Brazil faces a number of challenges resulting from its vast territory and complex geography, which have made difficult to meet the needs of population living in vulnerable and remote communities. The expansion of PHC has been marked by stark disparities across the states and municipalities, linked mainly to workforce shortages and imbalances in the distribution of medical doctors. There has also been a rise in the number of elderly patients and an increasing prevalence of chronic non-communicable diseases, which call for effective prevention and stronger PHC to better manage the burden of chronic conditions.

This chapter describes the PHC system in Brazil. It starts by analysing the socio-economic context in which the system operates, as well as describing the governance of the PHC sector. The chapter then examines the health care needs of the Brazilian population, and lastly presents the organisation of the PHC sector.

2.2. The socio-economic context for PHC in Brazil

Brazil's government is divided into 26 states and the federal district, and 5 570 municipalities. The states and the federal district are also grouped into five regions: North, Northeast, Central-West, Southeast and South, which are used mainly for statistical purposes and to define the distribution of federal funds. Municipalities are granted the status of federal entities, at the same level as the states. While there is great heterogeneity in the geographical area and population, as well as social and economic indicators, among the subnational jurisdictions, all Brazilian municipalities enjoy the same legal status (OECD/UCLG, 2019[1]). In 2015, 17 municipalities had more than 1 million inhabitants (22% of population). About 44% of municipalities had less than 10 000 inhabitants. Brazil also has 438 health regions, which are made up of municipalities, and are very heterogeneous in their demographics, socio-economic indicators and governance structures (Ministério da Saúde, 2020[2]).

In the recent past, strong economic growth and income distribution programmes were the driving forces for generating significant inequality and poverty reduction in Brazil. However, income inequalities have been rising again in recent years, and there are large regional disparities in prosperity and growth across the country, with North and Northeast regions faring worse than South and Southeast regions. Large inequalities along several dimensions affect health status.

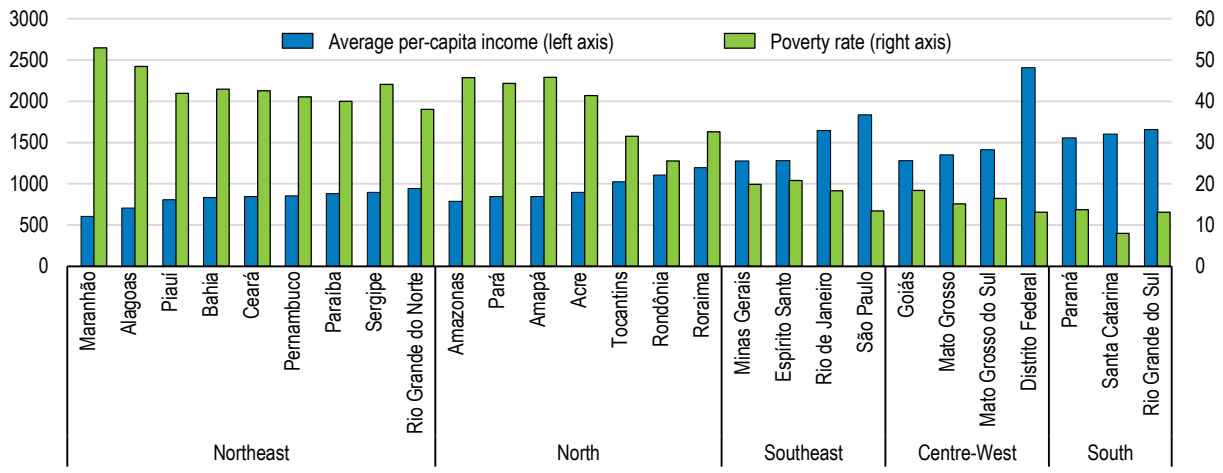
2.2.1. Despite progress, socio-economic inequalities remain a significant problem in Brazil

Brazil has had strong economic growth combined with remarkable social progress over the past two decades. In 2010, Brazil GDP grew by 7.5%, compared to around 3% across OECD countries. Currently social benefits amount to over 15% of GDP, and are characterised by poor targeting if pensions are also included. As a result, poverty rates have been reduced from 41% of the population in 2001 to 19% in 2019.[1] Public programmes have contributed to the decline in poverty rates (OECD, 2020[3]). Recent evidence shows that the *Bolsa Familia* programme alone has reduced poverty rates by 15% (Ferreira de Souza, Osorio and Paiva e Sergei Soares, 2019[4]).

These progresses have also generated reduction in income inequality. From 2001 to 2011, the GINI of income inequality in Brazil dropped continuously from around 58 to 52. However, it has been rising again in recent years, at around 53, and remains a significant problem in Brazil. Currently, the richest 10% of the population earn more than four times as much as the bottom 40% (OECD, 2020[3]).

Regional inequalities are another crucial challenge in Brazil. The distribution of income across Brazilian regions is highly unequal. Average incomes in the Northeast state of Maranhão are less than half of the national average. The opposite holds true for poverty. The poverty rates in the North and Northeast regions are between three to four times higher than the poverty rates in the Southeast, Central-west and South regions (Figure 2.1). Large regional disparities also exist with regards to labour market informality and illiteracy, which are three to four times more common in the poorer North and Northeast regions than in the relatively affluent South and Southeast regions (OECD, 2020[3]). As the social and economic context strongly influences health outcomes, economic disparities across regions are mirrored in health status and health outcomes.

Figure 2.1. Socioeconomic inequalities across regions, 2019



Source: IBGE (2019[5]), Síntese de Indicadores Sociais: uma análise das condições de vida da população.

2.2.2. The management of the Brazilian Unified Health System is decentralised

The principles and structure of Brazil's health care system were conceived in 1988 after the approval of the new Brazilian Constitution that established health as a universal right for the whole population. It became a state responsibility with the establishment of the Unified Health System (Sistema Único de Saúde, SUS). The SUS is structured around three main priorities (Massuda et al., 2020[6]):

- The universal right to comprehensive health care at all levels of complexity (primary, secondary, and tertiary).
- Decentralisation with responsibilities given to the three levels of government: federal, state, and municipal
- Social participation in formulating and monitoring the implementation of health policies through federal, state, and municipal health councils.

The management of SUS is shared across three different levels of governance: Federal Ministry of Health, state departments and municipal health departments. At federal level, the Ministry of Health defines the general objectives of the SUS and sets policy development, planning financing, auditing and control of health policies and health services linked to SUS. It is responsible for the overall co-ordination of the national priorities and actions defines as part of the Multi-Annual Plan 2020-23 and the National Health Plan (Plano Nacional de Saúde, [PNS]) 2020-23. The health related objectives for the Multi-Annual Plan 2020-23 is the expansion of the coverage and resolution of PHC, improving prevention and strengthening of integration between health care services. The PNS 2020-23 elaborates on SUS health policy objectives, with the definition of seven programmes (Ministério da Saúde, 2020[7]):

- Pharmaceutical services in SUS
- Specialised health care services
- PHC
- Scientific, technological and productive development in health
- SUS management and organisation
- Protection, promotion and recovery of indigenous health
- Health surveillance

In the area of PHC, the PNS 2020-23 is structured around three main priorities. First, the expansion of PHC access and of its infrastructure. Second, improvement in the digitalisation of PHC units, with better-integrated data and use of electronic medical records in North and Northeast regions. Third, increasing health promotion and prevention at PHC levels to address risk factors for health (for example nutrition and smoking) and encourage uptake of screening exams (for example cytopathology and mammography exams). The PNS 2020-23 defines 20 objectives in the area of PHC, with specific targets to achieve by 2023 around for example the number of Family Health Teams (both for the general and incarcerated populations), dental care coverage, pregnant women's prenatal consultations, cytopathology and mammography exams coverage, and quality of mental health (Table 2.1).

Table 2.1. The PNS 2020-23 objectives in the area of PHC

	Goals	Indicators	Reference Level	2023 Target
1	Increase to 72% the population coverage of PHC	Population coverage with PHC	63,5%	72,7%
2	Increase to 185 the number of "Doctor's Office at the Street" Teams	Number of "Doctor's Office at the Street" Teams	154	185
3	Increase to 2000 the number of Family Health Units with extended working hours financed by *Saúde na Hora* Programme	Number of Family Health Units functioning on extended working hours financed through the *Saúde na Hora* Programme	264	2 000
4	Increase to 155 the number of reference PHC team targeted at teenagers serving socio-educational measures	Number of PHC reference teams targeted at teenagers serving socio-educational measures	119	155
5	Increase to 677 the number of prison-based health teams	Number of prison-based health teams	357	677
6	Increase the occupation rate of more than 85% for placements offered through federal medical programmes (*Mais Médicos* project + *Médicos pelo Brasil* project)	Occupation rate of offered placements through federal medical programmes	82%	>85%
7	Increase to 80% the share of pregnant women with at least	Percentage of pregnant women with at least 6	40%	80%

	Goals	Indicators	Reference Level	2023 Target
	6 prenatal consultations taking place during the first 20th week of pregnancy	prenatal consultations, taking place during the first 20th week of pregnancy		
8	Increase to 49% the population coverage for Dental Specialties Centres	Percentage of population covered by Dental Specialties Centres	45%	49%
9	Increase to 689 Dental Specialties Centres that have adhered to the Network of care for People with Deficiencies	Number of Dental Specialties Centres that have adhered to the Network of Care for People with Deficiencies	579	689
10	Increase to 46% the population coverage of Dental Health Teams	Percentage of population covered by Dental Health Teams	42%	46%
11	Increase to 3 118 the number of municipalities with Dental Prosthesis Regional Laboratories services	Number of municipalities with Dental Prosthesis Regional Laboratories services	2468	3118
12	Increase to 60% the share of pregnant women with prenatal consultations at PHC who had individual dental appointments with Dental Health Teams	Proportion of pregnant women with dental appointments performed	25%	60%
13	Implement 39 River-based Family Health Units	Number of River-based Family Health Units implemented	19	39
14	Implement out-of-hospital psychosocial service focused at acute situations in 14 capitals	Number of capitals with out-of-hospital psycho-social service focused at acute situations	0	14
15	Reduce to 26 days the average time of psychiatric hospitalisations in medical institutions	Average time of psychiatric hospitalisation	45	26
16	Increase to 1.2% the proportion of alcohol dependents' appointments at the Centres of Psychosocial Care	Percentage of alcohol dependents' appointments at the Centres of Psychosocial Care	0,6%	1,2%
17	Increase at 80% the share of beneficiaries of the *Bolsa Família* Programme who have their health conditions monitored at PHC	Percentage of the *Bolsa Família* beneficiaries with health conditions monitored at PHC level	76.08%	80%
18	Increase to 48% the share of women aged between 25 and 64 years old that have done a cytopathology exam in the last 3 years	Percentage of women aged between 25 and 64 that did a cytopathology exam in the last 3 years	36%	48%
19	Increase to 35% the share of women aged between 50 and 69 years old that have done a mammography exam in the last 2 years	Percentage of women aged between 50 to 69 years old that have done a mammography exam in the last 2 years	23%	35%
20	Reduce the proportion of caesarean sections to 52.4%	Percentage of caesarean sections	55.7%	52.4%

Source: (Ministério da Saúde, 2020[7]), Plano Nacional De Saúde 2020-2023.

The 26 state governments, through states secretary of health, are responsible for regional governance and the regional health system organisation, co-ordination of strategic programmes, and delivery of specialised health care services that have not been decentralised to municipalities. At local level, 5 570 municipalities, through municipal secretary of health, handle the management of SUS, including co-financing, co-ordination of health programmes, and direct delivery and contracting of health services, including PHC services (Massuda et al., 2020[6]).

The Interfederative Pact of Executive Management allows SUS to have a dynamic functioning through agreements between each federative entity, with the establishment of the following councils or commissions:

- The *Conselho Nacional de Secretários de Saúde* (CONASS) brings together the health secretaries of the states and the Federal District with the purpose of implementing SUS principles, legislation and guidelines into health actions and services. CONASS also allows the exchange of experiences and information among States Secretaries.
- The *Conselho Nacional das Secretarias Municipais de Saúde* (CONASEMS) represents municipal health departments, with the objective of guiding health managers for the provision of PHC services.

- The *Conselho Estadual de Secretarias Municipais de Saúde* (COSEMS) brings together municipal secretaries of health to discuss and co-ordinates strategic health issues.

Box 2.1. The Governance of PHC in Brazil

The *Política Nacional de Atenção Básica* (PNAB) describes the governance of PHC in Brazil, the roles of the main actors and other strategic aspects of the PHC policy. The federal government, the state governments and municipalities are the main actors involved in the governance of PHC in Brazil. The specific competencies of each level of government is foreseen in the Federal Constitution and the PNAB (art. 7, Ord. 2 436).

The formulation of policy priorities and actions for the PHC sector is agreed and approved during the CIT, which is made of representatives from the Ministry of Health, CONASS and CONASEMS. Decisions on the operational, financial and administrative aspects for the management of PHC are taken by consensus.

Within the Ministry of health, the PHC Secretariat (SAPS) (established in 2019 – Decreto nº 9 795) is responsible for defining and co-ordinating the PNAB. It is also responsible for allocating federal resources to finance PHC (on a monthly, regular and automatic basis), providing integrated support to the state and municipal managers, formulating strategies for monitoring and improving PHC quality, establishing national guidelines and providing technical and educational supports for PHC managers and professionals.

The states define decentralised PHC actions, strategies, guidelines, as well as rules for the implementation of the PNAB during the CIB, which is made of representatives from the state secretaries of health and COSEMs. States are expected to allocate financial resources for PHC, monitor PHC actions and care quality in municipalities, verify the quality and consistency of information sent by municipalities. They might also provide institutional support to the municipalities in the process of implementing and monitoring PHC and expanding the Family Health Strategy. States are expected to provide technical and educational instruments to the municipalities to facilitate training and continuous education of PHC managers and professionals.

Municipalities have the main attribution concerning the provision and financing of PHC services. They are responsible for organising, managing and providing services and actions within each territory. Municipalities have to provide support to PHC teams and units in the process of monitoring and expanding the Family Health Strategy. To this end, municipalities select, hire and remunerate the PHC professionals in accordance with the current legislation, and guarantee that PHC teams and units have sufficient material resources, equipment and supplies to deliver PHC services. They might organise effective patient flow within SUS and adopt referral mechanisms to ensure effective care co-ordination. Municipalities should keep the registration of teams, professionals, workload, available services and equipment on a monthly basis in the National Registry System of Health Establishments according to specific regulations. Community participation should also be guaranteed through social control. Lastly, municipalities are required to analyse and verify the quality and consistency of the data collected in the national health information systems to be sent to other spheres of management, use them in the health care planning and disseminate results.

Source: Information provided by Brazilian Ministry of Health.

The *Comissão Intergestores Tripartite* (CIT) and the *Comissão Intergestores Bipartite* (CIB) are important bodies for the development of SUS strategies and resource allocation through collective consensus from the different spheres of government (see Box 2.1). The National Health Council, a collegiate body

composed of government representatives, service providers, health professionals and users, is also involved in the formulation of PHC priorities and actions. The OECD health system review provides a detailed description of these governance bodies (OECD, 2021[8]).

Since the establishment of SUS, Brazil has made substantial progress toward achieving universal health coverage. Virtually all of the population is covered for equal benefits and equal financial protection within the public health sector. Since its inception, a strong focus of SUS was to strengthen the role of PHC to reduce health inequalities and improve access to care, but also to move away from a health system that was historically very hospital-centred.

2.2.3. Brazil makes spending on PHC a priority

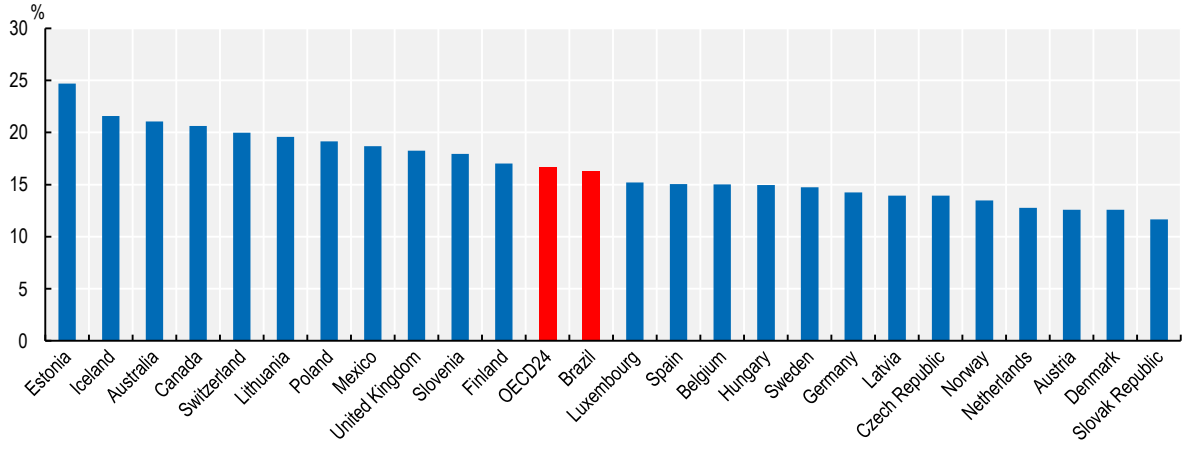
The public system is financed by tax revenues and social contributions from all three levels of government. By law, the federal government is required to spend 15% of net current government income on health, the states are required to spend 12% of total revenue on health, and municipalities are required to spend 15% of total revenue on health (Massuda et al., 2020[9]). It is reported that over the past 30 years, the share of municipal funding has increased to reach nearly one-fourth of their own total revenues on health (Massuda et al., 2020[9]).

Under SUS, the federal government has traditionally financed roughly one-third of total PHC costs (33%), with the remaining part being funded predominantly by municipalities (61%) (Ministério da Saúde/Fundação Oswaldo Cruz, 2018[10]). The participation of states is the smallest, with very few cases where states co-finance policies for PHC.

Analysing the composition of overall health spending in an international context, Brazil seems to make spending on PHC a higher priority than many OECD countries. In 2019, Brazil dedicated around 16% of its financial resources to general outpatient care, dental care, home-based curative care and preventive activities (Figure 2.2).

In 2020, the budget allocated to PHC from the federal government was BRL 20.9 billion, compared to BRL 17.5 billion in 2019 (CONASEMS, 2020[11]). In total, the federal government increased its PHC budget by around BRL 3.4 billion between 2019 and 2020.

Figure 2.2. Spending in PHC as a share of current health spending, 2019 or nearest year



Note: Basic health services combine general outpatient care, dental care, home-based curative care and preventive activities provided regardless of the setting. It can be used as a proxy for PHC for international comparisons.
Source: OECD (2021[12]), *Health Statistics Database*, http://stats.oecd.org; Brazilian Ministry of Health.

2.3. Health care needs of the Brazilian population

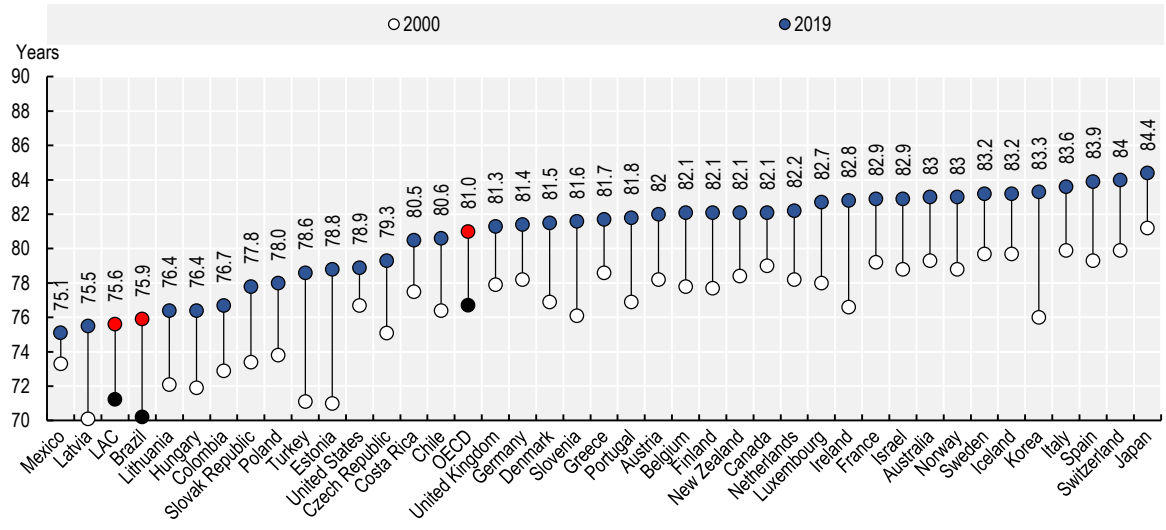
Since SUS inception, Brazil has made significant developments by improving in most of the general population health indicators. Brazil is however undergoing a profound demographic transition. As a result of decrease in fertility and mortality rates, the Brazilian population is rapidly ageing. The rapidly ageing population and increasing risk factors for health in Brazil (notably growing overweight rates) goes hand in hand with an increased prevalence of chronic non-communicable diseases, which call for effective prevention and stronger PHC to better manage the burden of chronic conditions.

2.3.1. Life expectancy at birth has improved in recent years, but is still falling behind other OECD countries

Life expectancy at birth in Brazil increased rapidly over the past decades, but is still five years below the OECD average of 81 years but above the LAC average of 75.6 years (see Figure 2.3). In Brazil, life expectancy at birth increased by more than five years between 2000 and 2019 (rising from 70.2 to 75.9 years), compared to four years across OECD countries. The gap in longevity between Brazil and other OECD countries has shortened from 6.5 years to 5.1 years.

Figure 2.3. Life expectancy at birth in Brazil has increased over the past decades

Life expectancy at birth, among OECD and LAC countries, 2000 and 2019 (or nearest years)



Source: OECD (2021[12]), *Health Statistics Database*, http://stats.oecd.org; World Bank World Development Indicators Online 2021.

Infant mortality rates have decreased from 30.3 deaths per 1 000 live births in 2000 to 12.4 deaths per 1 000 live births in 2019. Despite this decrease, the infant mortality rate in Brazil is still above the OECD average of 4.2 deaths per 1 000 live births. The same is true for maternal mortality rates in Brazil, which have decreased to 60 women per 100 000 live births in 2017 (13 percentage points reduction since 2000), although still higher than the OECD average of 8 per 100 000 live births but lower than the LAC average of 83 (OECD/The World Bank, 2020[13]).

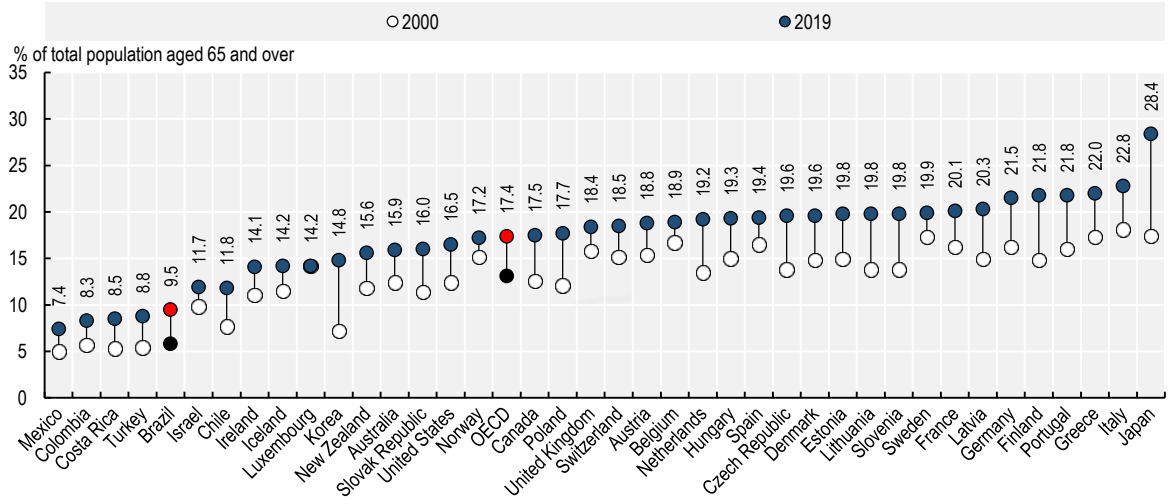
2.3.2. Brazil faces rapid ageing of its population

Brazil, similarly to other OECD countries, is experiencing a demographic transition characterised by a shift from high levels of mortality and fertility to lower levels. The fertility rate fell from 2.9 births per woman in

1990 to 1.7 births per woman in 2019 (OECD, 2021[14]). The combination of falling mortality rates (resulting in increasing life expectancy) and fertility rates causes rapid population ageing. The share of the population aged over 65 years has increased by 65% over the past decade, rising from 5.8% in 2000 to 9.5% in 2019 (Figure 2.4). Across the OECD, the share has increased by 32% over the same period, rising from 13.1 in 2000 to 17.4 in 2019.

Therefore, the dependency ratio (the number of people of working age for every person aged 65 years and more) is projected to substantially decrease by 2050, close to the OECD level. The rapid ageing population has an important impact on the health of the population in Brazil, putting pressure on both the health care systems and the economy.

Figure 2.4. Share of the population aged over 65 years, 2000 and 2019



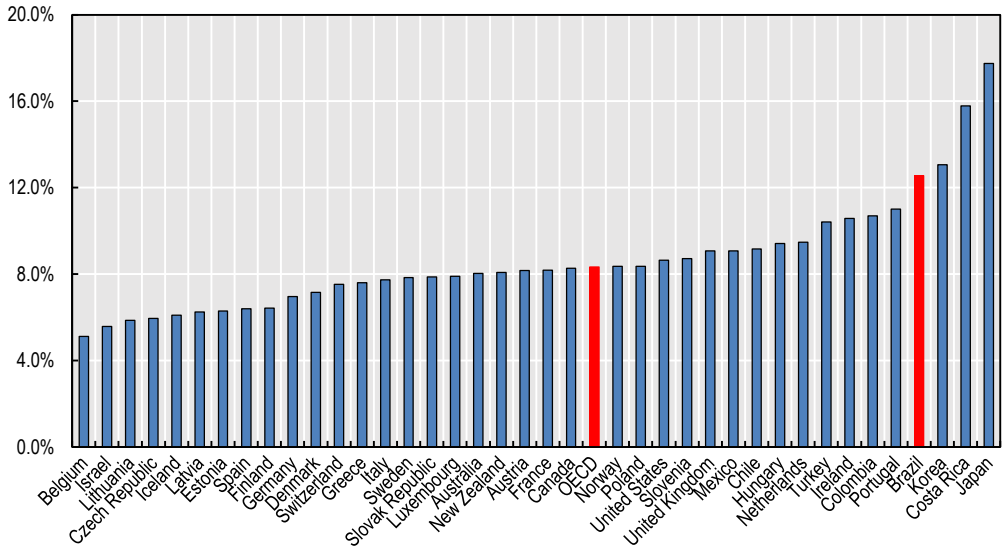
Source: OECD (2021[12]), *Health Statistics Database*, http://stats.oecd.org.

2.3.3. Rapidly increasing risk factors for health and associated ill-health are a major concern

Several risk factors for health give cause for concern in Brazil, including particularly overweight. Being overweight is a major risk factor for various chronic non-communicable diseases including diabetes, cardiovascular diseases and certain cancers. While overweight in Brazil is currently below OECD average, the trend is increasingly upwards. In 2016, estimations show that 56.5% of adults in Brazil were overweight, close to the OECD average of 58.4%. However, Brazil showed the fourth largest change in overweight between 2006 and 2016 with a growth of 13% in the past decade, compared to an increase of 8% across the OECD. This is the third highest growth rates behind Japan, Costa Rica and Korea (Figure 2.5).

Children overweight rates in Brazil are also increasing at a fast rate. In 2016, Brazil had a children overweight rate of 28%, very close to the 28.5% in average amongst OECD countries. Nevertheless, Brazil experienced an increase of 27% between 2006 and 2016, higher than the 15% increase in the OECD. Increasing children overweight rates means higher risk of cardiovascular diseases or diabetes during adult age, putting further pressure on the PHC sector.

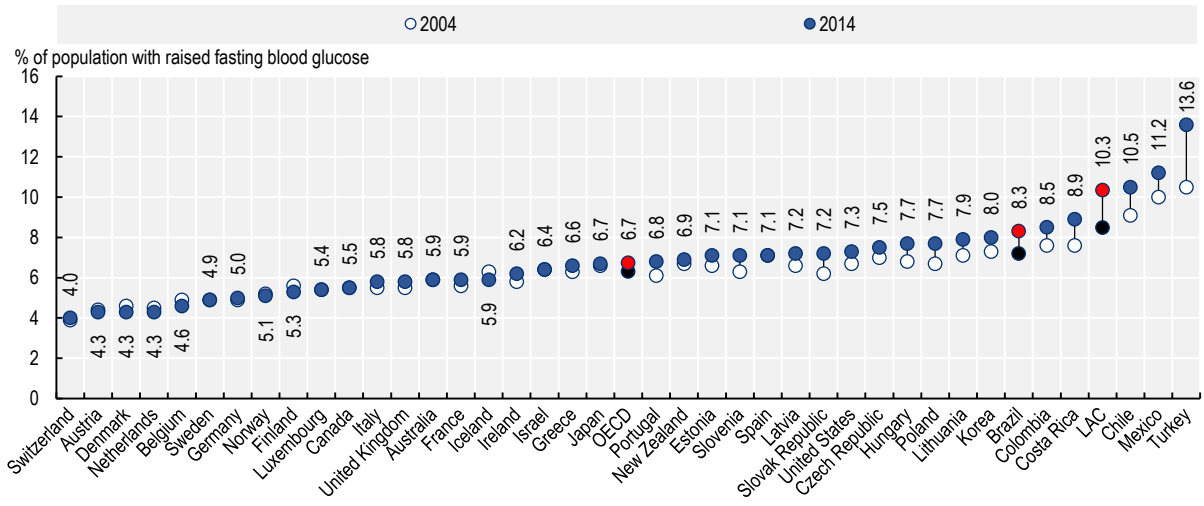
Figure 2.5. Changes in overweight rates among adults between 2016 and 2006



Source: OECD (2021[12]), *Health Statistics Database*, http://stats.oecd.org.

Already, when compared to OECD countries, diabetes represents a higher burden of disease in Brazil. Raised levels of blood sugar can lead to the development of diabetes. Fasting blood glucose (FBG) contributes to diagnose and monitor diabetes. In Brazil, 8.3% of the population had raised FBG in 2014, above the 6.7% average in OECD countries. Importantly, between 2004 and 2014, Brazil recorded one of the largest increase in its population with raised FBG, increasing by 15.3% (Figure 2.6). Only Turkey, Mexico, Chile, Costa Rica and Colombia had larger increases amongst OECD countries, evidencing a worrying trend in Brazil.

Figure 2.6. Raised fasting blood glucose among adults in Brazil and OECD, 2004 and 2014



Source: WHO Global Health Observatory (2017[15]), https://www.who.int/data/gho.

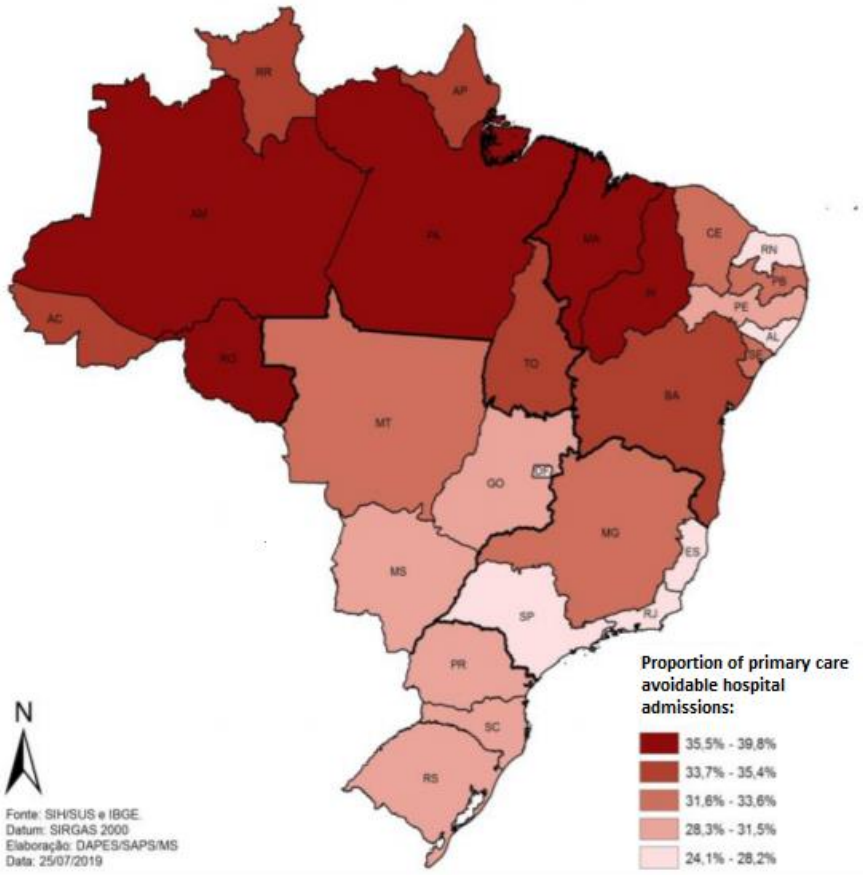
Overall, with increasing risk factors for health, the predominance of chronic non-communicable diseases is growing in Brazil. In 2017, four chronic non-communicable diseases dominated the causes of mortality in Brazil: circulatory system diseases (27%), neoplasms (17%), chronic respiratory diseases (12%), external causes (12%) and diabetes (5%), compared to only two in 1990 (cardiovascular diseases with 27.8%, and neoplasms with 11.4%).

2.3.4. There are large regional differences in health

There are large regional inequalities in health status across Brazil, where the most vulnerable municipalities consistently present poorer health outcomes than national average. While infant mortality rate in Brazil has decreased from 47.1 to 12.4 per 1 000 live births between 1990 and 2019, there are large differences in the magnitude of this reduction across Brazil's regions. The Northeast region showed the most significant decline of 80% in the period, while the lowest degree of reduction occurred in the Centre-west and North regions (reduction of 62%) (Szwarcwald et al., 2020[16]).

Another illustration of regional differences in health can be seen in terms of avoidable hospitalisation for conditions that could be treated in the PHC setting. The proportion of hospitalisations due to conditions that could be more effectively treated in the PHC setting ranges from 24% in the South region to 40% in the North region (Figure 2.7). Such regional differences point out that some remote and vulnerable areas require more attention than others to improve quality of PHC.

Figure 2.7. Share of hospital admissions due to conditions that are treatable in PHC, population aged 60 or more by region, 2019



Source: Ministério da Saúde (2020[2]), Plano Nacional de Saúde 2020-23.

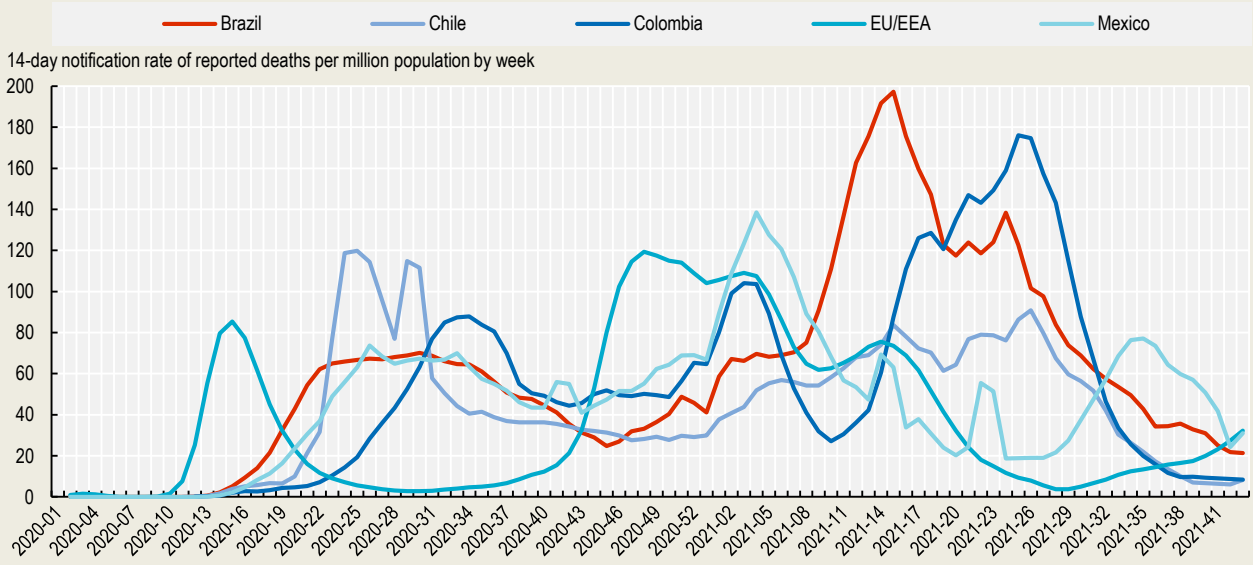
There are also significant inequalities in the rates of vaccination against yellow fever in Brazilian states where vaccination has been recommended, ranging, in 2018, from 21.8% in Sergipe to 100% in the Federal District and Roraima (the national average for all states where vaccination is recommended is 64.1%).

Regional inequalities in health have aggravated the impact of the COVID-19 pandemic and will likely exacerbate health inequalities in the future. The most precarious and vulnerable population are more likely to be affected by the COVID-19 virus, not only because of poor living and working conditions, but also because they are more likely to suffer from comorbidities and risk factors for COVID-19 severity. Mortality rates in the State of Amazonas have been found four-times higher than the national average, particularly among indigenous people (Pires, Carvalho and Rawet, 2020[17]). Box 2.2 presents the impact of COVID-19 on health in Brazil.

Box 2.2. The impact of COVID-19 on health in Brazil

The first case of COVID-19 in Brazil was reported on the 25th of February 2020. Since then, the impact on population health has been large. The total number of registered deaths is above 611 000 as of 17 November 2021 with 41 000 average monthly registered deaths in 2021. This situates COVID-19 as the first cause of death during the pandemic when compared to the average monthly figures for 2015-19 of deaths attributed to other conditions, the highest ones being 30 000 for circulatory diseases, 18 500 for cancers, and 13 000 for diseases of the respiratory system. However, there are scientific basis showing an underreporting of around 22% due to limitations to perform the SARS-CoV-2 screen by RT-PCR test (Carvalho, Boschiero and Marson, 2021[18]).

Figure 2.8. COVID-19 mortality rate evolution in Brazil and selected OECD countries between March 2020 and October 2021



Source: ECDC (2021[19]), *COVID-19 situation updates*.

The mortality epidemic curve in Brazil experienced an increase in cases by early April 2020, reaching the first peak during July 2020, later than what Europe experienced in the early months of the pandemic (Figure 2.8). Then, cases started to reduce but still with high level of virus circulation and mortality rates, similar to other Latin American countries such as Chile, Colombia and Mexico but dissimilar to Europe where mortality was substantially lowered between July and September. By mid-November, cases in Brazil began to rise once again. By the beginning of April 2021, mortality rate in Brazil reached its highest levels since the start of the pandemic and then started to decline.

One of the most important problems in handling the COVID-19 pandemic in Brazil was weaknesses in governance of the health sector. At the federal level, in the first year of the pandemic, four different ministers of health were in office, limiting continuity in the management of the response. Risk communication from federal authorities has also been conflicting and confusing for the population. Brazil is not unique, in that other OECD countries have pursued similar approaches.

As highlighted in Chapter 3, the COVID-19 crisis demonstrates the importance of placing PHC at the core of health systems, both to reduce pressure on health systems and minimise complications and direct deaths from the COVID-19, as well as to maintain ongoing routine care to patients who do not have COVID-19.

2.4. The organisation and structure of the PHC sector

In Brazil, the 5 570 municipalities handle the management, organisation and delivery of PHC. The Family Health Strategy programme launched in 1994 was remarkable. Based on multi-professionals PHC teams (called Family Health Teams), the expansion of the Family Health Strategy led to improvement in health care coverage and health outcomes. SUS prioritisation on PHC permitted an easier contact with health services at the community level.

2.4.1. Municipalities have primary responsibility for managing and delivering PHC

Since the implementation in 1994 of the federal programme called the Family Health Strategy (Estratégia de Saúde da Família – ESF), also known as the Family Health Programme (Programa Saúde da Família), the 5 570 municipalities have primary responsibility for managing and delivering PHC. With federal funding, municipalities have the freedom to organise family health teams according to the population needs and geographic characteristics.

The ESF is a decentralised programme aimed at expanding the PHC system in Brazil toward more co-ordinated, comprehensive and continuous care. The overarching objective was to ensure universal access to health care services for all Brazilians under the overall organisation of SUS (Macinko and Harris, 2015[20]; Castro et al., 2019[21]). The ESF became the main mechanism for expanding coverage to PHC services in Brazil. The ESF resulted in two major shifts. First a shift in priorities, from treating patients with diseases to delivering comprehensive care and preventing diseases through active health promotion. Second a shift in governance, from states to municipalities to allow for greater accountability and more collaboration between the private and public sector.

The ESF is funded through federal transfers but also includes financial contributions from municipalities. As earlier mentioned, the municipalities is the main financing agent of PHC. Smallest municipalities (up to 20 000 inhabitants), where there is no other supply of health care services, spend around 60% of their health expenditure directed towards PHC.

2.4.2. Public PHC is free of charge and is expected to be the initial contact point to SUS

SUS offers preventive services and PHC free of charge. Services that are publicly covered are based on health conditions, clinical and nonclinical procedures, and target population groups. The list of services has been gradually adapted to reflect changes in population health. Treatment and control of major chronic conditions (such as hypertension and diabetes) have been added in the list of services covered (OECD, 2015[22]). The federal Ministry of Health negotiates with state and municipal health secretariats to decide new health care services to be covered by SUS.

PHC provided by the ESF is expected to be the initial contact point for patients having new health needs, although it does not work as a “gatekeeper” and many Brazilian have direct access to outpatient specialties and hospital. For example, the latest Health Information Survey found that around 50% of the diabetic population identified basic health units as their last contact with the health system, 11% used public speciality units in hospitals, 6% public urgent care units and 30% private practices or clinics (IGBE, 2020[23]).

This is unlike many other OECD countries such as Australia, Canada, or the United Kingdom where general practitioners operate as gatekeeper to the health system as a referral is required and compulsory to access to specialist and hospital care (OECD, 2020[24]).

In PHC, private sector is more supplemental as health plans mainly offer specialist and hospital services. However, health plans in the private sector have begun to offer access to family doctors with no co-payment as an alternative to specialist visits (Massuda et al., 2020[9]).

2.4.3. PHC in Brazil is provided by multidisciplinary Family Health Teams

Prior to 1994, the role of PHC and health promotion was limited and services were predominantly delivered in a range of hospitals. As a community-based, large-scale PHC programme, the ESF relies on multi-professional teams called Family Heath Teams (FHTs). Each FHT is assigned a geographic area, covering up to 4 000 individuals located in non-overlapping areas. This helps FHTs to consider social, economic and environmental factors of the catchment area. FHT are responsible for registering every family in their geographic area, and are thus designed to facilitate access to the health care system (Massuda et al., 2020[9]).

A range of different health professionals are involved in PHC delivery. The FHT include physicians, nurses, and up to 12 community health workers. Other PHC workers, including nutritionists, pharmacists, social workers, psychologists, obstetricians and gynaecologists, and public health workers can provide additional support depending on local needs. Oral health teams have been integrated to the FHT in recent years to provide universal and free oral health services to the population. By 2019, there were 43 234 Family Health Teams and 27 564 Oral Health Teams in operation throughout Brazil (Figure 2.9). Solo practice in Brazil is thus becoming scarce, although there is no official registration and reporting of this practice.

This model of service delivery – based on multidisciplinary team – is well aligned with modern approaches to PHC which house multiple professionals with advanced skills working in teams (OECD, 2020[24]). Such models of PHC based on teams or networks of providers were reported by 18 OECD countries in 2018, including Australia, Canada, France, Switzerland or the United States.

FHTs are working in basic health care units (*Unidades Basicas de Saude* – UBS) or other PHC facilities called health clinics, health centres or health posts, and can also receive support from the Family Health Support Centers (*Nucleos de Apoio à Saúde da Familia* – NASFs). NASFs were introduced in 2008 to provide support to between one and nine FHTs. NASF is composed of health and social workers included for example acupuncturists, social workers, physical education professionals, pharmaceuticals, physiotherapists, gynaecologists and obstetricians; homeopathic doctors; nutritionists; paediatricians or psychologists. By 2019, there were 4 487 NASFs in operation throughout Brazil (see also Chapter 4 for a detailed description of NASFs). As of May 2021, there is a total of 50 029 PHC facilities in Brazil, including among other UBS, Health Post and NASFs.

In 2020, the government introduced a new classification of 12 health teams categories (Table 2.2 summarises the various family health teams in Brazil).

Table 2.2. PHC teams in the National Register of Health Facilities CNES, 2020

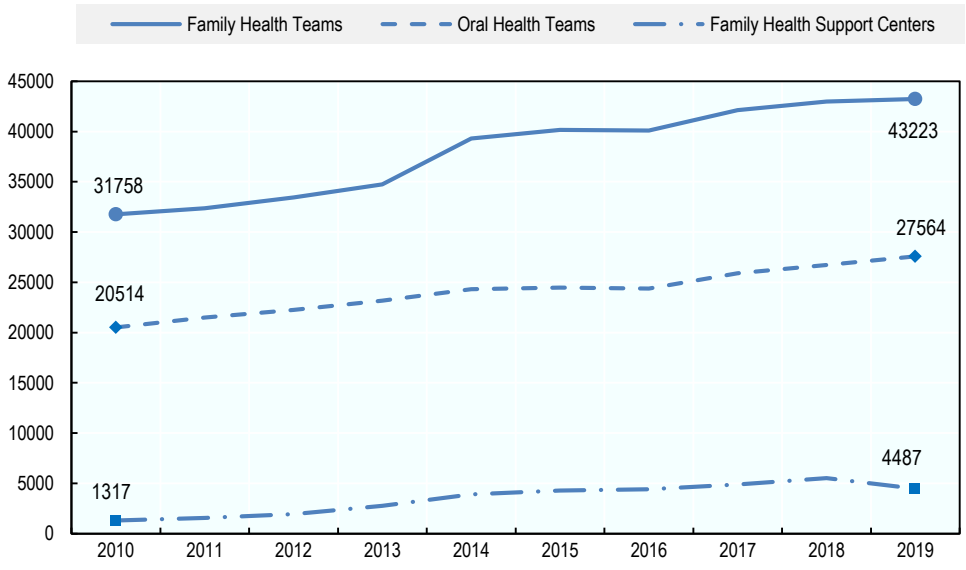
Acronym	Official name	PHC team
EMSI	*Equipe Multidisciplinar de Saúde Indígena*	Multidisciplinary Indigenous Health Team
EMAD I	*Equipe Multidisciplinar de Atenção Domiciliar Tipo I*	Multidisciplinary Team of Home Care type 1
EMAD II	*Equipe Multidisciplinar de Apoio*	Multidisciplinary Team of Home Care type 2
EMAP	*Equipe Multidisciplinar de Atenção Domiciliar Tipo II*	Multidisciplinary Support Team
EAD	*Equipe de Cuidados Domiciliares*	Home Care Team
eSF	*Equipe de Saúde da Família*	Family Health Team
eSB	*Equipe de Saúde Bucal*	Oral Health Team
eNASF-AP	*Equipe do Núcleo Ampliado de Saúde da Família e Atenção Primária*	Extended Family Health and PHC Team
ECR	*Equipe dos Consultórios na Rua*	Outdoors clinics Team
eAPP	*Equipe de Atenção Primária Prisional*	Prison PHC Team
eMAESM	*Equipe Multiprofissional Atenção Especializada em Saúde Mental*	Multi-professional Team Specialised Attention in Mental Health
eAP	*Equipe de Atenção Primária*	PHC Team

The scope of practice of the FHT has gradually increased over the past years to provide proactive preventive care and deliver public health intervention including for instance immunisation programmes and screening programmes (see Chapter 3). Services include not only maternal and child health care services, but also entail preventive care and control and management of chronic non-communicable diseases (Özçelik et al., 2021[25]). The FHT also link patients with social services (such as conditional cash transfer programmes), water and sanitation services, law enforcement, and school programmes (Massuda et al., 2020[9]).

2.4.4. The expansion of the Family Health Strategy has been remarkable, improving health care coverage and health outcomes

In 2019, 98% of the municipalities had adopted the Family Health Strategy model. In 2019, there were 43 223 family health teams, 27 564 oral health teams and 4 487 family health support centres (Figure 2.9), providing care to more than 127 million people (61% of the population). The number of family health teams and oral health teams has increased by respectively 36% and 34% over the past decade. At the same time, the number of NASFs has more than tripled over the past decade (Figure 2.9). As of May 2021, there are more than 50 000 PHC facilities in Brazil where teams can deliver services.

Figure 2.9. The number of Family Health Teams has increased by nearly 40% over the last decade



Source: Information provided by the Brazilian Ministry of Health.

There are strong evidence suggesting that the FHT provides better access and quality than other traditional health posts and centres (Massuda et al., 2020[9]). In a systematic review of the literature examining the impact of the ESF in Brazil, Bastos et al. (2017) show that increasing health care coverage through the expansion of the ESF was consistently associated with improvement in child mortality (Bastos et al., 2017[26]). A longitudinal analysis using panel data show that a 10% increase in FHT coverage was associated with a 4.5% decrease in infant mortality rate, all other things being equal (Macinko, Guanais and Marinho De Souza, 2006[27]).

Among adults, expansion of the ESF was associated with reductions in hospitalisations for diabetes mellitus and respiratory problems (Guanais and MacInko, 2009[28]). Estimations show that the ESF may have contributed to an estimated 126 000 fewer hospitalisations between 1999 and 2002. More recently,

Pinto and Giovanella (2018) show that the implementation of the ESF was associated with a reduction of 45% of the standardised hospitalisation rates per 10 000 inhabitants between 2001 and 2016. The decline was particularly pronounced for hospitalisation due to asthma, gastroenteritis and cardiovascular and cerebrovascular diseases (Pinto and Giovanella, 2018[29]). The implementation of the ESF is also positively associated with a significant reduction in the number of hospitalisations for heart failure and stroke per 10 000 inhabitants from 1998 to 2013 (De Fátima Barros Cavalcante et al., 2018[30]). Better prevention of PHC sensitive conditions, greater follow-up for chronic conditions, improved diagnosis, and easier access to medicines partly explain improvement in health care quality.

In addition to improving health outcomes through better access to care, the SUS made considerable investments to expand the availability and equipment of PHC facilities through the *Requalifica programme*. The programme carries out construction, expansion and refurbishment of the PHC facilities, including the construction of the Basic Fluvial Health Units, providing better conditions for accessing and offering public health actions and services. It also involves actions aimed at the computerisation of PHC, and the qualification of PHC workers (Ministério da Saúde, 2020[2]).

While these are all welcome news, the ESF expansion has also been marked by stark disparities across the states and municipalities (Andrade et al., 2018[31]). The ESF expansion has been heterogeneous across municipalities mainly because of geographic imbalances in the supply of physicians. The lack of PHC physicians in some remote municipalities has been one of the most important barrier to the expansion of the ESF (Andrade et al., 2018[31]).

2.4.5. The role of community health workers is predominant

Following the implementation of the Community Health Agents Programme (PACS), community health workers (CHWs) started to play a crucial role in the Brazilian PHC system. CHWs are frontline public health workers, often members of the communities in which they work. They have valuable knowledge of people needs and are trustful source of information. The implementation of the ESF gave an expanded role of CHWs, at the core of the country's PHC policy (Wadge et al., 2016[32]).

CWHs are integrated members of the FHT. They provide comprehensive PHC supports including clinical triage, supporting chronic disease management, screening uptake, immunisations, providing pre- and postnatal care assistance, health promotion, social determinants, community participation and household data (Wadge et al., 2016[32]). They are expected to resolve many low-level problems such as medication review for chronically ill patients, while referring more complex issues to doctors and nurses of the FHT. At the clinic or health posts, CHWs are also responsible for organising the waiting rooms and appointments for other health workers, and offering educations sessions.

Each CHW is assigned to maximum 150 households in a geographic area, and each household receives at least one visit every month from a dedicated CHW irrespective of needs or demand. Patients are not able to choose their CHW. Monthly visits allow health promotion activities and basic clinical care, checking whether prescriptions have been filled and whether patients have been taking their medications regularly, identifying risk factors for health or other social determinants, but also collecting individual and household level data (Wadge et al., 2016[32]). CHWs also help co-ordinate PHC services with public health efforts.

In 2020, more than 250 000 CWHs served 61% of the population (see Chapter 5), up from 60 000 in 1998. The minimum requirement to become a CHW is to get secondary education, but around two-thirds of them have a professional diploma. CHWs are most often recruited from within their own community. It is a stable and respectful profession and as a result, turnover is low.

A large body of evidence demonstrates the positive impact of CHWs on patient satisfaction and health literacy, notably for low-income and vulnerable groups (Wadge et al., 2016[32]; Grossman-Kahn et al., 2018[33]). CHWs have been key to effectively respond to the Zika virus for instance, providing health advice and incidence reporting. CHWs could thus have played a greater role to support the COVID-19 response.

So far, evidence shows that only an estimated 9% of CHWs have received infection control training and personal protective equipment during the pandemic. They have not been provided with clear guidance about their role in the COVID-19 response. The COVID-19 pandemic has revealed governance issues linked to the health sector, mainly due to a lack of leadership and oversight from the federal government. Risk communication from federal authorities has also been conflicting and confusing for the population and PHC workers, with no overall co-ordination (Lotta et al., 2020[34]).

2.4.6. Municipalities are responsible for hiring health professionals for PHC, with wide variations across the country

In the decentralised health care system, municipalities are responsible for the organisation, management and delivery of PHC services. In 2020, the federal government provided BRL 20.9 billion to the municipalities, which were then responsible for organising and delivering PHC services, by hiring FHT members as civil servants. As each municipality defines the level of salaries for health team members, there are wide wage variations across the country (Massuda et al., 2020[6]).

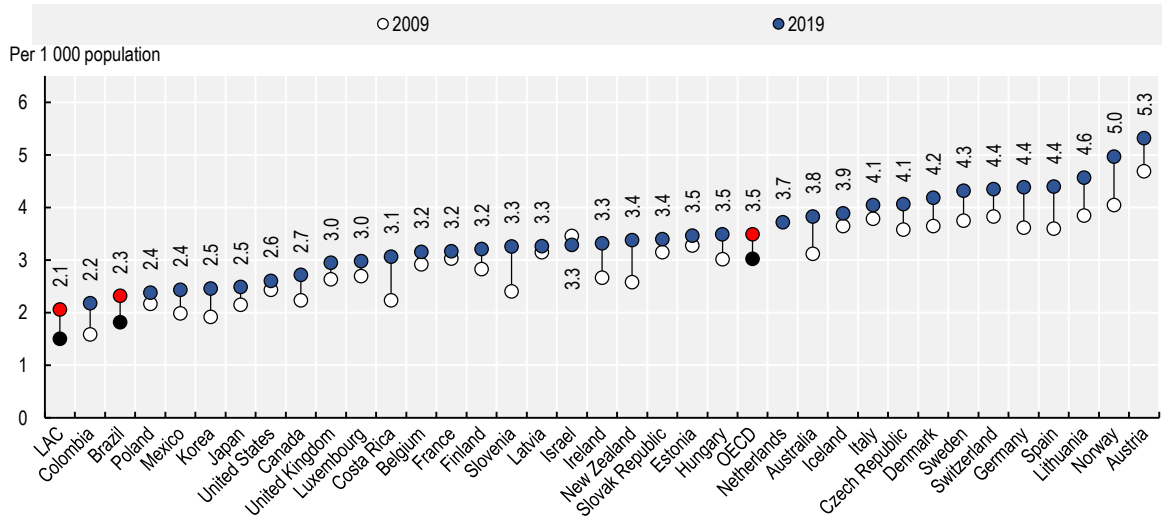
There are three types of possible contractual schemes with the municipality:

- Public officials: there are civil servants hired as statutory workers (there are salaried, with a stable position and there is a ceiling of money to pay them);
- Private workers hired by social organisations, non-profit private NGO (but anecdotal evidence suggests there are forms of corruption under such schemes),
- Private workers hired by Government owned social organisation NGO.

2.4.7. There are too few PHC physicians in Brazil

The number of trained PHC physicians is well below the OECD countries, and of other LAC countries. In Brazil, practicing doctors per 1 000 population in 2019 were very low compared to the OECD average, at 2.3 compared to 3.5 (Figure 2.10). This is among the lowest density, just above Colombia (with 2.2 doctors per 1 000 population) and the LAC average (2.1 doctor per 1 000 population). However, the number of doctors increased by 50% in Brazil over the past decade.

Figure 2.10. Doctors per 1 000 population, 2009 and 2019 (or latest year available)



Source: OECD (2021[12]), *Health Statistics Database*, http://stats.oecd.org; Brazilian Ministry of Health.

At the same time, while the specialty of family and community medicine was introduced as a clinical and licensed specialty, the number of PHC doctors has not increased accordingly. In Brazil, PHC is mostly delivered by physicians who do not have any specialty or by physicians with a specialty in internal medicine (see Chapter 5).

Table 2.3. Distribution of selected medical specialities per regions, 2018

	Physicians with no specialty training	Physicians with specialty training	Internal medicine (*Clinica Medica*)	Family and Community Medicine (*Medicina de Familia e comunidade*)
North	10118	10766	3.4%	4.6%
North East	34461	46162	18.0%	14.8%
South East	91124	153180	52.3%	43.1%
South	20948	47482	17.3%	31.6%
Central West	12828	24708	8.9%	5.8%
Total number	169479	282298	42728	5486
%	37.5% of all doctors	62.5% of all doctors	11.2% of all specialists	1.4% of all specialists

Source: Scheffer et al. (2018[35]), Demographia Médica No Brasil 2018.

In 2020, there are around 60 000 medical doctors working in PHC, alongside 50 000 nurses and 35 000 dentists currently in practice in Brazil. In 2018, only 5 486 medical doctors had a specialty training in family and community medicine, representing only 1.4% of all specialists in Brazil (see Table 2.3). Medical doctors specialised in internal medicine who have some competencies in family medicine to provide PHC, represent 11.2% of all specialists in Brazil. Lastly, there are 169 479 physicians, with no specialty training, representing around 37% of all medical doctors.

2.4.8. The uneven distribution of medical doctors is a major concern in Brazil

There is a marked disparity in the concentration of doctors in different regions and states, and between state capitals and other parts of states. Overall, there are 2.3 doctors per thousand population (Figure 2.10) but there are capitals with more than 12 doctors per thousand population – like Vitória, in Espírito Santo – and in the interior part of the Northeast region or in the Amazon with values below one doctor per thousand inhabitants. The Southeast is the region with the highest medical density per inhabitant (with 2.81 per thousand population), against 1.16 per thousand population in the North and 1.41 in the Northeast (Scheffer et al., 2018[35]).

Among states, the Federal District has the highest density with 4.35 doctors per thousand population, followed by Rio de Janeiro (with 3.55 doctors per thousand population), São Paulo (with 2.81), Rio Grande do South (with 2.56), Espírito Santo (with 2.40), and Minas Gerais (with 2.30). At the other end of the scale, are states of the North and Northeast. Maranhão presents the lowest density of medical doctors with 0.87 doctor per thousand population, followed by Pará with 0.97 doctor per thousand population (Scheffer et al., 2018[35]).

Geographical inequalities in the distribution of medical doctors hold true when looking at physicians with specialty training. Evidence indicates a clustering of PHC specialists in some regions: the best supplied regions are the South and Southeast Regions, followed by the Central-West (Scheffer et al., 2018[35]). Workforce imbalance across regions is analysed in further details in Chapter 5 of this report.

Several nationwide initiatives have attempted to address the imbalances in the distribution of health workers. Brazil introduced several programmes to improve access to medical training in underserved communities, including the 2001 Programme of the Interiorisation for Health Work (Programa de Interiorização do Trabalho em Saúde), the 2011 Programme for Valuing PHC Professionals (Programa de

Valorização dos Profissionais da Atenção) and the 2013 More Doctors Programmes (Programa Mais Médicos).

As described by Chapters 4 and 5 of this report, the More Doctor Programme (MDP) is considered as the world's largest government-led initiative that recruited domestic and foreign physicians to work in PHC settings within municipalities that typically faced difficulties in recruitment and retention. By November 2020, the programme was responsible for the presence of 16 426 doctors in 3 837 Brazilian municipalities. This programme has proven to have positive results, for instance, in terms of investment in PHC facilities, doctors availability and health outcomes (Hone et al., 2020[36]; Netto et al., 2018[37]).

On a less positive note, unfilled medical positions are still common in Brazil, even after the implementation of the MDP. In April 2019, it is estimated that 3 847 public sector medical positions in almost 3 000 municipalities remained unfilled (Scheffer et al., 2018[35]). Unfilled medical positions in the PHC sector certainly impede prevention, early diagnoses, the monitoring of children, pregnancies and the continuation of treatments for those having underlying health conditions.

2.5. Conclusion

In Brazil, the 5 570 municipalities handle the management, organisation and delivery of PHC. SUS offers preventive services and PHC free of charge for its population, based on multidisciplinary family health teams. Overall, the organisation of PHC delivery in Brazil is well aligned with modern approaches to PHC, which house multiple professionals with advanced skills working in teams. SUS prioritisation on PHC also permitted an easier contact with health services at the community level. The implementation of the Family Health Strategy, one of the largest community-based PHC programme worldwide, has contributed to increase population coverage, and led to measurable improvements in terms of infant mortality rates, maternal health, and avoidable hospitalisations. The life expectancy at birth in Brazil increased rapidly over the past decades – faster than across the OECD countries.

Despite major investments to improve access to PHC, health continue to be unequally distributed with people in North and Northeast regions suffering from poorer health outcomes. In part, these disparities are linked to workforce shortages and imbalances in the distribution of medical doctors, as well as lower PHC infrastructure and equipment in North and Northeast regions. There are also been a rise in the number of elderly patients and an increasing prevalence of chronic non-communicable diseases, which call for more effective prevention and stronger PHC to better manage the burden of chronic conditions. Brazil will need to continue to invest in a strong PHC system that is responsive to people's changing needs, capable of offering continuous, proactive and preventive care. The next four chapters set out in detail where changes are needed and how it can be achieved, notably to increase screening and prevention for the main chronic non-communicable diseases (Chapter 3), enhance the quality of PHC provision (Chapter 4), tackle workforce challenges in PHC (Chapter 5) and promote the digitalisation of PHC (Chapter 6).

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Notes

[1] The poverty rates is measured by the poverty headcount ratio at USD 5.50 a day (2011 PPP).

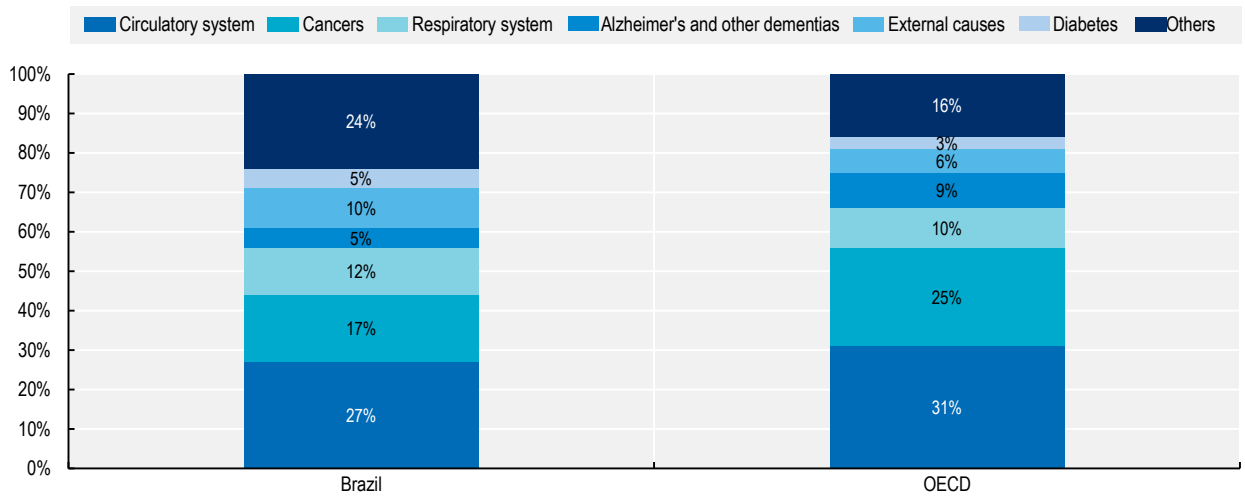
3 Screening in primary health care for the main chronic non-communicable diseases in Brazil

In Brazil, chronic non-communicable diseases such as cancer, diabetes and hypertension are of high public health importance. Brazil has already built mechanisms in the PHC sector to screen for some of the most epidemiologically relevant diseases. Some cancers, hypertension and diabetes have screening and prevention strategies, but more could be done to improve depth and scope of such strategies. Key priorities are to move towards population-based screening programmes for breast and cervical cancer, with a personalised approach and more communication strategies. In the area of diabetes and hypertension, Brazil will need to further develop disease management pathways with a people-centred perspective, integrating all health care providers across different sectors. Family health teams will need to have the right tools, capacities, and incentives to undertake these responsibilities. Last but not least, a more comprehensive information system based on registries, and allowing linking different data sources will also be important.

3.1. Introduction

In Brazil, as in other OECD countries, chronic non-communicable diseases such as cancer and cardiovascular diseases are of high public health importance. Diseases of the circulatory system was the leading cause of death in both Brazil and OECD countries in 2019 representing 27% and 31% of all deaths, respectively, followed by cancer representing 17% and 25% of all deaths. Diabetes in Brazil stands as the fifth cause of mortality with 5% of all deaths, higher than the 3% in OECD countries (Figure 3.1). This reflects the epidemiological transition from communicable to non-communicable diseases, where population ageing largely explains this mortality pattern but the prevalence of different risk factors and the performance of the health system play a relevant role as well.

Figure 3.1. Main causes of mortality in Brazil and the OECD, 2019



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

In this scenario, Brazil, based on its strong PHC system, has already built mechanisms to screen for some of the most epidemiologically relevant diseases. Some cancers, hypertension and diabetes are on this list, for which screening and prevention strategies have proven to be effective and cost-effective, becoming a very good public health intervention. However, many challenges remain, for instance, related to escalating coverage and expanding to new diseases.

This chapter begins by setting out the current cancer burden in Brazil, while exploring the strengths and weaknesses of Brazil cancer screening system. Next, it analyses the impact of hypertension and diabetes in Brazil's population health and health system, and addresses hypertension and type 2 diabetes screening in PHC as important interventions to control these medical conditions. Throughout the chapter, a series of recommendations on the policy priorities for Brazil when it comes to enhancing screening coverage and promoting early detection of these conditions are provided.

3.2. Cancer in Brazil has been recognised as a major public health challenge but much can be done in terms of prevention in PHC

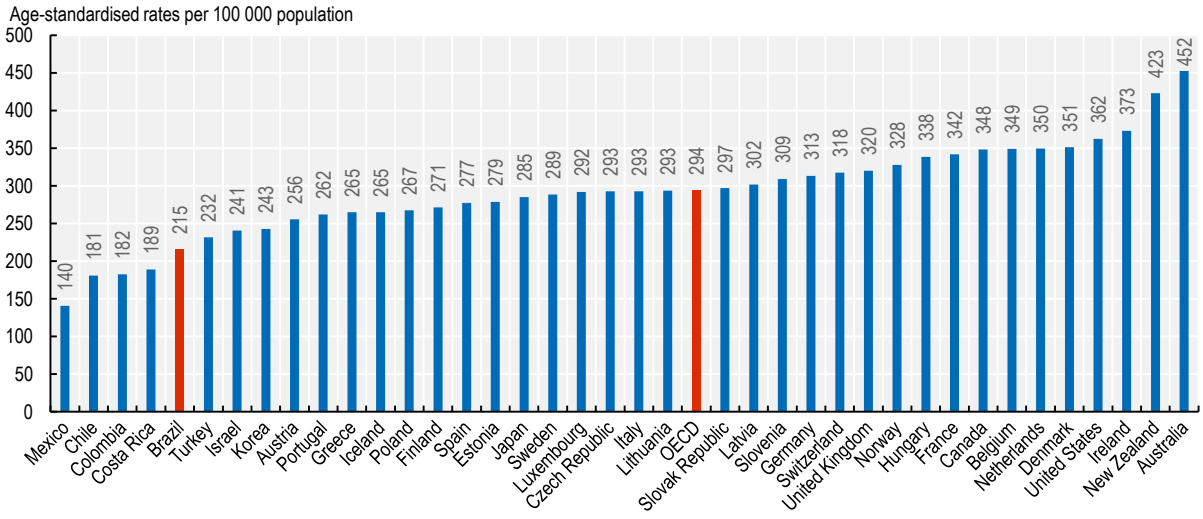
Cancer is the second highest cause of death across OECD countries, but its burden is increasing faster relative to the first cause of death, diseases of the circulatory system. The mortality rate of cardiovascular diseases has declined substantially over recent decades, while cancer mortality has also decreased but at

a slower pace (OECD, 2019[2]). This section summarises the incidence and mortality rates of cancer and their changes over time in Brazil compared to OECD countries to illustrate the relative importance of public health policies in Brazil.

3.2.1. Brazil has a lower cancer incidence than the OECD but mortality has remained stable when it has decreased in the vast majority of OECD countries

Cancer incidence rates vary across OECD countries from over 400 new cases per 100 000 people in Australia and New Zealand, to less than 200 cases in Mexico, Chile, Colombia and Costa Rica. Brazil stands at 215 new cases per 100 000 people, below the OECD average of 294 (Figure 3.2). It is important to notice that cross-country variations in incidence rates reflect differences not only in new cancers occurring each year but also disparities in national cancer screening policies, quality of cancer surveillance and reporting.

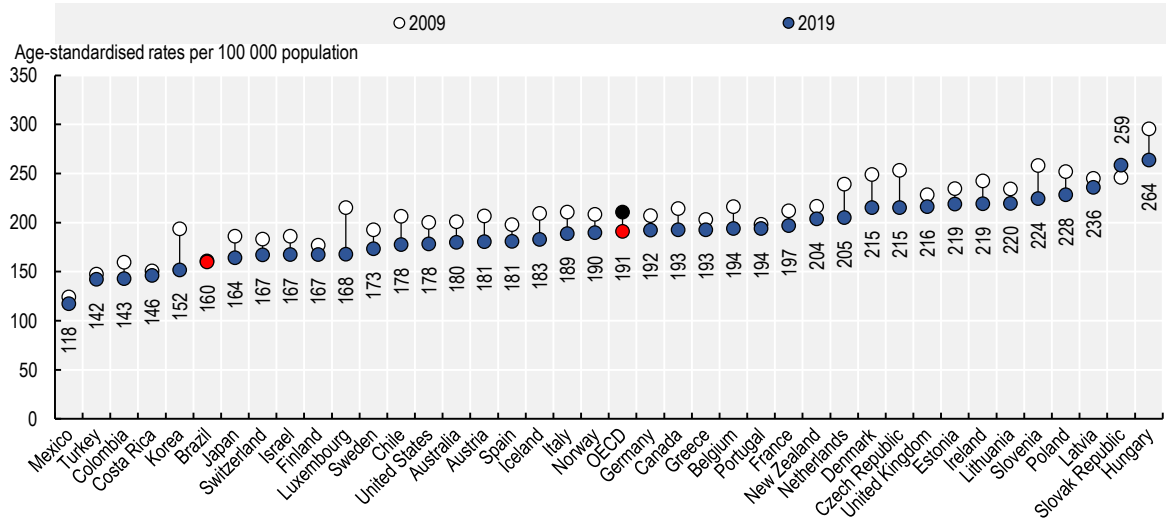
Figure 3.2. All cancer incidence in Brazil and OECD countries, 2020 (estimated)



Source: GLOBOCAN, (2020[3]), International Agency for Research on Cancer (IARC), https://gco.iarc.fr/.

Despite having a relatively low rate of cancer incidence, cancer mortality in Brazil has not been reduced in recent years. Between 2009 and 2019, Brazil´s cancer mortality passed from 161 to 162 deaths per 100 000 people, while the OECD average was reduced from 211 to 196. This decline was observed in most OECD countries, except in Chile and Turkey (Figure 3.3). The decrease of cancer mortality relates to early diagnosis, which puts a strong argument in favour of building effective screening schemes.

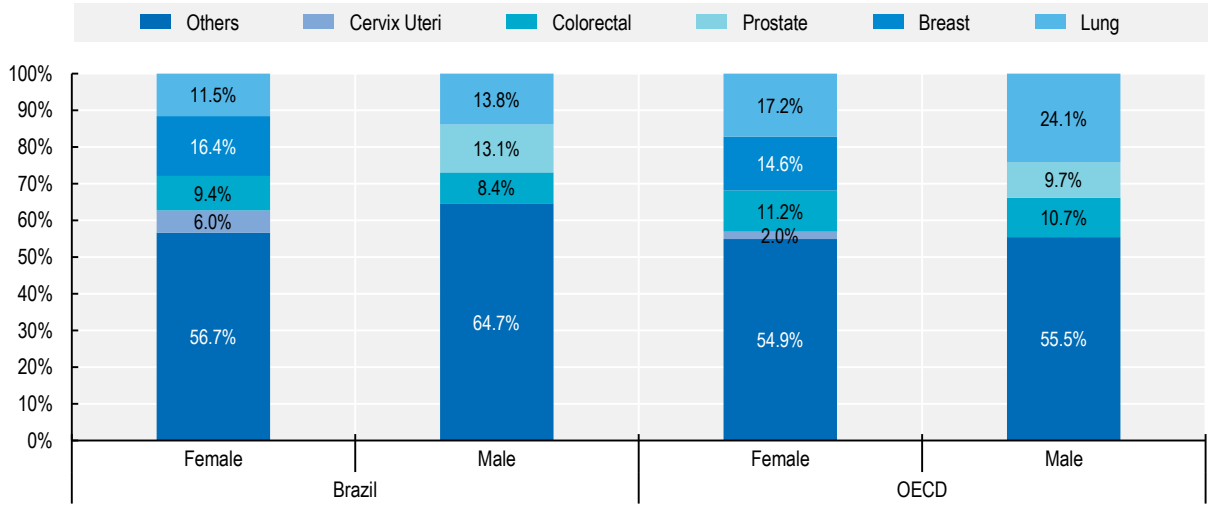
Figure 3.3. Cancer mortality in Brazil and OECD, 2009 and 2019 (or latest available year)



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

In Brazil, among women, breast cancer takes the largest toll among Brazilian women with 20.6 deaths per 100 000 females, representing 16.4% of all women's cancer deaths in 2019. It is followed by trachea, bronchus and lung cancer with 15.7 deaths per 100 000 females (11.5%); colorectal and anus cancer with 13.1 deaths per 100 000 females (9.4%); and cervical cancer with 7.4 deaths per 100 000 females (6%). In OECD countries, trachea, bronchus and lung cancer are in first place among women and the most relevant difference with Brazil can be found in cervical cancer that only accounts for 2% of all women's cancer deaths. Among men, trachea, bronchus and lung cancer explains the largest number of deaths in both Brazil and the OECD, but the proportion is higher in the latter with 24.1% versus 13.8% in Brazil. Prostate and colorectal and anus cancer are the second and third causes of cancer deaths among Brazil's men, while in the OECD colorectal and anus cancer takes the second place (Figure 3.4).

Figure 3.4. Main causes of cancer mortality by sex in Brazil and OECD countries 2019 (or nearest year)



Note: Colorectal includes colon, rectum and anus cancer. Lung includes trachea, bronchus and lung cancer.
Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

As in OECD countries, age-standardised mortality rates in Brazil due to all cancers are higher among men than among women: 202.8 men's deaths per 100 000 males versus 135.8 women's deaths per 100 000 females. The gender difference in cancer mortality can be explained at least partly by higher prevalence of some risk factors among men.

3.2.2. Breast and cervical cancer have long-standing opportunistic screening programmes delivered mainly through PHC

The control of breast and cervical cancer in Brazil has decades of development, with National Cancer Institute (*Instituto Nacional de Câncer*, INCA) and the Ministry of Health as the main actors in terms of national planning, while PHC in municipalities have had the provision of care role. Importantly, cancer screening in Brazil is opportunistic, meaning that it does not happen within a population-based programme designed and managed at the central level to reach most of the population at risk, but as a result of a recommendation made by a health care provider during a routine medical consultation or by self-referral of individuals. A summary of the main historical developments of breast and cervical cancer screening is presented in Box 3.1.

Box 3.1. Almost 40 years of breast and cervical cancer screening in Brazil

The first actions towards breast and cervical cancer control can be traced back to 1984, when the Program of Integral Assistance to Women's Health (*Programa de Assistência Integral à Saúde da Mulher*), which proposed care beyond the traditional attention to the gravidic-puerperal cycle, included actions for the prevention of these two cancers. In 1986, an Oncology Programme was created and in 1991 was finally hosted in the INCA. In the 1990s and early 2000s, different pilot projects and programmes, mainly for cervical cancer were developed.

In 2005, the Ministry of Health launched the first National Oncology Care Policy (*Política Nacional de Atenção Oncológica*), with emphasis on cervical and breast cancer. The control of these cancers is now a priority on the country's health agenda and it is part of the Strategic Action Plan for Coping with Chronic Non-Communicable Diseases in Brazil, 2011-22 (*Plano de Ações Estratégicas para o Enfrentamento das Doenças Crônicas Não Transmissíveis no Brasil, 2011-22*).

In May 2013 occurred the latest update of the national cancer care policy, instituting the National Policy for the Prevention and Control of Cancer in the Health Care Network of People with Chronic Diseases in SUS (*Política Nacional para a Prevenção e Controle do Câncer, PNPCC, na Rede de Atenção à Saúde das Pessoas com Doenças Crônicas no âmbito do SUS*). That same year, the Cancer Information System (SISCAN) was created, a web platform version that integrates the Cervical Cancer Information Systems (SISCOLO) and Breast Cancer (SISMAMA).

More recently, in 2015 the guidelines for early detection of breast cancer, and in 2016 the national guidelines for cervical cancer screening and a manual for quality management of cytopathology laboratories were published.

Source: INCA (2020[4]).

In Brazil's PHC, cervical cancer screening is performed through a cytopathological examination (Pap smear), which is offered to women aged 25 to 64 years and who have already had sexual activity. The recommended routine for screening in Brazil is to repeat the Pap smear every three years, after two consecutive normal examinations performed at an interval of one year. The repetition in one year after the first test aims to reduce the possibility of a false negative result in the first round of screening. The three-year periodicity is based on the WHO recommendation and the guidelines of most countries with an

organised screening programme (INCA, 2016[5]). Table 3.1 summarises the characteristics of cervical cancer programmes in OECD countries.

Table 3.1. Target age and periodicity of cervical cancer screening in OECD countries, 2019

Every year	Every two years	Every three years	Every five years	Other
Czech Republic (15 and over), Greece (20 and over), Luxembourg (15 and over), Mexico (25-64), the Slovak Republic (23-64)	Australia (20-69), Japan (20 and over), Korea (30 and over), Latvia (25-70), Costa Rica (20-64)	Belgium (25-64), Chile (25-64), Denmark (23-50), France (25-65), Hungary (25-65), Iceland (23-65), Ireland (25-44), Israel (25-64), Italy (25-64), Lithuania (25-60), New Zealand (20-69), Slovenia: (20-64), Spain (30-39), Sweden (23-50), Switzerland (no age limit)	Denmark (51-64), Estonia (30-55), Finland (30-60), the Netherlands (30-60), Ireland (45-60), Norway (25-69), Spain (40-69), Turkey (30-65), England (25-64)	Canada: no periodicity (20-69). Germany: no periodicity (20 and over). USA: Every one, two or three years depending on the insurance coverage (21 and over).

Note: Target women's age in brackets.
Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

As for breast cancer, the Brazilian Ministry of Health recommends a biennial mammogram for women aged 50 to 69 years as screening strategy in PHC. In addition, the Ministry of Health recommends against teaching self-examination as a method of screening, and also against screening using ultrasound, thermography, tomosynthesis and magnetic resonance imaging. To assure an early diagnosis of breast cancer, the Ministry of Health endorses that SUS actors develop awareness strategies, suggests urgent referral to diagnostic breast cancer services of patients with specific red-flag signs, and that all the services are to be provided in the same centre (Ministério da Saúde and INCA, 2017[6]). Table 3.2 summarises the target age and characteristics of breast cancer screening programmes in OECD countries.

Table 3.2. Target age in breast cancer screening programmes, 2018/19

Nationwide population-based		Population-based but not nationwide		Non-population-based
Wider age range (20 years+)	Narrower age range	Wider age range (20 years+)	Narrower age range	Wider age range (20 years+)
Australia (50-69), Belgium (50-69), Denmark (50-69), Finland (50-69), France (50-74), Germany (50-69), Hungary (45-65), Iceland (40-69), Israel (51-74), Korea (40+), Latvia (50-69), Lithuania (50-69), Luxembourg (50-69), the Netherlands (50-75), New Zealand (45-69), Norway (50-69), Poland (50-69), Portugal (45-69), Slovenia (50 69),Spain (50-69), Sweden (50-69)	England (53-69), Estonia (50-65), Ireland (50-64 but 50-69 by 2021), Northern Ireland (53-70), Wales (53-70)	Canada (50-69), Czech Republic (45+), Italy (50-69), Japan (40+), Mexico (50-69), Switzerland (50-70), Turkey (40-69)	Chile (50-64)	Greece (40+), the Slovak Republic (40-69) and United States (40 or 50+)

Note: Target women's age in brackets.
Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

The financing of these screening programmes is made through the Ministry of Health, which allocates resources to federated entities (states and municipalities), with these chiefly municipalities responsible for managing and providing the services. In 2020, a new financing model for PHC (the *Previne Brasil* Programme) was instituted combining financial resources from weighted capitation, pay-for-performance and resources for actions in specific contexts (see Chapter 4 of the report). Within the pay-for-performance component (15% of total funding), one of the seven initial target indicators rewards the teams that perform cervical cancer screening.

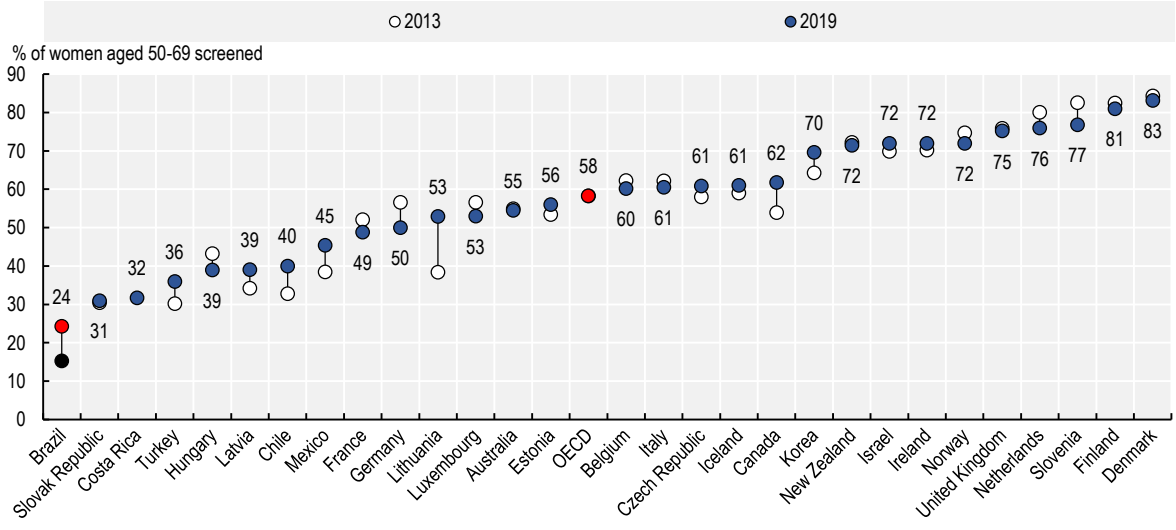
Regarding cancer information system, the PAINEL-Oncology is an instrument developed to monitor Law Nº12.732, of 22 November 2012, which establishes a 60 days maximum waiting time for the start of

treatment for patients with proven malignant neoplasia. The information on PAINEL-oncology refers to the time to start the first oncological treatment calculated from the information of the dates of diagnosis and treatment recorded. It also presents the cases diagnosed through pathological examinations. Cervical and breast cancer diagnosis information has been available since 2013 since the implementation of the Cancer Information System (Sistema de Informação do Câncer, SISCAN). For the other cancers, diagnostic information arising from biopsy or anatomo-pathologic (except for cervical and breast) is available from May 2018, but from other sources it was possible to calculate the time of onset of the first treatment from 2013 as well. The data presented in the PAINEL-oncology refers exclusively to users who have a national health master card (DATASUS, 2021[7]). In addition, a network of 17 Population-Based Cancer Registries, 16 located in capital cities and one of them in a non-capital city, provides crucial information about incidence, trends and survival (INCA, 2013[8]).

3.2.3. Breast and cervical cancer screening needs to drastically increase coverage among target populations

Screening for breast cancer in Brazil has improved in recent years. Between 2014 and 2019, it increased from 15.2% to 24.2% among the target group of women between 50 to 69 years of age. However, breast cancer screening coverage in Brazil is very low when compared to OECD countries, standing below all OECD countries and well below the 58% of average coverage (Figure 3.5).

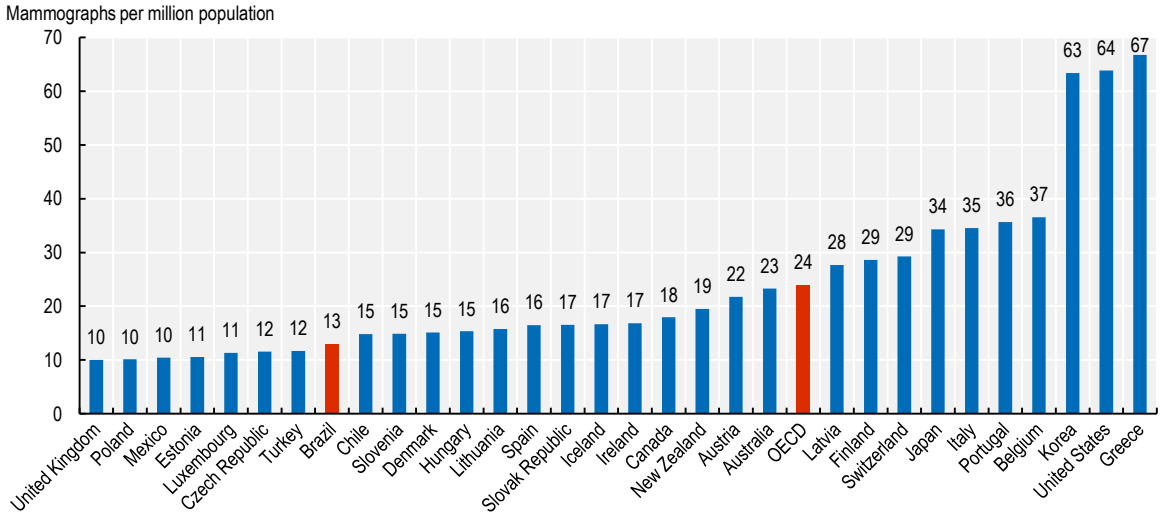
Figure 3.5. Breast cancer screening coverage in Brazil and OECD countries, 2013 and 2019



Note: Programme data is used for all countries. Brazil represent years 2014 and 2019.
Source: Ministry of Health for Brazil; OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

One of the key enablers for conducting breast cancer screening is the availability of mammography machines. In 2020, Brazil had 13 mammography machines per million people, almost half than that of the OECD average of 24 and close to the lowest availability of 10 in Mexico, Poland and the United Kingdom (Figure 3.6). This finding shows that Brazil has space to put more investment into medical technologies aiming to improve equitable access for the population. At the same time, such expansion in access can be accompanied by the development of regulatory frameworks in the areas of registration, assessment and purchasing rules. The existence of updated clinical guidelines for breast cancer screening in Brazil is a step ahead in the necessary task of promoting rational use of diagnostic technologies aiming to reduce the use of unnecessary diagnostic tests and subsequent procedures and treatments.

Figure 3.6. Availability of mammography machines in Brazil and OECD countries, 2019 (or latest year available)



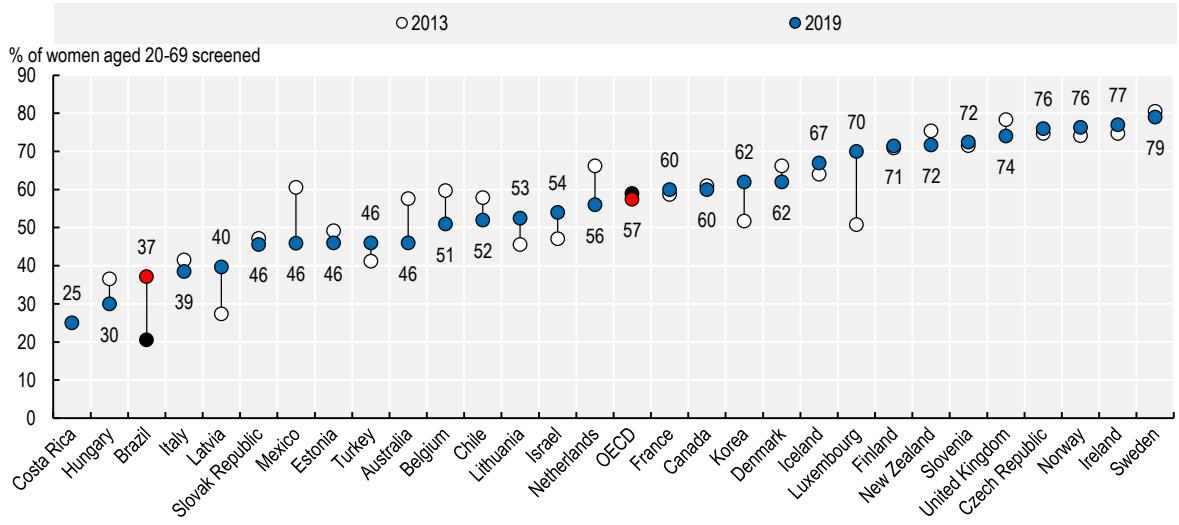
Note: Brazil represents year 2020.
Source: Colégio Brasileiro de Radiologia e Diagnóstico por Imagem; OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

A systematic review including 30 studies identified the main health system factors that led to a late diagnosis of breast cancer in Brazil (Da Costa Vieira, Formenton and Bertolini, 2017[9]). Results highlighted problems related to the distribution of mammography machines, with a higher proportion of unused mammography machines in the North and Northeast of Brazil, and that most mammography occurred in the private sector. Another study analysing the National Health Survey 2013 found that 59.4% of women users of SUS and 83.9% of women with private health insurance declared having a medical request for a mammography. Having private health insurance, higher education level, and being white were positively associated with having this medical request (Silva et al., 2017[10]). These findings highlight some of the problems with the health system organisation and with social inequities found in Brazil.

Cervical cancer screening in Brazil has substantially improved from 20.5% in 2014 to 37% in 2019. Yet, it also remains well below the OECD average coverage of 57% and below all OECD countries, except Costa Rica and Hungary (Figure 3.7).

A study that performed a trend analysis of the cervical cancer screening program's quality indicators in all Brazilian regions and states from 2006 to 2013, found that the estimated target population who underwent Pap testing was lower than that recommended by international guidelines in the North, Northeast and Central-West regions. The trends for this indicator remained stationary over the years in all regions of Brazil. Authors concluded that "the cervical cancer screening programme is still far from efficient" (Costa et al., 2018[11]). Another study using data for 2008 found that rural areas were more likely to have never received a Pap smear screening, while North and Northeast regions showed the highest prevalence of never-screened women. Poorer, less educated, non-white skin colour and younger women were less screened as well, showing the patterns of social inequities (Martínez-Mesa et al., 2013[12]).

Figure 3.7. Cervical cancer screening in Brazil and OECD, 2013 and 2019



Note: Programme data is used. Brazil represent years 2014 and 2019.
Source: Ministry of Health for Brazil; OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

3.2.4. Brazilian society is quite active and key stakeholders are regularly involved in decision making around cancer control issues

Brazil has good examples of stakeholder involvement for cancer policies. Voices of local and regional stakeholders such as municipal and state administrations and health care providers are represented in institutional spaces such as the National Health Council, CONASS and CONASEMS. In addition, representatives of the civil society and users of SUS apply the so-called democratic social control by participating in the National Health Conference, the Councils of Rights and the Councils of Health. The last two have expression at the federal, state and municipal levels (Ministério da Saúde, 2013[13]). Among the topics included, cancer regularly takes part of the agenda.

INCA develops several initiatives to engage civil society. The institution has a Consultative Council (Conselho Consultivo, CONSINCA) with representatives from technical-scientific entities related to cancer prevention and control; SUS service providers; SUS management councils; and SUS users. In recent years, INCA has organised conferences in different parts of the country with women's movements aiming to introduce the issue of cancer control into their working plans. Moreover, INCA has convened meetings with journalists with the objective of discussing the best ways to communicate information related to cancer control, including special meetings with radio managers of the North of Brazil, since in this region radios have a large audience in the population.

"All Together Against Cancer" (*Todos Juntos Contra o Câncer*) (TJCC, 2021[14]) is a civil society movement that brings together representatives of different sectors, such as health managers, medical entities, hospitals, professional associations, researchers, media professionals, patient organisations, and others, committed to guaranteeing the patient's right to universal and equal access to health care. The movement develops several initiatives to assure the implementation of the National Policy for Cancer Prevention and Control, including the areas related to prevention and screening.

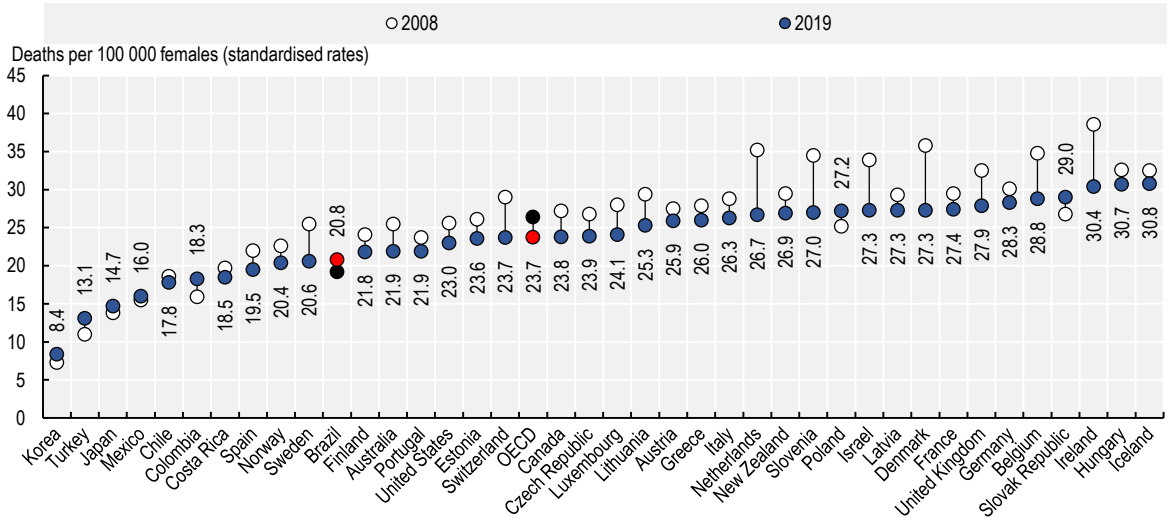
From the private sector, the "System S" carries out actions aimed at supporting promotion, prevention and treatment of cancer. The "System S" refers to nine institutions that are independently managed by business federations and confederations of the main sectors of the economy. Although they provide services of

public interest (e.g. education, social services, transport, etc.), these entities are not linked to any sphere of government, providing them a different space of action.

3.2.5. Despite prevention initiatives, breast and cervical cancer outcomes remain relatively poor with mortality increasing and survival decreasing in recent years

Between 2008 and 2019, breast cancer mortality increased from 19.2 to 20.8 deaths per 100 000 women in Brazil (+8.3%), which is the opposite of what happened as an average amongst OECD countries: a decrease from 26.4 to 23.7 (-10%). Only eight out of the 37 OECD countries experienced a growth in breast cancer mortality, with Turkey, Colombia and Korea having an increase of 15% or more in the period (see Figure 3.8). Despite Brazil's breast cancer mortality is lower than the OECD average, the increasing trend is worrisome.

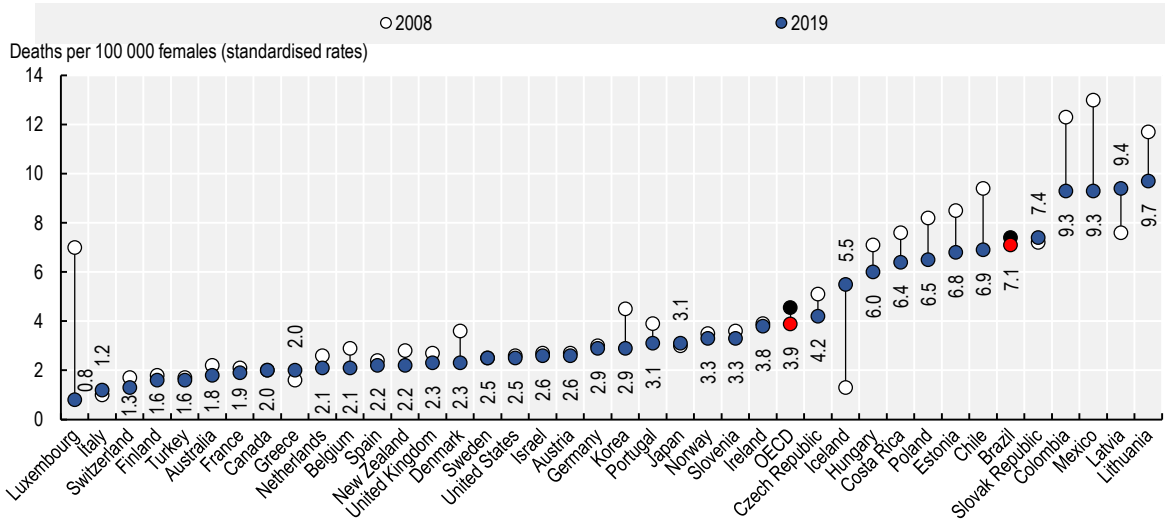
Figure 3.8. Breast cancer mortality in Brazil and OECD countries, 2008 and 2019



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

The picture for cervical cancer mortality in Brazil seems more problematic. Between 2008 and 2019, mortality remained stable around 7.1 and 7.4 deaths per 100 000 women, compared to a decrease in OECD countries from 4.6 to 3.9 (-14.7%). Only seven out of 37 OECD countries experienced an increase, with Iceland, Greece, Italy and Latvia increasing by 15% or more (see Figure 3.9). In this case, Brazil's cervical cancer mortality is substantially higher than the OECD average.

Figure 3.9. Cervical cancer mortality in Brazil and OECD countries, 2008 and 2019



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

These worrying trends are also observed in terms of 5-year net cancer survival. In all the selected cancer sites, Brazil has lower survival rates compared to OECD averages. Comparing the 2005-09 and 2010-14 periods, breast cancer survival dropped by more than two years in Brazil, while in the OECD it increased by one year. Colon cancer survival also decreased by more than two years, when in the OECD it increased by almost two years. Cervical cancer survival decreased by 11.3% and lung cancer survival declined by 11% in Brazil between 2000-04 and 2010-14, while in the OECD they both increased by 1.5% and 24.8%, respectively (Table 3.3).

Table 3.3. Trends in survival for breast, cervical, colon and lung cancer in Brazil and the OECD

Five-year net survival, population aged 15 and over

	2000-04	2005-09	2010-14
Brazil Breast	73.4	77.1	74.9
OECD Breast	81.0	83.3	84.3
Brazil Cervical	67.5	62.6	59.9
OECD Cervical	64.5	65.3	65.5
Brazil Colon	44.5	50.6	48.3
OECD Colon	56.1	59.4	61.2
Brazil Lung	9.1	8.5	8.1
OECD Lung	13.7	15.3	17.1

Note: Data for breast cancer considers only female population.
Source: CONCORD programme, London School of Hygiene and Tropical Medicine.

3.2.6. HPV vaccination has been very positive but it can be enhanced

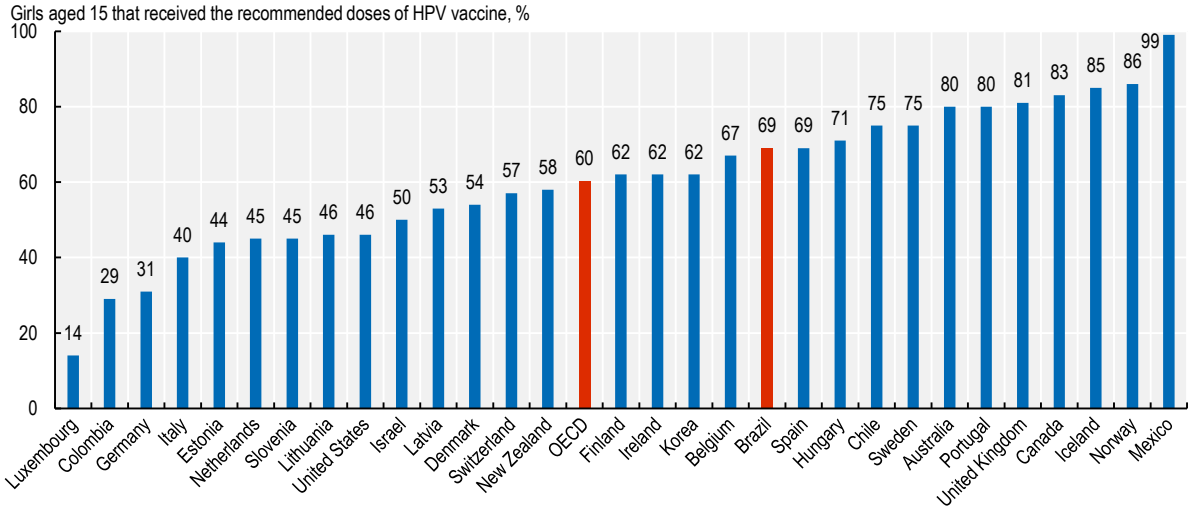
In 2014, the Ministry of Health, through the National Immunization Program, started the vaccination campaign for girls between 9 and 13 years against the Human Papilloma Virus (HPV). In 2017, girls aged 14 and boys between 11 and 14 years old were included as well. The vaccine is quadrivalent, which offers protection against HPV subtypes 6, 11, 16 and 18, preventing diseases such as precancerous lesions, cancer of the cervix, vulva and vagina, anus and genital warts. The vaccine is offered by SUS in

Basic Health Units and in vaccination campaigns in schools. The Practical Guide on HPV – Questions and Answers was launched by the National Immunisation Programme, in collaboration with INCA, seeking to clarify the main doubts on the subject (INCA, 2020[15]).

In 2018, coverage of HPV vaccine in Brazil was 69%, above the OECD average of 60% (see Figure 3.10). However, it is below the target coverage of 80% that was defined by Brazilian authorities (INCA, 2020[15]).

Figure 3.10. Human papilloma virus vaccine coverage in Brazil and OECD countries, 2018

Girls aged 15 that received the recommended doses of HPV vaccine, percentage



Source: Global Health Observatory: Explore a world of health data. (WHO, 2021[16]), https://www.who.int/data/gho.

Although not yet available to be applied, ANVISA has already approved a new vaccine against HPV, which protects against nine types of virus. It is offered for girls from 9 to 14 years old and boys from 11 to 14 years old, for people with HIV – AIDS in the age group of 9 to 26 years old. The vaccination schedule is three doses (interval of 0, 2 and 6 months). Other age groups may have vaccines available at private services, if indicated by their doctors.

3.2.7. A national strategy for cancer prevention and screening in PHC would synergise efforts to improve cancer outcomes in Brazil

Brazil can develop a single national strategy addressing cancer prevention and screening in PHC. Scientific evidence and social participation can be two key guiding principles in order to move towards population-based screening programmes. This strategy can consider the renewal of existing screening programmes for cervical and breast cancer; the expansion to new cancer sites such as colon and lung; the introduction of systematic personalised screening invitation letters and reminders; the redesign of cancer information systems; and the use of information and communication technologies to improve public awareness and health literacy.

Brazil can move towards a population-based cervical cancer screening programme, while introducing HPV-DNA primary testing in PHC settings

In the area of cervical cancer screening, especially after the introduction of the HPV vaccine, Brazil could consider instituting primary testing for the DNA of oncogenic HPV types as novel method for screening.

This would ideally require moving towards a population-based screening programme, further analysing the current epidemiology in the country and conducting a complete health technology assessment to understand the different factors that will determine the efficacy and cost-effectiveness of implementing such an organised programme. It would be important to use reliable, validated HPV tests in qualified laboratories, accredited by authorised accreditation bodies (e.g. ANVISA) and in compliance with international standards. Training for health workers would be another crucial component, along with communication strategies for women in target population.

A recent systematic review focusing in low- and middle-income countries found that cytology-based screening was the least effective and most costly screening method, while self-collected HPV testing was cost-effective when it yielded population coverage gains over other screening methods. The cost of the HPV test and loss to follow-up were also important factors (Mezei et al., 2017[17]). The European guidelines recommend the use of HPV primary testing within an organised, population-based programme for cervical cancer screening, avoiding co-testing (HPV and cytology primary testing) at any given age (von Karsa et al., 2015[18]). The American Cancer Society 2020 guidelines also recommends HPV primary testing as the preferred screening method (Fontham et al., 2020[19]).

Such a national strategy should include quality assurance in monitoring cervical cancer screening performance. The European guidelines define such a performance through achieving: (1) an invitation coverage of at least 95% of the target women; (2) an examination coverage of at least 70% (85% is desirable); and (3) a participation rate of at least 70% (85% is desirable) (von Karsa et al., 2015[18]). Box 3.2 summarises the experience of Finland and Italy with implementing HPV testing.

Box 3.2. HPV primary screening test programme in Finland and Italy

In Finland, women of 30-60 years of age are invited to take part in cervical cancer screening every five years. Some municipalities also invite women aged 25 and/or 65 for screening. About 70% of those invited participate in the screening for cervical cancer. The conventional cervical screening test used in Finland has been the Pap test, while the HPV test is applicable to cervical cancer screening for women over the age of 35. Samples for HPV and Pap are taken from participants in the HPV screening. Following a positive HPV test, the Pap sample is also analysed, after which any further management required is decided. The screening HPV test must meet the requirements of the IARC and WHO. Before being implemented, the validity of new HPV tests must always be verified by comparing them with the most studied HC2 or PCR GP5+/6+ tests. A referral to colposcopy is given to about 1% of the participants. Additionally, about 5% are invited for a follow-up test before the next screening invitation. An annual review provides a comprehensive overview of the Finnish cervical cancer screening programme, presenting information about attendance, outcomes, time series and costs of screening. The history of cervical cancer screening in Finland and its impact on cancer burden is also discussed.

In 2013, based on a health technology assessment report, the Italian Ministry of Health included HPV test every five years as an option for screening programmes for women of over 30 years of age. Stand-alone HPV was defined as primary test, with cytology only to be used as triage test in HPV+ women. Women with negative findings in the cytology analysis are invited for repeat HPV testing after 12 months and referred to colposcopy if still positive. The National Prevention Plan 2014-18 put as an objective the full implementation of HPV-based screening by 2018.

Source: Finnish Cancer Registry (2020[20]), Cervical cancer screening – Syöpärekisteri, https://cancerregistry.fi/screening/cervical-cancer-screening; Ronco (2020[21]), Core elements of the new HPV-based cervical cancer screening programme in Italy, https://www.hpvworld.com/articles/core-elements-of-the-new-hpv-based-cervical-cancer-screening-programme-in-italy.

Self-sampling with HPV testing has been explored as a novel strategy to increase screening coverage and could be considered in Brazil, for instance, within pilot studies. A systematic review including 34 studies, mostly from high-income countries, found greater screening uptake among HPV self-sampling participants compared with standard of care (e.g. Pap smear, visual inspection with acetic acid, clinician-collected HPV testing) (RR: 2.13, 95% CI 1.89 to 2.40). Uptake was higher when HPV self-sampling kits were sent directly to women's homes (RR: 2.27, 95% CI 1.89 to 2.71) or offered door-to-door by a health worker (RR: 2.37, 95% CI 1.12 to 5.03). However, meta-analysis showed no statistically significant difference in linkage to clinical assessment/treatment between arms (RR: 1.12, 95% CI 0.80 to 1.57) (Yeh et al., 2019[22]). The European guidelines state that the clinical accuracy of HPV primary testing on self-collected samples is sufficient to conduct pilot programmes (von Karsa et al., 2015[18]), while the American Cancer Society did not include a recommendation about it because the Food and Drug Administration has not yet approved self-sampling (Fontham et al., 2020[19]).

Brazil already has practical experiences with using HPV-DNA testing for screening. For instance, a study evaluated HPV-DNA screening in São Paulo, including 16 102 women, finding that high-risk HPV-DNA prevalence was 14.9%, whereas cytology abnormalities were found in 7.2% of the women. HPV DNA detected a significant number of patients with premalignant lesions missed by cytology and all 16 cervical intraepithelial neoplasia positive cases were HPV-DNA+. Authors concluded that HPV genotyping may reduce the burden of colposcopic referral and that HPV-DNA testing was shown to be feasible and advantageous over current cytologic screening in the public health system (Levi et al., 2019[23]). Another study conducted in three Brazilian cities found that the most relevant barriers for a more comprehensive screening programme relates to excessive travel required to access clinics, inconvenient service hours, and lack of public education. In addition, cytology had many unsatisfactory results and low positivity, follow-up was incomplete at all steps and laboratories provided delayed cytology and biopsy results (3+ months). Finally, screening clinics did not arrange or track colposcopy referrals; colposcopy clinics received no information from referring clinics, and electronic medical records have not yet replaced paper recordkeeping, leading to errors and loss of medical records (Ribeiro et al., 2018[24]). The identification of these and other barriers would be very important for policy design and an eventual implementation phase.

Breast cancer screening can evolve to a population-based organised programme and more tools can be provided in PHC

As in the vast majority of OECD countries (see Table 3.2), Brazil can develop a population-based breast cancer screening programme. In practice, this would require an effective call-recall structure, device a screening registry and safeguard robust quality assurance at all levels. The current process for population's registration in Brazil's PHC goes in the direction of individually identifying the eligible target population in each area served (e.g. municipalities), so it represents an opportunity for developing organised screening programmes.

The European guidelines on breast cancer screening and diagnosis describes seven characteristics of an organised screening programme (ECIBC, 2020[25]): 1. a policy specifying target population; 2. screening method and interval; 3. an active invitation of the entire target population; 4. a team responsible for overseeing screening centres; 5. a decision structure and responsibility for health care management; 6. a quality assurance system utilising relevant data; and 7. monitoring of cancer occurrence in the target population.

Building capacity in PHC teams would be crucial. As stated by WHO guidelines (WHO, 2017[26]), early diagnosis capacities requires guidelines or protocols and sensitise providers to cancer signs and symptoms to improve diagnostic accuracy; give sufficient time to evaluate patients and train practitioners in how to diagnose cancer including use of medical devices; promote a clear communication between the provider and the patient; and develop reliable referral mechanisms. In addition, mammography machines

distribution across the country should be also revised to achieve a balanced supply according to the population's need.

Brazil could build up from local experiences that have made progress towards an organised screening programme. For instance, a breast cancer organised screening programme in the community of the Andaraí in Rio de Janeiro targeting asymptomatic women aged between 50-69 years from SUS presented a mammographic coverage rate of 70%, suggesting that a population-based screening is feasible (Gioia et al., 2018[27]).

Systematic personalised invitations and reminders from PHC teams could improve cancer screening coverage

As part of population-based organised screening programmes, Brazil could adopt a more systematic and personalised approach in inviting target populations, as has been implemented in many OECD countries. An increasing number of OECD countries send a personal invitation letter for cancer screening to each individual in the target group, issued through a registry in a systematic manner. In Brazil, however, there is no national initiative regarding such invitations, which in practice are only implemented in some local levels depending on the initiative of particular municipalities or PHC teams.

In the majority of OECD countries, the invitation letter includes information on the benefits and potential harms of cancer screening such as false-positive screening results, over-diagnosis and over-treatment, and asks for either signed or verbal informed consent for screening (IARC, 2017[28]). This practice is in accordance with international recommendations as the WHO recommends organised population-based mammography screening programmes to provide information on both benefits and risks of mammography screening so that target women are able to make an informed decision before undergoing mammography (WHO, 2014[29]). In many OECD countries, additional efforts are also made to invite people with positive screening results in the past for follow-up assessment, and in some countries such as Denmark, Finland, Germany, Ireland, Italy, the Netherlands, Spain, Sweden and the United Kingdom, appointment date is fixed for mammography in the letter to further facilitate access to cancer screening (IARC, 2017[28]; ECIBC, 2020[30]).

A systematic review identified the most effective interventions to increase participation in organised screening programmes. Interventions such as postal reminders, telephone reminders, PHC physician's signature on invitation letter, and giving scheduled appointment instead of open appointment were all effective to increase uptake of breast, cervical and colon cancer screening. Mailing a kit for self-sampling cervical specimens increased participation in non-responders as well (Camilloni et al., 2013[31]). Another systematic review found that text messaging (short message service, SMS) appear to moderately increase screening rates for breast and cervical cancer and may have a small effect on colorectal cancer screening (Uy et al., 2017[32]). Future studies would also need to examine the cost associated with each of the invitation options and its impact in order to identify the most appropriate cost-effective strategies that may be different across regions in Brazil.

Screening in Brazil's PHC could explore expanding to sites such as colon and lung cancer

As colorectal and lung cancer are among the most important cancers in the country (see Figure 3.4), Brazil could explore the possibility of creating national screening programmes for these cancer sites.

For colorectal cancer, which represents the third major cause of cancer mortality in Brazil for men and women, opportunistic screening is available. The recommendation in SUS is to prioritise early diagnosis actions and personalised approach for high-risk groups. Recognising Brazil's different epidemiological and health care network realities, further studies are still needed to support the analysis of the feasibility of introducing screening in these different contexts (INCA, 2019[33]).

As reference, an increasing number of OECD countries have introduced population-based colorectal cancer screening programme for free to target population in recent years, and in many of these countries target population is the population of 50s and 60s years of age often with an upper age limit ranging between 64 and 74 (OECD, 2013[34]). The European guidelines recommend "only organised screening programmes should be implemented, as opposed to case-finding or opportunistic screening as only organised programmes can be properly quality assured". It also states that several issues should be considered: the legal framework, the availability and accuracy of epidemiological and demographic data, the availability of quality-assured services for diagnosis and treatment, promotional efforts, a working relationship with the local cancer registry, and follow-up for causes of death at individual level (Malila, Senore and Armaroli, 2012[35]). The United States recommends that adults age 50 to 75 be screened for colorectal cancer, either with stool tests, flexible sigmoidoscopy, colonoscopy, and CT colonography (virtual colonoscopy) (USPSTF, 2021[36]), varying depending on the patient's history and health system availability (Bibbins-Domingo et al., 2016[37]).

In relation to lung cancer, which represent the second cause of cancer deaths in Brazil (see Figure 3.4), general population screening is not currently recommended in the country and any examination should be discussed between the patient and the doctor (INCA, 2020[38]). Lung cancer screening is not common in OECD countries, but it exists in Canada, Japan and the United States. The Canadian Task Force on Preventive Health Care recommends screening for lung cancer with three consecutive annual low-dose computed tomography (LDCT) scans in high-risk individuals adults aged 55-74 years who currently smoke or quit less than 15 years ago, with a smoking history of at least 30 pack-years (CTFPHC, 2016[39]). In Japan, annual chest X-ray is recommended for people aged 40 and over, and sputum cytology is also recommended for smokers aged 50 and over who have smoked more than 600 cigarettes over their lifetime (OECD, 2019[40]). In the United States, the USPSTF released an updated recommendation in March 2021. Lung cancer screening is recommended as an annual screening with LDCT in adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery (USPSTF, 2021[36]).

Brazil could develop a thorough evidence-based analysis, including cost-effectiveness studies, to identify the potential harms and benefits of implementing colorectal and/or lung cancer screening in the country, along with appropriate definitions in areas such as eligibility criteria, screening intervals, existing local initiatives, monitoring schemes and quality improvement, infrastructure and equipment, and payment mechanism.

A redesign of cancer information systems can help manage screening programmes more effectively

Brazil has developed a monitoring system for cancer screening (SISCAN), cancer care (PAINEL-Oncologia) and population-level cancer epidemiology (Population-based cancer registry), which provides a good information infrastructure base. In addition, population-based surveys (Vigitel) regularly collect screening coverage and barriers to screening in view of seeking ways to increase screening coverage.

The main challenges for the cancer information infrastructure in Brazil, including screening information, relates to coverage, interconnectedness and feedback. Coverage aims to reach the full extent of the target population for each screening programme (including actions in the private sector). Interconnection challenges relate to linking existing information systems, for which an expansion of the national health card would be fundamental. Feedback to different actors in the health system, importantly to all PHC teams, is crucial to ensure that decisions and actions are informed by regular and updated information.

A comprehensive information system based on registries, capable of following each patient individually, is essential for efficient management of screening programmes and cancer care delivery. It can identify target

population who have and have not participated in the screening programmes, those who are monitored outside of the programme due to their previous diagnosis of cancer and/or genetic predisposition to specific cancer and those who do not consent to do screening. Using such a system, personalised invitations and reminders for cancer screening, which are important for increasing screening coverage, can be sent systematically to target population.

Integrated information systems generate data that need to be analysed periodically to assess the effectiveness of existing cancer screening protocols such as target group, screening frequency and/or methods and across population with different background. Brazil has started producing this data, which is also publicly available on line through DATASUS. Several OECD countries use information around cancer screening to improve quality of screening programmes as well. They provide feedback to individual providers and benchmarking is also possible. A systematic literature review supports these additional efforts as it found that provider assessment and feedback contribute to increased coverage for cervical, breast and colorectal cancer screening (Sabatino et al., 2012[41]).

Better information and communication technologies could improve public awareness and health literacy

Alongside more personalised invitation to cancer screening, Brazil could develop further communication and information-sharing strategies to improve public awareness on cancer prevention and screening and health literacy of the population. Since 2002, the Ministry of Health of Brazil has been investing annually in actions to raise awareness of cancer prevention measures, for instance, through the October Pink Campaign. The campaign consists of lighting buildings and monuments conveying the message "Prevention is necessary", while also promoting healthy lifestyle among women, encouraging HPV vaccination, overcome fear or stigma associated with cancer, among other topics.

Box 3.3. Sundhed.dk, the Danish e-health portal to support transparency and patient empowerment

Sundhed.dk, the Danish e-health portal launched in 2003, is the official website for the public Danish health care services and enables patients and health care professionals to find information and communicate. It is a public internet-based 24/7 portal that collects and distributes health care information among citizens and health care professionals. In a secure part of the portal the patient has access to:

- Personal health data on treatments and notes from hospital records, information about medication, laboratory test results, vaccination data and visits to the general practitioner (GP);
- Various e-services including making appointments with GP's, prescription renewals and electronic communication with the GP;
- Information on waiting times at all public hospitals and ratings of hospitals in terms of patient experienced quality;
- Patient networks and the sundhed.dk handbook for patients.

This portal brings the entire Danish health care sector together and provides an accessible setting for citizens and health care professionals to meet and efficiently exchange information. By serving both the citizens and the health professionals, the portals aim is to enable the two to achieve co-operation based on the same data. This empowers the citizen and gives the health professionals better tools to improve quality in care (OECD, 2013[34]; European Observatory on Health Systems and Policies and Petersen, 2019[42]).

Municipalities, with support from the State and the Federal Government, works to promote screening tests, through campaigns using printed media, social networks and local media. During determined periods in the year, some municipalities implement mobile units, which go to communities in the most distant parts of the country as a mean of increasing screening access, diagnosis and treatment. In addition, INCA has developed manuals or flyers that are sent to PHC teams every year for informing the public in the community and at work about healthy lifestyles to prevent cancer and the importance of early detection for cancer. INCA also develops videos and written material that is publicly disseminated in websites and social media.

As systematic sharing of information related to cancer is limited, particularly for cancer without screening programmes, Brazil could also better develop information-sharing strategies to help patients to seek care, including cancer diagnostic services, at the right place at the right time. In this context, an increasing number of OECD countries have developed information-sharing platforms to better involve and enable patients in taking care of their own health and navigating through health care systems for their conditions. For example, some OECD countries including Denmark (see Box 3.3), England and Estonia have developed a platform such as a website or e-Health account to share evidence-based information on health care for different diseases including cancer throughout patient pathway with a view to promoting health literacy of the population and to support them to seek health care including cancer screening, diagnosis and treatment appropriately in a timely manner.

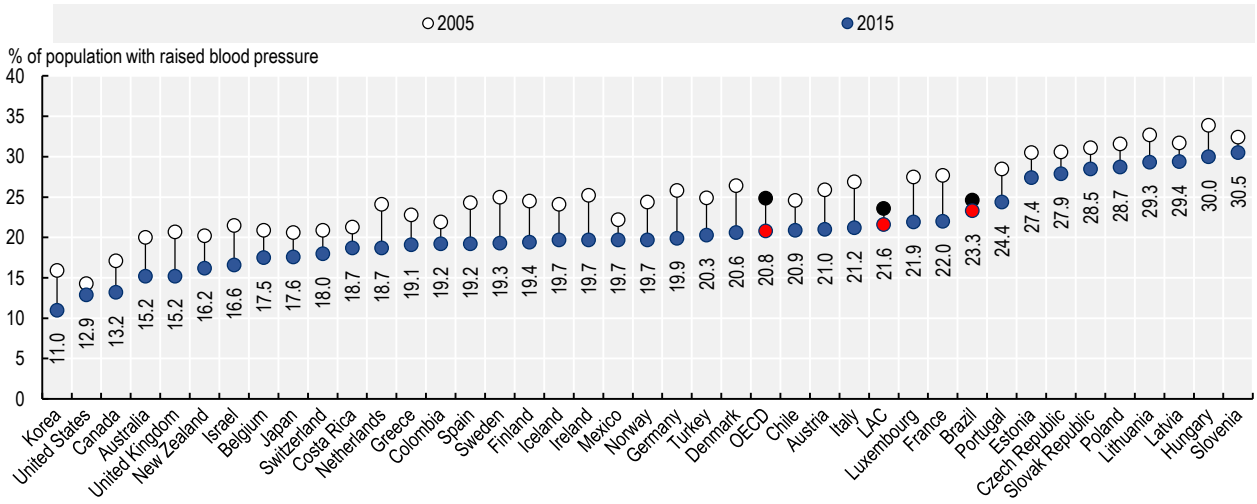
3.3. Screening for hypertension and diabetes can be further strengthened at the PHC level

3.3.1. Hypertension is one of the major health risk factors in Brazil

Hypertension or high blood pressure manifests by causing headaches, nosebleeds or difficulty breathing. If left untreated, hypertension can contribute to the development of more serious cardiovascular problems such as kidney disease, stroke and myocardial infarction. The absence of hypertension is a result of promotion efforts such as physical activity and healthy diets. When hypertension develops, it can be controlled with medication as well as with life style adjustments. This indicator is thus a proxy for both health promotion and medical services, usually delivered in PHC (WHO, 2019[43]).

In 2015, the average prevalence of raised blood pressure in Brazil was 23.3%, higher than the OECD average of 20.8% and the LAC average of 21.6%. Between 2005 and 2015, all OECD countries reduced the prevalence of raised blood pressure with an average of -16.4% reduction. Brazil also reduced this prevalence but only by -5.3%, a decrease lower than all OECD countries (Figure 3.11). Changes in risk factors and improvements in detection and treatment of raised blood pressure have, at least partly, contributed to these general reductions, but other factors such as improvements in early childhood nutrition and year-round availability of fruits and vegetables, might explain it as well (Zhou et al., 2017[44]).

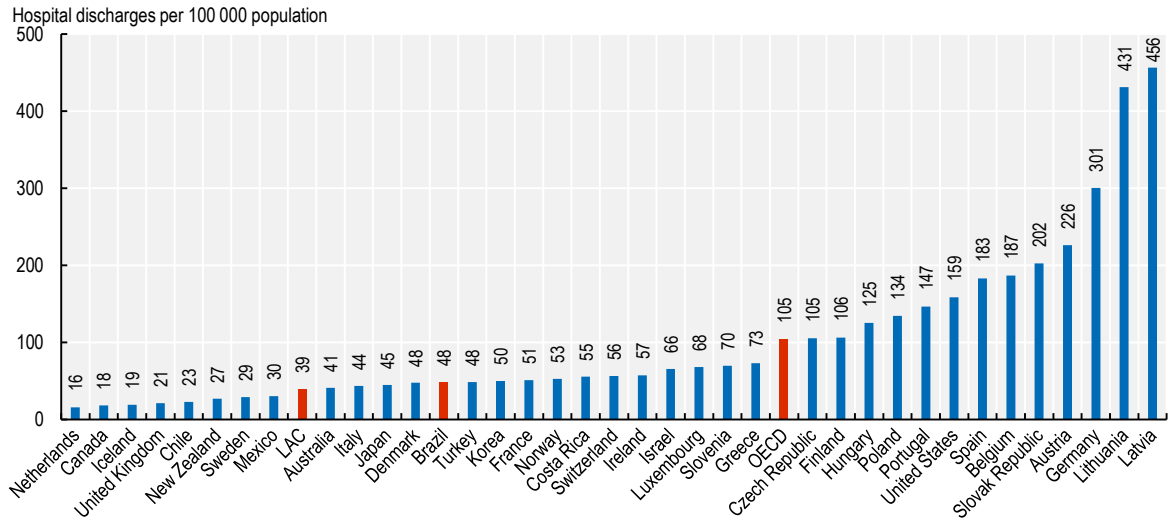
Figure 3.11. Raised blood pressure among adults in Brazil and OECD countries, 2005 and 2015



Note: Raised blood pressure (BP) defined as systolic BP >=140 or diastolic BP >=90. Age-standardised estimate.
Source: Global Health Observatory: Explore a world of health data. (WHO, 2021[16]), https://www.who.int/data/gho.

PHC is expected to keep people well by providing a consistent point of care over the longer term, treating the most common conditions, tailoring and co-ordinating care for those with multiple health care needs and supporting the patient in self-education and self-management. In this way, a good PHC performance can reduce the rates of hospital admissions of several diseases, including hypertension and diabetes. In Brazil, the rate hospital admission due to hypertension was of 48 per 100 000 people in 2019, which is less than half the OECD average of 105 but higher than the LAC average of 39 (Figure 3.12).

Figure 3.12. Hospital admission due to hypertension in Brazil and OECD countries, 2019 (or latest available)



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm; Ministry of Health of Brazil.

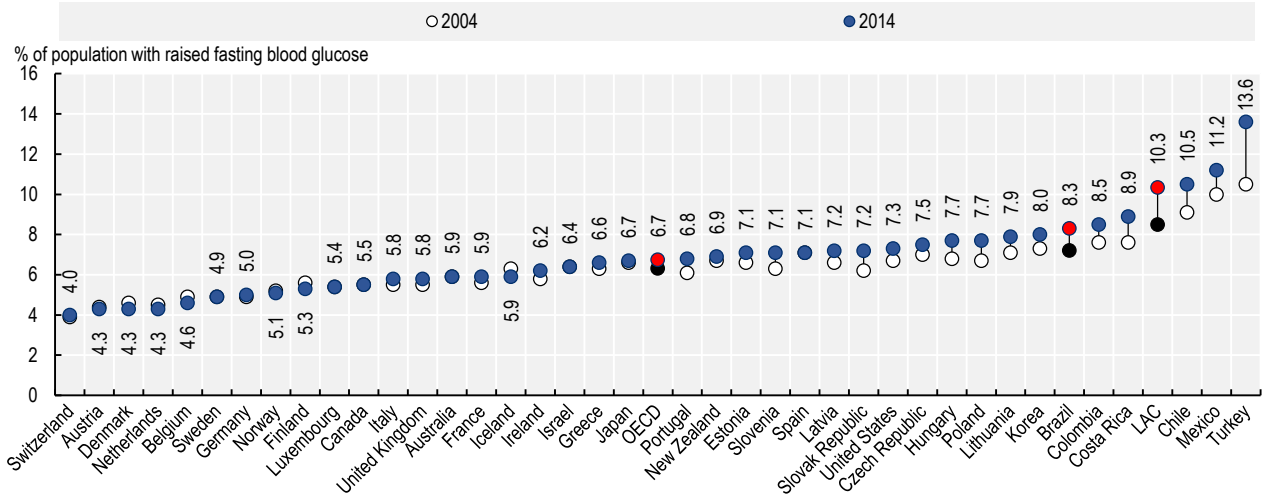
According to a recent study analysing high systolic blood pressure (HSBP) in Brazil, the prevalence of HSBP in 2017 was 18.9%, with an annual 0.4% increase rate, while age-standardised death rates attributable to HSBP decreased from 189.2 (95%UI 168.5-209.2) to 104.8 (95%UI 94.9-114.4) deaths per 100 000 from 1990 to 2017. However, the total number of deaths attributable to HSBP increased by 53.4% and HSBP raised from third to first position, as the leading risk factor for deaths during the period. Regarding total disability-adjusted life-years (DALYs), HSBP raised from fourth in 1990 to second cause in 2017 (Nascimento et al., 2020[45]).

3.3.2. When compared to OECD countries, diabetes represents a higher burden of disease in Brazil

Raised levels of blood sugar can lead to the development of diabetes. Fasting blood glucose (FBG) contributes to diagnose and monitor diabetes, and can be under control because of effective treatment with glucose-lowering medication and as a result of health promotion activities. PHC has a central role in accomplishing these actions (WHO, 2019[43]).

In Brazil, 8.4% of the population had raised FBG in 2014, above the 6.7% average in OECD countries. Importantly, between 2004 and 2014, Brazil recorded one of the largest increases in its population with raised FBG, increasing by 15.3% (Figure 3.13). Only Turkey, Costa Rica, the Slovak Republic and Chile had larger increases amongst OECD countries, evidencing a worrying trend in Brazil.

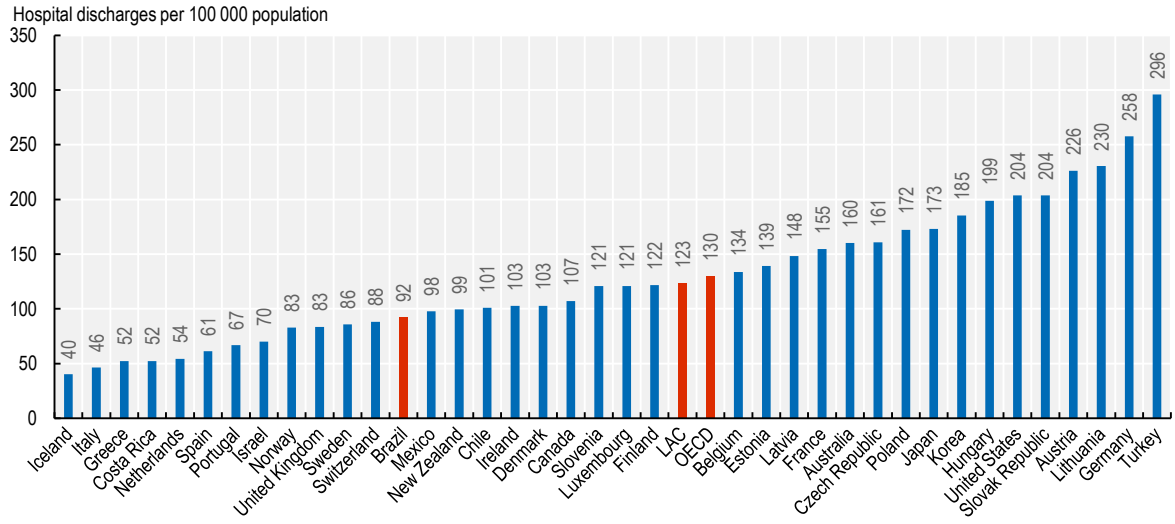
Figure 3.13. Raised fasting blood glucose among adults in Brazil and OECD, 2004 and 2014



Source: Global Health Observatory: Explore a world of health data. (WHO, 2021[16]), https://www.who.int/data/gho.

As stated previously, a well performing PHC can control and reduce the number of hospital admissions due to diabetes. In Brazil, the rate of diabetes hospital admission in 2019 was of 92 admissions per 100 000 people, below the OECD average of 130 and the LAC average of 123 (Figure 3.14). The differences between Brazil and OECD countries in terms of access to hospital care and the profiles of chronic non-communicable disease burden remain as some of factors to be studied more in depth aiming to understand these differences (OECD/The World Bank, 2020[46]).

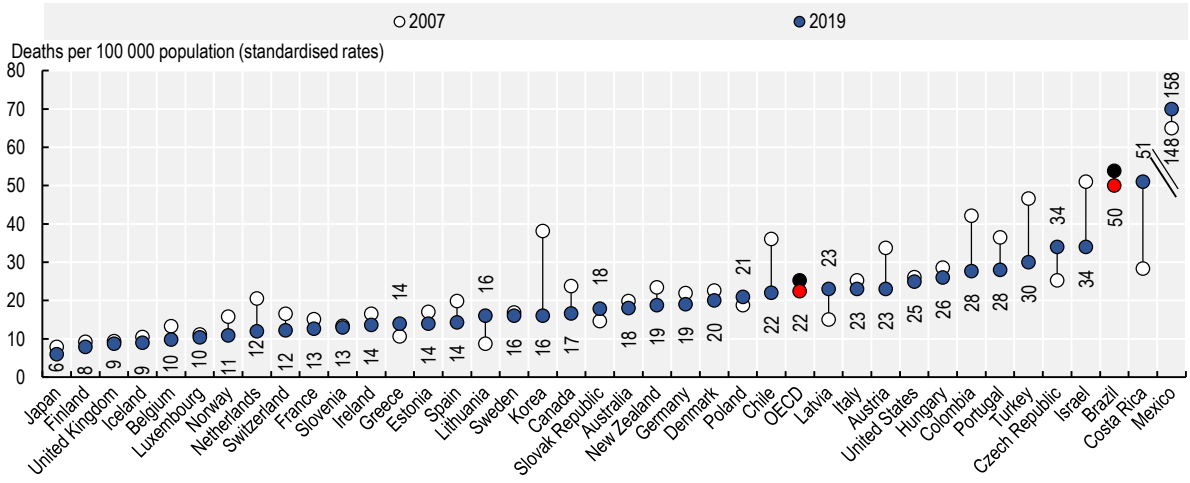
Figure 3.14. Diabetes hospital admission in adults in Brazil and OECD, 2019 (or nearest year)



Source OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

Diabetes mortality in Brazil reached 50 deaths per 100 000 people in 2019, higher than the OECD average of 22 and only lower than Costa Rica and Mexico. Between 2007 and 2019, diabetes mortality was reduced by 9.8%, higher than the average reduction of 7.8% amongst OECD countries (Figure 3.15).

Figure 3.15. Diabetes mortality in Brazil and OECD countries, 2007 and 2019



Source: OECD (2021[1]), Health Statistics Database, https://www.oecd.org/health/health-data.htm.

The impact of diabetes on the Brazilian heath system was further studied by (Quarti Machado Rosa et al., 2018[47]). They found that in 2014, 313 273 hospitalisations were due to diabetes in adults (4.6% of total adult hospitalisation), representing USD 264.9 million. The average cost of an adult hospitalisation due to diabetes was USD 845, 19% higher than hospitalisation without diabetes. Hospitalisations due to cardiovascular diseases related to diabetes accounted for the higher proportion of costs (47.9%), followed by microvascular complications (25.4%) and diabetes per se (18.1%). Another study analysing the burden of diabetes in Brazil, found that the overall estimated prevalence of diabetes in 2017 was 4.4% (95%UI

4.0-4.9%). While the crude prevalence of type 1 diabetes has remained relatively stable from 1990, type 2 prevalence has increased by 30% for males and 26% for females. In 2017, approximately 3.3% of all DALYs were due to diabetes and 5.9% to hyperglycaemia. Diabetes prevalence and mortality were highest in the Northeast region and growing fastest in the North, Northeast, and Central-West regions. Future projections suggested that the diabetes mortality burden will increase by 144% by 2040, more than twice the expected increase in crude disease burden overall (54%). By 2040, diabetes is projected to be Brazil's third leading cause of death and hyperglycaemia its third leading risk factor, in terms of deaths (Duncan et al., 2020[48]).

3.3.3. Hypertension and diabetes screening in Brazil is embedded in a broader PHC check-up programme

Overall, basic health checks and risk screening for chronic diseases in Brazil relies on PHC family health teams, and predominantly on opportunistic screenings. Blood pressure and blood glucose are usually checked during PHC basic check-ups for chronic diseases. These check-ups also include other measures such as cholesterol, screen for cardiovascular disease based on age, family history and risk factors such as body mass index (BMI) that can help diagnose persons at-risk of chronic diseases, or diagnose chronic diseases in their earlier stages when they can be managed with fewer complications.

An official Ministry of Health screening guideline for chronic non-communicable diseases was published in 2010 and it is valid until today (Ministério da Saúde, 2010[49]). For both hypertension and diabetes, screening target populations are quite wide. Screening for hypertension is recommended for adults (over 18 years of age) without the knowledge that they are hypertensive. It suggests screening every two years for people with blood pressure below 120/80 mmHg and annual screening if systolic blood pressure is between 120 and 139 mmHg or diastolic blood pressure between 80 and 90 mmHg. For diabetes, the guideline recommends screening in asymptomatic adults with sustained BP greater than 135/80 mmHg and does not apply to other screening criteria such as obesity, family history or age range. In addition, there are specific booklets (*Cadernos de atenção básica*) for the management of hypertension (Ministério da Saúde, 2013[50]) and a recent protocol for diabetes (CONITEC, 2020[51]), which also consider a screening component. For both diseases, the family health model proposes that trained health professionals work in an interdisciplinary manner, link with service users, and take on responsibility for ensuring the provision of comprehensive health care. For instance, for diabetes this includes from screening, classification, and diagnosis, along with an initial assessment, healthy lifestyle guidance and follow-up medical appointments. It also considers blood glucose control and treatment with or without medication, prevention and management of acute and chronic complications, care of feet and oral health care (Ministério da Saúde, 2013[52]).

A study assessed hypertension care continuum in Brazil's PHC, finding that over one-third of the Brazilian adult population had measured hypertension or prior diagnosis. Nearly 90% of these had recent contact with the health system, but only 65% were aware of their condition. Only 62% of these regularly sought care for hypertension, but of these 92% received treatment. Hypertension control was 33% overall, but increased to 57% among those who passed through all stages of the care continuum, showing the importance of high-performing PHC teams (Macinko, Leventhal and Lima-Costa, 2018[55]).

Regarding health information infrastructure, Brazil developed a specific registration and monitoring system for hypertensive and diabetic patients: HIPERDIA. It is managed by the Ministry of Health, through the Secretariat of Health Care Services, in conjunction with the the State and Municipal Health Secretariats. Municipalities that are members of the National Pharmaceutical Assistance Programme for Hypertension and Diabetes Mellitus send, through the HIPERDIA system, information on the registration and monitoring of patients with these diseases. All this information is processed and made available by DATASUS of the Ministry of Health (Ministério da Saúde, 2021[56]).

Box 3.4. People with pre-existing chronic conditions risk more severe COVID-19 health outcomes

Across OECD countries, people with existing chronic conditions (including cancer, chronic kidney disease, chronic obstructive pulmonary disease, heart conditions, immunocompromised state, diabetes type 2, sickle cell disease and obesity) are the most hard-hit patient population in the COVID-19 pandemic. People with chronic conditions are facing a 'double threat': they are more vulnerable to complications and death from COVID-19, and they experience indirect health effects from disruptions in essential care:

- First, people living with certain chronic conditions are at higher risk of severe COVID-19 symptoms. Early in the pandemic, it was shown in China that older patients and those with chronic conditions were more likely to have a severe to critical COVID-19 condition, to show deterioration of their health condition and to die from COVID-19 (Zhang and et, 2020[53]). Researches in the United States, Italy and the United Kingdom, confirm more severe COVID-19 outcomes and higher risk of hospitalisation among patients having underlying health conditions (OECD, 2021[54]);
- Second, people living with chronic conditions, also face indirect impacts of the pandemic due to disruptions in continuity of care or foregoing care. The lock-down and fears of contamination in waiting rooms have led many patients to forego care, including those who require regular follow-up for chronic diseases, such as cancer (OECD, 2021[54]). For example, in England, urgent referrals from PHC for people with suspected cancers decreased by nearly 80% in comparison with levels before the COVID-19 crisis. In France, the number of cancer diagnoses decreased by 35% to 50% in April 2020, as compared to April 2019. Preventive cancer screenings in the United States for breast cancer, colon cancer, and cervical cancer have also dropped between 86% and 94% in March 2020 compared to average volumes in 2017-19. In Australia, there were around 145°000 fewer screening mammograms conducted by BreastScreen Australia in January to June 2020 compared with January to June 2018.

Strong PHC has the capacity to mitigate these indirect effects during the pandemic, but also to reduce the pressure on the entire health system by providing comprehensive and preventive care.

Source: (OECD, 2021[54]). Strengthening the frontline: How primary health care helps health systems adapt during the COVID-19 pandemic. OECD Policy Responses to Coronavirus (COVID-19).

In the context of the COVID-19 pandemic, and recognising that people with NCDs are at higher risk, the Ministry of Health issued specific guidelines for supporting this group of the population through PHC. The aim was to follow-up of this population with adequate regularity, aiming at clinical stability, reducing the chances of unfavourable outcomes during the pandemic period. Amongst other components, the strategy included the identification, registration and risk stratification of people with obesity, diabetes and/or systemic arterial hypertension through surveillance actions and timely diagnosis of the adherent population. In addition, the early identification and prioritisation of follow-up and monitoring of these individuals with influenza syndrome or with suspected or confirmed COVID-19. The response included multi-professional therapeutic assistance, the prevention of coronavirus transmission in individuals with obesity, diabetes and/or hypertension, and the implementation of intersectorial and community actions for promotion of health, considering the epidemiological situation of COVID-19 in each territory (Ministério da Saúde, 2020[57]). These are all welcome strategies given that people with chronic non-communicable diseases are facing a 'double threat': they are more vulnerable to complications and death from COVID-19, and they experience indirect health effects from disruptions in essential care (Box 3.4).

3.3.4. Quality improvement and pay-for-performance schemes in Brazil's PHC have included hypertension and diabetes management

Checkup activities are part of the PHC Service Portfolio (*Carteira de Serviços da Atenção Primária à Saúde*), which receives financing from the Federal Government transferred to States and Municipalities, with these entities responsible for managing the provision of services. In 2011, the Ministry of Health created the Programme to Improve PHC Access and Quality (PMAQ), aiming at scaling up access and quality of care offered by means of financial incentives directed toward municipal health management, conditioned on formal agreements of commitments and indicator evaluation agreed between PHC teams, municipal health service managers, and the Ministry of Health (see Chapter 4). As part of PMAQ, the evaluation of FHTs included topics such as early detection of hypertension, laboratory exams for diabetes, and prescription refills for users on continued care/programs such as hypertension and diabetes without the need for marking medical appointments.

More recently, the new *Previne Brasil* Programme, implemented in 2020, includes a pay-for-performance component, which rewards performance linked to seven indicators (see Chapter 4). Two of them relates to hypertension and diabetes (Ministério da Saúde, 2020[58]):

- Indicator 6: Percentage of people with hypertension having blood pressure checked in each semester.
- Indicator 7: Percentage of people with diabetes with a request for glycated haemoglobin.

Even though these indicators are not directly related to screening but to the follow-up of patients who already have the disease, it is important to highlight that patients who are diagnosed may benefit from this incentive. However, it would be important to monitor how this programme could influence screening activities for hypertension and diabetes in PHC.

3.3.5. Hypertension and diabetes secondary prevention in Brazil should be revised to improve the efficacy and efficiency of its screening activities

Brazil could develop population-based hypertension and type 2 diabetes screening targeting high-risk population groups

Several OECD countries have health check-ups for chronic conditions, usually targeted at particular groups of the population, undertaken periodically for example every five years, and sometimes provided by health care professionals other than doctors. In Estonia, health check-ups and guidance are provided by family nurses for people aged between 40 and 60 with hypertension or diabetes (Habicht et al., 2018[59]), and in 2007, Korea introduced the National Screening Programme for Transitional Ages, targeting people at age 40 and 66 (Kim et al., 2012[60]). In England, the NHS Health Check was introduced for people aged between 40 and 74 in 2009 and an invitation letter is sent every five years to those who do not already have diabetes, heart disease, or kidney disease or have not had a stroke, in order to screen them for the risk of developing chronic conditions including heart disease, stroke, kidney disease, type 2 diabetes, or dementia (available only for those above 65 and above). This check-up is often undertaken by a nurse or health care assistant (Gmeinder, Morgan and Mueller, 2017[61]; NHS, 2018[62]). Table 3.4 shows the recommendations for hypertension screening from selected evidence-based guidelines along with the latest recommendations in Brazil.

However, a recent review commissioned by WHO Europe found that the available evidence does not support the recommendation on systematic population-level screening for hypertension (Eriksen et al., 2021[66]). Instead of recommending systematic screening, the preferred alternative would be targeting those in PHC who may be at a higher risk owing to age or the presence of a risk factor (i.e. case-finding). In Brazil, a study identifying the main risk factors for developing hypertension found that the prevalence increased with age, low educational level, increased body mass index and abdominal waist, and urinary

sodium excretion (Cipullo et al., 2010[67]). This type of studies in the Brazilian population could help to define the target group in order to guide future hypertension screening recommendations.

Table 3.4. Selected recommendations for high blood pressure screening

	Population group	Screening interval	Persons at increased risk of high BP
Brazil (Ministério da Saúde, 2010[49])	18 years and over, without known hypertension	• Every two years if BP below 120/80 mm Hg. • Every year if systolic BP 120-139 mm Hg or diastolic BP 80-90 mm Hg	None mentioned.
European Society of Cardiology and of Hypertension (Williams et al., 2018[63])	18 years and over	• Every 1-5 years or when opportunity arise if BP below 120/80 mm Hg • Every 3 years if BP 120-129/80-84 mm Hg • Every year if BP 130-139/85-89 mmHg	In older patients (>50 years), more frequent screening should be considered for each BP category.
United States (USPSTF, 2016[64])	18 years and over, without known hypertension	• Annual for adults aged ≥ 40 years and persons at increased risk for high BP. • Adults 18-39 years with BP < 130/85 mm Hg who do not have other risk factors, every 3-5 years.	Have high-normal blood pressure (130-139/85-89 mm Hg); those who are overweight or obese, and African Americans.
WHO HEART guidelines (WHO, 2018[65])	18 years and over, during routine visits to PHC	• Every 1 to 5 years if normal • No mention of other interval	Have had a prior heart attack or stroke; have diabetes; have chronic kidney disease; are obese; use tobacco; have a family history of heart attack or stroke.

Note: BP: Blood pressure.

Table 3.5. Selected recommendations for type 2 diabetes screening

	Population and screening interval	Persons at increased risk of DM2
Brazil (CONITEC, 2020[51])	• All adults over 45 years of age. • Adult overweight (BMI >25 kg/m2) and with one risk factor or moderate CVD risk. • If normal, screen every 3 years. • If pre-diabetes, screen every year.	Sedentary lifestyle; first-degree relative with DM; women with previous pregnancy with a fetus weighing ≥ 4 kg or with a diagnosis of gestational DM; hypertension or antihypertensive use; HDL cholesterol ≤ 35 mg/dL and/or triglycerides ≥ 250 mg/dL; women with polycystic ovarian syndrome; other clinical conditions associated with insulin resistance (e.g. obesity III, acanthosis nigricans); history of CVD.
Canada (Diabetes Canada, 2018[69])	• Screen every 3 years in individuals ≥40 years of age • Screen every 3 years in individuals at high risk according to a risk calculator • Screen earlier and/or more frequently (every 6 to 12 months) in people with additional risk factors for diabetes	First-degree relative with DM2; Member of high-risk population (e.g. African, Arab, Asian, Hispanic, Indigenous or South Asian descent, low socio-economic status); History of prediabetes; History of gestational diabetes; History of delivery of a macrosomic infant; presence of end organ damage associated with diabetes; and presence of vascular risk factors (e.g. smoking), associated diseases (e.g. HIV), and use of drugs associated with diabetes (e.g. statins).
United States (USPSTF, 2015[70])	• Adults aged 40 to 70 years who are overweight or obese. • Every 3 years for adults with normal blood glucose levels.	Family history of diabetes; history of gestational diabetes or polycystic ovarian syndrome; members of certain racial/ethnic groups (e.g. African Americans, American Indians or Alaskan Natives, Asian Americans, Hispanics or Latinos, or Native Hawaiians or Pacific Islanders) may be at increased risk for DM2 at a younger age or at a lower BMI.
WHO HEART guidelines (WHO, 2018[65])	• Adults who are 40+ years old and who are overweight (BMI >25) or obese (BMI >30) • No screening interval mentioned.	Have had a prior heart attack or stroke; have diabetes; have chronic kidney disease; are obese; use tobacco; have a family history of heart attack or stroke.

Note: DM2: diabetes mellitus type 2. BMI: body mass index. CVD: cardiovascular disease.

Similarly as with hypertension, diabetes screening in OECD countries is normally embedded in more general health check-ups. In Australia, for example, PHC physicians can provide health assessment for people who are at risk of developing a chronic disease. This assessment is provided to people aged between 45 and 49 once if they have at least one risk factor (lifestyle habits or a family history) for developing a chronic disease such as type 2 diabetes or heart disease. The assessment is also provided to people aged 75 and over with an interval of 12 months or longer (Department of Health, 2014[68]). In view of reducing the prevalence of lifestyle-related diseases including cancer, cardiovascular diseases and diabetes, Japan introduced the specific health check-up (Tokutei kenshin) to the population aged between 40 and 74 in 2008. All insurers in the Japanese health system are obliged to provide a specific health check-up to people in this age group every year as they are considered to have higher risks of developing lifestyle-related diseases. Insurers need to provide a nationwide standard set of health check-up items (OECD, 2019[40]). Table 3.5 shows the recommendations for diabetes mellitus type 2 screening from selected evidence-based guidelines along with the latest recommendation in Brazil.

According to the most recent scientific evidence, too much screening (e.g. by having a too wide target population) probably will not improve population health outcomes and can be an inefficient use of resources. Therefore, Brazil can aim for well-targeted hypertension and type 2 diabetes screening population-based programmes, based on its national epidemiology, health system characteristics and cost-effectiveness analysis, as an effective way to identify and manage chronic disease.

Strengthen disease management pathways with a people-centred perspective

Hypertension and diabetes screening should be just the first step in a clear disease management pathway in Brazil. Chronic disease management pathways (also called integrated care pathways), which can be embedded on clinical guidelines, should be available for all high prevalence chronic diseases, to give guidance to health care providers and patients over expectations of the care that should be delivered and received. The two existing clinical guidelines in Brazil (Ministério da Saúde, 2013[50]; CONITEC, 2020[51]) represent a very positive step towards developing best practice guidelines with explicit pathways of care. For the moment these pathways are focused on information for health professionals in PHC, but could be expanded to integrate other care providers (for example specialists, or patient-support groups), and be produced in a patient-friendly format.

Pathways of chronic disease care, produced in both patient-facing and clinician-facing formats, should clearly establish the professional responsibilities of health professionals at different stages of disease. These pathways can be used to set quality expectations for chronic diseases such as diabetes and cardiovascular disease, and standardise quality of care across Brazil. The pathways can also be used to clarify expected roles for different care providers. In the area of diabetes, clinical pathways can help by: (1) assisting to systemically evaluate the patient's clinical presentation and risk factors; (2) choosing the most appropriate behavioural and medication interventions; and (3) providing a timeline for patient follow-up and monitoring. In short, clinical pathways will assist in the co-ordination of care and follow-up (Wong, 2017[71]).

Figure 3.16. NHS England RightCare Pathway: Diabetes, summary table

The National Opportunity	5 million with non-diabetic hyperglycaemia Most receive no intervention	940, 000 undiagnosed Type 2 diabetes	>50% of diagnosed receive no structured education within 12 months of diagnosis	60% of Type 1 and 40% of Type 2 are not completing care processes	Few areas have high quality Type 1 services embedded	30% of hospitals don't have multi-disciplinary foot teams	National variation in spend and safety issues on non-elective admissions
Service component	**Risk Detection**	**Diagnosis and Initial Assessment**	**Structured Education Programmes**	**Annual Personalised Care Planning**	**Type 1 Specialist Service**	**Service Referral and key relationships**	**Identification/ Management of admissions by Inpatient diabetes team**
Interventions	Cross Cutting: 1. Shared responsibility and accountability 2. Participation in NATIONAL DIABETES AUDIT 3. Consistent support for patient activation, individual behaviour change, self-management, shared decision making 4. Integrated multi-disciplinary teams						
	NHS Diabetes Prevention Programme	Protocol for diagnostic uncertainty	Education programmes (including personalised advice on nutrition and physical activity)	9 recommended care processes and treatment targets	Type 1 Intensive specialist service	1. Triage to specialist services 2. RCA for major amputations	Inpatient diabetes team, shared records, advice line
Target outcomes	Decreased incidence of Type 2 diabetes	Improved detection	Better diabetes management and reduced complications	Reduced variation in completion of care processes	Reduced risk of Microvascular complications	Year on year reduction on major amputations	Reduction in errors in hospitals, reducing LOS
The evidence	Intensive behaviour change can on average, reduce incidence of Type 2 diabetes by an average of 26%	Diabetes prevalence model for local authorities and CCGs	Improved health outcomes and reduction in the onset of diabetic complications in both Type 1 and Type 2 diabetes	Control of BP, HbA1c and cholesterol reduces risk of macro and micro vascular complications	Type 1 services deliver year on year improvements in blood glucose control	MDFT and supporting pathway reduces risk of complications	Young Type 1 and older Type 2 diabetes patients have higher rates of non-elective admissions

Source: NHS England (2018[72]), NHS RightCare, Diabetes pathway, https://www.england.nhs.uk/rightcare/products/pathways/diabetes-pathway

England has developed more complex pathways, which include expectations at different stages of the disease, the roles for different care providers, key interventions and target outcomes (NHS England, 2018[72]). England's 'NHS RightCare Pathway: Diabetes' includes, for example, an expectation that care planning and an annual review take place for patients with both Type 1 and Type 2 diabetes, and the Pathway includes links to supportive documentation to help with care planning. In England, the expectation is that a lot of diabetes care is provided by multidisciplinary teams in community care settings, and the Pathway includes details of the services that the team would usually provide (patient education, pregnancy advice, foot protection team) (see Figure 3.16).

Alongside establishing clear chronic disease management pathways, there is a need to ensure that other levers within the system are effectively aligned with the pathway. This includes line up payment and reimbursement incentives, as well as ensuring that health professionals have the tools and capacities they need to undertake the responsibilities expected of them.

Create more capacity in PHC for screening and management of hypertension and diabetes through expanding the role of health workers

To strengthen prevention capacity and impact, Brazil should look to increase capacity in PHC. One way that several OECD countries have found to increase capacity relates to task shifting or expanding the role of other health workers (Box 3.5). Exploring whether there are ways for other health workers – for instance nurses, nutritionists or pharmacists – to play a role in delivering some of these key prevention activities is certainly a possibility for Brazil.

Box 3.5. Advanced nurse practitioners and community pharmacists in France

As in other OECD countries, France has extended the role of nurses and pharmacists, which is seen as a key policy lever to improve access in underserved areas where the number of PHC physicians is decreasing. The new decree establishing the profession of Advanced Nurse Practitioner (Infirmière en Pratique Avancée) was issued in June 2018. The Advanced Nurse Practitioner will work within a PHC team to manage patients having chronic conditions and take the lead in prevention and co-ordination.

In parallel, the role of community pharmacists is gradually increasing. Community pharmacists are allowed to perform three rapid diagnostic orientation tests: the capillary blood glucose test for diabetes screening; the oropharyngeal tests for influenza; and the group A streptococcal tonsillitis test. The objective is to determine if antibiotic treatment is necessary and if a visit to the doctor is required for a prescription. The community pharmacist can also participate in punctual screening programmes for chronic obstructive pulmonary disease (COPD). Lastly, pharmacists in France are now allowed to perform flu vaccination.

Source: OECD (2020[78]), Realising the potential of PHC, https://dx.doi.org/10.1787/a92adee4-en.

For example, when it comes to diabetes, nurses could have the capacity and training to conduct an initial assessment of the patient, including ensuring the capacity to do blood sugar testing in all practices and working together with doctors and other team members in follow-up activities. In general terms, nurse-provided care has shown equivalent or better quality of care across a large range of clinical outcome measures for chronic conditions, including diabetes (Maier, Aiken and Busse, 2017[73]). A systematic review found that nurse-led care was at least as effective as physician-led care in providing secondary prevention to patients with chronic conditions, where 84% of outcome parameters showed no statistically significant differences, and for the remaining 16%, secondary prevention outcomes improved in the nurse-group, primarily among patients with diabetes. In this patient group, nurse-led care was superior in preventing the onset of heart disease and it lowered cardiovascular risk (Martínez-González et al., 2015[74]).

Community pharmacists can also be considered for task shifting policies, and in most OECD countries its role has evolved substantially in recent years. Pharmacists can play a key part in giving advice to patients and supporting them to navigate their health needs and manage their care. Recent systematic reviews have shown that pharmacist involvement in care may improve health outcomes for chronic conditions such as diabetes and hypertension (Pousinho et al., 2016[75]), while it can turn to be cost-effective for health systems (Wang, Yeo and Ko, 2016[76]). In Brazil, pharmacists do not seem to have a large presence in PHC teams, even stating that pharmacists' isolation in PHC prevails (Barberato, Scherer and Lacourt, 2019[77]). Therefore, such a policy would require a thorough analysis and planning to define the best way to invest on further introducing community pharmacists in Brazil's PHC teams.

The health information system needs to be developed further to support targeted population-based screening for better monitoring and evaluation

Screening and other health care activities for hypertension and diabetes have the potential of generating a wealth of valuable health information, which could be used both for better managing population health, designing and targeting more effective public health interventions, and for research. However, HIPERDIA, Brazil's health information system for hypertension and diabetes in PHC, does not collect information about screening and it is not capable of capturing the pathway of care for each patient either (e.g. referrals, waiting times, consultations with specialists, laboratory tests, medications, etc.). It is also hard for PHC teams to review and act on this information as they do not receive regular feedback, and patients cannot

have access to his personal health data. It is also difficult for the system to link with other databases such as hospitalisations, death registries, etc.

Many OECD countries have nationally standardised digital medical records and they are able to use up-to-date data for monitoring and evaluation of the health system by automatically extracting data from electronic clinical records. For example, 13 countries including Canada, the Czech Republic, Denmark, Finland, Israel, Korea, New Zealand, Norway, Singapore, Sweden and the United Kingdom (England, Scotland and Wales) regularly link data from different national datasets such as hospital and mental hospital in-patient data, cancer registry data and mortality data. Using these linked data, these countries are able to actively monitor health care quality and health system performance.

In order to monitor and further develop secondary prevention strategies, Brazil needs to develop a health information system, which allows linking different data sources. Experiences of other OECD countries in developing a strong health information system within a data governance framework that protects patients' health information privacy, which is laid out in OECD (2019[79]), would be useful for Brazil in following such paths.

A stronger health information system could also facilitate streamlining the efforts to invite target population for hypertension and diabetes screening. Currently, these screenings are largely opportunistic and there is no information about who is receiving them. Moreover, it is not possible for municipalities or PHC teams to identify whom to send the invitations. The current process for population's registration in Brazil's PHC represents an opportunity for developing organised screening programmes. Brazil could send personalised invitation letters, without duplication, only to those who are in the target population, and not currently undergoing treatment, and to those who have not followed up on worrying results from a previous check-up. These targeted personalised approaches are considered more effective in recruiting people in need of health check-ups (Bunten et al., 2020[80]).

In the future, Brazil could consider bundled payments as a mechanism to improve management of chronic conditions in PHC

Brazil has recently innovated on its payment scheme in PHC with the *Previne Brasil* programme. For the future, another alternative to explore are bundled payments, in particular, for chronic conditions. These consist of one payment per patient with a chronic illness to cover the cost of all health care services provided by the full range of providers during a specific time period. It has been introduced in OECD countries to incentivise co-ordination of care between providers, or provide a broader set of care (e.g. education, regular checks, occasional specific checks). Bundled payments can encourage collaboration within and across care settings, contribute to greater standardisation of care for example by requiring adherence to quality criteria, and can strengthen data availability by requiring the collection of monitoring indicators or integration of data systems across care settings, and control overall costs (OECD, 2016[81]).

Although the design and characteristics of bundled payments differ between OECD countries, the models developed in Australia and Canada could be of particular interest to Brazil and others. In these countries, the bundled payment accounts for patient complexity, which is an important prerequisite to encourage the participation of PHC providers (OECD, 2020[78]).

3.4. Conclusion

In Brazil, all-cancer mortality has not been reduced in the past decade, while breast and cervical cancer have reduced its odds for a longer survival after being diagnosed. This finding goes in the opposite direction from the outcomes obtained in OECD countries, calling for an urgent action to reverse these trends. Although breast and cervical cancer screening have increased in recent years, its coverage remain well

below the recommended standards, limiting its potential to contribute to better cancer outcomes. In order to tackle the burden of cancer, Brazil has strengthened cancer care governance and delivery, however, more still needs to be done, with an emphasis in promotion and prevention of cancer. There is scope to expand the coverage of screening – notably by developing population-based programmes, introducing more systematic personalised invitation for cancer screening, and developing better communication and education strategies by using new technologies. Brazil could also look to expand efforts to new cancer sites such as lung and colorectal, as they represent a high burden of disease, deserving further analysis of the potential benefits of investing in national screening programmes. Meanwhile, developing a more comprehensive monitoring system for cancer screening, with information at the individual level of each patient, would help Brazil in both the administration of the cancer screening programmes (e.g. assuring effective target population coverage) and be a rich source of data to periodically assess the effectiveness of existing cancer screening protocols.

On the other hand, hypertension and diabetes also represent a burden for Brazil's population health and health system. For example, the prevalence of both raised blood pressure and of raised fasting blood glucose is higher than the average of OECD countries. For diabetes, mortality has not been reduced in past years in Brazil, on the contrary to what has been observed in OECD countries. Therefore, Brazil could strengthen its PHC check-up activities by moving towards population-based hypertension and type 2 diabetes screening programmes, targeting well-defined high-risk population groups. This goes in hand with further developing clear disease management pathways, where PHC teams and each individual patient can take appropriate actions to manage its disease. The current clinical guidelines and the registration of patients in PHC are good starting points to continue in this direction. There is also a clear scope for PHC nurses to play a more active role in patient education, screening promotion and disease management, while community pharmacists might be further introduced in targeted actions to manage these chronic conditions. Health information systems needs to be further developed in order to provide more and better information to both PHC teams and patients, which would allow improving clinical management decisions in PHC and will empower patients to take a leading role in its own prevention and control actions.

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4 Quality and outcomes in primary health care

Looking to expand access to high quality PHC, Brazil has taken important steps to improve the distribution of doctors, develop new forms of service organisations, introduce new financing models, and implement a range of quality initiatives, well aligned with the experiences of OECD countries. However, the Brazilian PHC system is still characterised by a relatively low population coverage, large disparities in care quality, and a weak referral system. PHC has also traditionally provided few low-complexity procedures, and is not comprehensive enough to meet evolving patients' needs. Tackling these challenges requires strengthening the gatekeeping system while expanding the range of services provided by family health teams. Efforts are also needed to ensure implementation of quality initiatives throughout the country. Greater guidance and support from the federal government will be necessary to help municipalities with low capacity.

4.1. Introduction

Brazil recognised that a strong PHC is the foundation of a health system that is effective, efficient and responsive to patients 'needs. Over the past decade, Brazil has implemented a wide range of reforms to develop the system accordingly and improve both care quality and the range of services provided by family health teams (FHTs). These include the development of standards of care, guidelines, health care services portfolio, the establishment of pay-for-performance programmes and the production and publication of data underpinning PHC. High level analyses however suggest significant scope for improving the quality and outcomes of PHC service delivery. While the burden of risk factors for health and of chronic conditions is growing in Brazil, compliance with preventive care norms, and the detection and management of chronic conditions give some cause for concern. In addition, PHC has traditionally been characterised by a low supply of health care services, offering few low complexity procedures and surgeries.

This chapter assesses Brazil PHC system with regards to the quality and outcomes of care provided. It starts with an overview of recent reforms to expand PHC and to foster quality improvement. The chapter then points to its performance in examining some indicators of PHC quality across OECD countries. The chapter concludes with some key suggestions to secure higher quality and outcomes of PHC services.

4.2. Recent reforms in PHC in Brazil

Following the implementation of the Family Health Strategy in 1994 (described in Chapter 2), several important reforms were introduced from 2011 to 2019 to continue to expand PHC in Brazil. The reforms intend to restructure PHC through new regulations to improve the distribution of doctors, to develop new forms of service organisation and new financing models for PHC.

4.2.1. Considerable efforts have been made to recruit and retain professionals in more remote areas

Several initiatives have been taken in Brazil over the past decade to recruit and retain professionals in more vulnerable areas. The *Inland Health Care Programme (Programa de Interiorizaçao de Trabalho em Saúde*) implemented from 2001 to 2004 first intended to improve the distribution and training of doctors and nurses in order to ensure their provision in poor and remote parts of the country. However, only 469 doctors joined the programme. Another federal strategy was the Valuing Primary health Programme (*Programa de Valorização da Atenção Básica – PROVAB*) introduced in 2011 to encourage health workers to spend a year working in PHC in areas with a shortage of these professionals (ordinance No. 2, 087, of 1 September 2011). The programme provided for the payment of a federal scholarship of BRL 10 000 a month. The programme also entails a mandatory 12-months theoretical-practical postgraduate course and the completion activity in the PHC units. To guarantee the quality of the service provided, medical doctors were evaluated, on a quarterly basis, by managers and institutions, in addition to conducting self-assessments. Well-evaluated participants received an additional 10% score on their medical residency exam. While the programme helped to attract more doctors in remote areas, the number was not enough to meet the needs of the target municipalities. Medical professionals showed a limited interest for the programme. In 2013, the programme hired 3 800 doctors, who were allocated in 1 300 different municipalities (Pereira et al., 2016[1]).

The Programme *Mais Médicos para o Brasil* (More Doctors Programme [MDP]) was then instituted as a federal government initiatives in 2013 to address shortfalls in the supply of doctors in PHC and diminish regional inequalities in health. The MDP was a supply side intervention with three prongs that complement each other, with a particular emphasis on strengthening PHC provision in underserved communities (Stein and Ferri, 2017[2]; WHO, 2018[3]).:

- (1) Transfer of funds to municipalities to strengthen PHC infrastructure;
- (2) Improving access to and quality of medical school training; and
- (3) Recruitment of Brazilian and foreign physicians to work within FHS teams.

Priority municipalities for participation in the programme were ones with population living in extreme poverty, population living in indigenous reserves, municipalities with very low human development index, or situated in areas of extreme poverty and with rural communities in the Northeast and North Regions (Pereira et al., 2016[1]).

The Ministry of Health paid the monthly salary of doctors enrolled under the programme. The agreement stated that Brazil paid about BRL 10 000 (EUR 2 126; USD 2 321) a month for each professional. Food, lodging and transportation costs were covered by the municipality. Doctors had a three-year contract, renewable once (Biernath, 2020[4]). It is not mandatory for the MDP physicians to take the national competency exam that is required for other physicians to practise medicine in Brazil. Instead, the MDP physicians are required to complete a mandatory three-week training course provided by the Brazilian health authorities before they could be deployed in municipalities. In addition, all MDP physicians are required to attend brief training sessions organised by Brazilian authorities in regular intervals. Online-learning courses are also available to the MDP physicians.

Overall, the MDP led to positive improvements. The programme has allowed to make considerable investment in the infrastructure of PHC units in all participating municipalities with the provision of new equipments and refurbishments (Pereira et al., 2016[1]). More recent evidence confirms that the MDP successfully channelled additional resources for strengthening the PHC infrastructure, with the MDP resources leading to the construction of 3 496 new basic health units and refurbishment of 3 417 units by 2015 (Santos et al., 2017[5]). According to Biernath (2020), more than 26 000 PHC facilities were built or renovated throughout Brazil.

In addition, the MDP have contributed to improvements in access to medical training. Data obtained from the Higher Education Census suggest that the MDP achieved its medium-term objective of expanding the number of new vacancies by 2017. An estimated 92% of the new medical undergraduate vacancies created from 2010 and 2018 took place after the MDP was launched in 2013 (Figueiredo et al., 2021[6]). It allowed to create 11 500 new places for medical training and 12 400 places for medical residency, opened to both Brazilian and foreign doctors (WHO, 2018[3]).

Lastly, evidence shows that the MDP has improved incentives for health professionals to work in underserved areas, and recruiting medical professionals from outside the country. As Brazilians were slow to accept posts in underserved communities (only 938 doctors applied for 15 460 job openings in the first months of the programme) (Biernath, 2020[4]), co-operation agreements between Brazil and Cuba facilitated by the Pan American Health Organization (PAHO) and the World Health Organization (WHO) have ensured an adequate provision of doctor. More than 20 000 Cuban doctors have been mobilised to the Brazilian health system (representing two-third of the professionals who joined the programme) (WHO, 2018[3]). In total, 18 240 job positions were created during the MDP. Among these, 8 332 were filled by Cubans, 4 525 by Brazilians who had graduated locally, 2 824 by Brazilians who had graduated abroad, and 451 by doctors of other nationalities (Biernath, 2020[4]).

Hone and colleagues (2020) suggested that the MDP was associated with a 12% increase in the number of PHC physicians by its fifth year of implementation, with more pronounced effects among municipalities that had lower levels of physician availability at the start of the programme (Hone et al., 2020[7]).

Between 2013 and 2014, the number of municipalities with fewer than 0.1 doctors per thousand inhabitants decreased by 75%, from 374 to 95 (Pereira et al., 2016[1]). More generally, the number of municipalities with a shortage of doctors fell from 1 200 in 2013 to 777 in 2015 (Biernath, 2020[4]).

In addition, the improved supply of medical doctors in remote regions in Brazil had prevented a total of 521 000 hospital admissions in 2015, generating large savings for the Brazilian health system (Biernath, 2020[4]). The MDP led to reductions in adult hospitalisations primarily due to infectious gastroenteritis, bacterial pneumonias, asthma, kidney and urinary infections, and pelvic inflammatory disease (Maffioli et al., 2019[8]), though it fell short of reducing hospitalisations due to other preventable conditions like hypertension (Özçelik et al., 2020[9]). Amenable mortality was also significantly reduced following the MDP, with greater benefits in municipalities prioritised for doctor allocation and where doctor density was low before implementation (Hone et al., 2020[7]). The positive impact of the MDP includes improved patient satisfaction with public health care services and better doctor-patient relationship (Biernath, 2020[4]) (Chapter 5 of this report provides additional details on the MDP).

The More Doctor Programme is still in place today but it will be gradually replaced by a new federal programme called *Programa Médicos pelo Brasil* (see Chapter 5).

4.2.2. New configurations of care have been established to promote greater co-ordination and integration of care

The family health support centres (*Nucleos de Apoio à Saúde da Familia*, NASF) were originally created in 2008 to expand the capacity of the Brazilian health care system to meet the increasing needs of the population, and move from vertical organisations of health care to horizontal modes of organisation.

The 2017 PNAB further encouraged the development of NASF to expand the scope of PHC for users and provide higher resolution of PHC through greater care co-ordination and longitudinally. NASFs were renamed Extended Family Health and PHC Units (NASF-AB). The organisation is structured on a territorial basis, depending on local needs. NASFs-AB should operate in an integrated manner to provide clinical, medical and pedagogical support for the PHC professionals (Barros da Silva, Carlos da Silva and de Araujo Oliveira, 2020[10]). NASFs- AB are multi-disciplinary teams, expected to function in an integrated manner. The overarching objective is to support FHTs and PHC teams for specific populations (Street Offices, river team) through supporting them in the management of health problems, as well as broadening the range of services offered in the community (Ministerio da Saude, 2021[11]).

Three types of NASFs-AB are recognised:

- NASFs-AB 1 includes 5 to 9 FHTs and/or PHC teams for specific populations (street consultancy team, riverside team, and river). Minimun 200 hours per week (minimum 20h and maximum 80h weekly workload)
- NASFs-AB 2 includes 3 to 4 FHTs and/or PHC teams for specific populations (street consultancy team, riverside team, and river). Minimun 120 hours per week (minimum 20h and maximum 40h weekly workload)
- NASFs-AB 3 includes 1 to 2 FHTs and/or PHC teams for specific populations (street consultancy team, riverside team, and river). Minimun 80 hours per week (minimum 20h and maximum 40h weekly workload)

The NASF-AB composition is defined based on the health needs of the territory and the supported family or PHC teams. It can be composed of social workers, physical educators, pharmacists, physiotherapists, speech therapists, nutritionists, psychologists, gynaecologists, obstetricians, psychiatric doctors, geriatric doctors, among others.

Activities carry-out by NASFs-AB include clinical care in the PHC facilities, home visits, multi-sectoral actions, health prevention, health education, case discussions with the teams and joint construction of Unique Therapeutic Projects (Barros da Silva, Carlos da Silva and de Araujo Oliveira, 2020[10]) (Sales et al., 2020[12])). Multi-disciplinary teams working in the NASF-AB have opportunity to share problems,

exchange knowledge and practices, and define together possible interventions through the Community of Practices (Communidad de Practicas).

NASFs are guided by the following priorities:

- It is a team formed by different professions and specialties;
- It is recognised as a specialised support for PHC, but it is not outpatient specialties or hospital service;
- It should be available to support scheduled and emergency health situations;
- It performs actions in collaboration with the FHT or the PHC team to increase the suppply of health services offfered in PHC settings.

Existing evaluations of NASFs-AB show overall positive results (Barros da Silva, Carlos da Silva and de Araujo Oliveira, 2020[10]; Sales et al., 2020[12]). The actions developed by the NASFs were positively perceived by the multi-disciplinary teams. Nurses and physicians acknowledged that the multi-professional formation allowed for a greater provision of services, and with greater co-ordination and communication between the team members (Sales et al., 2020[12]). A NASF team in the city of Recipe (Pernamsbuco, Brazil) has been found to improve the quality of referral, and also to generate greater care co-ordination and continuity (Barros da Silva, Carlos da Silva and de Araujo Oliveira, 2020[10]).

The technical Note of 27 January 2020 presents the new configuration of the Expanded Center for Family Health and Basic Health Care (NASF-AB). Given Brazil's vast territory and the heterogeneity of local environments, this technical note gives the flexibility to municipal managers to organise and define the team composition, the work-week hours, and team arrangements.

Another interesting development in Brazil is the establishment of the health care networks *Rede de Atençao à Saúde* (RAS) (CONASS, 2020[13]). Established in 2011, RAS are large health care networks aimed at reducing health fragmentation. FHTs and PHC teams have a key role to play here, in being identified as the hub to co-ordinate care between and across the health sector.

RAS are similar to territorial communities of health professionals aimed at improving patient-centred care. They are organised by *Regioes de Saúde* (Health Regions) which are agglomerations of municipalities, with the objective of integrating organisation, planning and provision of health care services at regional level (from PHC, mental health, public health, emergency care to specialised care and hospital care). RAS are agreed by Municipalities and States by the *Comissoes Intergestores*, according to population health needs, regional and municipal capacities (in terms of operational structure including support, logistical and governance systems), and the health care model.

There are thematic *Rede de Atençao à Saúde* including:

- Maternal and Child Health Care Network (Rede Cegonha)
- Urgency and Emergency Care Network (Rede de Atençao as Urgencias)
- Health care network for people with chronic diseases (Rede de Atenção à Saúde das Pessoas com Condições Crônicas) – such as cancer, overweight or obesity;
- Health care network for people with disabilities (Rede de Cuidados à Pessoa com Deficiência)
- Mental health care network

CONASS has been actively working on the development of RAS over the past years, notably with the development of *Planificação da Atenção Primária à Saúde* (PAPS) and *Modelo de Atenção às Condições Crônicas* (MACC) (CONASS, 2020[13]; CONASS, 2018[14]). PAPS and MACC provide technical and managerial guidance to support health managers and workers in states and municipalities to establish and organise RAS. PAPS consists of a set of workshops, tutorials and short-term trainings for health professionals and the managerial teams of the states and municipalities. The development of MACC in Brazil is based on the well-known Kaiser Permanente Pyramid Population Management, the Wagner

Chronic Care Model, and the Dahlgren-Whitehead "rainbow model" of social health factors (CONASS, 2018[14]).

The use of PAPS and MACC was piloted across several municipalities, for instance in Curitiba (Parana), Santo Antonio do Monte (Minas Gerais) and Taua (Ceará) (see Box 4.1). Evaluations of pilot programmes have been positive in terms of better management of chronic conditions through greater integration of primary and specialised health care (CONASS, 2018[14]; CONASS, 2020[13]).

Box 4.1. Establishment of RAS in Taua (Ceará)

A new configuration of PHC was developed in the municipality of Tauá (Ceará) with the establishment of a RAS in 2014. The project was led by CONASS in partnership with the Secretary of Health of the State of Ceará, Municipal Secretary of Health of Tauá, School of Public Health of Ceará and Fiocruz Ceará.

The project began through the use of the PAPS that proposes new way of organising health services in this municipality. The development of RAS were also supported by several workshops with the participation of all health professionals, and the use of the MACC to identify at risk population including children under 2 years old, pregnant women, hypertensive and diabetes patients.

Risk stratification was used to better understand the health and risk profiles of the community, to undertake proactive management of patients' needs and define intervention in primary and specialised care before the occurrence of any adverse outcomes.

Teams' actions are based on indicators defined by the management, such as:

- preventive actions for congenital syphilis (early detection of infection for pregnant women, timely notification and treatment of pregnant women and partners, appropriate referral to the maternity)
- updating immunisation for elderly people;
- better monitoring of chronic conditions in line with recommended clinical practice guidelines, and care co-ordination with secondary care for high-risk and very high-risk patients.

Evidence of the impact of this RAS in Ceará is positive, with reduced complication from chronic conditions; reduced mortality rates from cardiovascular disease, improved quality of health care service and greater supply of PHC services.

Sources: CONASS (2020[13]), Estudos sobre a planificaçao de atençao à Saúde no Brasil – 2008 a 2019: uma revisão de escopo.

4.2.3. Brazil has embarked on an important reform to finance PHC

Federal financing of PHC has recently changed with the Ordinance 2 979 (12 November 2019) which defines the *Previne Brasil*. Up until 2019, the federal transfers to the municipalities was based on a mechanism for regular and automatic transfer of federal funds. Every municipality received per capita funds per year to cover the cost of basic health care activities and incentives for implementing programmes recommended by the Brazilian Ministry of Health. Federal transfer consisted essentially of:

- Two capitation components -"PAB Fixo" and "PAB Variável". The PAB Fixo "fixed component" was multiplying a municipality-specific value with the number of residents in the catchment area of municipalities. In 2019, this fixed value varied among municipalities between BRL 23 and 28 depending on some few socio-economic factors such as GDP per capita and the poverty ratio. The variable capitation component depended on the accreditation of FHT, implementation of some

strategies and priority programmes such as the Family Health Strategy or the Community Health Agents Programme;

- A voluntary pay-for-performance bonus based on the National Programme for Improving PHC *Access and Quality* (PMAQ) (described in the next section);

In 2020, a new PHC funding model – *Previne Brasil* – has come into effect. This new funding model substantially modifies the way the federation allocates resources for PHC to the municipalities (Ministério da Saúde, 2019[15]). The objective of the Previne Brasil is to accelerate the expansion of the FHTs (to reach 50 000 FHT by 2022), and to strengthen quality of PHC. The new financing model includes:

- A weighted capitation calculated according to the population registered with the FHT or the PHC team, the socio-economic vulnerability and demographic profile of the registered population, and some geographical factors.
- A Pay-for-performance (P4P) bonuses. The programme is compulsory and focussed on seven priority areas, including prenatal care, women's health, child immunisation and care for chronic conditions (hypertension and diabetes mellitus) (describes in the next section). The P4P programme considers the results of the indicators achieved by the accredited teams and registered in the national register of health facilities.
- Incentives for strategic actions and priority areas, which target 16 programmes (Table 4.1). Actions cover specific characteristics according to the needs of each municipality.

Table 4.1. Incentives for strategic actions in Brazil, 2020

Areas of actions	Actions
Health promotion	Health on the Spot Program, Health at School programme, Academia da Saúde Programme
Dental care	Oral Health Team; Mobile Dental Unit, Dental Specialties Centre, Regional Dental Prosthesis Laboratory
Information and Communication Technology	Computerization of PHC facilities
Medical education	Incentive to municipalities with medical and multi-professional residency
Supporting vulnerable population	Prison PHC Team, Actions for adolescents in situations of deprivation for individual liberty, Ribeirinha FHT, Basic Fluvial Health Unit, Street Office team
Other areas	Community health agents, Microscopist

Source: Ministério da Saúde (2021[16]), Previne Brasil, https://aps.saude.gov.br/gestor/financiamento/incentivosacoes/

The new Brazilian approach to adjust capitation payments in PHC is in line with OECD policies in this area (it is already implemented in Chile, Israel, Portugal, New Zealand, the United Kingdom, or the Netherlands for example). The new capitation formula intends to allocate resources based on needs. The single capitation amount will be applicable to the population registered with family and PHC teams, adjusted for socio-economic, demographic and geographical factors. Low socio-economic status will be identified if people receive benefits from the *Programa Bolsa Familia* or *Beneficio de Prestação Continuada* or have small pensions. The demographic factor identifies children below the age of 6 and people above the age of 64 as those with higher needs. Finally, the municipalities are clustered into five different groups based on their urbanisation using an existing typology from the Brazilian Institute of Geography and Statistics (IBGE).

When it comes to the weighting of patients, the reference patient without low socio-economic status in the age group of 6-64 years registered in the most urban type of municipality (type 1) has a base value of 1. This base value will increase by 30% if the patient has either low socio-economic status or falls outside

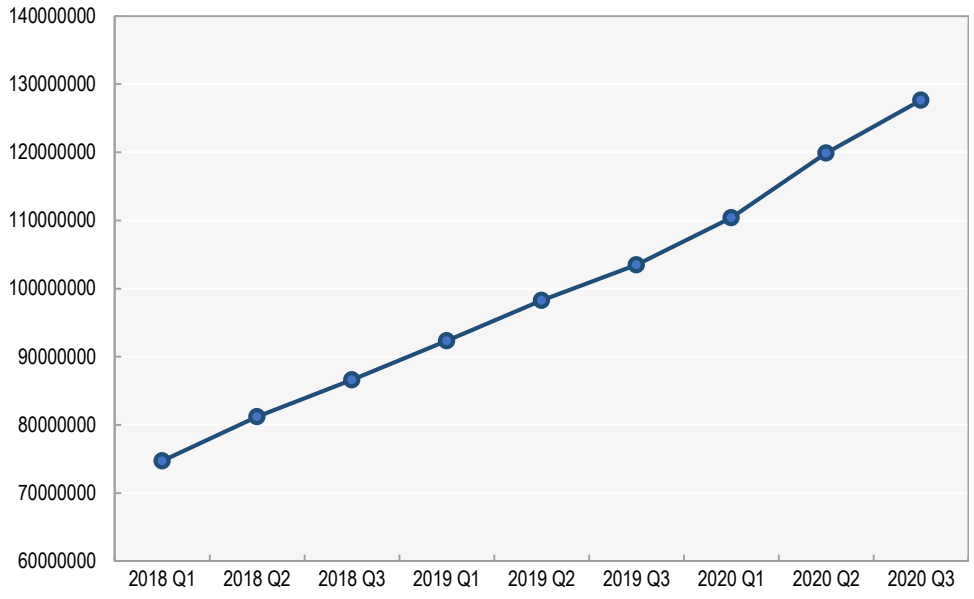
the above-mentioned age group. If a patient is registered in a municipality with medium type of urbanisation (types 2 and 3) the amount received will be multiplied by a factor of 1.45. For the two most rural types of municipalities (types 4 and 5) the amount will be multiplied by a factor of 2. Consequently, the new capitation adjustment is better taking into account differences in need (associated with age) than the previous method. Adjusting the capitated payments according to risk is an important step to make sure municipalities with higher population needs due to higher age and less favourable socio-economic situation receive the resources they need to provide care for everyone. This can limit the risk of increasing inequalities in access to PHC services.

In 2020, the value received by the municipalities from the federation ranged from BRL 51.35 for a patient in middle age (6-64 years) without low socio-economic living in an urban municipality to BRL 133.52 for a patient with either low economic status or an age outside the age bracket 6-64 living in the most rural type of municipality. These calculated amounts can be adjusted downwards if health workers in the FHT lack the required level of qualification.

There are also differences in the registration targets for each FHT based on the degree of urbanisation. In the most urban municipalities, FHTs are expected to register 4 000 people. In the two medium urbanised types of municipalities, this number stands at 2 750. In the most rural municipalities, expectations are that 2 000 people register with FHTs. Variations per FHTs are acceptable within defined limits. The new funding mechanism provides an incentive for FHT to register people in order to include the 50 million people who are not registered yet. Better registration will induce a more adequate identification of people linked to each FHT to encourage more appropriate longitudinal and co-ordinated care.

Already the number of registered people significantly increased since 2018 (Figure 4.1). The number of people registered with a FHT increased by 70% between 2018 and 2020, with around 61% of the population covered by a FHT (reaching 127 million of people registered by November 2020).

Figure 4.1. The number of people registered with a FHT has increased since 2018



Source: Ministério da Saúde (2021[17]), Secretary of Primary Health Care, Individual Records of Family Health Teams.

In 2019, the federal government announced that municipalities will receive BRL 401 million as a financial support for increasing the number of registered people (this will amount to BRL 8 900 for each municipality)

(Ministerio da Saude, 2019[18]). Although several researchers advocate the difficulties for some municipalities to be able to register people with FHTs and the fear of losing federal transfers (Harzheim et al., 2020[19]), it is important to highlight that a more systematic registration system in Brazil will help build a profile of the health needs of the registered population. Registering people with FHTs is a prerequisite for better knowledge and longitudinal monitoring of people. In addition, the threat of receiving discounted capitated amounts if health workers lack the required qualification should encourage municipalities to ensure that health workers are sufficiently qualified.

In 2020, 52% of the budget costs for the provision of PHC was allocated based on weighted capitation, 24% as salaries for community health workers (a subcomponent of the strategic actions), 15% of incentive payments for strategic actions and priority areas and 9% as performance bonuses. In the context of the COVID-19, the federal government decided to maintain the amount of funds received in 2019 for each municipality, and to provide punctual financial assistance to family and PHC teams (Box 4.2 and Table 4.2).

In 2020, the budget allocated to PHC from the federal government was BRL 20.9 billion, compared to BRL 17.5 billion in 2019 (CONASEMS, 2020[20]). In total, the federal government increased its PHC budget by around BRL 3.4 billion between 2019 and 2020.

Box 4.2. Supports provided to family and PHC teams during the COVID-19 pandemic

The Brazilian Federal Government provided punctual financial assistance to family and PHC teams through a series of block grants during the COVID-19 pandemic. These exceptional payments were given on a general basis to ensure a swift and effective PHC to manage COVID-19 cases, and to maintain routine care for non-COVID-19 patients. Municipalities with vulnerable population groups (indigenous groups, or incarcerated individuals) were specifically identified to receive additional funding. Supplementary grants were also given to mental health institutions, with amounts ranging from BRL 28 305 to BRL 400 000, depending on the size and type of psychosocial unit.

Beyond financial support, the Ministry of Health has published multiple guidelines to support family and PHC teams to managing the surge in health care demand while maintaining continuity of care for all patients.

FHTs and PHC facilities are expected to:

- Help diagnose and manage mild COVID-19 patients through testing, and providing care and appropriate exams when available;
- Follow-up people with COVID-19 to help them safely and effectively manage their care at home;
- Facilitate quick and effective referrals to hospitals for deteriorating cases.

As in other OECD countries, special COVID-19 care centres (see Table 4.2) have been established with specific health professionals and equipment to manage patients experiencing mild COVID-19 symptoms. Specific safety standards and protocols were established for high-risk patients. For example, safety protocols for delivery rooms were implemented to ensure staff is asymptomatic. In dental care, a set of ten recommendations were given to municipalities to adapt the delivery of care, including incentivising telemedicine while ensuring the continuity for dental emergencies. Informative campaigns have been developed to provide patient education on COVID-19.

To ensure care continuity, an online tool called “Consultório Virtual de Saúde da Família” has been made available to PHC facilities and FHTs. PHC workers can receive the necessary equipment, training and technical support on a 24 hours basis. PHC workers can also receive psychological support through a telephone helpline.

Table 4.2. Examples of policies introduced in Brazil to maintain care continuity for all patients during the pandemic

	Policy measures
Tele Health	Helpline to assist PHC workers to manage COVID-19 cases
Online teleconsultation platform and TeleSUS	Teleconsultation service to guarantee the continuity of PHC. Around 2 300 professionals were certified to use the system.
COVID-19 Assistance centres	Development of 3 395 centres throughout Brazil. They received special monthly federal funding, ranging from BRL 60 000 to BRL100 000 according to municipal population size.
Community Reference Centers	Community centres responsible for screening suspected COVID-19 cases, providing in-person consultations when necessary, monitoring people at home, testing high-risk patient groups, and disseminating the TeleSUS service. The focus groups for these centres are underprivileged communities and favelas. Around 130 centres were established and BRL 8.2 million spent each month.
COVID-19 contact tracing	Effort aimed at integrating health surveillance and PHC to better identify and follow COVID-19 cases and contacts at local levels
Other use of digital health to maintain access to care for patients with chronic conditions	Three punctual projects implemented in collaboration with the Federal University of Minas Gerais aimed at developing digital platforms to guarantee continuity of care and to provide other digital instruments to reduce referrals to specialist care. The three projects combined amounted to more than BRL 9 million.

Several OECD countries have also expanded PHC to reduce pressure on health systems and minimise complications and direct death from the COVID-19 crisis (OECD, 2021[22]):

- Use of COVID-19 community care facilities to manage patients experiencing mild COVID-19 symptoms, provide patient education on COVID-19 and work in close co-operation with other PHC centres, such as in Iceland, Slovenia and the United Kingdom;
- Expanding home-based programmes to improve access to care for all patients during the crisis and to alleviate pressure on hospitals in Canada, Spain or the United States;
- Leveraging telemedicine to support access to essential services and information. Removal of institutional barriers were required during the first wave of the COVID-19 pandemic, such as expanding insurance benefits to include telemedicine (Estonia), expanding provider payments (Canada and Australia), designing new telemedicine services (Canada and Belgium), and lifting requirements for face-to-face encounters prior to being seen virtually (France).
- Rearranging tasks and responsibilities in PHC, notably to allow community pharmacists to extend prescriptions and prescribe chronic disease medications, such as in France, Portugal or the United States.

Source: Brazilian Ministry of Health; OECD (2021[22]), Strengthening the frontline: How primary health care helps health systems adapt during the COVID-19 pandemic, https://dx.doi.org/10.1787/9a5ae6da-en.

4.2.4. The Agency for the Development of PHC is being established

The Agency for the development of PHC (*ADAPS*) is an autonomous social agency created by the Law 13 958 of December 2019. It is a privately incorporated non-profit organisation. The Agency will promote

the execution of policies for the development of PHC at the national level, including the new *Programa Médicos pelo Brasil* (see Chapter 5).

The advisory Board will consist of 12 representatives: six from the Brazilian Ministry of Health, one from CONASS, one from CONASEMS, one from the Brazilian medical association, one from the federal board of medicine, one from the Brazilian National Federation of Physicians and one from the National Council of Health (CNS).

The ADAPS will be responsible for PHC service provision, professional training and qualification, research and extension, incorporation of health care management technology, monitoring and assessment of health care activities, and execution of the new *Programa Médicos pelo Brasil*. It is expected that the new ADAPS will provide support for actions within the municipalities to execute the PNAB. This is a welcome development to provide support to vulnerable municipalities with low capacities and greater health care needs.

4.3. Brazil has put in place a number of initiatives to support improvements in quality of care

Several initiatives have been introduced within SUS to improve the quality and the performance of PHC in Brazil. These include the development of standards of care and guidelines, of health care services portfolio, of pay-for-performance programmes and the production and publication of data underpinning PHC.

4.3.1. Few institutions are responsible for improving quality of PHC

As mentioned in Chapter 2, the Política Nacional de Atenção Básica (PNAB) describes the aspects of the governance, the roles of different actors and other aspects of policy settings and governance for PHC.

The SUS National Audit Department (DENASUS) performs audits of Municipal Health Secretariats to verify the compliance with the PNAB. Based on auditing activities, DENASUS is also responsible for monitoring compliance with the recommendations from the Ministry of Health. The Department proposes and promotes methods to assist the execution and implementation of policies. It can provide technical and methodological support to the states, the federal district, and the municipalities as part of the SUS National Auditing System. However, DENASUS is a central entity of SUS National Auditing System, and does not work as an inspectorate for health to provide independent verification that standards of care are being met.

4.3.2. Standards of care and guidelines help structure the FHT responses to most health problems

In Brazil, practice clinical guidelines are developed by governmental and non-governmental organisations at municipal, state or federal government levels. The Ministry of Health and some professional and scientific societies such as the Brazilian Medical Association, the Brazilian Society of Diabetes or the Brazilian Society of Cardiology are involved in clinical practice guidelines (CPGs).

There are also the PHC Notebooks[1] (*Cadernos de Atencao Basica en Atencao Primaria*) which are clinical practice guidelines specifically designed for FHTs to improve the delivery of high quality PHC (Ministerio de Saude, 2021[23]). They are produced by CONASS to provide guidance on for example how to better meet the health needs of people, ensuring the diagnosis of morbidity, initiating and monitoring the treatment and control of diseases or risk factors. These guidelines are easily available to FHTs.

Many of the PHC Notebooks address specific diseases or risk factors such as care for the smokers (Cadernos de Atenção Básica 40), obesity (Cadernos de Atenção Básica 38), arterial hypertension

(Cadernos de Atencao Basica 37), diabetes mellitus (Cadernos de Atenção Básica 36) and mental health (Cadernos de Atenção Básica 34).

There is one PHC notebook to address chronic diseases (Cadernos de Atenção Básica 35) published in 2014. The notebook highlights the current importance of chronic conditions, the complexity of such diseases and of interrelated risk factors. It addresses concepts common to several chronic diseases and presents guidelines for the organisation of PHC, for example on health promotion and disease prevention common to tobacco consumption and cardiovascular diseases, or common to tobacco consumption and arterial hypertension. The PHC book presents some risk stratification models, and some case studies to guide health professionals. It also includes strategies for changing habits, promoting healthy eating and practicing physical activity, approaches to building and monitoring care plans and support for self-care (Ministerio de Saude, 2014[24]).

While such guidelines are useful, the PHC notebooks are still too narrowly defined and does not meet patients' expectations on integrated health care. There are too few clinical practice guidelines addressing integration of care for high prevalence chronic diseases (see also Chapter 3). In addition, information about their effective use is lacking. Implementation is the responsibility of the municipalities, but there is no mechanism at federal level to monitor compliance, and no systematic incentives to stimulate guideline uptake. Recent evidence show that compliance to clinical practice guidelines are unsatisfactory given inadequate follow-up observation of diabetes control and blood pressure control for people with hypertension (Leite Simão et al., 2017[25]; da Silva Rêgo and Radovanovic, 2018[26]). Another study shows that the degree of compliance with preventive care norms could be improved in Brazil (Guanais et al., 2019[27]). Less than 50% of men in the target population reported a blood pressure check in the last year and a measurement of cholesterol levels in the last five years.

In addition, while high-quality clinical practice guidelines are critical for improving health care management, some studies have noticed the low quality of CPGs in Brazil. Available evidence shows that around 77% of CPGs were deemed "low quality" (de Godoi Rezende Costa Molino et al., 2016[22]). Factors undermining the quality of CPG included a lack of multi-disciplinary team for the development group, no consideration of patients' preferences, a lack of rigor of development and conflict of interest among other (de Godoi Rezende Costa Molino et al., 2016[22]).

4.3.3. The PHC Portfolio defines the protocols and services offered in PHC

The SAPS established the PHC Portfolio (*Carteira de Serviços da Atenção Primária à Saúde,* CaSAPS). The portfolio defines and presents the procedures and services that should be offered in PHC to reduce the heterogeneity of existing practices between municipalities, but also between PHC units in the same municipality. It helps FHTs to organise themselves in the service routine, and seek appropriate competences and skills to offer the actions and services define in the protocol through several actions such as continuous personal development strategies, monitoring, and evaluation (da Cunha et al., 2020[28]).

The CASAPS is one of the most important tools to support municipalities and FHTs to provide high quality care. The portfolio has already been used in Rio de Janeiro, Curitiba and Florianópolis among other places (da Cunha et al., 2020[28]). Rio de Janeiro developed his own portfolio of PHC services to address the issue of having a high concentration of patients at the secondary and tertiary levels of care seeking low complexity procedures, such as ear washing or nail extraction (Salazar, Campos and Luiza, 2017[29]). This is a source of wasted resources for the health care system, overburdening emergencies and hospitalisation services, and reducing the quality of care for PHC conditions (Salazar, Campos and Luiza, 2017[29]).

The portfolio contains 210 actions and services organised in five groups: "health promotion for adults and elderly" (44 items), "Health care for Children and adolescent's (27 items), "PHC procedures" (17 items), and "Oral health care" (21 items). Each item is associated with recommendations, materials for consultation, and lists of inputs for implementation.

The elaboration of the portfolio is based on a review and evaluation of services implemented in Brazilian cities, and on consultations with several bodies including the Ministry of Health, CONASS, CONASEMS, the Professional Associations of the Brazilian Society of Family and Community Medicine (SBMFC) or the Brazilian Association of Family and Community Nursing (ABEFACO) (da Cunha et al., 2020[28]).

In the municipality of Rio de Janeiro, the use of the Services Portfolio was associated with a better performance compared to other municipalities not using similar portfolio (da Cunha et al., 2020[28]).

While the development of such PHC portfolios contributes to strengthen the attributes of a strong and comprehensive PHC sector, an important challenge relates to the need to have appropriate training for PHC providers to be able to deliver high quality actions and services. FHTs need to have the right and sufficient equipment and capacity to execute the PHC procedures and services.

4.3.4. National Programme for Improving PHC Access and Quality had a positive impact on quality

The federal government introduced a pay-for-performance programme (P4P) for FHTs in 2011 called the National Programme for Improving Access and Quality of PHC (PMAQ-BA in Portuguese). The programme defined standards of care in accordance to the PNAB to evaluate the performance of FHTs towards a wide range of structure, process and outcomes indicators.

Three cycles have taken place (in 2011/2013, 2013/2015 and 2015/2019). Although the programme was voluntary, almost 100% of all FHTs, oral health teams, NASFs and dental specialty centres were registered in the third round of the PMAQ (compared to 71% in round 1 and 91% in round 2).

The indicators selected were infrastructure, management for PHC development, worker appreciation, access and quality of health care and user satisfaction. In the 3rd round, more than 650 indicators were included around structural quality of care (for example availability of drugs and equipment), process of care (for example antenatal care and treatment completion rates), quality of care (for example patient satisfaction), utilisation of health care (patient volume), and management processes (proportion of appointments that are scheduled) (Kovacs et al., 2021[30]).

Certification processes consisted of self- and external assessment of the teams, involving facility assessments, examination of health indicators and interviews with health care professionals, municipal managers and service users. External evaluations were conducted by independent academic institutions by collecting indicators, and by conducting interviews (Macinko, Harris and Rocha, 2017[31]). A mean score was then calculated, and grouped according to the overall human development index for their municipalities to create several strata of similar socio-economic environments.

Each team received the bonus according to its ranking compared to a mean score for their stratum:

- Those at or below the mean score for their stratum received 20% of the bonus;
- Those above the mean received 60% of the bonus;
- Those significantly above the mean receive 100% of the bonus.

From 2011 to August 2018, the Ministry of Health has invested BRL 9.85 billion (USD 2.52 billion). The bonus ranges from BRL 1 700 (USD 434.55) to BRL 11 000 (USD 2 811.79) per team and month based on their performance (de Medeiros et al., 2020[32]).

One important consideration was the fact that each's team score was made publicly available on the Ministry of Health's website. It enhanced transparency and allowed citizens and health managers to see the overall performance of each team and the associated assessments. Each team was compared to municipal, states, and national averages, which helped nurture a quality improvement culture in PHC services.

Available data shows that PMAQ has led to an increase in federal investment for infrastructure, and a large increase in performance incentives (Macinko, Harris and Rocha, 2017[31]). In addition, the PMAQ has been associated with an increase in the provision of care to pregnant women and children under 2 years, with more significant improvement among the worst performing PHC providers (de Medeiros et al., 2020[32]). The positive impact of the PMAQ is also confirmed by a recent evaluation showing positive effects on the quality and access of PHC (Soares and Ramos, 2020[33]). On average, municipalities that adhered to the PMAQ had rates of hospitalisation for chronic conditions 9% inferior to those that did not adhere *ceteris paribus*. The effect of the programme was more pronounced in the Northeast regions of Brazil (rates of hospitalisation for chronic conditions 14% inferior for municipalities that adhered to the programme), and less pronounced for Southeast region (rates of hospitalisation for chronic conditions 5% lower for municipalities that adhered to the programme). Kovacs and al (2021) also showed that existing income inequalities in the delivery of quality PHC were eliminating during the three period of PMAQ implementation, due mainly to the design feature that adjusted financial payments for socio-economic inequalities (poorer municipalities received higher rewards than richer municipalities) (Kovacs et al., 2021[30]).

However, several failures of the programme were noted, including the very large group of indicators used (with almost 900 questions) and a too large focus on structure indicators, with little emphasis on outcomes indicators. According to the Ministry of health, the high number of indicators resulted in monitoring problems and lack of adherence by municipal managers. It is also reported that external evaluation as part of PMAQ was highly criticised, and thus not carried-out by health professionals. Lastly, the payment made by the Ministry of Health were directed towards the municipality and not the FHT. Municipalities were free to provide bonus payments to the team but little is known on the actual practice (Macinko, Harris and Rocha, 2017[31])

Despite these failures, the PMAQ programme had resulted in improvement of quality of PHC, notably because it was possible during the eight years of implementation to monitor improvements in infrastructure, medical supplies, medications and health outcomes.

4.3.5. The Previne Brasil established a new pay-for-performance scheme

With the reform of the PHC financing model, the federal government introduced a new P4P programme in 2020 as part of the *Previne Brasil programme*.

The new P4P programme is compulsory and focussed on fewer priority areas than the previous PMAQ programme. The initial number of indicators used in this programme was set at seven in 2020 and will rise to 21 by 2022.

In 2020, priority is given to prenatal care, women's health, child immunisation and two chronic conditions (hypertension and diabetes mellitus) (Ministério da Saúde, 2019[15]). The selected indicators are:

- Share of pregnant women with six or more prenatal consultations in the first 20 weeks of pregnancy
- Share of pregnant women with tests for syphilis and HIV carried out
- Share of pregnant women with dental examination
- Pap smear test carried out to detect cervical cancer
- Coverage of inactive polio and pentavalent vaccines
- Share of patients diagnosed with hypertension which have their blood pressure measured every six months
- Share of patients with diagnosed diabetes with controlled haemoglobin level.

For each of the seven indicators, weights of 1 or 2 are assigned to calculate the Final Synthetic Indicator. The weights reflect the clinical and epidemiological relevance of the indicator, as well as the level of difficulty in achieving the targets. This translates the effort of managers and teams to carry out actions,

programs and strategies. Table 4.3 presents the overall targets, the targets for 2020 and the weights defined for each indicator.

Table 4.3. Targets and weights assigned for each performance indicator, 2020

	Domains and indicators	Overall targets	Targets for 2020	Weights
Women health	Share of pregnant women with 6 or more prenatal consultations in the first 20 weeks of pregnancy	>=80%	60%	1
	Share of pregnant women with tests for syphilis and HIV carried out	>=95%	60%	1
	Share of pregnant women with dental examination	>=90%	60%	2
	Pap smear test carried out to detect cervical cancer	>=80%	40%	1
Care for children	Coverage of inactive polio and pentavalent vaccines	>=95%	95%	2
Care for chronic diseases	Share of patients diagnosed with hypertension which have their blood pressure measured every 6 months	>=90%	50%	2
	Share of patients with diagnosed diabetes with controlled haemoglobin level.	>=90%	50%	1

Source: Ministério da Saúde (2019[34]), NOTA TÉCNICA Nº 5/2020-DESF/SAPS/MS.

The performance score for each indicator will range from zero to ten, considering the targets for 2020 and the weighting scale. If the result for a given indicator is 30%, while the target is 60% for 2020, the final score for this indicator will be 5.0 (Ministério da Saúde, 2019[34]).

Further indicators to be included in the years 2022 will be discussed after evaluation and will cover the following areas: care for new-borns; care for babies (under 1-year-old); HIV, Tuberculosis, dental care, hepatitis, mental health, breast cancer, multi-professional action, and global measures including patient experience. Patient experience measurement will rely on population-based surveys conducted by the Brazilian Institute of Geography and Statistics (IBGE), which use PHC Assessment Tool (PCATool), the Patient-Doctor Relationship Questionnaire (PDRQ-9) and the Net Promoter Score (NPS) (Ministério da Saúde, 2019[15]).

While all these standards of care are based on scientific evidence, and selected on epidemiological and clinical relevance, there are all process indicators to assess the quality of care delivered.

The P4P programme and related transferred resources correspond to 9% (BRL 1.8 billion) of the budget linked to the *Previne Brasil* Programme. Performance indicators are collected every four months, and bonuses are paid monthly to municipalities based on the performance of their respective teams.

The amount of the performance payment vary according to the classification of team (Ministério da Saùde, 2020[35]). The following performance payment, referring to 100% of the Final Synthetic Indicator, are equivalent to:

- BRL 3 225.00 for the FHT;
- BRL 2 418.75 for the PHC Team Modality II 30h; and
- BRL 1 612.50 for the PHC Team Modality I 20h.

Results are publicly available on the Health Information System for PHC (SIAB) in the form of reports and dashboards, and on the e-Gestor AB web platform so that all municipalities and states can follow and adopt quality improvement strategies (e-Gestor AB, 2021[36]).

4.3.6. The Brazilian Government has invested a lot of efforts in the production and publication of data underpinning PHC

Several initiatives have been implemented to monitor the resources and activities in the PHC sector in Brazil. Within the Ministry of Health, the Department of Health Information (DATASUS) holds several databases including the national register of health facilities (CNES), the National Program of Immunization (SI-PNI), the System for prenatal care (SIPRENATAL) and the PHC Information System (SISAB, previously called SIAB) to mention a few.

The SISAB was established by Ordinance GM/MS N° 1 412 of July 2013 for the financing purpose and for implementing the PNAB. Community health workers collect on a monthly basis health and social data, monitoring of risks groups, priority health problems, child's follow-up, and on certain diseases and risk factors for health including alcoholism, disability, diabetes, epilepsy, hypertension, malaria or tuberculosis (Lopes, Monteiro and Santos, 2020[37]). The SISAB also integrates the information related to social programmes including Health at School Programme (*Saúde na Escola*) or the Health Academy Programme (*Academia da Saúde*).

While the SISAB gathers an impressive amount of indicators underpinning PHC, most indicators are inputs and process indicators including for example the number of FHTs, the number of people registered with a FHT, the number of community health agents, or the number of pregnant women receiving first prenatal care services (SISAB, 2021[38]).

It is fair to note that Brazil has developed some actionable indicators to support quality improvement in PHC, notably through the PMAQ strategy and the newly *Previne Brasil* programme. In 2020, quality indicators designed as part of the P4P programme are process indicators focussing on maternal health, cervical screening programme, immunisation coverage, and management of hypertension and diabetes. Still, they are good measures of the quality of care delivered by each FHT.

Input and process indicators are made publicly available, broken down by Federative Unit and Region, by urban or rural areas and by age group. The data can be presented in various formats such as tables, graphs, maps and technical documents in order to facilitate the interpretation and analysis of the data. This is an important quality initiative in Brazil as open publication promotes transparency within the PHC sector and expand the possibilities for improving care quality. However, the data is not published at more local, granular level. To date, patients are not allowed to monitor activity and quality of PHC at FHT level. Municipal health managers and FHTs have however access to their performance results through the e-Gestor AB portal (e-Gestor AB, 2021[36]).

At the same time, national reports based on the DATASUS databases are publicly available to assess and monitor population health and the health care system. The *Indicadores de Saúde no Brasil: conceitos e aplicações* for example reports data on health expectancy, diseases-specific mortality rates, diseases-specific incidence rates, prevalence of risk factors for health and some health care resources and activities.[2] The 2019 National Health Survey, which was jointly published by the IBGE and the SAPS, focuses in particular on access and use of PHC services.[3] The Survey provides data on access in PHC, it provides some prevalence rates for risk factors for health and some quality indicators around maternal health or cancer screening programmes. Importantly, the PHC module of the survey consisted of 26 items distributed in 10 components based on the PHC Assessment Tool (PCAT) developed by Starfield and Shi (Pinto and Silva, 2021[39]). The use of PCAT allowed to assess the attributes and the characteristics of a strong PHC: first contact access, longitudinal, co-ordination, comprehensiveness, family orientation, and community orientation (the next section of this chapter presents the results of the 2019 National Health Survey). Incorporating a standardised and internationally validated instruments for the evaluation of PHC services is a major step in Brazil to improve the provision of high quality patient centred care. It demonstrates the high political will to strengthen PHC services in Brazil.

It is also important to note that the e-SUS PHC System was developed to be used in multiple computerisation and care settings, ranging from PHC units without computers to those with computers and the internet (Sousa et al., 2019[40]). The e-SUS PHC System is made of two softwares: simplified data collection and individual health records. The simplified data collection has been specifically developed for non-computerised environments. It is a software for entering a set of files that include the work process of FHTs. Today, only around 40% of FHTs do have adopted the individual health records (see also Chapter 6).

While there is lot of data underpinning PHC in Brazil, some studies have noted the poor reliability and quality of the collected information for planning and public decision making (Lopes, Monteiro and Santos, 2020[37]). As municipalities can be penalised with cancellation of their funding resources, the work process is rather motivated by production targets. It is reported that community health workers, responsible for the data collection, have not properly completed the forms because they do not have the knowledge and training to perform the task. So far, these data have not been used to estimate diseases prevalence, characterise the epidemiological profile of the population, assess health status and even more important be linked with other information system. (Lopes, Monteiro and Santos, 2020[37]). This is a challenge also reported by the OECD Brazil Health System review (OECD, 2021[41]).

4.4. Outcomes associated with PHC

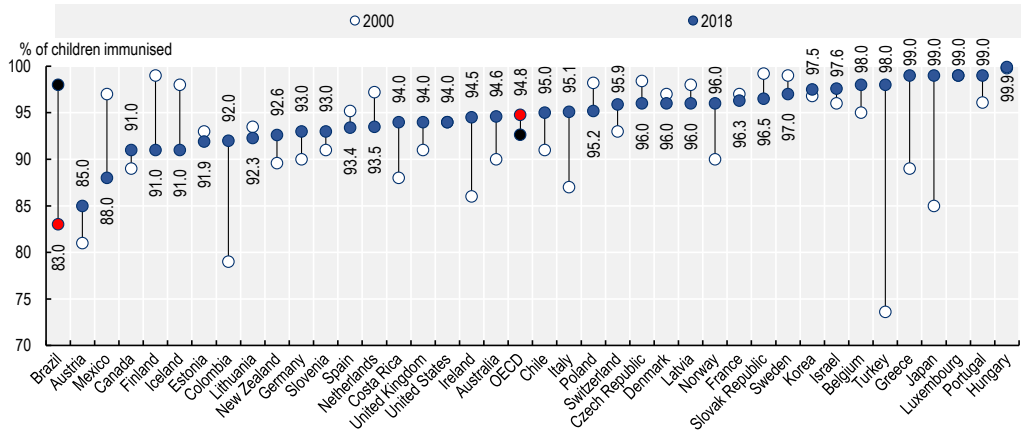
Despite progress, several indicators pertaining to quality of PHC place Brazil among poor performers. PHC in Brazil has traditionally been characterised by providing few low complexity procedures and surgeries. In addition, international figures demonstrate that Brazil lags behind other countries regarding to preventive care and management of chronic conditions. Large regional differences in health care quality also suggest that some remote and vulnerable areas require more attention, more support than others to improve quality of PHC.

4.4.1. Brazil lags behind other countries with regards to preventive care

There is strong evidence that vaccines provide safe and effective protection against diseases such as diphtheria, tetanus, pertussis, measles, and hepatitis B. The proportion of children protected from these diseases can be considered as an indicator of quality in PHC. According to the WHO Global health Observatory, 84% of Brazilian children aged around 1 were vaccinated against measles, below the average in OECD countries (95%). Additionally, 83% of Brazilian children aged around 1 were vaccinated against diphtheria, tetanus, and pertussis, compared with OECD average of 95% (Figure 4.2). In a similar vein, Brazil achieved 83% coverage for vaccination against hepatitis B for children aged around 1, compared with the OECD average of 91%.

There are also significant inequalities in the rates of vaccination against yellow fever in Brazilian states where vaccination has been recommended, ranging, in 2018, from 21.8% in Sergipe to 100% in the Federal District and Roraima (the national average for all states where vaccination is recommended is 64.1%).

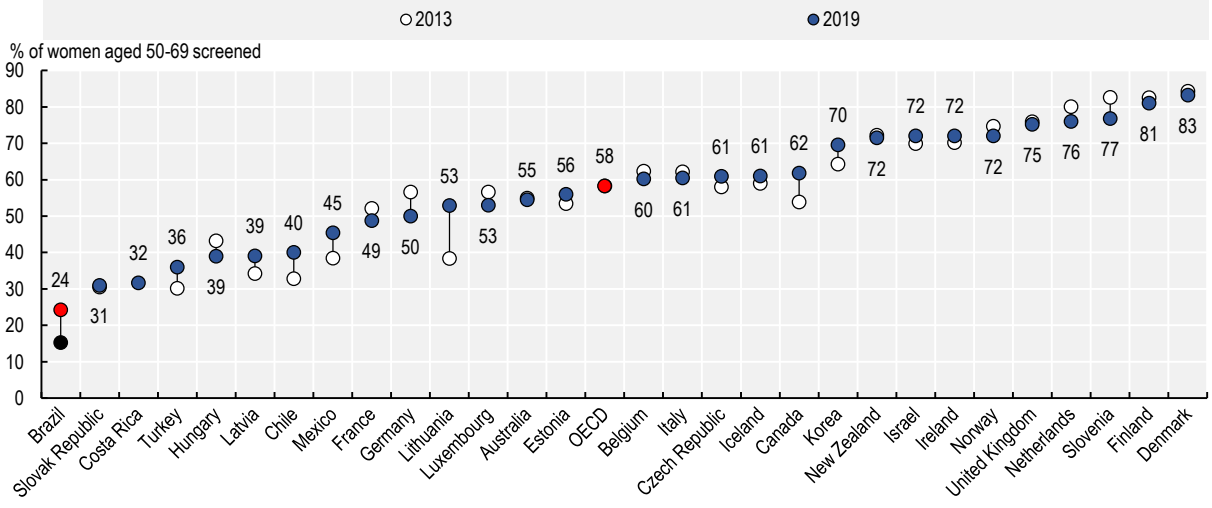
Figure 4.2. Vaccination rates for diphtheria, tetanus toxoid and pertussis (DTP3), children aged around 1, 2000 and 2018 (or latest year available)



Source: OECD (2021[42]), Health Statistics Database, https://www.oecd.org/health/health-data.htm; Brazilian Ministry of Health.

International figures also show that breast and cervical cancer screening needs to improve. Although screening for breast cancer in Brazil has improved in recent years, breast cancer screening coverage in Brazil (at 24%) is very low when compared to OECD countries. Brazil stands below all OECD countries and well below the 58% of average coverage (Figure 4.3). In a similar vein, cervical cancer screening in Brazil stands at 37.1% in 2019, well below the OECD average coverage of 58% (see Chapter 3 on Screening in PHC).

Figure 4.3. Breast cancer screening coverage in Brazil and OECD countries, 2013 and 2019 (or latest year available)



Note: Programme data is used for all countries. Brazil represent years 2014 and 2019.
Source: OECD (2021[42]), Health Statistics Database, https://www.oecd.org/health/health-data.htm; Brazilian Ministry of Health.

Inappropriate preventive care has also been highlighted by previous studies. The use of patient-reported experience measures for the prevention, detection and management of chronic diseases has shown that only around one people over five reported that their PHC physicians sent a reminder for check-up among

SUS users (Guanais et al., 2019[27]). In addition only 22% of SUS users indicated that they had received some recommendation on healthy lifestyles from their family doctor, and less than 40% of public users had a preventive visit in the past two years.

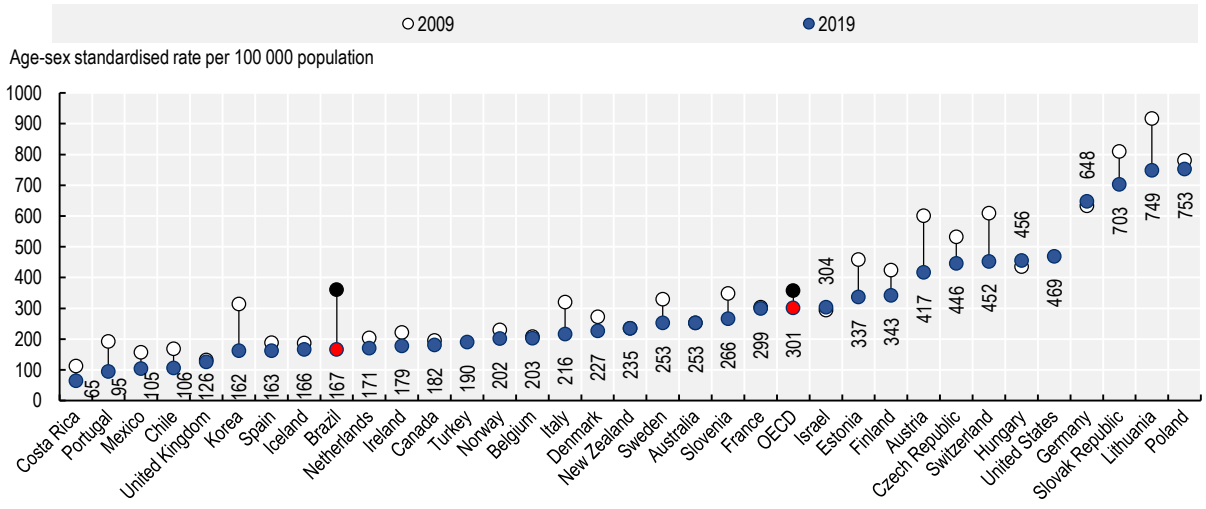
More preventive care is warranted in Brazil at a time when the burden of disease is shifting towards chronic diseases.

4.4.2. Indicators around the management of chronic conditions give some cause for concern

Hospitalisations for chronic conditions, also known as avoidable hospitalisations, are used as an indirect indicator of the overall effectiveness of PHC. There is growing evidence that proactive management of some chronic conditions may prevent or reduce the need for acute hospital admission (OECD, 2020[43]). Ambulatory care sensitive conditions, such as asthma, chronic obstructive pulmonary disease (COPD), congestive heart failure, and diabetes, are conditions for which accessible and effective PHC can generally reduce the risk of complications and prevent the need for hospitalisation. The evidence base for effective treatment for these conditions is well established and much of it can be delivered at a PHC level. Therefore, a high performing PHC system should be able to avoid to a large extent any acute deterioration of the health status of people living with chronic conditions and prevent their admission to hospital.

In Brazil, hospitalisations for chronic conditions are lower than in OECD countries. The rate of diabetes hospital admissions in 2019 was 92 admissions per 100 000 people, below the OECD average of 131 (see Chapter 3). In addition, hospital admission rates for congestive heart failure (CHF) and hypertension are lower in Brazil than the OECD average, but still higher than other LAC countries including Costa Rica, Mexico, or Chile (Figure 4.4).

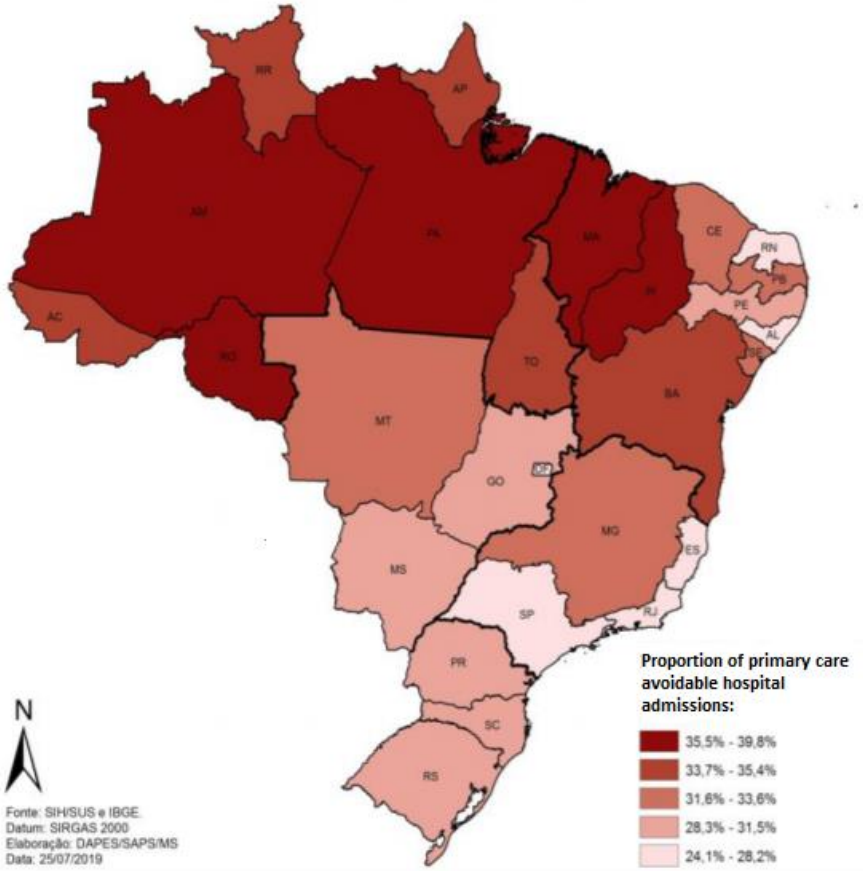
Figure 4.4. Congestive heart failure (CHF) and hypertension hospital admissions in adults, 2009 and 2019 (or latest year available)



Source: OECD (2021[42]), Health Statistics Database, https://www.oecd.org/health/health-data.htm; Brazilian Ministry of Health.

In Brazil, lower rates of avoidable hospital admissions can be the result of a lower prevalence of chronic conditions than across OECD countries. At the same time, whilst the performance is good on average, there are significant differences across regions. There is a North-South gradient where North and Northeast regions show higher hospitalisation rates for chronic conditions (Figure 4.5).

Figure 4.5. Share of hospital admissions due to conditions that are treatable in PHC, population aged 60 or more by region, 2019

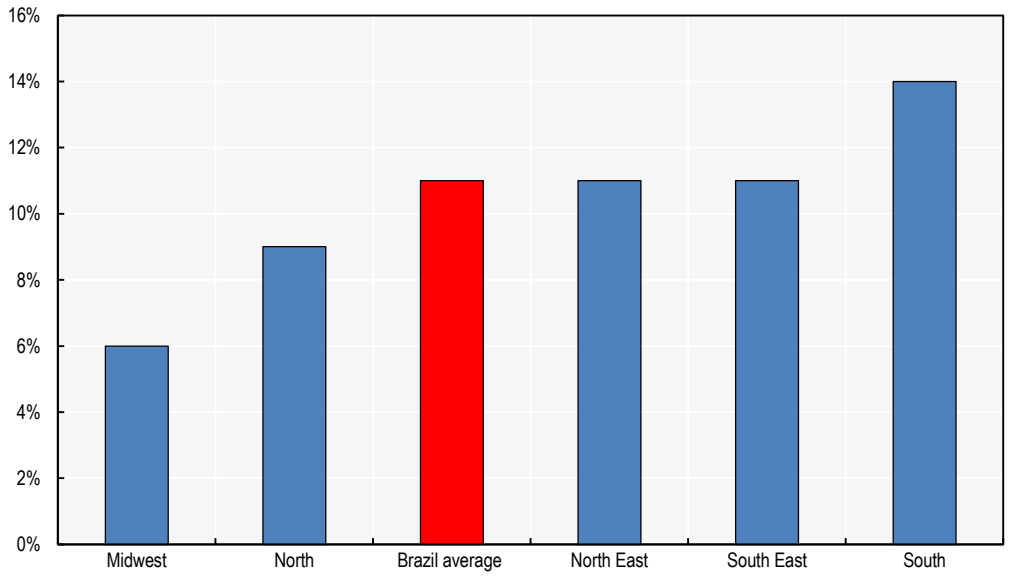


Source: Ministério da Saúde (2020[44]), Plano Nacional de Saúde 2020-23.

The 2019 Health Interview Survey also corroborates the North-South gradient. Accordingly, diabetic patients have a higher likelihood of complications (as measured in hospitalisations) in the Northeast than in the Southeast (IGBE, 2020[45]).

High hospitalisation rates for chronic conditions show that recommended care is not always provided for people with these conditions. This is confirmed by performance indicators reported in the SIAB system. Two indicators relate to whether people with diabetes and hypertension are receiving recommended care or effective management for their conditions. In 2020, only 4% of hypertensive patients had their blood pressure measured every semester, and only 11% of diabetics patients had controlled haemoglobin level (SISAB, 2021[38]). Although such very low performance scores certainly reflect difficulties in recording and monitoring PHC activities by municipalities, it gives some cause for concern. Again, the South and Southeast regions report higher performance score than the North, Northeast and Central-West region regarding to the management of diabetes patients (Figure 4.6).

Figure 4.6. Share of diabetes patients with controlled haemoglobin level, 2020 (Q3)



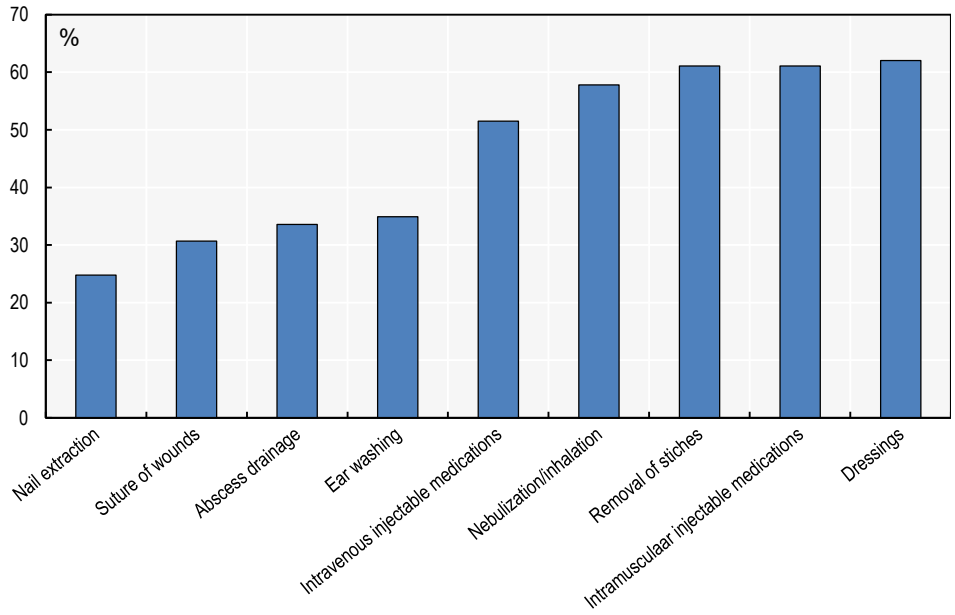
Source: Ministério da Saúde (2021[46]), Secretary of Primary Health Care, Performance indicators by Regions, https://sisab.saude.gov.br/paginas/acessoRestrito/relatorio/federal/indicadores/indicadorPainel.xhtml

Such inequalities in favour of wealthier regions can be explained by a greater supply of PHC services, health workers, equipment and compliance with clinical practice guidelines or standard treatment guidelines. The use of therapeutic guidelines protocol for hypertension, diabetes, tuberculosis, leprosy and mental health service is found to be consistently lower in small geographical areas (Salazar, Campos and Luiza, 2017[47]). Kovacs et al. (2021) also confirmed that FHTs located in poorer areas performed significantly worse than those in richer areas. A PMAQ performance score across 20 income groups has shown that a higher monthly household income of BRL 1 000 was associated with a 1.59 percentage point higher PMAQ score (Macinko, Harris and Rocha, 2017[31]).

4.4.3. Simple procedures and small surgeries are not always provided by family health teams

Simple procedures and surgeries should be widely provided in PHC settings. This is both a matter of striving for better safety and care quality, and an economic necessity. However, available data from the PMAQ programme show that only 62.8% of FHTs performed low complexity procedures or small surgeries in 2012. Worst, only one-third of FHTs performed suture of wounds and abscess drainage. The highest national share for low complexity procedures is around 60% for removal of stiches, dressings, or intramuscular injectable medications (Figure 4.7). Still, this is too few if Brazil wants to increase the responsibility of PHC.

Figure 4.7. PHC has historically offered a low supply of procedures



Source: Adapted from Salazar, Campos and Luiza (2017[47]), The Rio de Janeiro Municipality's Services Portfolio and Health Actions in Primary Care in Brazil, https://doi.org/10.1590/1413-81232017223.33442016.

The low supply of simple procedures and surgeries is a source of care fragmentation and inappropriate referrals to more specialised care. High turnover of medical doctor, inadequate training to practise as PHC physicians, and the lack of equipment or resources are leading factors contributing to the difficulty of performing such procedures for FHTs (Salazar, Campos and Luiza, 2017[47]).

4.4.4. There is scope to improve patient experiences with public PHC services

Recent data from the 2019 National Health survey show that patient experience with PHC in Brazil needs to further improve. PHC obtains an overall score of 5.9 on a scale of 0 to 10, which is below the benchmark value of 6.6 recommended by the PCAT methodology (IBGE, 2019[48]). Some differences appear when considering registered households and non-registered households (Table 4.4). The general score was 6.0 for registered people versus 5.5 for non-registered people. The score was also more favourable among household that received at least one visit from community health workers or other members of the FHT, and for people having chronic conditions. People living in the South region also reported a higher score (6.3) than people living in the North (5.5).

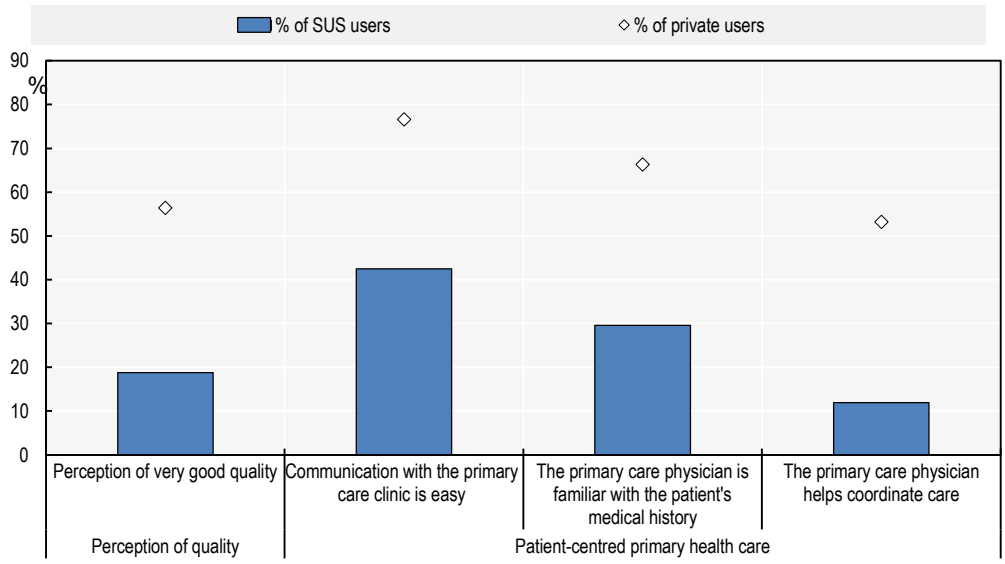
Less recent data looked at people-centeredness of PHC in Brazil. Good provider-patient communication and patient involvement in care and treatment decisions are key dimensions of patient centeredness, alongside the dimension of co-production which entails patients self-management and care co-ordination (OECD, Forthcoming[49]). Results from the PMAQ 2017 cycle showed that around 90% of patients reported that PHC doctors provided easy-to-understand explanation, and involved patients in decisions about care and treatment. An adaptation of the Commonwealth Funds International Health Policy Survey to the LAC context has shown a large variation in patient's experience between public and private users. SUS users were consistently less likely to report a positive experience with PHC compared to private users (Figure 4.8).

Table 4.4. Overall mean score of PHC (value from 0 to 10) depending on individual characteristics

Individual characteristics	Yes	No
Arterial hypertension	6.2	5.7
Diabetes	6.3	5.8
Heart disease	6.4	5.8
Depression	6.1	5.8
Is the household registered at the family health facility	6.0	5.5
Visit from community health workers	6.1	5.7
Overall score per Regions		
North	5.5	
Northeast	5.8	
Southeast	5.8	
South	6.3	
Midwest	5.8	

Source: IBGE (2019[48]), Pesquisa Nacional de Saude in Portuguese: Atenção primária à saúde e informações antropométricas, https://biblioteca.ibge.gov.br/visualizacao/livros/liv101758.pdf

Figure 4.8. SUS users consistently report lower patient experiences with PHC than private users, 2013



Note: Prevalence are adjusted for sex, age, level of education and self-reported health status.
Source: Authors, adapted from Guanais et al. (2019[27]), From the patient's perspective: experiences with primary health care in Latin America and the Caribbean.

4.5. Securing a greater quality dividend from PHC in Brazil

4.5.1. Strengthening the gatekeeping system to better recognise the central role of FHTs

While the overarching objective of the Family Health Strategy was to strengthen access to care, 20 years after its implementation only about 65% of the Brazilian population are currently registered with a FHT. The number of registered people is increasing in recent years following the *Previne Brasil* Programme

(Figure 4.1). Still, this is too low to address the new Brazilian's health care needs characterised by rising burden of chronic conditions and risk factors for health.

In addition, many Brazilians have direct access to outpatient specialties and hospitals for minor conditions that could be treated more effectively in primary are settings. The latest Health Information Survey for example found that around 50% of the diabetic population identified basic health units as their last contact to the health system, 11% used public speciality units in hospitals, 6% public urgent care units and 30% private practices or clinics (IBGE, 2020[50]). The later example confirms that a significant proportion of the population uses public speciality units or emergency departments for provision of chronic services, while these types of conditions are best treated in PHC settings. These give strong arguments to strengthen the gatekeeping system in Brazil with a systematic registration system with FHTs, which better control and orient the patient's into specialist care.

Gatekeeping system with a named PHC doctor or a FHT who provide overall care co-ordination can drive better care for patients, particularly for those having chronic diseases. It refers to the arrangement where a patient is only seen by a hospital specialist if authorised by the PHC physician who is responsible for overseeing and co-ordinating the health needs and providing care. In a recent systematic review of the literature, Sripa, Hayhoe, Garg et al. confirmed that gatekeeping was associated with better quality of care and appropriate referral for further hospital visits and investigation (Sripa et al., 2019[51]). Overall gatekeeping resulted in fewer hospitalisations and use of specialist care, but also led to lower patients satisfaction because it limits patient choice (Sripa et al., 2019[51]). In addition, a systematic registration system allow to build a profile of the health needs of the registered population, which improve care continuity through better patients' relationship to PHC providers (Starfield, Shi and Macinko, 2005[52]; Kringos et al., 2010[53]). Having a PHC physician as a regular source of care consistently show benefits for a variety of health and health related outcomes (Starfield, Shi and Macinko, 2005[52]). It allows for the provision of continuous and comprehensive care, focused on prevention and management of long-term conditions.

Box 4.3. Introducing a compulsory registration system in Norway

While before 2000, Norwegian citizens were able to consult GPs without restrictions, the Regular General Practitioner reform introduced a compulsory registration system. Pilot of the reform was undertaken in four municipalities in 1993 prior to national implementation.

With the reform, the general practitioner became responsible for providing and co-ordinating prevention, investigation and treatment of health care needs. He is also responsible for decisions on the need for referral to secondary care, and link with social security and social services when appropriate. The reform also specified that GPs should engage in public health activities, emergency care, out-of-hours care, and supervise students and doctors in training.

National implementation was a success, with close to 100% of Norwegians now registered with a GP. The scheme has been regarded as one of the most successful public services in Norway, with high satisfaction among both patients and GPs (Svedahl et al., 2019[54])

Source: OECD (2014[55]), *OECD Reviews of Health Care Quality: Norway 2014: Raising Standards*, https://dx.doi.org/10.1787/9789264208469-en.

Some OECD countries have introduced a compulsory registration system to encourage the right care at the right place (Box 4.3). In Norway, the Regular General Practitioner reform introduced in 2000 required all citizens to register with a named general practitioner (GP) of their choice. General practitioners became the usual source of care for people, and are now responsible for co-ordinating individual's prevention,

investigation, and treatment of health care needs. This approach is also taken in Chile, Portugal, and Italy: in these countries, the population are required to register with a PHC physician who control access to secondary health care (OECD, 2020[43]). Strengthening the gatekeeping system by requiring all individuals to register with a FHTs is a reform that Brazil wishes to consider in the future to strengthen the role and accelerate the expansion of the FHTs. This would help build accurate patient registers, and better recognise the central co-ordinating role of FHTs.

4.5.2. Expanding the range of health care services provided by FHTs towards disease prevention, treatment and management of long term conditions

In recognition of the challenges set out in Section 4.4, there is an increasing need to support and encourage FHTs to deliver a modern PHC service. A key function of a modern PHC is the provision of continuous and comprehensive care, focused on health promotion, prevention, treatment, follow-up of diagnoses and management of chronic and long-term conditions.

Previous studies have shown that PHC, when well equipped, can deal with a large range of health problems, including health promotion, preventive care, treatment and follow-up of diagnoses and simple technical procedures (Starfield, Shi and Macinko, 2005[52]; Kringos et al., 2010[53]). A comprehensive scope of PHC services is consistently associated with lower hospitalisation for chronic conditions, improved health outcomes and reduce health inequalities (OECD, 2020[43]; Starfield, Shi and Macinko, 2005[52]; Kringos et al., 2010[53]).

Underpinning greater comprehensiveness of PHC services entails delivering actions defined in the PHC Portfolio, and ensuring that all municipalities are able to properly deliver these actions and health care services. In Rio de Janeiro, the Health Services Portfolio has been found to be an important guiding tool to standardise and improve the range of services offered by FHTs (Salazar, Campos and Luiza, 2017[47]). For all defined procedures, Rio de Janeiro reports better performance than national average or other urban centres. An important policy lever has been the use of management agreements to foster compliance with the Health Services Portfolio. One indicator called “rate of implementation of items of the services portfolio” is monitored quarterly as part of the agreement, which enables to highlight problems in the practice and take corrective actions. Such a good practice could be consolidated nationwide. Another option for consideration, would be to monitor compliance rates with the CaSAPs and link it to financial incentives attributed in the Strategic Actions of the *Previne Brasil* Programme.

In a similar vein, although a number of clinical guidelines are produced in Brazil, there are no requirements and few incentives for FHTs to comply with the standard level of care. There is a risk, then, that these guidelines are not adequately adopted by FHTs. Experiences from OECD countries can be useful for Brazil in its efforts to improve compliance to clinical guidelines. Some OECD countries provide grants to municipalities to encourage compliance with clinical practice guidelines. In Sweden, the central government provides grants to regional governments to encourage guideline implementation (OECD, 2013[56]). New guidelines on dementia, for example, were accompanied by grants to be disbursed to local government, which were then free to use the additional funds as they saw fit. This approach maintains local responsibility for effective implementation, whilst drawing in national resources and support (OECD, 2013[56]). Arguably, the Ministry of Health could use the *Previne Brasil* Programme to monitor and encourage more systematic compliance with clinical guidelines.

At the same time, there is a need to support continuing medical education (CME). As earlier mentioned, a number of bodies such as the CONASS, CONASEM, the Brazilian Medical Association or the Brazilian Society of Family Medicine organise several training, conferences and on-line learning. However, a more formal CME framework which makes clear the expectation upon each FHT members, and supports them to meet it will be required to provide comprehensiveness of PHC services, and in line with the best available evidence.

4.5.3. Quality monitoring and benchmarking within PHC needs to improve

A fundamental element within a strengthened PHC sector is a data infrastructure capable of monitoring and benchmarking PHC activities and outcomes in a consistent way at national, municipal and provider level (OECD, 2020[43]).

Brazil collects several indicators on access to PHC, risk factors and quality for maternal health, child immunisation, breast cancer screening and management of hypertension and diabetes a part of the *Previne Brasil* Programme. While it is an important initiative toward quality monitoring, five quality indicators are process indicators, and only 2 indicators are intermediate outcomes measures. Better measurement of patient outcomes and experiences with PHC needs to be a priority in Brazil.

It will be important for Brazil to collect a richer set of quality indicators on a wider array of preventive activities and management of chronic conditions such as alcohol consumption, obesity, cancer screening or mental health. The experience from Portugal can be helpful to inform Brazil on the development of candidate indicators. Portugal has an extensive quality information infrastructure for PHC, which are collected as part of the contracting arrangements with PHC bodies (OECD, 2015[57]). The indicators provide information to senior management to evaluate performance and achievement, benchmarked against other institutions (OECD, 2015[57]). Indicators are collected across several domains – women's health and family planning; maternal health; child and youth health; hypertension; diabetes; cancer screening; mental health or patient experience (Table 4.5).

Table 4.5. Examples of indicators collected in Portugal

Domains	Indicators
Hypertension	Proportion of clients with hypertension, with at least one record of BMI in the last 12 months
	Proportion of users with hypertension with blood pressure recording in each semester
Diabetes	Proportion of users with diabetes, with at least one foot examination of recorded in the last year
	Proportion of clients with diabetes, with record management regimen (three items) in the last year
	Proportion of clients with diabetes, with consultation of nursing surveillance diabetes in the last year
	Proportion of clients with diabetes, with at least two HgbA1c tests in the past year
	Proportion of clients with diabetes, with the last record HgbA1c lower or equal to 8.0%
	Proportion of users with diabetes, with at least one or at least referencing a record of performing examination of the retina, in the last year
Mental health	Proportion of users aged over 18 years and a diagnosis of depression who were prescribed antidepressant therapy
	Proportion of users aged over 65 years who were not anxiolytics or sedatives or hypnotics prescribed in the period
Screening and prevention	Share of women with mammography in recent two years
	Proportion of users aged years with screening for colon and rectal cancer performed
	Proportion of users aged 14 and over, with quantification of smoking habits in the last three years
	Proportion of users aged over 14 years and with smoking, whom smoking-related consultation was held in the last year
	Proportion of users aged 14 and over, with quantification of alcohol consumption, registered in the last three years
Pharmaceuticals	Proportion of users aged over 75 years, with chronic lower than five prescription drugs
	Proportion of packaging billed drugs that are generic
	Proportion of users aged over 65 years with no prescription trimetazidine in the last year
Patient experience	Proportion of users satisfied or very satisfied
	Number complaints per 1 000 medical consultations conducted by doctors or nurses

Source: OECD (2015[57]), *OECD Reviews of Health Care Quality: Portugal 2015: Raising Standards*, https://dx.doi.org/10.1787/9789264225985-en.

Another best practice example across the OECD is from the National Programme for Quality Indicators in Community Healthcare (QICH). The programme is used to monitor and improve the quality of preventive, diagnostic, and therapeutic PHC services in Israel. The indicators in QICH cover nine clinical areas: health

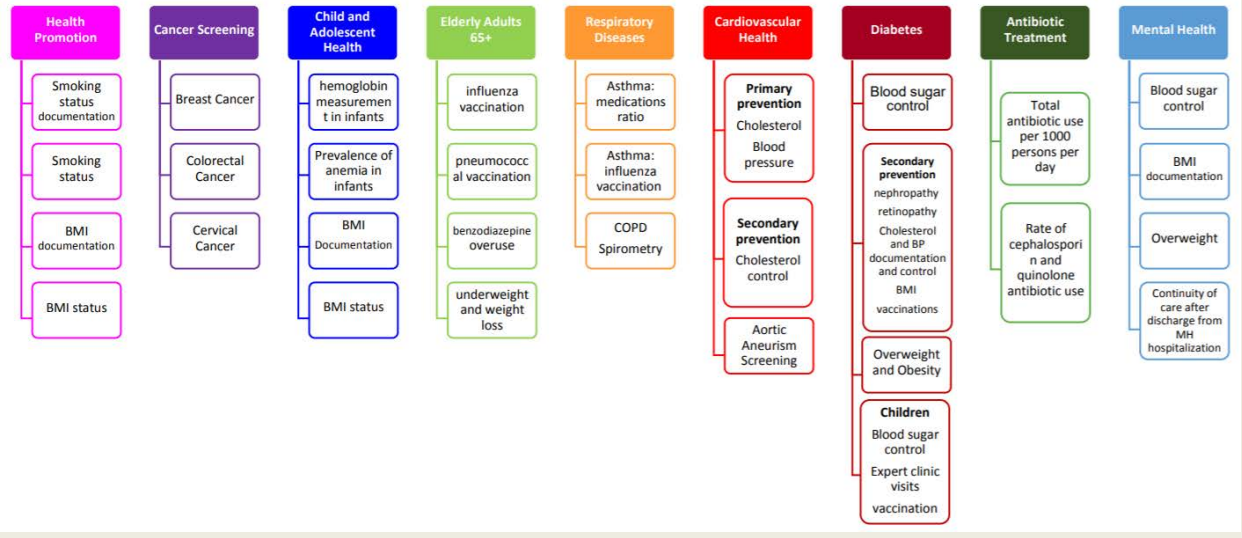
promotion, child and adolescent health, cancer screening (breast, colorectal and cervical cancer), elderly health, respiratory diseases, cardiovascular health, diabetes, antibiotic treatment and mental health. QICH incorporates a focus on primary prevention and management of chronic conditions, as demonstrated by the inclusion of indicators relating to risk factors in the general population, and the focus on COPD and asthma, diabetes, cardiovascular diseases and mental health (Box 4.4). Data quality for QICH is ensured through the use of standard indicator definitions by all health funds, and a systematic data quality audit cycle to ensure validity and comparability. Past evaluations have shown that the quality in community health care has improved over time for almost all categories of care – primary prevention, treatment and effectiveness of care (QICH, 2017[58]). In the area of diabetes care for example, a recent evaluation has found an improvement in most quality indicators (from 53% to 75% for the composite quality score). Declines were noted in rates of blindness, diabetes-related end-stage kidney disease, lower limbs amputations and diabetes-related mortality (Calderon-Margalit et al., 2018[59]). Quality improvements were also observed for elderly health (Podell et al., 2018[60]). The extensive use of electronic health records by health plans are one key successful factor of the QICH.

Regular feedback to providers on quality and outcomes as well as open publication for patients with performance data at municipal level and FHT level could also drive aspiration for continuous improvement. On this front, Brazil will need to improve transparency at granular level, and ensure that patients can monitor activity and quality of PHC at FHT level.

Box 4.4. The National Programme for Quality Indicators in Community Healthcare in Israel

The indicators in QICH cover nine clinical areas: health promotion, child and adolescent health, cancer screening (breast, colorectal and cervical cancer), elderly health, respiratory diseases, cardiovascular health, diabetes, antibiotic treatment and mental health. In total 20-eight indicators are collected (Figure 4.9). These indicators are based on national and international guidelines reflecting the current scientific evidence, international practices, relevance for the Israeli Health care system, and the feasibility of production.

Figure 4.9. The National Programme for Quality Indicators in Community Healthcare



An internal audit is conducted within each health plan, the QICH programme's directorate also performs a data audit, and an external audit is carried-out by a certified external audit. Throughout the auditing

process, methodologies, control processes, documentation, and lessons learned were examined, nurturing a continuous improvement in indicator reporting.

Table 4.6. Performance results at national level for selected indicators, 2017-19

Domains	Indicators	2017	2018	2019
Health promotion	Documentation of BMI components (ages 20-64)	90.33%	89.51%	89.16%
Cancer Screening	Under-screening for cervical cancer (women aged 35-54 who were not screened in the last 5 years)	35.71%	34.64%	32.65%
Child health	Documentation of BMI components in children (age 14-18 years)	74.94%	76.71%	77.54%
Elderly health	Use of long-acting of benzodiazepines in older adults (aged 65 years or older)	2.29%	2.17%	1.88%
Respiratory diseases	Asthma medication ratio (AMR) greater than or equal to 0.5 (ages 5-45 years)	69.71%	70.67%	71.94%
Cardiovascular health	Rate of LDL cholesterol level less than or equal to 160 mg/dL in those at low-risk for heart disease (ages 35-74 years)	90.18%	90.35%	90.49%
Diabetes	Uncontrolled diabetes: HbA1c greater than 9% in individuals with diabetes mellitus (ages 18 years or older)	9.98%	9.60%	9.01%
Antibiotic	Documentation of molecular HCV test among those with a positive serology test	83.34%	85.55%	87.59%
Mental Health	Adequate control of HbA1c in individuals with SMI and diabetes mellitus (ages 18-84 years)	71.15%	71.83%	72.07%

Source: QICH (2017[58]), National Program for Quality Indicators in Community Health Care in Israel, https://en.israelhealthindicators.org/publications.

To support greater patient-centred care, it is also important to collect patient-reported experience measures with PHC (OECD, 2021[61]). This approach is taken internationally. In England for example, the GP Patient Survey assesses patient's experience of health care services provided by GP practices within the National Health Service (NHS) England (OECD, 2020[43]). It assesses experience of access, making appointments, the quality of care received from health care professionals, patient's health and experience of their GP practice. Around 2 million patients registered with a GP practice are surveyed twice a year. The Care Quality Commission uses the results from this survey in their regulation, monitoring, and inspection of GP practices in England. The GP Patient Survey offers a description of each GP practice and its performance based on the latest survey. The analysis tool also provides comparison of performance between GP practices.

In 2017, the OECD launched the Patient-Reported Indicators Surveys (PaRIS) to address the need to understand the outcomes and experiences of people with chronic diseases (Box 4.5) (OECD, 2021[61]). PaRIS is the OECD's Patient-Reported Indicator Surveys initiative where countries work together on developing, standardising and implementing a new generation of indicators that measure the outcomes and experiences of health care that matter most to people. The International Survey of People Living with Chronic Conditions will be the first of its kind to assess the outcomes and experiences of patients managed in PHC across countries. The PaRIS survey aims to fill a critical gap in PHC, by asking about aspects like access to health care, waiting times, as well as quality of life, pain, physical functioning and psychological well-being. The initiative will help open a dialogue with service providers about how to further improve the performance of health services and health systems to become more people-centred. Brazil might want to join the OECD PaRIS survey to understand how the outcomes and experiences of care in Brazil compare with those in OECD countries.

Box 4.5. The OECD PaRIS Survey

In 2017, the OECD launched the Patient-Reported Indicators Surveys (PaRIS) to address the need to understand the outcomes and experiences of people with chronic diseases. PaRIS offers an opportunity for gathering the evidence necessary to transform health care systems into patient-centred systems based on the needs of the people they serve. The initiative includes:

- the collection of validated, standardised, internationally comparable patient-reported indicators in three areas: hip and knee replacements, breast cancer care and mental health care
- the collection of a new set of internationally comparable measures which focus on patients with one or more chronic conditions, who are living in the community, and who are largely treated in PHC or other ambulatory care settings.

Source: OECD (2021[61]), Patient-Reported Indicator Surveys (PaRIS), https://www.oecd.org/health/paris/.

The inclusion of the PCAT Tools in the 2019 National Health Survey is a positive step in Brazil to better understand users' experience with PHC services. This initiative should be maintained over the longer term.

4.5.4. Accreditation system for FHTs could help standardise and improve care quality

To standardise quality across the country, it is warranted to establish accreditation programme for PHC. Accreditation is a control mechanism to assure the quality of health care services, which often feeds into quality improvement (OECD, 2017[63]). It uses explicit standards derived from the best available evidence to assess performance of health care organisation through survey, assessments, or audits. Accreditation is particularly needed when performance data are lacking.

Several OECD countries have established accreditation system in PHC, including Australia, Canada, England, New-Zealand or the United States (Tabrizi and Gharibi, 2019[64]). In these countries, community oriented care, safe-care, high quality care, care continuity and human resource management had the highest priority among accreditation programmes (Tabrizi and Gharibi, 2019[64]).

England's approach to health service accreditation is at the forefront of OECD efforts, and is a model for other health care systems to emulate (Box 4.6). It is unusually comprehensive as it accredits all providers of primary and social care. The accreditation is carry-out by the Care Quality Commission an independent statutory body responsible for registering care providers; monitor, inspect, and rate services, and take action to protect population who use services (Care Quality Commission, 2021[65]). In Australia, the Australian Commission on Safety and Quality in Health Care, in collaboration with the Royal Australian College of General Practitioners, developed the voluntary National General Practice Accreditation Scheme. The Scheme aims to encourage safe and quality general practice in Australia. It involves independent third party review that practices meet the requirements set by the Royal Australian College of General Practitioners, and offer financial incentives to support activities that encourage continuing improvement in quality of care.

A starting point to improving quality in PHC will be to build accreditation system for all FHTs to carry out independent assessment of performance and identify areas that may require improvements. An accreditation system in Brazil could help standardise PHC in municipalities to achieve more consistent quality across the country.

Establishing a national inspectorate for health similar to the Care Quality Commission in England or the Haute Autorité de Santé in France could help to provide independent verification that standards are being met, identify good practice and support weaker centres to improve their standards. The new Agency for

the Development of PHC could also take this role, and act as an inspectorate for PHC. The Agency could for example be responsible for quality monitoring and improvement, and have a prescriptive role in producing overviews of current practice, current performance, and setting standards on performance and performance reporting. It could also develop tools such as evaluation framework, deep dive teams to visit and support municipalities with special needs, and levelling out resources when needed. This Agency could also provide a platform or forum for contact and exchange between municipalities, evaluating innovative practices and consolidating quality initiatives across the country when successful.

Box 4.6. Accreditation system in England is comprehensive

In England, the Care Quality Commission (CQC), an independent statutory body established in 2009, is responsible for the inspection for hospitals, adult social care, general practice, mental health care services, ambulances and community-based services. All providers of regulated activities, including NHS and independent providers, have to register with CQC and follow a set of fundamental standards of safety and quality below which care should never fall. The CQC assesses if providers are meeting these fundamental standards through monitoring and inspection.

The findings of such assessments are shared with the public, and citizens are encouraged to share their experience or report concerns to the CQC.

England's health care system is one of the few in the OECD to have a comprehensive accreditation programme for PHC. By Mars 2020, 7 237 GP services have been inspected and rated, while only 1 461 sites have not. Detailed individual practice inspection reports are publicly available on a website (Figure 4.10). The core services being inspected are urgent and emergency services, medical care, surgery, critical care, maternity and gynaecology, services for children and young people, end of life care, outpatients' services and diagnostic imaging. After inspection, the GP services must respond to areas of concern that was identified, develop an action plan to address them and make improvements. Detailed individual practice inspection reports are publicly available on a website.

Figure 4.10. Example of a CQC inspection in a GP surgery

CQC inspection area ratings

(Latest report published on 8 March 2021)

Safe	Inadequate
Effective	Requires improvement
Caring	Good
Responsive	Requires improvement
Well-led	Inadequate

Source: Care Quality Commission (2021[66]), CQC inspection ratings for GP services, https://www.cqc.org.uk/search/services/doctors-gps?sort=default&distance=15&mode=html.

4.5.5. Designing smarter payment for PHC

The *Previne Brasil* scheme is an important scheme to drive quality improvement in Brazil. In the years to come, it will be important to maintain and even expand the scheme. Compared to other OECD countries, the incentivised priority areas in Brazil have a stronger focus on child and maternal health. In OECD countries, the management of chronic conditions is frequently put at the centre of P4P schemes (OECD, 2020[43]). The *Previne Brasil* programme plans to expand the number of indicators by 2022 to include other indicators around mental health, breast cancer, multi-professional action, and patient experience (Ministério da Saude, 2020[67]). This will be an important step given the rising burden of chronic conditions and the need to address some risk factors for health including obesity. The experience from Portugal or England could inform the development of candidate indicators to be incorporated to the *Previne Brasil* programme.

A second key difference between the Brazilian P4P compared to most OECD P4P schemes is the fact that bonus payments are not made to the individual physician or the structure that he/she works for but to the municipalities that employs him/her, with no obligation for municipalities to pass on their bonuses to staff. This is not common in OECD countries in PHC. Generally, research suggests that P4P schemes with bonus payments aimed directly at professionals are more effective (Eijkenaar et al., 2013[68]).

Table 4.7. New forms of payment for PHC across the OECD

Add-on payments	Bundled payments	Population-based payments
Australia, Austria, Canada, Denmark, France, Germany, Iceland, Israel, Italy, Mexico, Sweden	France, Italy, the Netherlands, Canada, Australia, Belgium	United States (Accountable Care Organisations), Germany (Gesundes Kinzigtal GmbH)

Source: OECD (2020[43]), Realising the Potential of Primary Health Care, https://doi.org/10.1787/a92adee4-en.

Lastly, there are successful experiences across the OECD where innovative forms of payment for PHC have been introduced to encourage greater prevention, management of chronic disease and incentivise providers to effectively work together. Beyond P4P programme, there are three innovative forms of payments across OECD countries (OECD, 2020[43]) (see also Table 4.7):

- Add-on-payments: Additional payments to remunerate specific activities in order to target some dimensions of the care provisions such as establishment of care plans, collaborative care meetings or the provision of patient education. In 2018, 11 OECD countries used add-on payments to pay for co-ordination or prevention. In Denmark, general practitioners get pay-for-co-ordination, notably when they have more responsibility for treatment of chronically ill patients (e.g. diabetes).
- Bundled payments: The objective is to bundle separate health care activities into a single tariff for chronic conditions. The single tariff should cover the cost of all health care services provided by the full range of providers during a specific time period. In this type of arrangement, a group of health care providers is collectively responsible for the delivery of a wide range of activities for a pre-defined population group, typically involving at least PHC and secondary care. Evidence shows that bundled payments lead to better collaboration within and across care settings and can contribute to a greater standardisation of care and to the development of sophisticated IT systems. In 2018, 5 OECD countries used bundle-payments. The Netherlands have for example established bundled payments to care groups for patients diagnosed with Diabetes type 2, COPD and cardio-vascular diseases.
- Population-based payments: This payment scheme is an extension of bundled payment, being not restricted to particular episodes of care or conditions. It consists of one payment made to groups of health providers as well as management companies to cover most health care services for a

defined group of the population. Rather than paying providers in "silos", the money follows the patients across providers, covers most health care services and has a more comprehensive view of population well-being. In 2018, only two OECD countries used population-based payments, including for example the "Gesundes Kinzigtal" Initiative in Germany.

4.5.6. Expand the development of Rede de Atenção à Saúde to promote integrated care

Given the context of an epidemiological transition towards longer lives and increasing prevalence of chronic conditions, an important challenge in Brazil is to shift the focus of health care services towards addressing longer episodes of health care needs. To this end, greater integration between PHC, emergency care, specialist care and social care services is needed. Interactions between various health care providers about patient cases, and transitions from one service to another, should be timely, safe, and seamless for the patient and its family (OECD, Forthcoming[69]). PHC needs to play a key role in achieving this goal.

The impact of integrated care include better access, improved satisfaction for patients and health professionals, more appropriate care, enhanced preventive care, reduced avoidable hospital admissions, prolonged independent living and delayed admission to institutional care, improved health status and quality of life (Nolte and Pitchforth, 2014[70]; Curry and Ham, 2010[71]).

In Brazil, the *Rede de Atençao à Saúde* (RAS) are ambitious health care network aimed at reducing health fragmentation within the Brazilian health system. As earlier mentioned, the implementation of RAS is supported by Planificação da Atenção à Saúde (PAS) and Chronic Conditions Care Model (MACC) developed by CONASS (CONASS, 2020[13]; CONASS, 2018[14]). RAS is included in the scope of the Regioes de Saúde, with technical, logistics and managerial support to encourage effective integration.

However, implementation of RAS in Brazil is challenged by bureaucratic governance model and weak institutional leadership, workforce issues such as inadequate training and qualification toward inter-professional collaboration and co-ordination, a weak information system and payment policies that do support integrated care (Ministério da Saude, 2014[72]). These have resulted in low and uneven diffusion of RAS initiative across the country. Brazil will need to work on these four fronts to promote integrated care and ensure effective implementation of RAS (Box 4.7).

Brazil could learn from other OECD countries, which have embarked on different pathways to operationalise the integration of care, such as the Spain Basque Country with Integrated Care Organisations, the United Kingdom with PHC Networks and the United States with Accountable Care Organisations.

Box 4.7. Promoting integrated care and ensuring effective implementation of RAS in Brazil

Stronger leadership and governance model

The importance of leadership and management for the successful implementation of integrated care as well as integrated care service delivery as already been demonstrated in recent studies (Borgermans and Devroey, 2017[73]). While there is no one size fit all models, consolidated strategies seem often to be developed based on consultations with main stakeholders so that they can be implemented effectively by holding them collectively accountable and committed to achieving the common goals of promoting integrated care delivery.

Better workforce planning and modern educational training

To ensure that PHC workers work together with other health care professionals, there is a need to increase effort to develop appropriate training towards multi-disciplinary teams, case management, and

developing new roles for care co-ordination. In Germany, a national training programme focussing on case management was made available for nurses to strengthen their role in delivering care co-ordination. The Basque country in Spain created new roles such as liaison nurses and referral internists to co-ordinate and organise care. In Australia also, care co-ordinators for cancer patients or patients with chronic long-term conditions have been established to liaise health professionals, interface with the patient's health care team, help arrange health screenings, resolve barriers to accessing the health networks, and source follow-up health education.

Stronger data and information systems

Strong data and information systems are critical to support integrated care. With growing number of patients with complex needs receiving care by various services over long episodes of care, such systems can help improve communication and co-ordination between patients and their providers, increase the accuracy of diagnoses and clinical decision-making, help monitor and deliver appropriate services remotely, and provide patients more access to their health history. In Brazil data linkage remains insufficient, undermining information sharing in the context of integrated care (see (OECD, 2021[41]).

Smarter payment models

Payment models need to incentivise providers from different health sector to effectively work together. Fragmented governance in Brazil may undermine resource allocation across health care, hinder integrated care delivery. At the same time, there are some good providers' payment mechanisms that encourage greater co-ordination and integration of care – such as add-on payments, bundled payments or population-based payment. Add-on payments reward more co-ordinated, safer and effective care, and are widespread across OECD countries in PHC (Table 4.7). Population based payment for example pool into a single payment all services delivered to patients including prevention and treatment across hospitals, primary and long-term care. In the United States, ACO receive a virtual budget for a wide range of services and they are incentivised by shared savings contracts by payers to co-ordinate care across different levels efficiently.

Source: OECD (2020[43]), Realising the Potential of Primary Health Care; OECD (Forthcoming[69]) Strengthening Performance of Integrated Care Delivery across OECD countries.

4.6. Conclusion

Looking to expand access to high quality PHC, Brazil has been taking important steps to improve the distribution of doctors, develop new forms of service organisations and introduce new financing models for PHC. The development of guidelines and health care services portfolio; and the production and publication of data underpinning PHC are also important steps towards ensuring high quality care across the country. All these developments are well aligned with the experiences of OECD countries, and have led to large improvements in access to PHC and population health outcomes.

However, the Brazilian PHC system is still characterised by a relatively low population coverage. A significant proportion of the population also have direct access to outpatient specialties and hospitals for minor conditions, perhaps because PHC has traditionally provided few low complexity procedures and surgeries. Available evidence also points to the need for enhancing the contribution of PHC to prevention and management of chronic conditions, notably in North and Northeast regions which present consistently poorer health care.

These shortcomings give strong arguments to strengthen the gatekeeping system in Brazil with a systematic registration system with FHTs, which will control and orient the patient's into specialist care. This is a prerequisite to accelerate the expansion of FHTs, helping to build a profile of the health needs of the registered population, and better recognise the central co-ordinating role of FHTs. Actions are also needed to support FHTs to deliver a more modern PHC service provision, focused on prevention, treatment, follow-up of diagnoses and management of chronic conditions. The federal government will need to play a more prescriptive role to strengthen comprehensive PHC evenly across the country. These would include ensuring that all municipalities are well equipped and trained to properly deliver actions and services defined in the CaSAPs. There are also opportunities to monitor and encourage compliance with clinical guidelines and CaSAPs using the *Previne Brasil* Programme – either through the Strategic Actions or the P4P component. Collecting a richer set of quality indicators on a wider array of preventive activities and management of chronic conditions (such as alcohol consumption, obesity, cancer screening or mental health, and patient experience) would also support greater patient-centred PHC. An accreditation system in Brazil could help standardise PHC quality – notably in municipalities having low capacity and high vulnerability – to identify areas that may require greater financial and organisational support. The new Agency for the Development of PHC could act as an inspectorate for PHC, for example to provide independent and external verification that standards are being met, identify good practice and support weaker centres to improve their standards.

Going forward, Brazil will have to establish strong oversight and good management, develop appropriate training, alongside strong data and information systems for the successful implementation of RAS. Appropriate payment models would be critical to incentivise providers from different health sectors to effectively work together. While this may come too early at the moment, the introduction of add-on payments or bundled payments is certainly something Brazil could consider in the future.

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[1] See https://aps.Saúde.gov.br/biblioteca/index/MQ==/Mg==

[2] See for example http://www.ripsa.org.br/category/publicacoes-ripsa/

[3] Available at https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2101758

5 Workforce challenges in primary health care in Brazil

Brazil is struggling with a shortage and an uneven distribution of medical doctors across regions, compounded with a low credibility and recognition of the PHC specialty. To secure a greater number and distribution of primary care doctors and ensure a high-quality workforce, the first priority for Brazil is to implement a coherent workforce planning based on an objective assessment of present and future needs to govern health care human resources. In tandem, Brazil could look at the experiences of OECD countries to train more rural doctors and to provide both financial and non-financial incentives linked with a return of service obligation. A smarter use of nurses and community health workers is another option to cope with workforce gap. There are also opportunities to make the PHC specialty a mandatory requirement to be allowed to practise PHC, and to implement stronger requirements around continuous medical education.

5.1. Introduction

As many other OECD countries, Brazil is struggling with a shortage and an uneven distribution of medical doctors across regions. Practicing doctors per 1 000 population in 2019 were lower than the OECD average (at 2.3 compared to 3.5), while the distribution of medical doctor followed a North-South gradient where North and Northeast regions show a lower density of medical doctor. At the same time, the specialty of family and community medicine (FCM) is not attractive and undervalued in Brazil. Very few doctors working in PHC have undertaken specialist training. In 2018, only 5 486 medical doctors had a specialty training in FCM, representing 1.4% of all specialists in Brazil. While people living in North and Northeast regions have the highest health care needs, these regions gather less than 20% of all FCM specialists.

In recognition to these challenges, several programmes were implemented by the federal government to reduce the shortage of doctors in prioritised regions; and improve access to and quality of medical training in the country, including the More Doctors Programme (*Mais Médicos para o Brasil*). However, unfilled PHC positions is still the norm in Brazil, gaps in medical education remain between medical schools and geographic disparities in access to medical training persist. The North and Northeast regions offer the lowest levels of per capita medical undergraduate positions in the country.

This chapter examines workforce challenges for the PHC setting in Brazil. Section 5.2 describes the shape of Brazil PHC workforce in terms of the rates and ratios of medical doctors, nurses and community health workers. In Section 5.3, the chapters describes the organisation and quality of medical education in Brazil. In Section 5.4, the chapter then explores ways to improve the geographical distribution of doctors and overcome the issue of shortage of PHC doctors. Section 5.5 considers how to improve the recognition and credibility of the specialty of FCM and points out some key policy levers to strengthen the quality of medical education in Brazil.

5.2. The shape of Brazil's PHC workforce

Brazil's health workforce is characterised by a shortage and a misdistribution of medical doctors that is particularly acute in the North and Northeast of the country. Brazilian figures suggest that medical doctors do not perceive the specialty of PHC, and rural and remote areas, as attractive and prestigious. The shortage and misdistribution of PHC physicians is a common health workforce policy challenges OECD countries face. Concerns about income, opportunities for career development, isolation from peers, as well as educational options for children and professional opportunities for their spouse are leading factors of these challenges.

5.2.1. Physician density in Brazil remains lower than the OECD average, with persistent concerns over geographic distribution

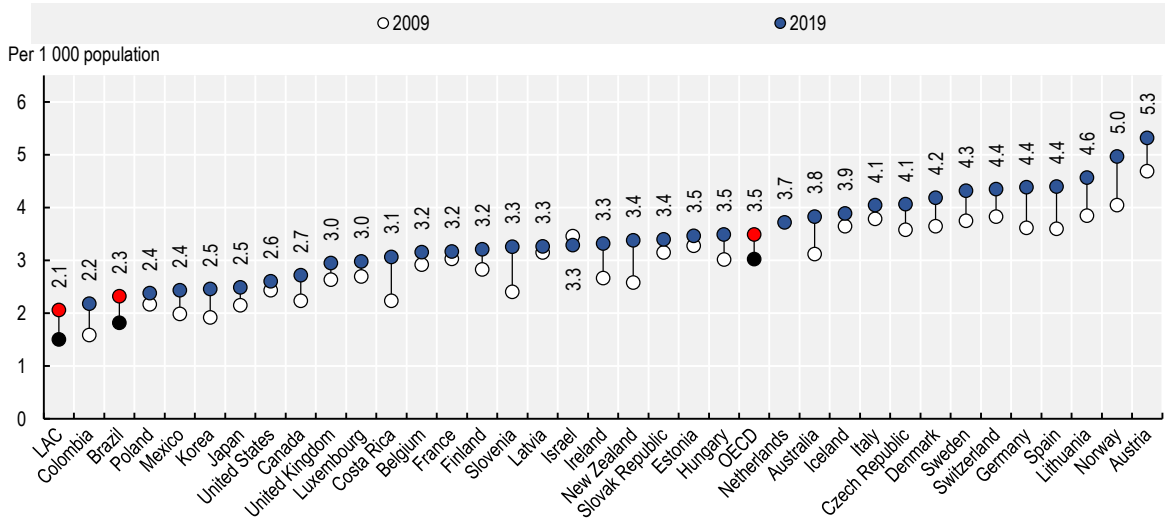
While Brazil has clearly recognised that a strong PHC is the foundation of an effective, efficient and responsive health system, the number of trained PHC physicians is well below OECD countries and of other LAC countries.

In Brazil, practicing doctors per 1 000 population in 2019 were very low compared to the OECD average, at 2.3 compared to 3.5 (Figure 5.1). This is among the lowest density, just above Colombia (with 2.2 doctors per 1 000 population) and the LAC average (2.1 doctors per 1 000 population). However, the number of doctors increased by 50% in Brazil over the past decade.

According to the Ministry of Health, there are around 60 000 medical doctors working in PHC in Brazil. Although a distinct specialty of FCM is established in Brazil, very few doctors working in PHC have undertaken specialist training in FCM. In 2018, only 5 486 medical doctors had a specialty training in FCM, representing only 1.4% of all specialists in Brazil (Scheffer et al., 2018[1]). Medical doctors who specialise

in internal medicine also have some competencies applicable to FCM, but they also represent a small share of specialists (around 11.2%) in Brazil in 2018. Taken together, these figures suggest that Brazil struggles to attract physicians to specialise in PHC. The low attractiveness of the PHC specialties can be linked to a lower recognition, prestige, and remuneration level compared to other specialties.

Figure 5.1. Doctors per 1 000 population, 2009 and 2019 (or latest year available)



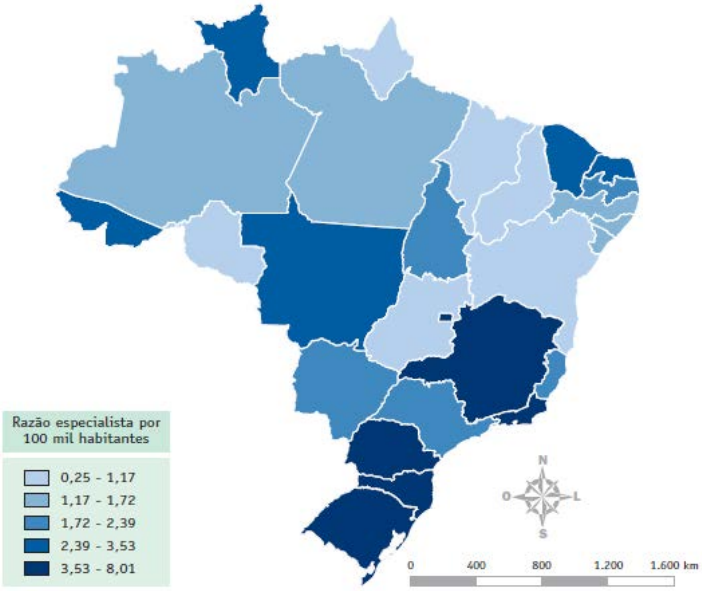
Source: OECD (2021[2]) Health Statistics Database, http://stats.oecd.org; Brazilian Ministry of Health.

Regional differences in the distribution of all physicians is an important concern in Brazil. As in many OECD countries, the number of doctors per capita varies widely across regions. While overall there are 2.3 doctors per thousand population in Brazil, there are capitals with more than 12 doctors per 1 000 population (Vitória, in Espírito Santo for example), and regions with values below one doctor per 1 000 population (the Amazon Region in the North) (Scheffer et al., 2018[1]). The differences between small and large municipalities in Brazil is comparable to other OECD countries.

The uneven distribution of doctors holds true when looking at some specialities, for example for the FCM specialist. Figure 5.2 indicates that some states in the North and Northeast regions have the fewest doctors per population, while the best-supplied region is the South and Southeast regions, followed by the Central-West (Scheffer et al., 2018[1]).

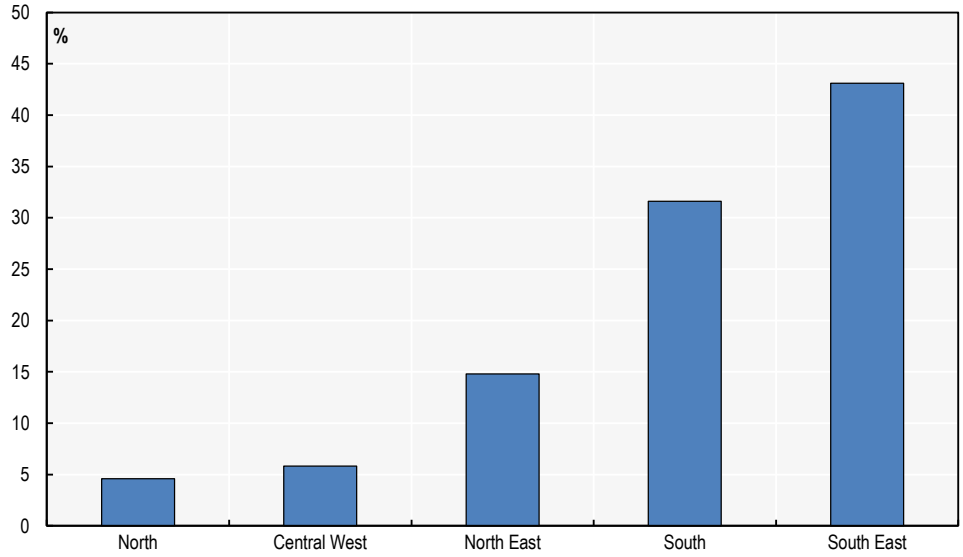
On a state level, the FCM specialist per 1 000 population ratio ranges from 0.4 in Maranhão in the Northeast region to 1.6 in Rio de Janeiro. Overall, the North region of Brazil gather only 4.6% of all FCM specialists, while the South and Southeast regions gather almost 75% of all FCM specialists (Figure 5.3).

Figure 5.2. Density of family and community medicine in Brazil per States, 2018



Source: Scheffer et al. (2018[1]), Demographia Médica No Brasil 2018.

Figure 5.3. Distribution of family and community specialists per regions, 2018



Source: Scheffer et al. (2018[1]), Demographia Médica No Brasil 2018.

Geographical imbalances across different regions in Brazil reflect the concentration of specialised services and physicians' preferences to practise in urban settings. As in many other OECD countries, Brazilian doctors might be reluctant to practise in rural regions or socio-economically challenged urban areas due to concerns about their professional life (including their income, working hours, opportunities for career development, isolation from peers) and social amenities (such as educational options for their children and professional opportunities for their spouse) (OECD, 2019[3]).

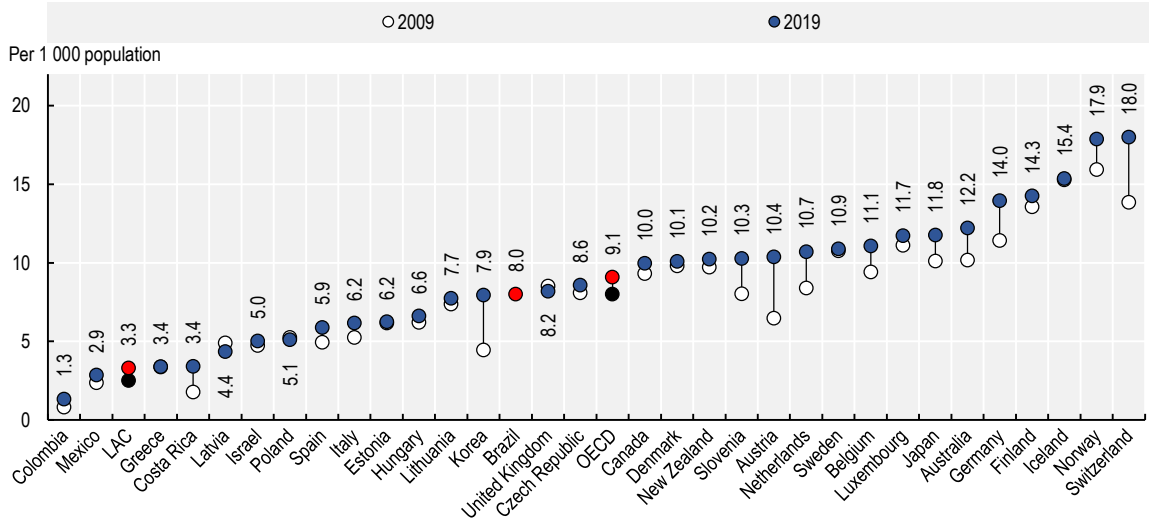
It is also important to note that geographical imbalances in medical doctor (and PHC physicians), is disproportionately experienced by people living in remote and rural areas who have the highest health care needs, and where social vulnerabilities are highest (Oliveira et al., 2017[4]). This means that the PHC sector faces a double challenge of high health care demand and staff shortages, which can lead to inequitable access to care (Barbosa and Cookson, 2019[5]). Shortages and geographical imbalances in workforce need to be addressed as a matter of priority as it can lead to lower health outcomes, lower health care quality and unmet needs for population living in underserved regions (see Chapter 2 and Chapter 4).

5.2.2. Brazil nursing workforce has significantly increased over the past decades

In 2019, Brazil had 414 712 nurses, and annually produced about 50 000 nurses in their undergraduate nursing programmes (Cassiani and Silva, 2019[6]). In the Latin American region, Brazil is the only country that trained nurses in professional master's degree, which grew by 156% in the period 2011-20.

Brazil's nursing workforce has increased over the past decade to reach eight nurses per thousand population in 2019, moving closer to the OECD average of 9.1 (Figure 5.4). This is much higher than the LAC average of 3.3 nurses per 1 000 population. The increase in the volume of nurses is mainly explained by the implementation of new federal regulations, including the creation of specific PHC teams (Riverside team, Health Academy Programmme, the Home care teams among other), requiring nurses.

Figure 5.4. Nurses per 1 000 population, 2009 and 2019 (or latest year available)



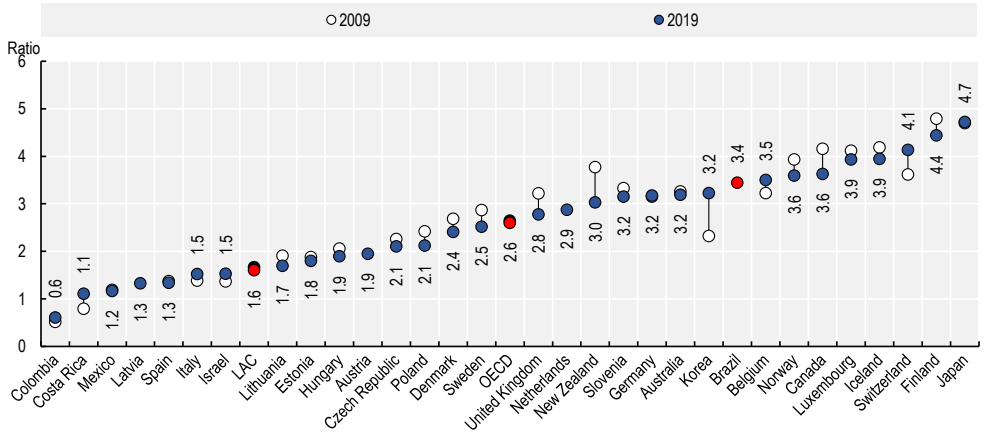
Source: OECD (2021[2]) Health Statistics Database, http://stats.oecd.org; Brazilian Ministry of Health.

The skill-mix – the ratio of nurses to doctor – is relatively higher in Brazil (Figure 5.5) than the OECD and LAC average. Nurses outnumber doctors in Brazil at 3.4 nurses per medical doctor, compared to the OECD average of 2.6 and the LAC average of 1.6.

This is a welcome news to respond to the changing demand for health services. There is a need for a better health professional skill-mix in the context of rapidly ageing populations and rising burden of chronic conditions in Brazil (see Chapter 2). Currently, there is no discussion around the expansion of nursing role or implementing advanced functions for nurses, as it has been introduced with some success in other OECD countries such as Australia, Canada, the United States, the United Kingdom, some Nordic countries, and France more recently. In these countries, advanced practice nurses provide greater support in the care of chronically ill patients and those with complex morbidities, working in co-operation with PHC

doctors and specialists in teams and other health and long-term care settings. Improved interaction and communication between members of FHTs is critical for the success of task shifting and redistribution of roles.

Figure 5.5. Ratio of nurses to doctors, 2009 and 2019 (or latest year available)



Source: OECD (2021[2]) Health Statistics Database, http://stats.oecd.org; Brazilian Ministry of Health.

5.2.3. Community health workers play a crucial role in PHC

Following the implementation of the Community Health Agents Program (PACS), CHWs started to play a crucial role in the Brazilian PHC system. CHW are frontline public health workers, often members of the communities in which they work and have therefore valuable knowledge of people needs and are trustful source of information (Grossman-Kahn et al., 2018[7]; Wadge et al., 2016[8]). While a range of different health professionals are involved in PHC delivery (physicians, nurses, nutritionists, pharmacists or social workers, etc.) (see Chapter 2), there are up to 12 CHWs involved in each FHT. In 2020, more than 250 000 CWHs served 61% of the population, up from 60 000 in 1998. The population covered by CHWs is the highest in the Northeast and North regions (with at least 74% of the population covered by CHWs) (Figure 5.6).

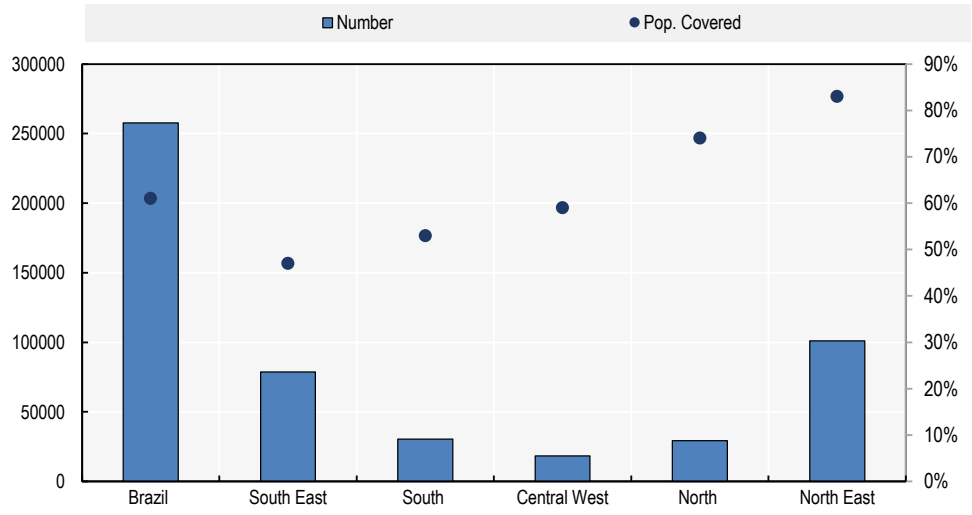
Unlike many OECD countries, in Brazil, CWHs provide a wide range of support for comprehensive PHC services including clinical triage, health promotion, social determinants and household data (Grossman-Kahn et al., 2018[7]). They are expected to resolve many low-level problems such as medication review for patients chronically ill, while referring more complex issues to doctors and nurses of the FHT. CHWs complete between 10-15 home visits a day, and spend between 1-2 hours a day at the clinics doing paperwork, organising the waiting rooms, consultation appointments for other health professionals and offering educational sessions. They are responsible for registering the households in the areas where they work, and help families access other government services such as conditional cash transfers and social services. Within FHTs, each CHW is responsible for 150 families.

The minimum requirement to become a CHW is to get a secondary education, but more than 60% have a professional diploma. Turnover is low as it is a stable and respectful profession (Wadge et al., 2016[8]).

Despite their importance for the provision of PHC services, studies have shown that CHWs do not have many technological supports to operate in the community. Evaluations show that CHWs are effective at improving specific health outcomes and access to health care (Grossman-Kahn et al., 2018[7]), and that it can represent a cost-effective intervention to deliver essential health care services (Vaughan et al., 2015[9]). Yet, available evidence also highlights that, in many remote and vulnerable municipalities, CHWs

are not equipped with mobile phones and tablet computers to enable remote diagnoses and real time communication with the PHC facilities (Wadge et al., 2016[8]).

Figure 5.6. Number of community health workers by regions



Source: Ministério da Saùde (2020[10]), Painéis de Indicadores : Agentes comunitários de saúde, https://sisaps.saude.gov.br/painelsaps/acs

Overall, the COVID-19 pandemic demonstrated the importance of having a skilled and sufficient health workforce to respond swiftly and effectively to the public health crisis. Health professionals (doctors, nurses and community health workers) are at the forefront of the crisis, and the pandemic has put huge pressure on them, affecting their physical and mental health. In Brazil, as well as in OECD countries, investments in human resources for health are critical (see Box 5.1).

Box 5.1. The COVID-19 pandemic demonstrated that investments in human resources for health are critical

Across OECD countries, the pandemic is making pre-existing shortages of doctors and nurses more visible and acute. Shortages of doctors and nurses result from a lack of investment in education and training programmes and in recruitment of new staff and retention of existing staff. These shortages, in turn, resulted in heavy workload and burnout among health workers.

As doctors, nurses and other health professionals mobilised on the frontline to respond to the COVID-19 pandemic, OECD health systems sought ways to increase the number of staff available during the peak of the pandemic and to make the most efficient use of their work. This included recalling inactive and retired health professionals, offering them some short training to update and upgrade their skills (Italy, Portugal, the United Kingdom for example). Other countries mobilised or established a “reserve list” of health workers to deal with the outbreak and reallocate staff across regions (France, Belgium, Ireland and Iceland). COVID-19 has also accelerated innovative roles of health professionals, removing pre-existing structural and institutional barriers and permitting a more efficient use of human capital in the health sector. In Canada, for example, pharmacists have been authorised to extend prescriptions beyond what they were previously allowed to do, and to prescribe certain medications.

Source: OECD/European Union (2020[11]), *Health at a Glance: Europe 2020*, https://doi.org/10.1787/82129230-en.

5.2.4. Health workforce planning is at best very limited in Brazil

In Brazil, the federal agency called *Instituto Nacional de Estudos e Pesquisas Educacionais Anisio Teixeira (*INEP) monitors workforce trends to support policy planning. INEP is also responsible for monitoring and assessing the basic and higher education system, and for promoting the dissemination of indicators and results of evaluation of the education system. The Secretaria de Gestão do Trabalho e da Educação na Saúde (SGTES) at the Ministry of Health is responsible for formulation of policies for health workforce management, training and qualification of health workforce, regulations of health professionals and regulation of the decentralisation process. It was created as the main federal instrument to mobilise and manage health care workforce. It defines the National Human Resources Health Policy for the good performance of SUS, in partnership with the Ministry of Education.

However, there is a lack of knowledge of present and future needs for doctors and other health care professionals in Brazil (Oliveira et al., 2017[4]). Health care workforce planning is not based on an objective assessment based on the characteristics of the professionals (age, and sex), the work processes (productivity, workload), the characteristics of the health system in place (coverage and type of services offered), and population health needs (such as socio-economic and epidemiological profiles).

Rather, existing estimates are built on feasibility concerns, using data comparing ratio of doctors per thousand population between Brazil and other countries to determine a desirable ratio and create targets for improvement (Oliveira et al., 2017[4]). A fixed minimum ratio target can be defined, but without considering the contextual factors described above to make a forecast of anticipated needs and demands, and a simulation of the necessary profiles and possible reform scenarios that would lead to a set of human resources better suited to meet the increasing demand for care.

Box 5.2. The workforce planning in Italy is based on a bottom-up approach

In Italy, there is a bottom-up approach for human resources planning in the Italian Servizio Sanitario Nazionale. Primary responsibility for health workforce planning is at the regional level, with information then fed back to the Ministry of Health, which brings together the data and forecasts from the regional levels, and analyses and validates the results to make appropriate recommendations to the Ministry of Education concerning entry to medical, nursing and other health-related education programmes.

The main objective of the health workforce planning in Italy is to ensure a suitable number of health care professionals in order to satisfy demand and to avoid workforce imbalances in the Servizio Sanitario Nazionale. The Ministry of Health and the regions then agree on the number of students to enter related education and training programmes.

Source: OECD (2014[12]), *OECD Reviews of Health Care Quality: Italy 2014: Raising Standards*, https://doi.org/10.1787/9789264225428-en.

This is unlike many OECD countries such as Italy or the United States, which have strong bases for workforce planning. In the United States, the National Centre for Health Workforce Analysis offers health workforce research, data, tools and projections to inform programme planning and policy making (HRSA, 2021[13]). In Italy, national needs in human resources are established based on regionally reported needs to establish the NHS human resources planning (Box 5.2). It is based on a bottom-up approach where information from the Regions is fed back to the Ministry of Health to make recommendations to the Ministry of Education (OECD, 2014[14]). Experiences from OECD countries can be useful for Brazil in its efforts to define a clearer workforce management policy to govern health care human resources. Brazil already collects municipality-level data on a monthly basis, meaning that the pre-requisite data is already there to inform workforce management. A smarter use of those data is warranted to better understand workforce

challenges in Brazil, including for example the shortage and uneven geographic distribution of doctors. Greater co-ordination between municipalities and federal level could help in this direction.

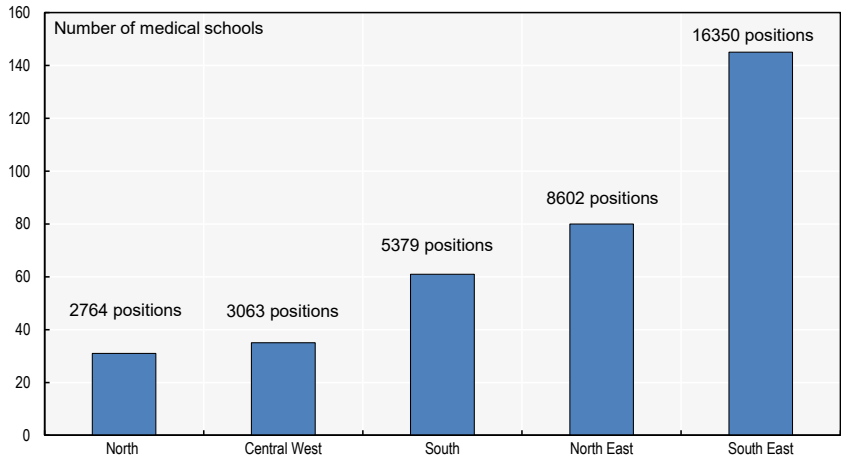
5.3. The organisation and quality of medical education in Brazil

Over the past decades, the number of medical schools has grown exponentially, driven mainly by the opening of private institutions. While some programmes have been set up to improve the medical curriculum toward PHC and achieve consistent quality across curriculums, gaps in medical education remain between medical schools and geographic disparities in access to medical training persist. The North and Northeast regions offer the lowest levels of per capita medical undergraduate positions in the country. Last but not least, the specialty of family and community medicine is undervalued in Brazil, and most doctors working in PHC in Brazil do not have a specialist qualification.

5.3.1. The number of private medical schools has grown exponentially in Brazil

In Brazil, the distribution of medical schools is uneven across the country. In 2020, the Southeast region had the highest distribution of medical schools among all regions (with 145 medical schools and 16 350 positions) (Figure 5.7). The same region concentrates around 45% of all positions in Brazil, with only one-fourth being offered in public institutions. At the other end of the scale, the North region concentrates 8% of all positions in Brazil.

Figure 5.7. Medical schools and positions by Regions, 2020



Source: Escolas Médicas do Brasil (2021[15]), Escolas Médicas do Brasil, https://www.escolasmedicas.com.br/index.php.

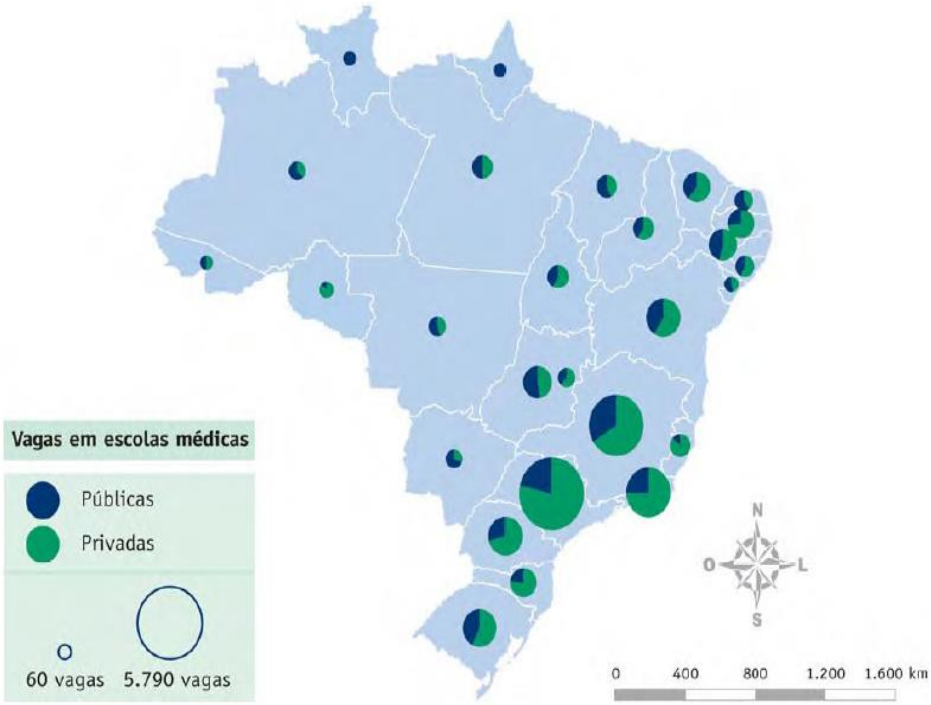
Unlike many OECD countries, medical education in Brazil has been marked by privatisation (Scheffer and Dal Poz, 2015[16]; Scheffer et al., 2018[1]). In addition to being larger in number, private medical schools also offer more places. In 2020, there were 352 medical schools, offering more than 35 000 training positions. Of these schools, 41% were public and 59% private (Escolas Médicas do Brasil, 2021[15]). Public medical schools are free, while tuition at private medical schools varies from USD 700 to USD 2 500 (BRL 3 600 to BRL 13 000) per month (Escolas Médicas do Brasil, 2021[15]). The country has around 14 places in medical schools per 100 000 population.

Throughout the country, public training positions represent 35% of the total training positions. In the South, 33% of training positions are public, in the Northeast 42% are public; in the North 48% are public, and in the Central-West 53% are public. Figure 5.8 presents the distribution of public and private medical schools

by States. In the State of São Paulo – which gathers 20% of training positions – only 21% are public. At the other end of the scale, the States of Roraima and Amapá only have public medical positions.

Private medical schools target niche markets, and generally offer education in more restricted and prestigious areas of knowledge (Scheffer and Dal Poz, 2015[16]; Scheffer et al., 2018[1]). Given that private medical schools charge high entry fees, the current admission system fosters inequality of access to medical school, favouring students from higher socio-economic background that do not specifically wish to work in PHC area and in rural areas.

Figure 5.8. Distribution of public and private medical schools in Brazil, 2018



Source: Scheffer et al. (2018[1]), Demographia Médica No Brasil 2018.

5.3.2. Medical education in Brazil lasts six years

Undergraduate programme in Brazil is similar to many OECD countries. Physicians trained in Brazil follow an undergraduate programme lasting six year. The curriculum is divided into three cycles of two years (Conselho Federal de Medicina, 2020[17]). During the first two years, the *ciclo básico* instruct basic scientific education with activities integrated to several medical specialties, allowing the practical application of such content. The next two years is called *ciclo clinico* with continued courses alongside clinical experience in medical setting (generally hospital setting). The last two year – *ciclo do internato*- focuses on clinical practice, through training in teaching hospitals and clinics. During the *ciclo do internato*, physicians actively participate to the medical practice under the direct supervision of medical schools. There are four six-month clinical rotations through internal medicine, surgery, paediatrics/obstetrics/gynaecology and public health, of which the latter includes exposure to PHC. In Brazil, graduate students are awarded the title of physician (Médico), allowing them to register with the Regional Council of Medicine (*Conselho Regional de Medicina*).

Unlike many other OECD countries (such as Canada, France or Italy), there is no national examination to be placed on a national register and be allowed to practise. Some states have made progress towards the

introduction of an Examination in Medicine, to be registered and allowed to practise. For example, the Regional Council of Medicine of São Paulo (*Conselho Regional de Medicina do Estado de São Paulo*) established that physicians who graduate from 2012 must pass a test to obtain professional registration.

Following the licensing, physicians can work as a "generalist" or choose among various professional path depending on the postgraduate specialisation programme they attend. Specialisation can last two to five years, and take place in a medical school. There are two types of specialisation programme. First, direct access programme where any graduates can apply to examinations for these specialties regardless of training or prior experience. Second, prerequisite programme, where doctors should have already completed a specialty or achieved expertise.

As of February 2019, the Federal Council of Medicine, the Brazilian Medical Association and the National Commission of Medical Residency Brazil recognise 54 specialty programmes (Scheffer et al., 2018[1]). In 2018, among the total number of medical doctors, 169 479 (37.5%) were generalists with no specialty training and 282 298 (62.5%) had a speciality training. Four specialty training concentrate 40% of all specialists in 2018 (Clinica Médica, Pediatria, Cirurgia Geral, and Ginecologia e Obstetricia).

The specialty of FCM is not recognised as a knowledge area by the Federal Agency for Support and Evaluation of Graduate Education. However, the specialty of community general medicine was officially recognised in 1981 by the National Commission on Medical Residency (Giliate Cardoso Coelho, Valeska Holst and Aristides, 2019[18]). The Brazilian Society of Family and Community Medicine (SBMGC) was also created at that time, followed by the creation of the Brazilian Society for Family Medicine (SOBRAMFA) (Box 5.3). Since 2001, the specialty is called Family and Community Medicine, with medical residencies lasting two years. In 2018, there were more than 100 FCM residency programmes in the country, with around 1 600 training positions each year (representing 4.4% of all training position) (Scheffer et al., 2018[1]). Although few in number, some post-graduate programmes in Family and Community Medicine are well known in Brazil such as the Conceicao Hospital Group (with 22 training positions each year), or the Municipal Health Department of Fortaleza in the State of Ceará (with more than 50 training positions each year) (Justino, Luzón Oliver and Palhano de Melo, 2016[19]). Most medical residencies, master's and PhD degrees in FCM are located in the Southeast and South Regions (Fontenelle et al., 2020[20]).

While the number of specialists in FCM increased over time, recent evidence suggests that FCM is still the last option among physicians (Fontenelle et al., 2020[20]). As earlier mentioned, in 2018, only 5 486 medical doctors had a specialty training in FCM, representing only 1.4% of all specialists in Brazil (Scheffer et al., 2018[1]).

Most doctors working in PHC in Brazil do not have a specialist qualification. This is unlike many other OECD countries where medical doctors are required to have a specialty training to be allowed to practise as a PHC doctor. In Canada, for example, physicians must have additional specialist training in family medicine to work in PHC (Ponka et al., 2019[23]). In the United Kingdom, participation in a three-year course is compulsory to practise family medicine. Turkey introduced specialised family medicine training as part of the *Health Transformation Programme* launched in 2005. The reforms sought to reinvigorate the speciality of family medicine, which was first defined in 1983 but failed to embed itself extensively in PHC provision. The reforms defined the Family Medicine core team as comprising a family physician, nurses and professional assistants, to whom a list of named patients was assigned. Family physicians across Turkey are required to deliver a defined set of services, to work to a standard set of norms and are paid according to national terms and conditions. Significant investment has been made to improve working conditions, with more generous salaries than before the reform. In 2018, Turkey's PHC/generalist doctors now comprises 32% of all doctors, above the OECD average of 23% (OECD, 2019[22]).

Box 5.3. The Brazilian Society of Family and Community Medicine (SBMGC) and the Brazilian Society for Family Medicine (SOBRAMFA)

Founded in 1981, the Brazilian Society of Family and Community Medicine aims to promote the principles and values of Family and Community Medicine as an academic discipline, as well as to promote patient-centred care in the clinical practice and the medical education.

The Brazilian Society of Family Medicine is organised around three priorities:

- Prepare future professionals based on patient-centred approach
- Integrate medical students to health services and connect them to the real needs of the population
- Train teachers, educators, and managers to promote academic incorporation of the specialty.

The Brazilian Society for Family Medicine (SOBRAMFA), founded in 1992, also organises several activities to spread the family medicine value among medical students at congresses, academic meetings, family medicine seminars and international meetings. It organises Mini-Fellowship in Family Medicine programme, where students experience family medicine practice by managing patients under the supervision of the SOBAMFA faculty and residents in a range of practice setting. For example, the SOBRAMFA develops guidelines, promote research and provide training and continuous medical education (such as the Miles Programme).

The internship for medical students in undergraduate programme, and the specialty programme focus on follow-up care for chronic patients, health prevention, treatment of multiple comorbidities. It also focuses on geriatric care (care for the elderly who live in communities), palliative care (learning how to care for patients without therapeutic possibility, discuss approach to death, deal with disabilities, and symptom treatment), understanding patient's pathway, learning team work and improving communication, and work in palliative care team.

Source: Janaudis et al. (2009[24]) Academic Family Medicine in Brazil ; SBMFC (Janaudis et al., 2009[24]; SBMFC, 2021[25]).

In the area of nursing, Brazil has several degrees ranging from bachelor degree, master degree to doctoral professional degrees (Cassiani and Silva, 2019[6]; Neto et al., 2018[26]). It is reported that around 50 000 nurses are trained every year (Cassiani and Silva, 2019[6]). An evaluation of nursing training found that the training had a hospital-centric model, with little interdisciplinary integration (Magnago et al., 2017[27]). This is not appropriate to strengthen people-centred primary health care.

CHWs are most often selected by local health committees and have to be literate. The training of community health workers is conducted in regional health schools operated by the national Ministry of Health using curriculum approved by the Ministry of Education (CHW Central, 2018[28]).The curriculum consists of 8 weeks of training from local nurses, followed by 4 weeks of supervised field training. These include training on home visits and on how to conduct a family census, but also on specific priority health care interventions. CHWs are not trained to address health needs, but rather they are trained to recognise health needs and encourage communities to seek care (CHW Central, 2018[28]; Grossman-Kahn et al., 2018[7]). CHWs also receive monthly and quarterly ongoing training.

5.3.3. National evaluation tools and voluntary accreditation facilitate evaluations of the quality of medical education in Brazil

Each medical school in Brazil decides its own curriculum and educational objectives, and implements its own summative and formative assessments of students based on skills, abilities, and curriculum content.

To promote changes in the medical curriculum toward PHC, the Ministry of Education has introduced the Program for the Encouragement of Curricular Changes in Medical Courses (Promed), the National Program for the Reorientation of Health Professional Education (Pró-Saúde), and the National Guidelines for the Curriculum of Health Professional Education. The National Curricular Guidelines of Medical Courses introduced in 2001, then updated in 2014 to support the More Doctor Programme, intends to ensure homogeneity between medical schools across the country (Ferreira et al., 2019[29]).

The curriculum's competencies target three axes: health care, health management and health education, with a focus on collective health and comprehensive care. The updated guidelines aim at moving away from hospital practice, increasing the inclusion of theoretical and practical activities related to collective health and PHC, and improving uptake of activities related to social determinants of health. The overarching objectives encompass (1) promoting patient-centred care, (2) reliance on inter-professional teamwork, and (3) developing shared individual therapeutic plan with the patient (Ferreira et al., 2019[29]). With these programmes, undergraduate students are supposed to be exposed to a more community-based curriculum, although it is difficult to appreciate the impact of these initiatives on the skills of the students (Scheffer and Dal Poz, 2015[16]).

National tools have also been set-up to evaluate medical schools as a result of the sharp increase in medical schools from 1990. The National System for the Evaluation of Higher Education (SINAES, *Sistema Nacional de Avaliação do Ensino Superior*) is responsible for evaluation system to renew, supervise, accredit and reaccredit medical schools (INEP, 2015[30]). The evaluation system consists of three main components:

- Institutional evaluation: performed by self-evaluation and external evaluation by institutional evaluators accredited by the INEP;
- Evaluation of the course and curriculum by teachers, co-ordinators, students, and external evaluators;
- Evaluation of the students entering and finishing the course: through the National Exam of Student Performance (ENADE, Exame Nacional de Desempenho dos Estudantes), which is performed by each schools (Ministerio da Educaçao, 2021[31]). ENADE covers seven areas of knowledge including general medicine, paediatrics, gynaecology and obstetrics surgery, public health, medical ethics and basic sciences. The test results are used to identify areas of good performance and weaknesses in all medical schools. The ENADE gives an indication of the development of competences and skills foreseen in the National Curricular Guidelines of Medical Courses.

The Sistema de Acreditação de Escolas Médicas (Accreditation System of Medical Schools, SAEM) has also been developed by the Conselho Federal de Medicina (CFM, Brazilian Federal Council of Medicine) in 2016 to reaffirm its commitment toward high quality standards for medical education (SAEME, 2021[32]). The accreditation is voluntary and complements the government evaluation procedure. The SAEM is based on the WHO and the WFME Guideline for Accreditation of Basic Medical Education. The accreditation process consists of the completion of online questionnaire covering five standards (Educational Management, Educational Programme, Academic Staff/Faculty, Students, and Educational Resources), data analysis by an evaluation committee; and a visit to the medical school by a team composed of four evaluators, one of them being a student. After this process, the evaluation committee issues a report to the educational institution with the result, which can be classified into three categories: Accredited, Accredited with recommendations of improvement, and Non-Accredited.

National tools and voluntary accreditation allowing to evaluate the quality of medical education is paramount to ensure consistency in the skills and competences of medical doctors across the country, but also to make sure the supply of medical schools and their postgraduate activities reflect the evolving Brazilian health needs. However, the CFM recently noted that, in spite of government initiatives, there are still inadequate academic programmes, inadequate internship offers and that gaps in medical education remain between medical schools (AML, 2019[33]). In addition, comparing the performance of public and

private medical schools, evidence suggests that public medical schools consistently performed better than the private undergraduate medical courses about the ENADE (Scheffer and Dal Poz, 2015[16]). Reinforcing mechanisms to ensure high quality of medical education is thus warranted in Brazil.

5.4. Improving the distribution and supply of PHC doctors in Brazil

To address the shortage of PHC doctors and the uneven geographic distribution of doctors, Brazil implemented several federal programmes including the More Doctors Programme. These efforts contributed to improvements in access to and quality of medical training in Brazil, but geographic disparities in access to medical training persist and unfilled PHC positions remains the norm.

There are three main policy levers to help address the shortages of medical doctors and improving its distribution:

- Training more rural doctors;
- Providing financial and non-financial incentives, while implementing regulations to restrict the freedom of medical doctors (the “stick and carrot approach”);
- Promoting innovations in health service delivery, through task-shifting and the use of telemedicine.

They are not mutually exclusive, and may not offer the panacea when implemented in isolation. Previous studies show that these policy levers may have a greater impact if they are used in combination (OECD, 2016[34]).

5.4.1. Large-scale PHC programmes to address maldistribution of PHC physicians

The More Doctors Programme partly addressed the imbalances in the distribution of health workers

Established in 2013, the More Doctors Programme (MDP) is a large-scale health system intervention that aims to strengthen the provision of PHC services in underserved communities, within the framework of the Family Health Strategy (see Chapter 2). The MDP was designed by the Ministry of Health as a supply side intervention with three prongs that complement each other, with a particular emphasis on strengthening PHC provision in underserved communities:

- Transfer of funds to municipalities to strengthen PHC infrastructure;
- Improving access to and quality of medical school training; and
- Recruitment of Brazilian and foreign physicians to work within FHTs.

At the outset, the first two components were envisioned as long-term investments in the overall organisation of the Family Health Strategy. Broadly, the first component aimed at improving the availability and quality of work environments in which the FHT provide care (Santos et al., 2017[35]). The second component focused on enhancing access to and quality of medical training, particularly in communities that have been lagging in attracting and retaining health workers (Figueiredo et al., 2021[36]). In comparison, the third component was initially envisaged as an emergency provision to fill the immediate gaps in PHC physician availability through a large-scale physician recruitment initiative, particularly targeted at municipalities that had difficulty recruiting and retaining doctors (Santos et al., 2017[35]).

The MDP came on the heels of previous nationwide initiatives that attempted to address the imbalances in the distribution of health workers. Prior to the MDP, Brazil introduced several programmes to improve access to medical training in underserved communities, including the 2001 Programme of the Interiorisation for Health Work (*Programa de Interiorização do Trabalho em Saúde*) and the 2011 Programme for Valuing PHC Professionals (*Programa de Valorização dos Profissionais da Atenção –*

PROVAB) (Figueiredo et al., 2021[36]). While these initiatives did not eliminate the underlying drivers of the geographic imbalances in distribution of health workers, they provided valuable experiences and the know-how that informed the design and implementation of the MDP.

The new stream of funding led to a laudable expansion of the Family Health Strategy infrastructure

The first component involved creating a new stream of funding to strengthen the Family Health Strategy physical infrastructure. Municipalities could use the allocated MDP funding to increase the availability and the quality of the existing Family Health Strategy infrastructure on the ground. To receive funding, each municipality was required to submit an application to the MOH for review. Upon approval of their application, municipalities could choose to either refurbish the existing PHC clinics and purchase basic equipment (e.g. autoclaves) or build new facilities (Santos et al., 2017[35]).

Relatively little evidence exists on the impact of this component on the provision of PHC services. Though limited, evidence suggests that the MDP successfully channelled additional resources for strengthening the PHC infrastructure, with the MDP resources leading to the construction of 3 496 new basic health units and refurbishment of 3 417 units by 2015 (Santos et al., 2017[35]). According to Biernath (2020), more than 26 000 PHC facilities were built or renovated throughout Brazil following the implementation of the MDP (Biernath, 2020[37]).The administration of this component was recently halted following a federal funding freeze (Hone et al., 2020[38]).

The MDP contributed to improvements in access to and quality of medical training in Brazil, but geographic disparities persist

Despite previous attempts to improve equitable access to medical training, the geographic distribution of medical schools prior to the MDP were marked by notable disparities. For instance, in 2013, nearly 41% of all medical schools were located in the Southeast Region, compared to only 8.2% in the North and 9.3% in the Central-West regions (Santos et al., 2017[35]). Compounding this challenge, the undergraduate medical curriculum did not adequately emphasise the diverse health needs of the Brazilian population (e.g. population groups residing in rural and remote areas) and PHC competencies in line with the priorities of the SUS (Carvalho, Marques and Silva, 2016[39]).

In recognition, the second component consisted of a set of initiatives that aim to enhance access to and quality of medical education, with an explicit emphasis on alleviating geographic disparities in medical training. The MDP introduced multiple changes in medical education at the same time. First, the education component of the MDP involved the development of new frameworks to regulate the location of new public and private medical schools. Next, the MDP aimed at expanding the number of positions in medical undergraduate institutions by adding nearly 11 500 new positions by 2017 (Santos et al., 2017[35]). Finally, the Programme led to the updating of the national undergraduate curriculum for medical training with more emphasis on PHC provision in line with the SUS priorities.

Early evidence suggests that the MDP may have contributed to improvements in access to medical training. Evaluating the impact of MDP on medical education in Brazil is complicated by the length of time required before the potential impacts on health system performance can become discernible. Yet, data obtained from the Higher Education Census suggests that the MDP achieved its medium-term objective of expanding the number of new positions by 2017. Mirroring this, an estimated 92% of the new medical undergraduate vacancies created from 2010-18 took place after the MDP was launched in 2013 (Figueiredo et al., 2021[36]).

Despite these improvements, geographic disparities in access to medical training persists. Today, the North and Northeast regions continue to offer the lowest levels of per capita medical undergraduate vacancies in the country (Figueiredo et al., 2021[36]).

The recruitment of PHC physicians contributed to enhancing health system performance, but challenges in the implementation of MDP diluted beneficial impacts

The third component involves the roll out of one of the world's largest PHC physician recruitment programme. At its height, the MDP recruited more than 16 000 physicians both from within Brazil and abroad to work exclusively within the FHT. The majority of the MDP physicians were recruits from across 85 countries, mostly from Cuba (Santos et al., 2017[35]). All MDP recruits were selected from physicians who had prior experience in practicing family medicine, but without recertification requirement.

All Brazilian municipalities are eligible to request physicians from the MDP. To receive MDP physicians, municipalities are required to submit an online application to the Ministry of Health for review and approval. The Ministry of Health has the discretion to decide on the number of MDP physicians that will be deployed in the applying municipality. To inform the decisions over MDP physician allocations, the Ministry of Health developed a set of criteria aiming to identify underserved communities across Brazil in congruence with the aims and objectives of the Programme (Box 5.4).

Provider contracting arrangements for MDP physicians differ from contracts typically used by municipalities to hire non-MDP physicians. In general, the FHP physicians are hired directly by municipal governments, with little standardisation of contractual terms across physicians or municipalities. In comparison, the MDP physicians are hired directly by the Ministry of Health through contracts that can be renewed in every three years. Municipal governments are responsible for covering costs associated with transportation, lodging and food. This contracting structure was embedded in the MDP to reduce potential financial barriers that may disincentivise municipalities from joining the Programme. Importantly, municipalities are not allowed to substitute Brazilian physicians that are already practicing within the FHT in their communities with MDP physicians. However, no mechanism has been put in place to monitor any potential physician substitution.

It is not mandatory for the MDP physicians to take the national competency exam that is required for other physicians to practise medicine in Brazil. Instead, the MDP physicians are required to complete a mandatory three-week training course provided by the Brazilian health authorities before they could be deployed in municipalities. In addition, all MDP physicians are required to attend brief training sessions organised by Brazilian authorities in regular intervals. Online-learning courses are also available to the MDP physicians. Once deployed in municipalities, the MDP physicians are assigned to advisors, who are selected from experienced Brazilian health care professionals.

To date, the MDP has been associated with improvements in physician availability, though there is evidence of substitution of Brazilian physicians with the MDP recruits. Hone and colleagues (2020) suggested that the MDP was associated with a 12.2% increase in the number of PHC physicians by its fifth year of implementation, with more pronounced effects among municipalities that had lower levels of physician availability at the start of the Programme (Hone et al., 2020[38]). Despite this, evidence suggests that the MDP also had unintended consequences for human resources for health, with the MDP leading to the substitution of Brazilian physicians who were already working in communities. In their analysis, Hone and colleagues quantified that, in the absence of any substitution of Brazilian physicians with MDP recruits, the MDP could have led to a 30% increase in PHC physician availability, more than double that of the current improvements in physician availability (Hone et al., 2020[38]). This is despite the design feature of the MDP that explicitly prohibited any replacement of Brazilian physicians with MDP physicians.

The impact of MDP on adult and child mortality remains mixed. Hone and colleagues found that the MDP was associated with a modest 1.4% reduction in adult mortality amenable to health care services (Hone et al., 2020[38]). Earlier studies suggested that the MDP fell short of reducing maternal and child mortality (Carrillo and Feres, 2019[45]; Mattos and Mazetto, 2019[46]), despite an attributable rise in the number of FHT consultations attended by physicians (Mattos and Mazetto, 2019[46]). One potential explanation relates to the significant bottlenecks in access to the secondary and tertiary care, suggesting that further progress in maternal and child health may require further improvements in co-ordination of care between different

levels of care (the Brazilian Network for the Surveillance of Severe Maternal Morbidity study group, 2014[47]).

Box 5.4. Defining underserved municipalities within the framework of MDP

The MOH ranks municipalities based on a set of explicitly defined criteria to inform the distribution of MDP physicians (Hone et al., 2020[38]). Criteria used for the MDP are similar to those used in PROVAB, with the two initiatives sharing similar, readily available data sources at the community level (e.g. municipality-level or census tracks within municipalities). In the first five years of the MDP, the Ministry of Health revised the prioritisation criteria twice, but in each iteration, the selected criteria aimed at capturing the socio-economic, health systems and geographic determinants that may reveal the local needs in each community. These indicators included: the proportion of population living in extreme poverty, population size, PHC infrastructure and health worker supply, as well as geographic location (Özçelik et al., 2021[40]).

A substantial fraction of Brazilian municipalities enrolled in the MDP in a relatively short time span, thought the rollout of the Program has not been without challenges. The share of municipalities that received at least one MDP physician expanded from about 20% in 2013 to 69% in 2017 (Özçelik et al., 2021[40]). Over time, participation improved among municipalities that were considered priority for the purposes of the MDP. By 2017, about 76% of priority municipalities had at least one MDP physician. Priority municipalities that did not enrol in the MDP had smaller population density and higher rates of extreme poverty compared to priority municipalities that participated in the MDP. Importantly, this finding is in congruence with earlier evidence suggesting that less densely populated communities with higher levels of poverty also lagged in the expansion of the Family Health Strategy prior to the MDP (Andrade et al., 2018[41]).

It might be warranted to improve the community targeting methods used by the MDP to maximise the potential benefits of the Programme. As experienced by other OECD countries (the United States, Australia, and Canada), the community targeting method has large implications for human resource planning, and this might not be enough recognised in Brazil. In Australia, for example, communities with a shortage of medical practitioners are designated as the *Distribution Priority Areas* on the basis of their demographic and socio-economic status, population size and measures of geographic remoteness. Foreign-trained general practitioners are required to work at least 10 years in communities with DPA designation. In Canada, criteria used to define underserviced communities consider physician to population ratios, demographic and socio-economic status and geographic accessibility. In The United States, the Health Professional Shortage Area designation is determined based on a composite score derived as a combination of health care service provider density, level of poverty, infant mortality rate and the age structure of each community.

Source: Özçelik et al. (2021[40]), Assessing the performance of beneficiary targeting in Brazil's More Doctors Programme, https://doi.org/10.1093/heapol/czaa137; Andrade et al. (2018[41]), Transition to universal primary health care coverage in Brazil:, https://doi.org/10.1371/journal.pone.0201723; Hone et al. (2020[38]), Impact of the Programa Mais médicos (more doctors Programme) on primary care doctor supply and amenable mortality: quasi-experimental study of 5 565 Brazilian municipalities, https://doi.org/10.1186/s12913-020-05716-2. And information taken from Canada (Ministry of Health, 2018[42]), Australia (Australian Government, 2021[43]), and the United States (HRSA, 2021[44]).

Most evidence suggests that the MDP led to improvements in access to care. One study that evaluated the impact of the MDP in its first two years found that the Programme was associated with increases in appointments, consultations, medical referrals and home visits by 5.9%, 9.4%, 12.3%, and 29.7%, respectively (Mattos and Mazetto, 2019[46]). This study also found that the MDP led to a 4.6% reduction in

general hospitalisations. Similarly, the MDP has been shown to improve patient satisfaction (Comes et al., 2016[48]).

The MDP has also been linked with improvements in the quality of care, as measured by reductions in hospitalisations considered to be preventable by timely and adequate access to health care services. Earlier assessments concluded that the MDP resulted in a decrease of about 23 000 hospitalisations due to preventable causes in its first three years, corresponding to about USD 6 185 019.85 in savings from treatment costs (Fontes, Conceição and Jacinto, 2018[49]). The beneficial impacts of the MDP have been shown to accumulate and grow over time. Evidence also shows that the MDP led to reductions in adult hospitalisations primarily due to infectious gastroenteritis, bacterial pneumonias, asthma, kidney and urinary infections, and pelvic inflammatory disease (Maffioli et al., 2019[50]), though it fell short of reducing hospitalisations due other preventable conditions like hypertension (Özçelik et al., 2020[51]).

Evidence on the contributions of MDP for narrowing geographic disparities in population health remains mixed, suggesting that further improvements in community targeting methods may be needed to reap the potential benefits. Hone and colleagues (2020) concluded that the MDP fell short of yielding greater health gains in priority municipalities (Hone et al., 2020[38]). In concordance, another recent study also showed that there has been no discernible differences in hospitalisations due to hypertension between urban and rural municipalities as defined by the Programme (Özçelik et al., 2020[51]). This study also showed that the MDP was linked with reductions in hospitalisations due to cerebrovascular diseases only in urban municipalities. Both studies suggested that further improvements in the community targeting methods used by the MDP may be considered to maximise the potential benefits of the Program.

The new programme Médicos pelo Brasil will gradually replace the MDP

A new programme called Doctors for Brazil (Médicos pelo Brasil, law No. 13.958 of 18 December 2019) was initiated by the new federal government administration. Its purpose is to increase the provision of medical services in places of difficult delivery or of high vulnerability, along with promoting the training of doctors specialising in family and community medicine.

The *Médicos pelo Brasil* programme is expected to gradually replace the *Mais Médicos* programme, in particular by hiring Brazilian trained doctors who have already shown to be scarce or not wanting to go to isolated or underserved areas.

Médicos pelo Brasil and *Mais Médicos* will operate in parallel to guarantee continuity in the supply of health care services. This type of changes represent a governance challenge for the Brazilian health system, which should develop a strategic vision to preserve and amend policies or programmes that have shown to improve outcomes. The MDP should inform the design and implementation of the *Médicos pelo Brasil* programme.

Based on prioritisation criteria, the new programme will expand the number of PHC doctors to 7 500 in the poorest areas of the country, with 60% of the professionals to be hired in the North and Northeast regions. In total, 4 823 municipalities are expected to be part of the programme. To maximise the potential benefits of the new programme, it will be critical to make the prioritisation criteria clear and transparent.

Médicos pelo Brasil has a stronger focus on quality than the MDP, and positive steps have been taken so far:

- Medical licenses have to be recognised for all medical doctors who apply to the programme, either through the registration process for Brazilian students or the revalidation process for foreign-trained medical doctors. The recognition process is the responsibility of the Medical Council and Regional Councils of Medicine.
- The *Médicos pelo Brasil* programme offers two-year specialty training in Family and Community Medicine so that all contracted doctors become specialists in PHC. At the end of the training,

specialists in PHC will have to present a *"Trabalho de Conclusao de Curso*", an analysis of the local health needs of the catchment area where medical doctors work so that improvement and evaluation strategies are being implemented.

- PHC doctors are expected to remain in the Family Health Units where they did the specialty training, and receive a 2-year training grant, which varies according to the municipalities' level of vulnerability. The grant is BRL 12 000 net monthly, and an additional BRL 3 000 bonus for remote locations (those classified as rural and intermediate) or an additional BRL 6 000 for indigenous districts, as well as riverside and river locations. Once qualify as specialist in Family and Community Medicine, they are hired under the Consolidation of Labor Law (CLT) which supposes better working conditions and security at work compared to the *Mais Médicos* programme.

With regards to the tutorial programme, only specialists in family and community medicine or in internal medicine can be selected. Tutors are also hired under the CLT. They will be responsible for serving the population registered to the FHT, and for supervision of other medical doctors who are enrolled in the specialisation training. There are four salary scales, with progression every three years: The first salary level can reach up to BRL 21 000 and, gradually, up to BRL 31 000, considering performance bonus and additional grants depending on the level of vulnerability.

All these changes are promising, representing improvements compared to the Mais Medicos Programme and real opportunities to increase the attractiveness of the PHC specialty (Table 5.1). Strategic thinking toward the community targeting methods is required to make sure that eligible municipalities are effectively enrolled to the new programme.

Table 5.1. Médicos pelo Brasil programme has a greater focus on quality

Mais Medico	*Médicos pelo Brasil*
Scholarship without employment link and for a determined time	Contracting by the CLT with the right to FGTS holidays
Does not require any Brazilian diploma or revalidation	Requirement to have a recognised Brazilian licence or to undertake revalidation of foreign diploma
No requirement to have a formal specialisation degree in PHC	Requirement to pass the speciality training in Family and Community Medicine.
Foreign Medical doctors are not allowed to bring the family to live in Brazil	Foreign Medical doctors are allowed to bring the family to live in Brazil

Source: Brazilian Ministry of Health.

The next two sections present policy responses that could help tackle the uneven distribution of PHC physicians in Brazil.

5.4.2. Changing regulations can help address shortages of medical doctors in some remote areas

Training more rural doctors to boost their numbers

As the MDP, the new *Médicos pelo Brasil* programme sets very promising objectives to improve the supply and the distribution of PHC doctor across the country. As part of the new programme, it will be important to train rural PHC doctors to improve retention over the longer term. International evidence confirm that medical education in rural location led to increases in the number of medical graduates that will work in rural place over the long term (McGirr, Barnard and Cheek, 2019[52]). In congruence, experiences from OECD countries also highlight the importance of having medical studies for PHC professionals be located in local regions such that students are close to their residencies and are incentivised to stay upon successfully completing their training (OECD, 2016[34]).

Box 5.5. The Rural Clinical School Programme in Australia

The Rural Clinical Schools (RCS) Programme was launched in 2000 to enable medical students to undertake the majority of their clinical training in regional areas.

The RCS aim to deliver significant components of the medical curriculum in a rural environment, with students undertaking a year or more of their medical training in a rural location. It entails the following targets (McGirr, Barnard and Cheek, 2019[52]):

- 25% of all medical students to have at least one year of rural clinical training by graduation
- 25% of government-supported medical students to be recruited from a rural background
- All government-supported medical students to have at least 4 weeks of rural placement.

The programme is structured around four broad objectives (Australian Department of Health, 2008[53]):

- Encourage medical students (and medical professionals) to take up a career in rural practice
- Encourage rural health professionals to take up academic positions
- Improve the range of rural health care services in rural communities across Australia
- Strengthen the health workforce in rural communities across Australia.

As of 2018, there were currently 18 RCSs in Australia (McGirr, Barnard and Cheek, 2019[52]). The Rural Clinical Schools Programme has allowed to develop teaching and learning facilities, and student accommodation in dozens of rural and regional locations across Australia. There are positive evidence showing that RCS programme improve retention and recruitment, but also improving the range of quality of health care services in rural area. With this regards, particular specialties that were not available in the community have become available because of a successful appointment by the programme.

Source: McGirr, Barnard and Cheek (2019[52]), The Australian Rural Clinical School (RCS) programme supports rural medical workforce, https://doi.org/10.22605/RRH4971; Australian Department of Health (Australian Department of Health, 2008[53]), Rural Clinical Schools Programme.

Prior experiences from OECD countries, such as Australia, Canada, England or Norway, offer many opportunities for Brazil. For instance, in Australia, the Rural Clinical School (RCS) Programme was launched in 2000 to enable students to undertaken their training in rural areas. The RCS Programme supports 18 rural clinical schools, where it is required that 25% of students enrolled in the medical course have a rural background (McGirr, Barnard and Cheek, 2019[52]). Recent evaluations showed that the RCS Programme was effective in increasing both the recruitment and retention of medical practitioners in rural areas over the long term (McGirr, Barnard and Cheek, 2019[52]). Results show that students who have participated in RCS Programme were 1.5 times as likely to continue practicing medicine in regional and rural locations five years after graduating from medical school (Box 5.5). Other OECD countries established medical programmes in rural localities, such as Canada with the Northern Ontario School of Medicine, England with the Exeter and Playmouth medical school, or Norway with the Tromso's medical school.

Implementing a "stick and carrot" approach

It is important to implement a "stick and carrot" approach to attract and retain PHC doctors in rural areas. This approach consists of combining financial and non-financial incentives for medical doctors with regulations which restrict the freedom of doctors.

Offering financial incentives to compensate for some of the disadvantages in less attractive regions is an important policy option already implemented in many other OECD countries such as in Chile, Germany, Canada or France. Such financial incentives compensate for longer working hours, a less advantageous "business environment" for doctors in underserved areas. They can be either one-off or wage-related financial incentives that are directly directed to the PHC doctors:

- First, there are **non-wage related payments**, which are used to encourage physicians to move to or stay in underserved areas. It is a one-off payment to help facilitate a location choice, and which can be linked with a return of service obligation. Such policies exist in some Canadian provinces. In Ontario, the Northern and Rural Recruitment and Retention Initiative offers grants of between CAD 80 000 and CAD 117 600 for a practice opening in a rural area paid over a four-year period (Ontario Ministry of Health, 2021[54]). The applicant must commit to establish a full-time practice in a community in Northern and very rural areas, and in which they have never previously practiced full-time. The higher the rural index (the more Northern and rural the area), the higher the value of available grant. To encourage both recruitment and retention, the proportion of the grant paid out will be highest in year 1 and year 4. The payment schedule is as follows: Year 1: 40%, Year 2: 15%, Year 3: 15%, Year 4:30%. The province of New Brunswick also offers recruitment incentives to Medical Residents and newly recruited family physicians looking to establish a full-time community-based practice in designated fields. Family Medicine New Brunswick is a new programme that aims to improve patient access, increase collaboration between physicians using technology, and create a better work-life balance for physicians. For the first year, a new physician joining the programme will receive a guaranteed minimum remuneration of CAD 175 000 (New Brunswick Canada, 2021[55]). Similar policies exist in Germany, where states (Länder) offer financial incentives for GPs opening their practice for the first time. In some states, the one-time payment comes with a return-of-service obligation of five to ten years (OECD, 2016[34]).
- Second, there are **wage-related financial incentives**, where physicians in underserved areas receive financial incentives linked to income. These payments aim to compensate rural GPs for a smaller number of patients, longer working hours or challenging working conditions. In the Canadian province of Ontario, the Northern Physician Retention Initiative enables eligible physicians (general practitioners and specialists) in Northern Ontario to receive the equivalent of CAD 7 267.46 retention incentive paid at the end of each fiscal year in which they continue to practise full-time in Northern Ontario (Ontario Ministry of Health, 2021[56]). In France, the Contrat d'Aide à l'Installation des Médecins offers a one-off payment of between EUR 50 000 and 31 250 to help physicians set-up a practice in an underserved region. The payment schedule is 50% upon signature of the CAIM, and 50% one year later (Assurance Maladie, 2020[57]).
- Third, countries can **combine financial and non-financial incentives** to attract and retain physicians in underserved communities. For instance, Chile provides a promising example, where several incentives are combined to attract physicians to work in rural PHC hospital and health centres for a minimum of three years to a maximum of six years (Pena et al., 2010[58]). The programme, called the Chilean Rural Practitioner Programme, entails 1) monetary compensation (direct and indirect financial incentives such as additional compensation depending on the level of isolation, performance bonus, installation and transport costs), 2) education incentives (four week clerkship with physicians, 3) management, environment and social support interventions (paid continuous medical education, additional days for personal reason, and additional week off) and 4) external incentives (better equipment, better connectivity, and internet ad mobile phone access) (Pena et al., 2010[58]). The programme has been found successful: the number of applicants exceeded the number of available positions, high retention rates, and high satisfaction rates from applicants (Pena et al., 2010[58]). While dropouts from the programme are exceptional, around 60% of participants stay for the maximum period (six years).

As part of the *Médicos pelo Brasil* programme, physicians in underserved areas will receive financial incentives of BRL 3 000 when working in "rural and intermediate" areas, and of BRL 6 000 when working in indigenous districts, as well as riverside and river locations. As done in other OECD countries, it could be important to link financial incentives with a return of service obligation of between two and four years. Combining financial and non-financial incentives, and implementing some regulations to restrict the freedom of doctors, as experienced by OECD countries, could also be a good solution to recruit and retain doctors in underserved areas. The federal government will need to ensure that the various types of financial incentives are received by the medical doctors, and not distributed at the discretion of the municipalities.

Restricting the choice of location

A more stringent regulatory measure to redress the geographical imbalance of doctors would be to restrict the choice of practice location for PHC doctors. Brazil could, for example, learn from Turkey, Germany, Norway or some provinces in Canada (New Brunswick, Quebec) where interventions to restrict the choice of location of newly medical doctors have been established. At any rate, such regulatory approach requires careful and coherent workforce planning.

In Germany, self-employed doctors are not allowed to set up their practice and serve public patients in a catchment area that is considered 'overserved' based on a patient-to-doctor ratio. Physicians need to obtain a practice permit to be reimbursed by the statutory health insurance (KBV, 2021[59]). The number of these permits is controlled by the National Association of Statutory Health Insurance Physicians through its 17 state associations. It is mandated by the government to guarantee medical service coverage of the population based on a quota agreed within the self-administration of the German health care system. The service coverage is measured based on the ratio between physicians and inhabitants in each of the 395 planning regions. For GPs, 100% coverage is achieved when the ratio of GP to inhabitant reaches 1:1 617. If the coverage of a region exceed 110%, no further permits are issued (OECD, 2016[34]). In Canada, in the province of Alberta, the Bill 21 proposed that after April 2022 new doctors in the province will be required to obtain practice permits from the government upon completion of residency training. These permits will restrict new doctors to work only in certain regions. Turkey restricts service location choice of new medical graduates who want to work in the public sector. Recent medical schools graduates are required to work for the states for a period of 300 to 500 days after graduation. After this service period however, physicians wants to secure employment in urban areas (Phcpi, 2018[60]).

Such regulatory approaches can be controversial with fears from professional association that designating where doctors should work impede recruitment. In this case, it is important to provide strong financial compensation to medical doctors.

5.4.3. Changing service delivery can help reduce geographical inequalities in access to care

There are several interventions on the supply side to promote the use of innovative health service delivery to provide adequate level of access to PHC in areas with fewer physicians (e.g. through telemedicine or telehealth) or shifting some health service provision from physicians to other health care providers. The strategy is not to train more doctors or to rely on more doctors, but rather to rely on smart information and communication technology and to maximise use of human resources already living in areas where there are shortages of medical doctors. This could constitute a good complement for usual care provided by medical doctors.

Expanding the role of nurses or community health workers

Unlike many other OECD countries, Brazil has not yet experimented with changing scope of practice and task shifting among health workers. More strategic use of the existing rural health workers other than

physicians who are already residing in areas where there are physician shortages will be crucial to meeting health care needs in more remote areas.

Core PHC functions, including comprehensiveness, continuity and co-ordination, can be discharged to health workers other than PHC doctors. In recognition, many OECD countries are moving to change the scope of practice of health professionals as a means of coping with health workforce shortage, which typically involves developing new roles for nurse practitioners and community health workers (OECD, 2020[61]).

International evaluations of task shifting provide conclusive results. Nurse practitioners with proper education and training generally show that they can improve access to services, reduce waiting times and deliver the same quality of care as doctors for services such as routine follow-up of patients with chronic conditions (Maier, Aiken and Busse, 2017[62]). Recent systematic review found that PHC teams that enable nurses to play a more advanced role in service provision (e.g. providing patient education, co-ordination, prevention advice or drug prescription) achieve better patient outcomes and greater patient satisfaction, while reducing hospitalisation (Matthys, Remmen and Van Bogaert, 2017[63]). Moreover, another recent systematic review showed that scaling up reliance on nurse practitioners yielded greater access to care among rural and underserved populations without deteriorating the quality of care (Yang et al., 2020[64]). In low and middle income countries, the implementation of task-shifting has been a key lever to fill the gap in PHC provision due to a lack of PHC doctors (Afobali et al., 2019[65]).

Among OECD members, some countries such as Australia, and more recently France have sought to improve access to PHC by expanding advanced education programmes for nurses. In Australia, remote area nurses are recognised as the backbone of rural and remote PHC. They can work as part of a small team or work independently. With a rotation system, they are available 24 hours a day, seven days a week. They are able to work across diverse care settings, including acute, emergency, aged, palliative, mental health, family and community health care areas (OECD, 2020[61]). Some Jurisdictions in Australia, including Queensland, and Victoria, have also implemented the Rural and Isolated Practice Endorsed Registered Nurse scheme. The scheme permits approved nurses to provide a limited range of medicines, where there is little or no access to PHC. In France, the National Health Strategy 2018-22 promotes more advanced roles for nurses to improve access to care, particularly in areas where there are relatively few doctors (OECD, 2020[61]). The position of advanced practice nurses was legally created in 2018. These nurses provide support in the care of chronically ill patients and those with complex morbidities, working in co-operation with GPs and specialists in PHC teams and other health, and long-term care settings. Their tasks include prevention and screening activities, prescription of complementary exams and renewal or adjustment of medical prescriptions.

Brazil has amongst the most extensive education networks for nurse training in the LAC region. According to the Department of Management of Health Education in Brazil, the number of nursing schools amount to 790 in 2020, with several specialisation programmes being offered. In 2019, there were around 24 master's degrees programme in nursing, constituting powerful training spaces for developing advanced practice nurses (Cassiani and Silva, 2019[6]; Neto et al., 2018[26]).

Brazil can capitalise on its existing nurse training network to expand and recognise the role of advanced practice nurses, which in turn, can help alleviate the persistant workforce shortages in PHC. Advanced practice nurses in Brazil could contribute to the management of care of patients with mild acute diseases and chronic disorders, complementing the already practicing PHC doctors. Alternatively, they can be deployed in remote and underserved areas to help enhance access to qualified health professionals. Such a policy would require a thorough analysis on current nursing curriculums to further invest on core competencies including team practice, care co-ordination between and across health sectors, clinical and professional leadership, quality and safety management among other (Cassiani et al., 2018[66]).

Beyond expanding the role of nurse practitioners, it is also warranted to make the most of community health workers within the Brazilian PHC team. Community health workers already play a crucial role in

PHC provision in Brazil. They are trusted members of the communities in which they work and have valuable knowledge of local health needs. In Brazil, there is scope to expand further their role toward more preventive activities and care management. In Alaska (United States), CHWs are the first point of contact with the health care system for the population living in very remote villages (Box 5.6). There, they provide preventive treatment, chronic care and emergency visits.

In a systematic studies review (Hartzler et al., 2018[67]), community health workers are found to be able to perform three main functions:

- providing clinical services, such as assessment of vital signs, lifestyle advice, and routine examinations aided by remote communication with physicians;
- linking patients with community-based services, such as referrals for transportation or food assistance; and
- providing health education and coaching, to help patients achieve health goals and increase self-efficacy.

With serious workforce gap in Brazil, community health workers could play a bigger role, notably by taking a patient's medical history, conducting basic physical exams, ordering tests, counselling on preventive care. To date, CHWs in Brazil motivate patients to get care and bring test results to patients, check whether patients are taking medications, schedule appointments for individuals with other health professionals and encourage community members to seek care at the clinic (Wadge et al., 2016[68]).

There is further scope to train CHWs in Brazil to directly address health needs and provide some clinical services, aided when necessary by remote communication with PHC doctors. The lack of opportunities to learn and advance in the community health worker role has already been noted elsewhere (Grossman-Kahn et al., 2019[69]). So were the lack of recognition of their work, the poor communication and co-ordination between community health workers and the basic health units, as well as the lack of resources at the basic health units (Grossman-Kahn et al., 2019[69]). Investments in CHW trainings, in streamlined IT systems and improved communication between CHW and other staff from the FHT will help expanding CHW roles.

Box 5.6. CHWs are the first point of contact with the health care system in remote part of the United States

In the United States, community health workers have a key role to address social determinants of health and to promote access to care for vulnerable and hard to reach populations (Hartzler et al., 2018[67]). Community health workers, for example, provide PHC services in remote Alaskan villages, whose population would otherwise have no access to appropriate health care delivery (Golnick et al., 2012[70]). They are the first point of contact with the health care system for the population living in these very remote villages. They work under the supervision of community health practitioners, and there is an integrated referral system that includes physicians, regional hospitals and a tertiary hospital (Golnick et al., 2012[70]). The range of PHC services delivered by community health aides mostly includes care for chronic and preventive treatment, and emergency visits (often for respiratory distress and chest pain).

Furthermore, community health workers played a critical role as frontline health care workers during the first wave of the COVID-19 pandemic. In New York for example, community health workers provided educational sessions to patients with chronic conditions or at risks for chronic conditions to help them manage their conditions. They have also made home-visits, conducted wellness checks over the phone, helped people enrolling in online patient portals and prepared them for tele-health appointments. They served as support in navigating the health care systems, and mitigating fear and correcting misinformation in disadvantaged communities.

Source: Golnick et al. (2012[70]), Innovative primary care delivery in rural Alaska, https://doi.org/10.3402/ijch.v71i0.18543; Hartzler et al. (2018[67])Roles and Functions of Community Health Workers in Primary Care, https://doi.org/10.1370/afm.2208.

Greater use of teleconsultations needs greater funding and new governance model

Improved use of alternatives to face-to-face consultations is another avenue for consideration to cope with PHC doctor shortages and geographical imbalances in Brazil. Telemedicine is used internationally to make PHC services available to patients closer to their home or work. It facilitates communication between patients and medical staff, as well as the transmission of medical records and other data between different locations (OECD, 2020[61]).

Teleconsultation is a very promising way to improve access – both timely and geographically – and to relieve pressure on PHC physicians. Previous studies have shown that telemedicine improves access to care, reduces travelling costs and leads to better equity for rural and indigenous population (Oliviera Hashiguchi, 2020[71]). Nearly 90% of international studies concluded that telemedicine interventions were at least as effective as face-to-face interaction (Oliviera Hashiguchi, 2020[71]). Benefits can be found for preventing and controlling PHC sensitive conditions, like 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 (Oliviera Hashiguchi, 2020[71]).

As already detailed in Chapter 6, telehealth has been in use in Brazil for quite some time now, especially in remote areas like the Amazon (Santos et al., 2016[72]). In addition, the Brazil Telehealth Network Programme seeks to expand and improve PHC provision in regions with high social vulnerability, where the supply of health care services is very limited. The programme provides health care professionals that are part of the network both synchronous (real-time) and asynchronous teleconsultations, telediagnostics, second opinions and telelearning (Ministério da Saúde, 2020[73]).

Telehealth services remain under-utilised in Brazil, despite evidence that points to beneficial effects. Available evidence shows that so far implementation of telehealth in PHC in Brazil has been associated

an improvement in child care, diabetes mellitus care, hypertension and women's health (Dos Santos et al., 2019[74]). Despite this, from 2016 to July 2019, just under 3.5 million telehealth services across all levels of care (from tele-consultations to tele-learning sessions) had been registered in Brazil. Of these, 50% had taken place in the Southeast region and 36% in the South region. Only 1% of activities took place in the North region. Out of 26 Brazilian states, only 18 have telehealth centres participating in the network.

In many ways, telehealth initiatives in Brazil are promising, but several factors impede the development of telehealth. These impediments include the lack of funding, the lack of training, the lack of equipment for FHT and a fragmentation of governance mechanisms (see Chapter 6 for more details). Argawal et al. (2020[74]) noted that Brazil lacks guidelines around reimbursement models and regulatory frameworks for telemedicine.

There are successful experience across the OECD, where telemedicine services have been used to expand access to care among rural and remote patients. Canada and Australia are two examples, where large investments have been made to make access to telehealth services a reality:

- In **Ontario, Canada**, the Telemedicine Network includes 120 virtual care systems to connect communities to care across the province (Ontario Telemedicine Network, 2021[76]). In 2017, the Ontario Telemedicine Network supported more than 896 000 visits (Agarwal et al., 2020[75]). The province of Saskatchewan has also been using telehealth technology for over a decade to reach rural and remote locations (Ontario Ministry of Health, 2021[54]). Patients can receive PHC by visiting the nearest telehealth site and meeting with a professional in a virtual exam room. Telehealth can connect to available diagnostic peripherals, such as stethoscopes, vital signs monitors and ultrasound equipment, making real-time diagnosis and patient monitoring possible. In rural and remote areas, telehealth services are particularly used for mental health and addiction appointments, for prescription refills and chronic disease management. In addition, Saskatchewan began piloting remote presence technology for a number of North communities in 2017 (OECD, 2020[61]). The project allows the PHC team in the community to have access to expertise (such as physician, nurse or pharmacist, etc.) on demand. Overall, previous experiences with telemedicine in Ontario (called Champlain BASE) have been shown to be cost-effective for the provision of specialist care. The cost of traditional referral to a specialist provider was, on average, CAD 133.60 per case; versus CAD 47.35 per case for a teleconsultation service on average (Agarwal et al., 2020[75]).
- **Australia** has also made large investment in telehealth services to be used for specific health conditions such as chronic conditions and dermatology for people (OECD, 2015[77]). In the Northern Territory, PHC doctors can be anywhere in Australia, and assist remote nurses and Aboriginal health practitioners to manage chronic disease patients appropriately by reviewing pathology and assessment results, then have case discussions with the local team. They also monitor and advise on other pathology testing. The medical practitioners consist of a group of general practitioners, who have usually previously worked in remote Northern Territory, and have moved away but can continue to provide quality care for remote patients through the use of a web-based electronic patient record with a unique patient identifier. Remote nurses and Aboriginal health practitioners can then contact a doctor who understands the conditions and circumstances they are providing care in. The Australian College of Rural and Remote Medicine also developed Tele-Derm, an online resource enabling rural doctors to receive advice on the diagnosis and management of skin disease. A rural doctor submits a photo of a skin condition, together with information on the patient's history and a possible diagnosis. A dermatologist responds usually within two days with a diagnosis and treatment options. PHC doctors can also access online case studies and education opportunities.

To address workforce shortages through a wider use of telehealth, Brazil will need to establish a governance structure that better support municipalities with insufficient resource capacity. Greater financial

support and adequate training will be required to avoid compounding existing social divides (see Chapter 6).

5.5. Increasing the recognition of the PHC specialty and ensuring high quality of medical education

Beyond addressing the uneven geographic distribution of PHC physician, there is an urgent need to increase the recognition of the PHC specialty and to ensure high quality of medical education in Brazil. Actions are needed in three broad areas:

- Standardising the contractual arrangement of PHC workers, with a more consistent salary scale across the country;
- Improving the academic incorporation of the family and community medicine specialty in graduate and post-graduate programmes to improve its credibility and recognition;
- Introducing quality measures to medical education to secure a high quality PHC workforce through a national licensing examination, making the specialty training in PHC compulsory for all medical doctors wishing to practise PHC, and implementing stronger requirements around continuous medical education.

5.5.1. Standardising the contractual arrangement for PHC workers

There are avenues for Brazil to improve the attractiveness of the PHC profession through a greater standardisation of contractual arrangement outside of the *Médicos pelo Brasil* programme. As each municipalities define the level of salaries, bonuses and other payment mechanisms, there is wide heterogeneity in these arrangements between municipalities. In Brazil, stronger oversight and regulation from the federal government is warranted to ensure consistency across the country. It could be important to make sure that small municipalities offer similar contracts as bigger municipalities, with a more consistent salary scale across the country. The new Agency of the Development of PHC could have a role to play in this direction.

Across OECD countries, Turkey implemented a similar strategy with the Health Transformation Programme launched in 2005. The overarching objective was to strengthen family medicine and PHC, notably through establishing new contractual arrangements for family physicians. Before the Health Transformation Programme, contractual arrangements and roles of family physicians were loosely defined. With the implementation of the health reform, family physicians have started to be paid according to national terms and conditions, and with more generous salaries and improved working conditions.

5.5.2. Improving the credibility and recognition of the specialty of PHC in Brazil

While the Family Health Strategy has made access to PHC a priority, the country has not invested well in building a strong credibility and recognition of the specialty of family and community medicine. In Brazil, the FCM specialty is the last option among physicians. Available evidence shows that the specialty of PHC is the first option for only 1.5% of recent graduates among the 55 specialties (Scheffer et al., 2018[1]). It is important to add that the specialty is not recognised as a knowledge area by the Federal Agency for Support and Evaluation of Graduate Education, meaning that funding research and investment in this research area has traditionally been very low.

The low degree of academic incorporation of the family and community medicine specialty in graduate and post-graduate programme has been found to impede building a strong recognition of this specialty in Brazil (Wenceslau, Sarti and Trindade, 2020[78]; Fontenelle et al., 2020[79]). Few researchers build their carrier

around PHC, and perhaps as a consequence, PHC departments in universities and medical schools are very rare.

A strong academic incorporation is however critical to allow transmission of the specialties' value and allow a practice to be recognised by other health care professions. Without such promotion, it is very difficult to promote FCM among the students and to encourage them to choose this specialty as their future career. Low academic incorporation also reduces scientific production in the area of FCM, and limits it to collective health (Wenceslau, Sarti and Trindade, 2020[78]; Fontenelle et al., 2020[79]). Arguably, the specialty of family and community medicine is undervalued in Brazil, explaining why there is still bottleneck in filling physician vacancies in FHTs. Even with the implementation of the More Doctors programme, which has managed to allocate more than 16 000 new professionals to PHC since 2013, unfilled medical positions in FHTs are still common (Giliate Cardoso Coelho, Valeska Holst and Aristides, 2019[18]).

Serious efforts are needed to counter the misconception that PHC is merely health care for the poor or the marginalised people, that it is a profession without much qualification, a second-rate profession (Justino, Luzón Oliver and Palhano de Melo, 2016[19]). The knowledge, skills, responsibilities and core competencies of the family and community medicine speciality should be evident to all population groups and from all other health care professionals. The creation of academic departments of family and community medicine in all medical schools is a prerequisite to undertake research in PHC, develop clinical guidelines specific to PHC, as well as teach the specialty. Dialogue, inter-disciplinary collaboration with other specialists and mutual respect between health professionals are also key to support this.

When good family and community medicine curriculums are in place for both students and residents, it becomes possible to attract students to this specialty (Blasco et al., 2008[80]). Family physicians who are recognised for their academic competence, leadership and who teach PHC practice with determination can awake a sense of vocation in their students, and will also win prestige among other health care professionals. Strong academic incorporation is also a prerequisite to develop and encourage further continuing medical education for all medical doctors who practice currently with no specialty training, helping to maintain and improve the quality of care.

Brazil could build up from experiences that have allowed to make good steps towards incorporating PHC as a core scientific area in some federal universities. For instance, the Master's Program in PHC at the Federal University of Rio de Janeiro, or the Family Health Master's Programs at the Federal Universities of Ceará and Mato Grosso do Sul. At the same time, Brazil could also build from successful experiences of network of Family Health Professional Master's, which attracted a high number of professionals: the programme of the Family Health Training Northeast Network (RENASF) created in 2009 (RENASF, 2012[81]), and the Family Health Professional Master's (ProfSaúde) created in 2016 (ProfSaúde, 2019[82]). Such good local initiatives could be consolidated by the federal government to design a National Family and Community Medicine postgraduate programme for Brazil.

5.5.3. Introducing quality measures to medical education

Implementing a national licensing examination

While the Ministry of Education in Brazil regulates medical education nation-wide, more could be done to secure standardisation of the medical curriculum in Brazil. The inadequate academic programme and gap in medical education between medical schools is an area of concern.

To achieve greater standardisation of the medical curriculum and teaching across the country, Brazil could introduce a national test at the end of the university period. The implementation of a standardised national exam would replace each final exam in medical schools. The national licensing examination will not replace accreditation performed by the INEP or the CFM, but rather complement it.

A national licensing examination would assess both knowledge and clinical skills of undergraduate students. This is a necessary step to improve the public trust and confidence in physicians. It will make transparent that all medical doctors in Brazil are competent in their clinical skills and medical knowledge. There are several advantages of establishing a national examination (Bajammal et al., 2008[83]):

- First, the use of a standardised national exam is the best way to ensure any medical graduate or practicing doctor in Brazil has achieved at least a common standard of medical knowledge and clinical skills competencies. This would ensure that minimum standards and minimum competencies are met.
- Second, a national examination would act as a tangible and standard measurable outcome to identify areas in need for potential improvement in the curriculum and teaching methods. It could be used to benchmark medical schools across the country, and to correct any potential problem or deficiency in the curriculum or teaching method.
- Third, a national exam could be used as a reliable and transparent measure of candidates' qualification for post-graduate program's application. In other OECD countries such as France and Italy, allocations to specialist schools are determined by the results of the national examination. This approach is seen as a more meritocratic and transparent way to attribute specialist training places.

The national examination has been increasingly used across OECD countries. This is a mandatory requirement to practise medicine in Canada, France, Italy, and just recently in the United Kingdom. While the United Kingdom has relied on external examiners and inspection carry-out by the General Medical Council to assure quality across the United Kingdom medical schools, the country is introducing a Medical Licensing Assessment which will test the core knowledge, skills, and behaviours needed to practise medicine (Box 5.7). The overarching objective is to drive up high standards for medical schools in the United Kingdom (CMC, 2020[84]). Brazil could learn from the United Kingdom's experience in building the Medical Licensing Assessment, and the role played by the General Medical Council.

At the same time, it will be important to ensure that doctors who qualified abroad pass a national licensing examination in order to be eligible to practise in Brazil. This approach is taken internationally – for example in the United States, Canada, France or the United Kingdom. In these countries foreign medical graduates must pass licensing examinations in order to be eligible to practise in the country, and then be able to enrol in a residency programme and pass the post-graduate examination. This system ensures every foreign graduate has at least the minimum competences to function as a physician, according to the licensing body standards of the country. In the United Kingdom, international medical graduates have to pass the Professional and Linguistic Assessments Board (PLAB) test (GMC, 2021[85]). The PLAB Test helps make sure doctors who qualified abroad have the right knowledge and skills to practise medicine in the United Kingdom. From early 2024, international medical graduates will also have to take the MLA if they are applying for registration with a license to practise in the United Kingdom (Box 5.5). In Australia, international medical graduate seeking general registration as a medical practitioner needs to undertake the Standard Pathway which consists of the completion of a written examination (CAT MCQ) and structured clinical examination of the Australian Medical Council (AMC, 2020[86]).

With the new Médicos pelo Brasil programme, the Revalida system will be a compulsory requirement for foreign medical graduates. This is an important step going forward to ensure that all medical doctors who qualified abroad have the right knowledge and skills to practise medicine in Brazil. As in the United Kingdom and Australia, revalidation consists of a theoretical written test and a practical clinical skill test, covering all level of health (primary, secondary, clinical, surgical). It might be warranted to better target the Revalida Test toward specific clinical areas or level of care depending on the profile of each graduate to better recognise their qualifications.

Box 5.7. The United Kingdom is introducing a Medical Licensing Assessment

The United Kingdom has traditionally relied on external examiners – visiting medical educators from other organisation – and General Medical Council inspection to assure quality across UK medical schools. Medical schools used to set their final exam independently in line with the General Medical Council's outcomes for graduates. However, the United Kingdom is introducing a Medical Licensing Assessment (MLA) which will test the core knowledge, skills, and behaviours needed to practise in the country. Medical students graduating in the academic year 2024-25 will need to pass the MLA as part of their medical school degree before they can join the medical register. The MLA test will have two-part: an applied knowledge test that will be computer-based, and a clinical and professional skills assessment. The aim is to provide a standardised mean of assessing all UK doctors, which in turn will help ensure patient safety. The benefit of the new system is, for the first time, to demonstrate that graduates from each medical school have met an agreed standard of proficiency and are well prepared to practise medicine. The work entailed by the MLA will be overseen and regulated by the General Medical Council. This work will consist of:

- Defining the range of professional skills, knowledge and behaviours a candidate needs to have achieved to be ready to practise medicine in the United Kingdom;
- Approve procedures to compile test questions and papers, set standards and run exams;
- Take corrective action if through its quality assurance processes, it considers that standards are not met;
- Be responsible for using information and data from the exams to apply a consistent approach to the assessment of international medical graduates.

Under this agreement, medical schools will continue to develop and deliver their own curricula and prepare students for the MLA, which will be regulated by the General Medical Council.

A process of phased introduction will begin from 2021 with robust testing and piloting, and the assessment will be fully implemented for students graduating from UK medical schools from the academic year 2024/25.

Source: CMC (2020[84]), https://www.gmc-uk.org/news/news-archive/gmc-and-msc-welcome-agreement-on-medical-licensing-assessment-delivery-model

The specialty of family and community medicine should be a mandatory requirement to be allowed to practise PHC in Brazil

As earlier mentioned, most doctors working in FHTs do not have a specialist post graduate training in FCM. Brazil is currently aiming for each FHT to have a FCM specialist with the implementation of the new Doctors for Brazil programme. The new programme will make the specialty training in PHC compulsory for all medical doctor wishing to practise PHC. Arguably, this new programme will help deliver more effective and patient-centred care. The benefits of specialist PHC has already been demonstrated elsewhere: PHC specialists place a stronger emphasis on preventive interventions and early management of health conditions, and are more likely to address the majority of patient's need, as well as to help them to co-ordinate care with other health services contributing to better quality and responsiveness (OECD, 2020[61]).

Currently, at least 22 OECD countries (Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, France, Greece, Israel, Italy, Ireland, Latvia, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom) have introduced a post-training

requirement to practise PHC. Such a professionalisation of PHC specialists goes along with the formation of professional organisations, scientific research in PHC, or the development of guidelines. This is warranted for driving up quality and patient-centred PHC in Brazil.

Requirements around continuous medical education for PHC medical doctor could be implemented

Continuing medical education (CME) includes the acquisition of new knowledge, skills and approaches considered useful for developing competent and experienced medical practice. It helps medical doctors maintain their competence and acquire new skills throughout their carriers. This is critical to keep practice up-to-date, and to make sure medical doctors possess the skills useful and needed in daily practice to respond to evolving patients' needs.

In Brazil, the Política Nacional de Educação Permanente em Saúde was instituted in 2004 as the main mechanism to encourage continuing professional development. It is based on participatory teaching and learning approaches at the practice level. The overarching objective being to improve the skills and fill gaps in competence according to patients' health needs in daily practice, rather than updating medical knowledge using didactic approaches. While continuing professional development is a good practice to continuously and actively improve the skills and competences of medical doctor, the uptake of this activity within FHTs remains unknown.

In addition, CME is voluntary in Brazil. There is no specific requirement for each medical doctor. The take-up of CME relies upon professional and individual choice, without any regulatory approach, peer evaluation requirement or re-certification requirement. The current system does-not guarantee high standard of competencies for PHC doctors, and does not ensure their fitness to practise throughout a carrier. So far, it is impossible to know whether and how many PHC medical doctors have undertaken CME.

A number of bodies such as the CONASS, CONASEM, the Brazilian Medical Association, the SBMGC or the SOBRAMFA organise several training, conferences and internet-based learning model. These are all valuable approaches. However, a more formal CME framework, which makes clear the expectation upon PHC doctors and supports them to meet it, will constitute a marked improvement. Brazil could introduce strong requirements around CME for PHC physicians, as experienced by other OECD countries including Norway, the Netherlands or the United Kingdom (OECD, 2014[12]). In the United Kingdom and the Netherlands, CME for PHC medical doctor is compulsory and linked to re-certification. PHC physicians need to demonstrate that they have regularly participated in CME activities and there is a peer evaluation regarding professional skills. To be successfully re-certificated, PHC physicians need to achieve at least 50 CME credits per year. Norway use financial incentives to increase compliance with CME requirements. Specialists in PHC are able to charge higher fees for each consultation than regular GPs if they have followed a number of CME courses. This gives strong incentives to comply with national requirement, which in turn improve their competencies and performance.

Experiences from OECD countries could be helpful to inform Brazil on ways to implement requirements and mechanisms to secure compliance to CME requirements. The Agency for the Development of PHC and municipalities could for example add a requirement to demonstrate the attendance or completion of some specific training in the local contracting of PHC doctors. Using the contracting arrangement could actively push PHC doctors toward compliance with CME requirements, and encourage quality improvement. If strong CME requirements are introduced in Brazil, the country should also ensure that CME is directed towards some of the key challenges of the health care system, for example on prevention of risk factors for health and management of chronic conditions.

5.6. Conclusion

In Brazil, problems of shortage of PHC doctors and regional disparities in supply are acute. They are leading factors of lower health outcomes, lower health care quality and can result in unmet health care needs for Brazilian's most remote population. While the implementation of the More Doctor Programme in 2013 led to positive improvements with greater investment in PHC infrastructure, better access to medical training, and increased number of recruitment in underserved communities, more needs to be done to increase and ensure a more even distribution of PHC medical doctors. The new federal programme *Medicos pelo Brazil*, which has a stronger focus on quality than the previous programmes, aims at expanding the number of PHC doctors to 7 500 in the poorest areas. To meet this ambitious target, strategic thinking toward the community targeting methods will be required to make sure that all eligible municipalities are effectively enrolled to the new federal programme.

At the same time, and as informed by the experiences of OECD countries, it will also be important to increase the number of rural trained doctors and to provide both wage- and non-wage related financial incentives – linked for example to a service obligation of between two and four years – to recruit and retain doctors in underserved areas. Restricting the choice of practice location is another strategy to ensure a more even distribution of medical doctors. At any rate, such solutions require careful and coherent workforce planning in Brazil, based on an objective assessment linked to socio-demographic characteristics of medical doctors, their work processes and population health needs.

A smarter use of existing local workforces (nurses and community health workers), and changes in scopes of practice, are innovative ways that Brazil might want to consider in the future. The country should also continue to expand the use of telehealth to facilitate access to PHC in places with fewer physicians. To this end, it will be crucial to establish a governance structure that better supports municipalities with insufficient resource capacity to avoid compounding existing social divides.

While much policy attention has been directed to improving access to PHC, little attention has been devoted to building a strong credibility and recognition of the PHC specialty, and to ensuring high quality and well-skilled medical doctors. Actions to improve the academic incorporation of the FCM specialty in graduate and post-graduate programmes are needed through for example the development of additional family and community medicine departments in medical schools. To secure high quality PHC medical doctors and ensure their fitness to practise throughout their carrier, there are high opportunities to make the specialty training in FCM compulsory for all medical doctors wishing to practise PHC, and to implement stronger requirements around continuous medical education and recertification.

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6 The digital transformation of primary health care in Brazil

Brazil has made strides towards a digital transformation of PHC, building on more than a decade of policies to digitalise health care and make better use of health data, and with key investments in networks, data, interoperability and skills. The COVID-19 pandemic has only provided further impetus. Yet, progress towards effective use of digital PHC has been slow, and fundamentally unequal, with significant inequalities in the use of digital technologies and tools among health workers and citizens. Other major barriers include human and technical capacities in municipalities, with potential diseconomies of scale resulting from setting responsibilities for digital health at municipal level. Tackling these challenges requires: 1) digitalising all PHC units and teams; 2) promoting inclusive connectivity for all Brazilian citizens, especially the most vulnerable; and 3) establishing a governance structure with clear well-funded mandates at the right levels of government.

6.1. Introduction

A digital transformation of health care in Brazil is well underway, propelled by a broader strategy for a digital transformation of the public sector. For some time now, the Government of Brazil has been increasing its use of digital tools and data to make its public institutions more efficient, more transparent and more responsive to citizen and business demands (OECD, 2018[1]). Clear governance and a focus on connectivity, interoperability, open government data and citizen-driven service delivery have resulted in Brazil recently scoring above the OECD average on the 2019 Digital Government Index (OECD, 2020[2]).

Brazil has made significant inroads with respect to building a foundation for digital PHC, from strategies at various levels of government to essential investments in networks, data, interoperability and skills. However, progress towards effective use of digital technologies in PHC has been slow, and fundamentally unequal. Contributing factors include both demand and supply side factors, but also disarticulated governance and insufficient and poorly targeted funding.

This chapter provides an overview of recent initiatives and developments in the digitalisation of PHC in Brazil. Over the last decades, Brazil has been making impressive progress towards a digital transformation of its public sector and its health care services, but progress towards effective use of digital technologies in PHC has been slow, and fundamentally unequal, as discussed in section 6.2. Moreover, as shown in section 6.3, millions of Brazilians are digitally excluded, and there is a risk that a digital transformation of PHC will only compound existing social divides. The chapter concludes with a discussion in section 6.4 of how Brazil's decentralised government, along with the country's heterogeneous regional demographics, socio-economic indicators and governance structures, create challenges to digitalising PHC.

6.2. Overall progress in health system digitalisation but less so in the digitalisation of PHC

The creation of the Brazilian Internet Steering Committee (*CGI.br*) in 1995 to provide strategic guidelines related to the use and development of the Internet in Brazil can only be considered foundational (OECD, 2018[1]). The Committee established the basis for an ecosystem between citizens, the private sector and the public sector. Linked to the Brazilian Internet Steering Committee, and sitting under the Brazilian Network Information Centre (*NIC.br*), the Regional Centre for Studies on the Development of the Information Society (*Cetic.br*) was created in 2005 to monitor the adoption of information and communication (ICT) technologies in Brazil. It has conducted its ICT Households Survey annually since 2005, and has, since 2013, also undertaken the ICT in Health Survey focusing on the infrastructure, availability and use of ICT-based applications in health care facilities in Brazil. These surveys are invaluable and they provide many of the statistics and indicators used in this chapter. Unfortunately, the most recent results predate COVID-19 and thus may not fully reflect the current situation.

6.2.1. The government has made strides with a clear ambition for digital health services

Since 1995, and especially in recent years, Brazil has made impressive progress towards a digital transformation of its public sector. In 2019, more than 500 public services, spanning 29 different entities, were made available through digital channels, leading to reported annual savings of USD 66.9 million[1] (BRL 345 million) (gov.br, 2020[3]). Under its current Digital Government Strategy 2020-22, the government is aiming to offer all of its more than 3 000 public services via digital channels by the end of 2022 (Diário Oficial da União, 2020[4]). Among the existing digital transformation plans of 73 public entities is the Brazilian National Digital Health Strategy 2020-28 (*Estratégia de Saúde para o Brasil para 2028* or *ESD28*).

The *ESD28* (2020[5]) builds on more than a decade of policies to digitalise health care and make better use of health data, going as far back as the National Policy for Health Information and Informatics of 2004 (*Política Nacional de Informação e Informática em Saúde* or *PNIIS*). There has been an acceleration of efforts in more recent years, with the publication of the 2015 *PNIIS*, which is currently being reviewed, the publication in 2017 of the e-Health Strategy for Brasil 2020 (*Estratégia e-Saúde para o Brasil 2020*), and the publication in 2020 of Brazil's National Digital Health Strategy Action, Monitoring and Evaluation Plan (*Plano de Ação, Monitoramento e Avaliação da Estratégia de Saúde Digital para o Brasil 2019-23*). The *ESD28* is also aligned with Brazil's National Health Plan 2020-23 (Ministério da Saúde, 2020[6]).

Actions within the *ESD28* are built around three axes (Ministério da Saúde, 2020[5]). The first axis seeks to build on existing programmes and initiatives to digitalise health care in Brazil, including the National Health Data Network (*Rede Nacional de Dados em Saúde* or *RNDS*), as well as the Connect SUS (*Conecte SUS*) and the *Informatiza APS* programmes (these are described in greater detail below). The second axis looks to develop the necessary conditions (e.g. organisational, legal, regulatory and governance structures) to spur effective collaboration in digital health. The third and final axis will establish a conceptual, normative, educational and technological forum (the so-called *Espaço de Colaboração*) to operationalise collaboration. Training and capacity building for health care workers is a key priority in the implementation of the *ESD28.*

The *ESD28* plan of action has seven priorities (Ministério da Saúde, 2020[5]): 1) governance and leadership, 2) digitalisation of the three levels (primary, secondary and tertiary) of health care provision, 3) supporting health care quality improvements, 4) the patient as the protagonist, 5) human resource training, 6) an environment of interconnectivity, and 7) an innovation ecosystem. The *ESD28* also identifies the main actors and stakeholders, establishing five types of participation (leadership, partnership, sponsorship, contribution, engagement) that are expected of each actor for each action point (see Box 6.1).

Box 6.1. Digitalisation of PHC in the National Digital Health Strategy 2020-28

Action point 2.1.2 of the ESD28 seeks to expand the digitalisation of PHC in Brazil. It is led by the Ministry of Health and the Health Secretaries of Municipalities and States, in partnership with the CONASSEMS and CONASS, with sponsorship from the Federal Government, the National Health Council and the CIT, plus contributions from Associations of Health Professionals, and engagement from Anvisa and ANS. The foundation of this action point is the Primary Health Unit Computerisation Programme (*Programa de Apoio à Informatização e Qualificação dos Dados da Atenção Primária à Saúde*) or *Informatiza APS*, which seeks to digitalise all PHC units and teams in Brazil. New financing schemes (part of *Programa Previne Brasil*) and implementation and training initiatives have been piloted in the state of Alagoas (more detail is provided in the text below). The timeline for full implementation of the action point is December 2022.

Source: Ministério da Saúde (2020[5]), Estratégia de Saúde Digital para o Brasil 2020-28, http://bvsms.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf.

There is a comprehensive push for a digital PHC in Brazil

The importance of connecting and digitalizing PHC practices is clear and the potential value added would be very significant (see Box 6.2). Digital health can help PHC be the first point of contact with patients, co-ordinate referrals and follow-up to secondary and tertiary care, and monitor and keep track of community and population-level health risks and conditions (Castle-Clarke and Imison, 2016[7]). The COVID-19 pandemic has made clear there are enormous benefits to digitalising and connecting health care facilities and services.

Box 6.2. A digital transformation can help realise the full potential of PHC

Digital PHC is the use of digital technologies to support PHC (it is a subfield of digital health focusing specifically on PHC). Digital technologies (or information and communication technologies) are electronic tools, systems, devices and resources that generate, store, process and/or transmit data. Digital technologies include devices such as smartphones and computers, as well as intangible products such as software, platforms and algorithms, and can support PHC in a variety of ways.

At the centre of digital PHC is the **electronic health record** or EHR. The EHR is a longitudinal digital record of an individual patient that contains or virtually links together multiple electronic medical records from different institutions and health care settings. As it contains a history of contact with health care providers from any organisation at any level of care, the EHR plays an essential role in helping PHC providers co-ordinate care for individual patients.

An EHR that is complete, accurate, up-to-date, comprehensive, and that can be shared, enables a plethora of digital applications in PHC. An EHR that contains clinical (e.g. medications prescribed), sociodemographic (e.g. employment) and administrative (e.g. insurance) information allows supports many applications, including among many others:

- Targeted **alerts and reminders** to patients (e.g. for screenings or vaccinations).
- Electronic referrals, **ePrescribing** and certifications (e.g. for sick leave).
- Clinical decision making (e.g. medications to avoid given patient allergies).
- **Telemedicine** applications (e.g. video consultations and remote monitoring).
- Mobile health or **mHealth** applications (e.g. smoking cessation and mental health apps).
- Population-level statistics on the prevalence and incidence of diseases and risks.
- Research studies taking into account **real-world data** (e.g. pharmacovigilance).

It is possible to implement some of these applications without a complete EHR system (e.g. telemedicine), however without the EHR, digital technologies will fall short of their potential and will not fully assist PHC.

Source: World Health Organization (2018[8]), Digital technologies: shaping the future of primary health care, https://apps.who.int/iris/bitstream/handle/10665/326573/WHO-HIS-SDS-2018.55-eng.pdf?sequence=1&isAllowed=y; OECD (2019[9]), Health in the 21st Century: Putting Data to Work for Stronger Health Systems, https://dx.doi.org/10.1787/e3b23f8e-en.

The potential benefits of a digital transformation of PHC are also clear in the context of Brazil's National Health Plan 2020-23 (Ministério da Saúde, 2020[6]). Among its objectives are to promote the expansion and effectiveness of PHC services in an integrated and planned fashion, to guarantee access to quality PHC services for all, and to reduce population health risks through prevention, epidemiological surveillance and health promotion.

Brazil has a long history of developing, implementing and using health information systems (Ministério da Saúde, 2017[10]). In 2017, the government launched a public tender, the Primary Health Unit Computerisation Programme, to support the country's PHC units in using electronic health record (EHR) systems by enhancing connectivity, acquiring ICT equipment, and providing technical support and training of health professionals (OECD, 2020[11]). Following concerns from the Federal Court of Accounts regarding the viability of a national rollout, the programme was replaced by Connect SUS. Connect SUS seeks to bring together all the health information of any one citizen under a large data network that can be used to continuously improve health care and decision making. The Connect SUS programme depends on two essential elements: the RNDS and the updated Primary Health Unit Computerisation Programme

(*Programa de Apoio à Informatização e Qualificação dos Dados da Atenção Primária à Saúde* or *Informatiza APS*).

Through the Connect SUS programme, and as part of the *Previne Brasil* programme, the *Informatiza APS* programme provides federal funding (between USD 330 or BRL 1 700 and USD 388 or BRL 2000 per month) to family health teams that are able to collect and send data from electronic health record (EHR) systems (Harzheim et al., 2020[12]). The programme includes the provision of training in ICT and data analysis to public employees in municipal health departments (CGI.br, 2020[13]). The training is jointly organised by the Ministry of Health and the University of Rio Grande do Sul. It consists of 60 hours of training delivered through Telehealth Centres. In order to qualify for support from *Informatiza APS*, family health teams need to have already made investments in digital technologies, have a working EHR system and be able to share data through the PHC Health Information System (the *Sistema de Informação em Saúde para a Atenção Básica* or *SISAB*). Those teams that are eligible may use the funds from *Informatiza APS* to acquire software or hardware, pay for Internet connectivity in UBS, and hire ICT services, among others.

A key eligibility requirement of the *Informatiza APS* programme is that family health units need to already be using digital technologies. However, Connect SUS ran a pilot project in the state of Alagoas between October 2019 and June 2020 that did include an additional financial incentive for PHC units that have not yet been able to digitalise (Ministério da Saúde, 2020[14]). The Alagoas pilot provided a lump sum of between USD 1 649 (BRL 8 500) and USD 1 940 (BRL 10 000) to each municipality in Alagoas for every PHC unit that was not yet digitalised (more than USD 1.07 million or BRL 5.5 million were disbursed to 97 municipalities). In light of the COVID-19 pandemic, the Ministry of Health instituted a time-limited incentive of USD 5 268 (BRL 27 157) to be paid to municipalities and states for each health team that has not yet been digitalised (see Box 6.3). The Ministry of Health is also collaborating with the Ministry of Science, Technology, Innovation and Communications, with support from the National Education and Research Network (*Rede Nacional de Ensino e Pesquisa* or *RNP*), to provide Internet connectivity to 16 000 PHC facilities (CGI.br, 2020[13]).

A key element of Connect SUS focusing specifically in PHC is the e-SUS APS strategy (or *Estratégia e-SUS APS*, often also referred to as *e-SUS AB* for *Atenção Básica*) which seeks to modernise PHC through the use of health information systems, in order to better manage individual health and care, optimise data collection and improve health information (Ministério da Saúde, 2020[6]). The strategy is based on two underlying data collection systems: the simplified data collection system (C*oleta de Dados Simplificada*) and the EHR system (*Prontuário Eletrônico do Cidadão* or *PEC*). Around 56% of family health units that have been digitalised use the *PEC*, while others use third-party EHR systems (Ministério da Saúde, 2020[14]).

The Informatics Department of SUS – typically referred to as DATASUS – has also made various other applications available to citizens, frontline care workers and health care managers (CGI.br, 2020[13]). These include: *MedSUS*, an application that lists all medications approved for use in SUS; *e-Gestor AB*, a platform that combines multiple PHC information systems to facilitate the planning and delivery of health services; and the *Conecte SUS Cidadão* app, which builds on a previous version called *Meu digiSUS*¸ which allows citizens to access their personal and clinical data collected from multiple national registries as well as access useful information, such as where are the closest health care facilities and pharmacies. There are also versions of *Conecte SUS* for frontline health workers (*Conecte SUS Profissional*) as well as managers.

Another interesting system is *DigiSUS Gestor – Módulo Planejamento* (*DGMP*), a tool made available to states, the Federal District and municipalities in May of 2019. The *DGMP* allows local managers to register population health targets, annual plans, produce and send reports to the National Health Council, as well as produce annual reports. The Ministry of Health also makes available an Application Programming Interface, or API, that allows different software platforms used by health care facilities to integrate their EHR systems with the *RNDS*, as well as make use of blockchain solutions.

Municipalities are also increasingly providing digital services to citizens (CGI.br, 2020[13]). For example, the São Paulo prefecture has developed an app called *Agenda Fácil* which allows patients to book, confirm and cancel consultations and examinations in the municipality's PHC units. According to the latest ICT Electronic Government Survey (2020[15]), 25% of Brazilian prefectures allow patients to book appointments online and in some cases to be consulted via the Internet.

Start-ups in telemedicine are also becoming increasingly relevant. *Brasil Telemedicina*, founded in 2010, offers online medical services. It produces around 60 000 reports per month and has clients in more than 700 Brazilian cities (Brasil Telemedicina, 2020[16]). Another startup, *Telelaudo*, provides tele radiology services 24 hours a day, seven days a week, and employs 120 radiologists. It has provided more than 4.7 million reports to more than 450 hospitals (Telelaudo, 2021[17]).

Box 6.3. COVID-19 has been a catalyst for digital health and telehealth in Brazil

The federal government authorised on 15 April 2020 the use of telemedicine during the COVID-19 pandemic (through law number 13.989/2020). This enabled continuity of care for patients who may have feared physically visiting health care facilities, but it also protected health care professionals most at risk of serious COVID-19 (such as those with chronic conditions, those who are pregnant and those aged 60 years old and older) (see Chapters 3 and 4). To help PHC units access digital technologies, the Ministry of Health also instituted an exceptional incentive to be paid to municipalities and states for each health team that has not yet been digitalised, budgeting over USD 83.8 million (BRL 432 million) for 2020. The Brazilian Telemedicine University Network (*RUTE*) also created a special interest group on COVID-19.

Artificial intelligence, specifically machine learning algorithms, has also been employed to monitor the spread of SARS-CoV-2 infections and to actively search for individuals who may have been exposed to the virus. Algorithms have been used to predict how the virus will spread further, to assess the clinical outlook of individual patients as well as support decisions concerning the most appropriate treatments, and to manage hospital beds and other resources.

Chatbots and virtual assistants have been used by public authorities to provide accurate information on COVID-19 to populations, and also to collect data that can be used to monitor the spread of the virus. The Ministry of Health created a WhatsApp channel to answer questions from citizens as well as health care professionals, and to fight disinformation. Various states – such as Ceará, Rio Grande de Sul, and Amazonas – have also used digital tools to communicate with their populations and to aid decision making during the pandemic.

This rapid adoption of digital tools is potentially introducing some risks. For example, the emergency approval of telehealth during COVID-19 (law 13.989/2020) does not include any language relating to medical liability, data and information protection and security, medical licensing across states, nor location of medical act for tax purposes. While in some cases, it is clear that other existing laws apply (e.g. with respect to data protection and medical liability), the lack of specific text on these issues may introduce significant uncertainty and lead to lower adoption than would be desirable.

Source: CGI.br (2020[13]), ICT in Health 2019; CGI.br (2020[15]), ICT Electronic Government 2019; Diário Oficial da União (2020[4]) PORTARIA Nº 3.193, DE 27 DE NOVEMBRO DE 2020; Caetano et al. (2020[18]), Challenges and opportunities for telehealth during the COVID-19 pandemic:, https://doi.org/10.1590/0102-311X00088920.

6.2.2. Progress towards digital health has been uneven, especially in PHC

Out of the 40 880 PHC units (from a total of 43 200) that responded to the ICT in Health Survey (2020[13]), it is estimated that 3 600 did not have computers and 7 200 were not connected to the Internet. Internet connection speeds in PHC facilities increased from 2018 to 2019, but still only 17% of PHC units had speeds over 10 Mbps (CGI.br, 2020[13]). Across all health care facilities, only 20% of public facilities had speeds over 10 Mbps compared to 60% of private facilities. The United States Federal Communications Commission (FCC) recommends a minimum speed of 10 Mbps for a small practice with two to four physicians (ONC, 2019[19]). Speeds under 4 Mbps are not recommended if practices want to make simultaneous use of EHR systems and high-quality video consultations, not to mention remote patient monitoring. Because many public PHC facilities are small, these facilities do not actually contract broadband connections themselves, but rather these are procured by municipal and state health secretaries. This could be why almost half (46%) of managers in public health facilities do not know the speed of their broadband connections (CGI.br, 2020[13]).

While health care managers increasingly perceive their ICT equipment and Internet connections to be up-to-date and appropriate, there are marked differences between perceptions of managers in public and private health facilities (CGI.br, 2020[13]). A majority (68%) of managers of private facilities consider their ICT equipment to be new and up-to-date, compared to only 36% of managers in public facilities, and 40% of managers in PHC units. Similarly, 67% of managers in private facilities considered their Internet connection to be appropriate given their needs, compared to only 31% of managers in public health care facilities, and 32% in PHC units. These same patterns are observed among frontline care workers, like physicians and nurses. Across both public and private facilities, managers in non-capital cities were less likely than managers in capitals to consider their ICT equipment and Internet connections were up-to-date and appropriate.

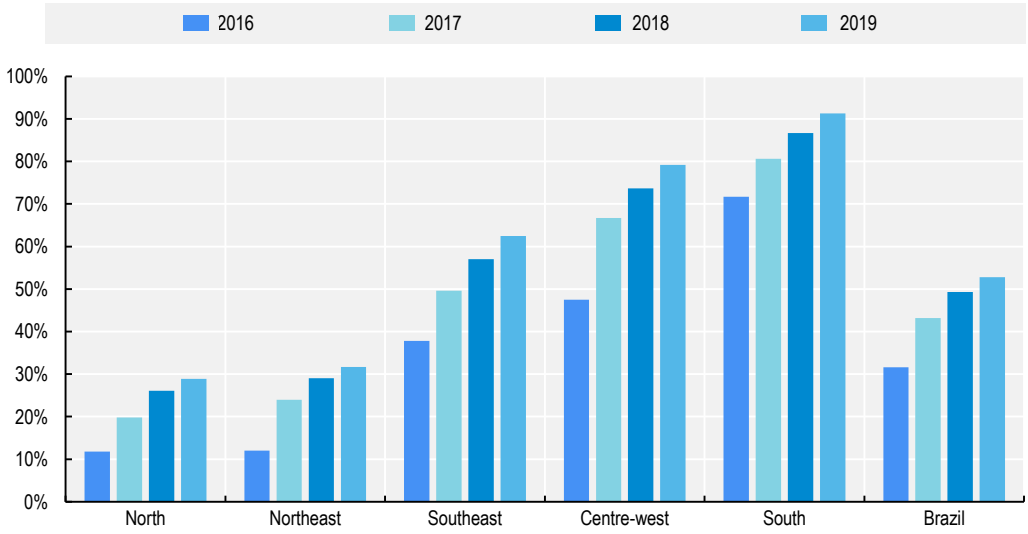
Only 14% of public health care facilities (from large institutions with over 50 beds to smaller PHC practices) had an ICT department, compared to 38% of private facilities (CGI.br, 2020[13]). Among PHC units, 10% had in-house ICT teams. The share of public facilities (16%) that had an information security policy was significantly lower than the share of private facilities with such a policy (44%). Among PHC units, 15% had an information security policy in place. Around 14% of public facilities had adopted data loss protection and prevention tools, compared to 29% of private facilities. The use of information security tools in PHC units was especially underdeveloped, with only 40% of facilities having a firewall, only 27% with encrypted databases, and 16% having data loss prevention tools. Close to a third of PHC units did not have password-protected access to electronic systems.

In 2019, an estimated 82% of all health care facilities and 78% of PHC units had EHR systems (CGI.br, 2020[13]). Around 18 000 health care facilities (or 18% of all facilities) did not have an EHR system, 12 000 of which were public facilities. According to the National Register of Health Establishments (*CNES*), 62% of FHTs were digitalised (using the same definition as that used in *Informatiza APS*), leaving almost 20 000 teams not digitalised (Ministério da Saúde, 2020[14]).

Adoption of EHR systems was highest in the South and Southeast regions (at 90% and 83% of facilities in those regions, respectively) compared to the Northeast and North regions (77% and 74% respectively). Facilities in non-capital cities lagged behind those in capital cities in the use of EHR systems (79% of non-capital facilities compared to 92% of facilities in state capitals). Close to one in every three public facilities, and 25% of all PHC units, still maintained clinical records and patient data only in paper form, compared to one in ten private facilities. In particular, while a majority of physicians in public facilities do use electronic prescribing, 71% of physicians signed their prescriptions by hand, rather than electronically. Between 2016 and 2019, the number of PHC units using EHR systems increased from 13 375 to 21 557, a 61% increase in three years (Ministério da Saúde, 2020[6]). Yet, the evolution has been very unequal across regions of Brazil (see Figure 6.1).

Figure 6.1. Very large inequalities in the use of EHR systems in PHC units

Share of PHC units using EHR systems in Brazilian regions, 2016-19



Source: Ministério da Saúde (2020[6]), Plano Nacional de Saúde 2020-23.

Many of Brazil's indigenous populations are based in the North and Northeast regions where digitalisation is least advanced. Indigenous children under one year old have lower rates of utilisation of medical appointments to monitor their growth and development (Ministério da Saúde, 2020[6]). There are also significant inequalities in the rates of vaccination against yellow fever in Brazilian states where vaccination has been recommended, ranging, in 2018, from 21.8% in Sergipe to 100% in the Federal District and Roraima (the national average for all states where vaccination is recommended is 64.1%).

Digital tools can help tackle these inequalities but the underlying infrastructure needs to be in place. Unfortunately, the rate of digitalisation of PHC units in Brazilian states seems to be inversely proportional to inequalities in health status and need. The share of hospital admissions due to conditions that are treatable in PHC is higher in regions with lower use of EHR systems in PHC units: the North and Northeast regions. Digital PHC could help reduce unnecessary admissions through, for example, better prevention, screening and monitoring of conditions that are treatable in PHC (see Box 6.2), but this cannot happen if the needed enablers – from infrastructure to software to skills – are not in place.

While the majority of health care facilities did have an EHR system in place, the information and data contained within these systems was not always complete, limiting the potential benefits. Decision support capabilities, specifically, were low, with only around a fifth of health facilities (including both large inpatient facilities with more than 50 beds as well as smaller PHC units) having EHR systems that allow, for example, drug allergy and drug dosage alerts (CGI.br, 2020[13]). Only around a third of facilities were capable of sending and receiving discharge reports or clinical information (ibid).

Since 2018, the ICT in Health Survey collects data on how many health care facilities have electronic systems in place to send or receive data directly from electronic systems in other health care facilities (be it PHC practices or hospitals). In both 2018 and 2019, the share of health care facilities that had systems in place to exchange information was 19%, suggesting that interoperability and data exchange remain limited in Brazil (CGI.br, 2020[13]). This is a serious barrier to effective PHC, greatly limiting care continuity and co-ordination.

Around one in five public health care facilities and PHC units offer digital services directly to patients (CGI.br, 2020[13]). These include scheduling appointments (23% of PHC units), exams (20% of units) as well as accessing results online (22% of units). Around one in ten allow patients to access their health record online and 7% of PHC units enable communications with health professionals.

Telehealth has been in use in Brazil for quite some time now, especially in remote areas like the Amazon (Santos et al., 2016[20]). In the rest of the country, however, its use has been very uneven. Around one-fifth of health care facilities provide remote learning (or e-learning) services (CGI.br, 2020[13]): continued education for health care professionals delivered via videoconferencing. The share of PHC units using remote learning is higher, reaching 39%. This is the most frequent use of telehealth, with other applications, such as real-time teleconsultations and remote monitoring, having lower adoption rates. Having said that, PHC units make more use of telehealth that the average health care facility in Brazil, with 35% providing teleconsultations and 25% telediagnosis. For example, remote monitoring has been implemented in less than one in ten facilities.

Unlike with the use of EHR and the Internet, it is public health care facilities that are most active in telehealth networks, with virtually no participation among private providers (CGI.br, 2020[13]). Among public facilities, 32% report being part of state telehealth networks, 19% report being part of the Brazil Telehealth Network Programme (*Programa Nacional Telessaúde Brasil Redes*), and 11% report participating in the Telemedicine University Network (*RUTE*). Among PHC units, the shares were 40%, 23% and 14% for state networks, the Brazil Telehealth Network Programme and *RUTE* respectively. Despite these encouraging figures, 47% of all public health care facilities are not part of any telehealth network.

The Brazil Telehealth Network Programme seeks to expand and improve health care provision, especially through PHC. The programme provides health care professionals that are part of the network both synchronous (real-time) and asynchronous teleconsultations, telediagnostics, second opinions and telelearning (Ministério da Saúde, 2020[6]). In 2015, the SMART (*Sistema de Monitoramento e Avaliação de Resultados do Programa Telessaúde*) system was created to monitor the use of telehealth services in Brazil. From 2016 to July 2019, just under 3.5 million telehealth services (from teleconsultations to telelearning sessions) had been registered by SMART. Of these, 50% had taken place in the Southeast region and 36% in the South region. Only 1% of activities took place in the North region. Out of 26 Brazilian states, only 18 have telehealth centres participating in the network.

Few health care professionals participated in ICT training courses in 2019, according to the latest ICT in Health Survey (2020[13]). Around 36% of nurses and 30% of physicians reported having completed capacity-building courses in health informatics, 8% of nurses and 6% of physicians participated in specialisation courses, and only 1% of nurses and 2% of physicians signed up for master's or doctorate degrees in health informatics.

Notably, around 60% of nurses and 43% of physicians did not perceive any added or reduced workload as a consequence of using computers and the Internet (CGI.br, 2020[13]). Nurses were less likely than physicians to say that computer and Internet use had decreased their workload (17% of nurses compared to 33% of physicians). More broadly, health care professionals has overwhelmingly positive views of the use of electronic systems in their facilities. Around 90% of physicians and nurses considered the implementation of electronic systems improved efficiency in team work. Over 80% agreed that the use of electronic systems resulted in higher quality of care as well as greater efficiency in services.

6.2.3. Effective digital PHC requires a focus on the fundamental enablers

A real digital transformation of PHC in Brazil will not happen without some foundational basics. These basic enablers – individually necessary though not sufficient – include Internet connectivity, appropriate hardware (e.g. computers, tablets, servers, etc.), standards and interoperability for data collection and sharing, software (like EHR systems), ICT security, and, crucially, appropriate training of clinical and

managerial staff, including through change management. All these elements require investments and resources at different levels of government, from the federal government all the way down to the municipalities and family health teams.

Reliable energy supply and fast connectivity are indispensable

Appropriate electricity supply and Internet connectivity are vital. As discussed, a significant number of PHC units do not have an Internet connection and a majority have speeds that are likely insufficient to make simultaneous use of EHR systems, high-quality video consultations and remote patient monitoring. Among the main barriers to digitalisation reported by 12 municipalities in the context of the recent pilot project in Alagoas were unreliable electricity supply and a lack of sufficiently fast broadband (Ministério da Saúde, 2020[14]). In some cases, there were no broadband suppliers (ibid). A 2018 study of 91 electricity suppliers serving 81 million households, found the quality of supply varies across regions, with citizens in remote localities, like the Amazonas, having significantly less stable electricity than someone living in São Paulo (Idec, 2018[21]).

Brazil's geography (nearly eight times the size of France and Spain combined) and sparsely distributed population are certainly challenging for inclusive connectivity (OECD, 2020[22]). The Brazilian Digital Transformation Strategy (E-Digital), along with the Connected Brazil programme, have been instrumental in expanding broadband connectivity (OECD, 2020[11]). Yet, connectivity targets have focused exclusively on schools and have not made explicit mention of concrete connection speeds or reliability. Brazil could explore how rural co-operatives might help bring stable electricity supply and affordable broadband, as done in North Dakota, and build on private sector efforts to connect rural populations in Peru (see Box 6.4).

Box 6.4. Bringing stable electricity supply and Internet connectivity to rural areas

The Dakota Carrier Network: a consortium of small, independent rural companies and co-operatives

Local mutual and co-operative organisations, which were crucial in bringing electrical and telephone services to rural areas of the United States in the 1900s, are now attempting to do the same with Internet connectivity. With more than 200 rural co-operatives are building advanced broadband networks across the country, evidence suggests these networks may be cheaper and faster than private-sector networks (OECD, 2021[23]). In North Dakota, a rural and sparsely populated state, in 2019, rural residents had better connection speeds than average fibre speeds in both rural and urban areas nationwide. This achievement has been credited to the Dakota Carrier Network, an umbrella organisation made up of small, independent rural companies and co-operatives. With financial support via the federal Broadband Technology Opportunities Programme, besides connecting citizens, the organisation is also deploying a dedicated 10 Gbps network to cover health care providers to enable telemedicine and data exchange.

***Internet para Todos*: A private sector collaboration to bring Internet connectivity to rural Peru**

A collaboration between IDB Invest (the private-sector arm of the IDB Group), Telefónica, Facebook and the Development Bank of Latin America (CAF), *Internet para Todos* (Internet for All) is a wholesale operator with a new business model that aims to provide Internet connectivity in rural areas of Peru at a profit (IADB, 2020[24]). The financial institutions provide funding with a long-term vision, while Telefónica makes its infrastructure available to rural operators. By the end of 2021, the company expects to have connected 6 million people in more than 30 000 rural areas. Expansion into other parts of Latin America is being considered, starting in Colombia.

Source: OECD (2021[23]), Delivering Quality Education and Health Care to All, https://dx.doi.org/10.1787/83025c02-en; IADB (2020[24]), https://www.iadb.org/en/improvinglives/internet-para-todos-helping-latin-america-log.

Remote and rural municipalities face significant barriers to dependable and fast connectivity, as well as a stable energy supply. These locations often have more limited resources yet face higher costs from broadband suppliers than better resourced large municipalities in urban areas. Partnerships between the Ministry of Health, the Ministry of Science, Technology and Innovation and the Ministry of Defence to connect PHC units, especially in remote locations, are crucial. It is important to evaluate the impact of these initiatives. For example, the already mentioned programme under the *RNP* that aims to connect 16 000 primary health units is limited to 12 months and does not seem to set concrete targets in terms of connection speeds or reliability. Without adequate Internet connectivity, the poorest and most remote regions of Brazil will be further left behind, with a digital transformation at national level compounding rather than reducing existing regional inequalities.

Purely financial incentives can be helpful but capacity building is still a major barrier

The Connect SUS pilot project in Alagoas provided municipalities with up to USD 1 940 (BRL 10 000) per unconnected PHC unit (Ministério da Saúde, 2020[14]). Despite this, in the period under evaluation, digitalisation in Alagoas lagged behind the average in the Northeast region as well as the overall Brazilian average (ibid). There is no question that financial support is needed to help PHC units and municipalities acquire essential ICT products and services. Yet, the results in Alagoas show financial support alone is not enough. One of the barriers to digitalisation reported by the 12 municipalities in Alagoas was the lack of an implementation team (Ministério da Saúde, 2020[14]).

It is not only digital skills among health care workers that matter, but also the skills, time and ownership needed to drive digitalisation of PHC units. The Alagoas pilot planned to conduct capacity-building workshops in three regions in the State, but due to COVID-19 ended up conducting workshops in only one region. That region (the *1ª Região de Saúde de Alagoas*) was responsible for half of the total increase in digitalisation during the pilot. The workshop trained professionals from 19 municipalities on the installation and use of the *e-SUS AB* EHR system (*PEC*) and other *e-SUS* software, as well as training those professionals attending how they themselves could train their colleagues. Another key activity in the workshop was to establish the timeline and responsibilities for implementation of the EHR system. While there are other reasons for the success of the *1ª Região de Saúde de Alagoas*, such as high degree of urbanisation, it is likely that the capacity-building workshop had a positive impact.

It is not just health care workers but also crucially managers that lead digitalisation of care services. In England, since 2017, the NHS Digital Academy has been training clinical and information technology leaders to support the digital transformation of the NHS. The Academy is delivered through a partnership between Imperial College London, the University of Edinburgh and the Harvard Medical School (Socha-Dietrich, 2021[25]). Its flagship Digital Health Leadership programme combines content in leadership and change management, health informatics and data analytics, health systems and user centred design, as well as citizen informatics, among other subjects. In Brazil, the implementation of the *Programa Educacional em Saúde Digital* is a step in the good direction. The programme was instituted in 2020 by the *Secretaria de Gestão do Trabalho e da Educação na Saúde* and in partnership with the Federal University of Goiás. In 2021, the programme includes specialisation in digital health for both health care workers and health managers at States and Municipal levels.

As mentioned, the EHR system is at the core of digital PHC. It is impossible to send out vaccination alerts, to suggest therapies based on clinical records, and to predict clinical outcomes when patient records are not digitalised. As seen, the large majority of health care facilities, especially smaller PHC practices, do not have decision support and information exchange capabilities within their EHR systems. However, Brazil has shown it is capable of making rapid progress. In just three years (2016-19), the share of public health care facilities with EHR systems capable of (CGI.br, 2020[13]): listing every lab result a patient has had increased from 17% to 41%; listing every patient that is using a specific pharmaceutical went from 18% to 40%; electronic drug prescribing increased from 29% to 51%. These are key functionalities in support of

PHC, especially when it is estimated that the purpose of one in five medical appointments is not clinical but to ask for prescriptions and certificates (Mendes, 2011[26]; Marshall, Shah and Stokes-Lampard, 2018[27]). Tying financing of digital PHC to the use of specific functionalities can be a powerful way to increase adoption (more on this in section 6.4.2).

Box 6.5. Key recommendations to increase digitalisation of PHC units

Ensure reliable energy supply and fast connectivity in all PHC units

- Set ambitious and clear targets for both reliability and speed of connections as part of existing and future collaborations between the Ministry of Health and other ministries and the *RNP* to increase Internet connectivity in PHC units. Improve co-operation among governmental entities and across the different levels of government (federal, state and municipal) for implementation of broadband connectivity initiatives.

Expand digitalisation of PHC units through financial support and capacity building

- Expand financial payments included in the Connect SUS pilot project of Alagoas to the entire Brazilian territory. Condition receipt of financial support to participation of municipal and state officials in capacity-building workshops, and develop training specifically for senior executives. Set ambitious and clear quantitative targets for adoption and use of EHR systems (such as *e-SUS AB*), including effective use of electronic drug prescribing and exchange of clinical and administrative data across units. Emphasise importance of cybersecurity as an inevitable consequence of PHC units' operational dependence on digital systems.

Note: see also recommendations in the *OECD Telecommunications and Broadcasting Review of Brazil 2020* (OECD, 2020[22]) and the *OECD Reviews of Digital Transformation: Going Digital in Brazil* (OECD, 2020[11]), as well as the *Recommendation of the Council on Broadband Connectivity* (OECD, 2021[28]).

6.3. Digital divides pose barriers to an effective digital PHC

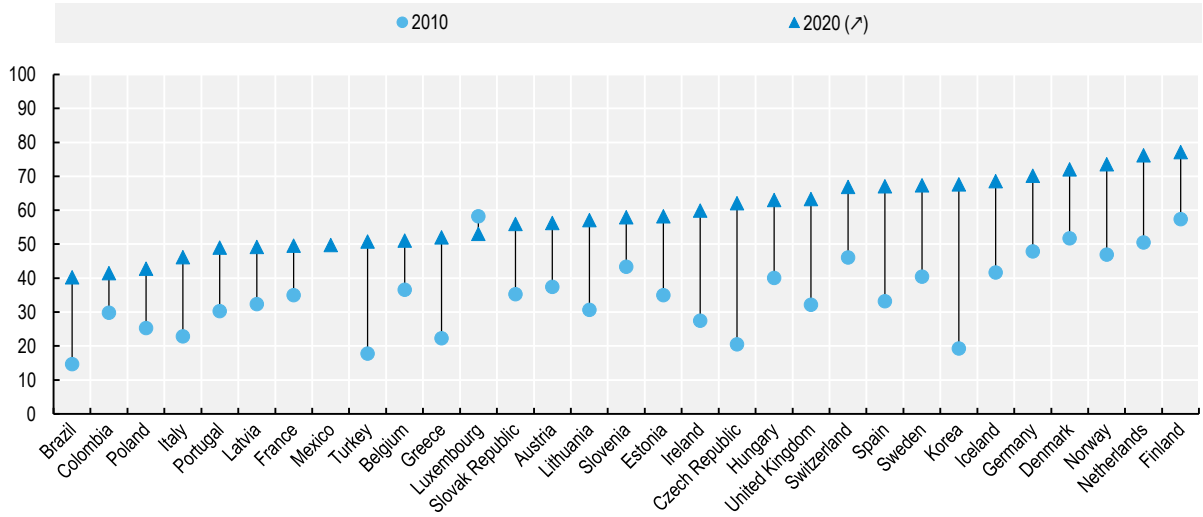
Even if Brazil were to break down all barriers to connectivity and digitalisation of PHC units, there would still persist significant inequalities in the use of digital technologies and tools among its citizens. While the country has made enormous progress in recent years, millions of Brazilians are still digitally excluded, and what is worse there is a clear association between digital and social inequalities in the country. Evidently, digital PHC cannot be effective if populations – especially those that most need it – do not have access to digital services.

6.3.1. Brazilian citizens have never been as connected but clear digital divides persist

According to the most recent ICT Households Survey, in 2019, 50.7 million Brazilian households (or 134 million individuals) had Internet access (corresponding to 71% of all households), an increase of 5.2 million connected households in relation to 2018 (CGI.br, 2020[29]). Brazilians are more connected but also more digitally engaged. More than two in three Internet users aged 16 or over used electronic government services in 2019 (ibid). Between 2010 and 2019, the share of individuals using the Internet to look for health information more than doubled from around 15% in 2010 to 40% in 2019 (see Figure 6.2). Despite these clear improvements, the country ranks below OECD countries in indicators of digital uptake and use, and digital divides tend to reflect "analogue" divides (OECD, 2020[11]; BNDES, 2017[30]).

Figure 6.2. More Brazilians are seeking health information online

Share of individuals using the Internet for seeking health information in the last three months, in 2010 and 2020



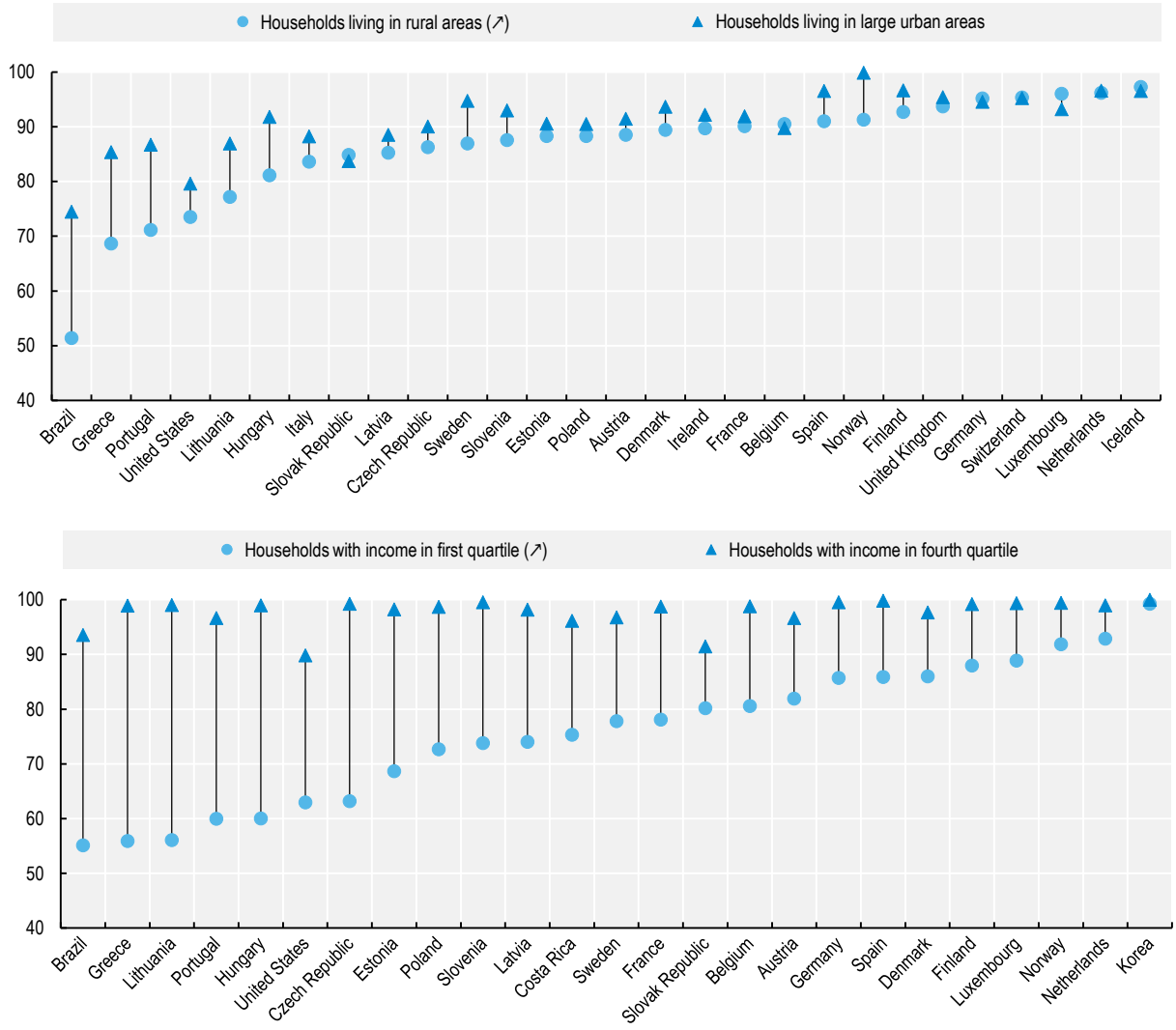
Note: Differences in methodology in Colombia in 2010 and in Korea in 2010 and 2019. Most recent data point for Colombia is for 2018 and for France, Switzerland and Mexico it is 2019 (not 2020). For Brazil specifically, the data are for 2010 and 2020 and are collected by CETIC.
Source: OECD ICT Access and Usage by Households and Individuals (database), http://stats.oecd.org/Index.aspx?DataSetCode=ICT_HH2.

Digital divides mirror social inequalities limiting effective digital PHC provision

There is a clear association between digital and social inequalities in Brazil (see Figure 6.3). Despite important increases in connectivity, nearly 47 million Brazilians did not use the Internet in 2019 (CGI.br, 2020[29]). Among non-users, the large majority had lower education (85%) and lower socio-economic status or SES (95% belonged to classes C and DE[2]). Furthermore, regional disparities in use persist. The difference between the proportion of connected households in the Southeast (75%) and the Northeast (65%) regions is of 10 percentage points (ibid). According to the most recent ICT Households Survey (2020[29]), close to 20 million Brazilian households did not have Internet access in 2019, of which 6.4 million households were from the Northeast region. Households with the lowest SES made up the majority of households without Internet access (13 million households in classes DE did not have access in 2019). In 2019, nearly 35 million were disconnected in urban areas (23%) and 12 million in rural areas (47%).

Figure 6.3. There are important digital divides in Internet access at home

Share of households with broadband Internet access at home, 2020



Note: Differences in methodology for income in Korea, Brazil and the United States, and for rural/urban in the United States only. Data on income for Brazil, the United States, Costa Rica and France are for 2019; data on rurality for Brazil, the United States, France, the United Kingdom and Switzerland are for 2019. For Brazil specifically, the data are collected by CETIC. Income data are collected using ranges in minimum wages. Reported data were aggregated in a way that best fit the distribution into four balanced categories. Income non-response are not included. Areas are defined as urban or rural according to local legislation, as compiled by the NSO. Reported data refer to urban (densely populated) and rural (thinly populated).
Source: OECD ICT Access and Usage by Households and Individuals (database), http://stats.oecd.org/Index.aspx?DataSetCode=ICT_HH2.

As mentioned, in 2019, 40% of Internet users in Brazil searched for information on health or health care services online (CGI.br, 2020[29]). The share of individuals seeking health information on the Internet was lower among those aged 60 years and older, as well as in groups with lower SES (classes DE). Only 23% of Internet users searched for or used public health services (CGI.br, 2020[29]).

While Brazil has made significant progress in implementing digital government services, certain groups of individuals are not taking full advantage. According to the 2019 ICT Household Survey (2020[29]), those less likely to use e-government services include people aged 60 years and older (46% use e-government services compared to 75% of 25 to 34-year-olds), those with lower education levels (46% of those with

elementary education compared to 87% of those with tertiary education), and those from groups with lower SES (48% in classes DE compared to 88% in class A).

6.3.2. Equitable digital PHC starts with ensuring digital uptake and use

It is clear that a digital transformation of PHC can have multiple benefits for populations and individuals, but there is also a risk that digital divides may add to social divides, compounding existing inequalities and deepening social exclusion. With digital divides so clearly aligned with social inequalities in Brazil, there is a serious risk that a digital transformation of PHC will compound existing social divides. An effective digital PHC that reaches all Brazilians is only possible if every citizen is not only connected but can have a say in the design of digital PHC services.

Digital inclusiveness as a foundation for digital PHC for all

Brazil's policies for digital inclusion have focused on bringing the Internet to remote areas and isolated communities (OECD, 2020[11]). This is the case with the Electronic Government – Citizen Assistance Service *(Governo Eletrônico – Serviço de Atendimento ao Cidadão* or *GESAC*) programme, created in 2002 to provide free broadband Internet connections to telecentres, schools, health care units as well as indigenous villages and socially vulnerable communities (OECD, 2018[1]). Other programmes[3] include the Digital Inclusion Programme, the Connected Citizen Project, the One Computer Per Student Project and the Telecentros.BR Programme (OECD, 2018[1]). The Internet for All (*Internet para Todos*) programme is a more recent expansion of the *GESAC*, focusing on subsidising broadband connections for the more than 30 000 localities and districts in Brazil without a connection.

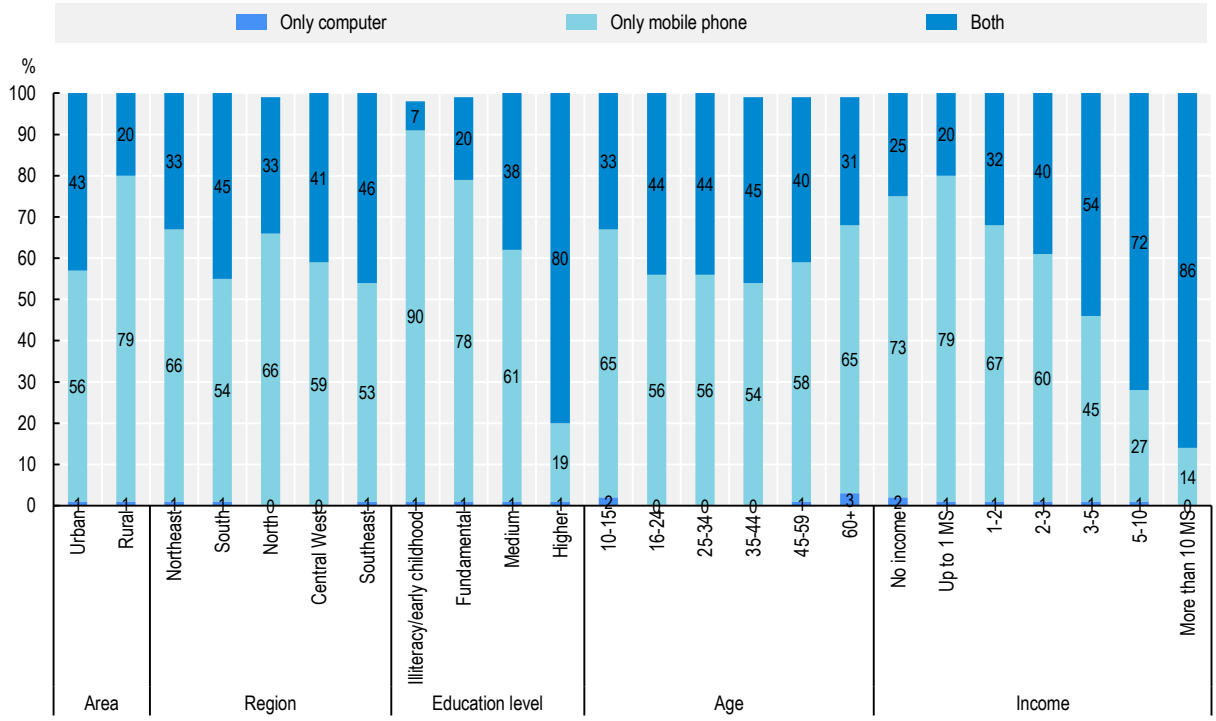
The creation of telecentres throughout Brazil in the 2000s was one of the first initiatives at the federal level to promote digital inclusion (CGI.br, 2020[31]). Telecentres are public spaces that provide computers with an Internet connection free for anyone to access, as well as workshops, courses and training. According to the most recent ICT Public Access Centres 2019 Survey, which gathers information on telecentres, 45% of telecentres were not operational in the three months prior to the data collection, the most cited reason being a lack of computers and Internet connection, followed closely by lack of maintenance and financial resources (CGI.br, 2020[31]). The number of telecentres in use decreased from the previous Survey in 2013, one possible reason being that the original telecentre programme stipulated that after an initial five-year period of support by the federal government, the equipment would be donated to the municipalities (OECD, 2020[11]).

In 2015, the Federal Audit Office (*Tribunal de Contas da União*) reviewed public policies related to digital inclusion, finding difficulties in the co-ordination of the different levels of government, limited previous studies to inform and frame new policies and actions, and no systematic monitoring and evaluation of programmes (Tribunal de Contas da União, 2015[32]). In 2018, the Federal Audit Office again drew attention to the lack of co-ordination across the federal, state and municipal governments, and pointed out that many municipalities do not have any telecentres (Tribunal de Contas da União, 2018[33]).

Many policies and programmes to promote digital literacy and ICT use focus on younger people and on schools, which are undeniably important and will lead to improvements in digital inclusion in the coming decades (OECD, 2020[11]). Yet, it is older people who most need and access PHC (Mendes et al., 2019[34]), and more must be done today to include older Brazilians in the digital transformation. Besides strengthening the role of telecentres as providers of training, especially in rural and remote areas, it is important to develop a multi-channel approach to the inclusion of vulnerable groups who are most likely to need and access PHC. Such an approach cannot ignore the crucial role that mobile phones play as a means to access the Internet for older individuals as well as those from rural areas, those on lower incomes, and those with lower levels of education (see Figure 6.4).

Figure 6.4. Mobile phones are the only means to access the Internet for more vulnerable groups

Older, rural, lower income and lower education groups are more likely to use only mobile phones to access Internet



Note: MS = minimum salary.
Source: *ICT Households 2019: Survey on the Use of Information and Communication Technologies in Brazilian Households* (database), https://cetic.br/en/pesquisa/domicilios/indicadores/ (accessed in March 2021).

Access to mobile broadband is behind the rapid increase in Internet access among the Brazilian population (OECD, 2020[11]). Reliance on mobile connectivity exclusively may prevent some users from accessing more sophisticated services that require higher speeds (e.g. real-time teleconsultations), either because those speeds are not available or data plans are prohibitively expensive. The fact that exclusive use of mobile phones for Internet access is associated with more vulnerable groups could mean that those citizens who most stand to benefit from digital PHC may also be less likely to be able to access it. This is why it is important to adopt a dual strategy of developing new channels to reach these vulnerable groups on mobile platforms, coupled with improvements in high-speed broadband connectivity and digital skills, for example through an expansion of telecentres.

The use of short message service (SMS) and mobile applications to deliver government services is already a reality in many countries, especially in Korea, a country that topped the OECD 2019 Digital Government Index, and where citizens can access government services on their mobile phones. In the United States, the government has set up a mobile first strategy to ensure government services are mobile friendly (United Nations, 2020[35]). In Finland, the government has created a centralised multi-channel one-stop-shop portal that is linked with other specialised portals, thus promoting equity in citizen access to digital government services (ibid).

Adopting a user-driven approach to digital PHC

A *user-driven* approach describes government actions that allow citizens and businesses to indicate and communicate their own needs and, thereby, drive the design of government policies and public services

(OECD, 2020[36]). This requires a shift from a government-centred focus to a user-centred approach that places the needs of users at the core of digital transformation processes and services. A common pitfall of many digital health initiatives is that they fail to adequately engage with health professionals and citizens, leading to products and services that are not relevant to users and add no value (WHO and ITU, 2012[37]).

User needs should be the basis of a digital transformation of PHC. From service design and development through to implementation and monitoring, the user should be present during the entire lifecycle (OECD, 2020[36]). Throughout the process there should be opportunities for feedback and even co-creation. What is key, especially in the Brazilian context, is that a user-driven approach that is accessible and inclusive is also an approach that produces more accessible and inclusive services. Coupled with a strategy to increase digital literacy among citizens, a user-driven approach can engage those citizens that are both most vulnerable and most digitally excluded. Indeed, the now widely used participatory budgeting approach is a Brazilian creation, first implemented in the city of Porto Alegre (OECD, 2019[38]). Participatory budgeting allows citizens a say in how (usually local) budgets are formed and how public moneys are spent. In Porto Alegre, widely seen as a success story, thousands of people have voiced their preferences over the years, affecting how millions of dollars were spent, and importantly – because minorities and vulnerable groups were sometimes overrepresented – shifting public money to where it as most needed (Local Government Association, 2016[39]).

Box 6.6. Key recommendations to promote citizen uptake and use of digital PHC

Focus on eliminating digital divides as a foundation for effective digital PHC

- Strengthen the role of telecentres as providers of training, especially in rural and remote areas, and ensure appropriate funding and technical assistance at all levels of government. In parallel, develop a multi-channel approach that focuses on mobile access to reach vulnerable groups who are most likely to need and access PHC.

Users must be at the centre, if not drivers, of a true digital transformation of PHC

- Develop content, services and applications that meet the needs of both health professionals but especially citizens, particularly those with low digital uptake, e.g. low-educated, low-income and elderly people. Continue to expand patient access to their personal health information.

Note: see also recommendations in the *OECD Reviews of Digital Transformation: Going Digital in Brazil* (OECD, 2020[11]) and the *OECD Digital Government Review of Brazil: Towards the Digital Transformation of the Public Sector* (OECD, 2018[1]), as well as the *Recommendation of the Council on Broadband Connectivity* (OECD, 2021[28]).

6.4. A governance structure that is fit to deliver a digital PHC

Brazil's government is divided into 26 states and the federal district, and well over 5 000 municipalities. Municipalities are granted the status of federal entities, at the same level as the states. While there is great heterogeneity in the geographical area and population, as well as social and economic indicators, among the subnational jurisdictions, all Brazilian municipalities enjoy the same legal status (OECD/UCLG, 2019[40]). In 2015, 17 municipalities had more than 1 million inhabitants (22% of population). About 44% of municipalities had less than 10 000 inhabitants. Brazil also has 438 health regions, which are made up of municipalities, and are also very heterogeneous in their demographics, socio-economic indicators and governance structures (Ministério da Saúde, 2020[6]). Collaboration and co-ordination across these multiple structures is very challenging, yet it is crucial for a successful digital transformation of PHC.

6.4.1. Brazil's decentralised government poses challenges to digital PHC

Decentralisation can have economic and administrative benefits, from services that are better aligned with local needs, to more innovative local experimentation, to economic growth driven by competition and accountability in public services (OECD, 2019[38]). However, there are challenges too. Some of the most relevant drawbacks in the context of a digital transformation of PHC in Brazil include overlapping responsibilities, diseconomies of scale, and lack of human and technical capacities.

A digital transformation of PHC cannot take place without adequate governance arrangements, from leadership and co-ordination to institutional models and resources (OECD, 2020[2]). The *OECD Digital Government Index* sets out four transversal facets that can be used to frame progress towards digital public services, including in PHC (see Box 6.7): a *strategic approach* with a clear vision, objectives, goals and actions; the specific *policy levers* and tools to connect strategies to policy actions; *implementation* capacity that transforms goals and strategies into effective and concrete programmes; and finally *monitoring* activities to take stock of progress and feedback into strategies.

Box 6.7. The OECD Digital Government Index

The OECD Digital Government Index (DGI) is a cornerstone of the OECD work on digital government and public sector data. Built on the OECD Recommendation on Digital Government Strategies, the Index responds to the need for a measurement instrument to track the adoption of digital government policies across OECD member and partner countries. The Digital Government Index draws upon the OECD Digital Government Policy Framework, which characterises a mature digital government as:

- being **digital by design** when governing and leveraging digital technologies to rethink and re-engineer public processes, simplify procedures, and create new channels of communication and engagement with stakeholders;
- being **data-driven** when valuing data as a strategic asset and establishing the governance, access, sharing and re-use mechanisms for improved decision-making and service delivery;
- **acting as platform** when deploying platforms, standards and services to help teams focus on user needs in public service design and delivery;
- being **open by default** when making government data and policy making processes available to the public, within the limits of legislation and in balance with national and public interest;
- being **user-driven** when according a central role to people's needs and convenience in the shaping of processes, services and policies; and by adopting inclusive enabling mechanisms;
- being **proactive** when anticipating people's needs and respond to them rapidly, avoiding the need for cumbersome data and service delivery processes.

Source: OECD (2020[2]), Digital Government Index: 2019 results, https://doi.org/10.1787/4de9f5bb-en.

Brazil's strategic approach is exemplary, embodied in the excellent and comprehensive ESD28. However, like other OECD countries, Brazil has been better at adopting strategies than at promoting and monitoring their implementation. The ESD28 sets out an ambitious vision for digital health in Brazil, but it will be difficult to realise. This is because there are significant risks, as identified in the WHO/ITU *National eHealth Strategy Toolkit* (2012[37]), namely: insufficient and geographically imbalanced resource capacity, scarce funding, too broad of an implementation focus, and unavailability of required infrastructure (this last one has already been discussed in previous sections). To these barriers, one can add a lack of clarity in the assignment of responsibilities across levels of government.

In Brazil, the division of responsibilities is unclear in a number of areas, including in health care (OECD, 2019[38]). This is frequently the case in policy areas that are "shared" across levels of government, as is the case with health care in Brazil. This can result in duplication, cost shifting and scale inefficiencies. The government's 2017 eHealth Strategy noted that initiatives to create a national eHealth architecture had lacked alignment and continuity, leading to frustration, scepticism that such a programme could work and demotivation in tackling the inevitable barriers (Ministério da Saúde, 2017[10]). It was also mentioned that strategies and investments had been traditionally defined and executed in isolation by the federal, state and municipal governments. Despite the existence of high-quality initiatives in digitalising health care, these remained "islands of excellence" due to a lack of integration across levels of government (Ministério da Saúde, 2017[10]).

Small municipalities, especially, face significant barriers to digitalisation of PHC units and teams. Because responsibilities are "shared", the three levels of government are often dependent on each other to implement the actions set out in the ESD28. This can lead to delays in adoption due to holdups in different levels of government (Andrade et al., 2019[41]). Municipalities are responsible for many key steps in digitalising PHC, from purchasing ICT equipment and software to hiring ICT specialists. Smaller municipalities may have limited capacity to manage these processes. One example is the requirement that the contracting of essential services be renewed every five years, which has been flagged as an impediment to the expansion and upkeep of ICT infrastructure (Ministério da Saúde, 2017[10]). It is not uncommon for smaller municipalities, and even larger ones, to not have any long-term ICT planning (Veloso et al., 2011[42]).

Financial commitments have also perhaps not been as ambitious as the agendas set out in previous strategies and in the ESD28. This has led to a situation in which some municipalities are responsible for digitalising PHC services but lack the necessary resources to do so. In other words, these are unfunded mandates (OECD, 2019[38]). Since 2014, the Ministry of Health has provided a monthly payment of USD 117 (BRL 603.38) for PHC units who seek to improve their connectivity (Ministério da Saúde, n.d.[43]). The target was to connect 12 000 units, however only 8 000 had been connected and only 4 800 were sending data back to the Ministry of Health.

More recently, the *Informatiza APS* programme provides monthly support of USD 330 (BRL 1 700) to USD 388 (BRL 2000) to family health teams that are able to collect and send data to central repositories. A key eligibility requirement of the programme is that family health units need to already be using digital technologies. The pilot project in the state of Alagoas has expanded support to include an additional financial incentive for PHC units that have not yet been able to digitalise (a lump sum of between USD 1 649 (BRL 8 500) and USD 1 940 (BRL 10 000) to each municipality in Alagoas for every PHC unit that was not yet digitalised). As this is still a pilot, this form of pre-digitalisation support is not yet available for all municipalities. In light of the COVID-19 pandemic, the Ministry of Health did institute a time-limited incentive of USD 5 268 (BRL 27 157) to be paid to municipalities and states for each health team that has not yet been digitalised, but it is still too early to know what impact this has had on the numbers of PHC units without computers and Internet access.

6.4.2. Moving from digital strategies to implementation and monitoring

Determining which level of government should take over which responsibility related to digitalisation is not without challenge, but it is also of the utmost importance. Clear assignment of responsibilities is crucial for accountability, monitoring and effectiveness of investment (OECD, 2019[38]). Particularly with shared responsibilities, as is the case with health care in Brazil, clarity is all the more important, so that all parties mutually understand what their individual responsibilities are. It is important to avoid multiple co-ordination mechanisms with no clear role in decision-making processes (OECD, 2019[38]). Finally, it is vital to build the necessary capacity to deliver on mandates. This means aligning funding with functional responsibilities

to avoid unfunded mandates, but also encouraging sharing of best practices and specialised knowledge across jurisdictions, making expertise available to all levels independent of size (OECD, 2019[38]).

Setting clear well-funded mandates for digitalisation at the right levels of government

A major barrier to digital PHC in Brazil is human and technical capacity in municipalities. Having more than 5 500 municipalities procure ICT products and services for over 42 000 PHC units every five years is not good practice. Around one in five Brazilian municipalities have less than 5 000 inhabitants, and yet they are responsible for hiring ICT specialists and purchasing ICT products and services, from hardware to software, to connectivity and cybersecurity. Often, municipalities either have no providers to choose from, or face prohibitively high costs. As the pilot project in Alagoas has demonstrated, municipal managers lack the capacity to digitalise, even when financing is provided by federal and state governments (Ministério da Saúde, 2020[14]). Setting responsibilities for digitalisation of PHC at municipal level for all of Brazil is likely leading to diseconomies of scale, and creating challenges for small municipalities that do not have the human and technical capacities.

In OECD countries with small subnational government units, such as the Nordic countries, France, the Slovak Republic and Spain, subnational partnerships, joint authorities and outsourcing are frequently used to create scale economies (OECD, 2019[38]). In the context of digital health, specifically, regional health authorities that bring together smaller jurisdictions and provide shared services to all members are a way to achieve both economies of scale and valuable expertise. For example, in New Zealand, primary health organisations or PHOs, especially larger PHOs like ProCare (which serves 800 000 patients in greater Auckland), offer its member practices a centralised human resource, practice management and procurement service (Varsamis, 2019[44]).

Established in 2005, the English NHS Shared Business Services (SBS) provide a mix of finance and accounting, procurement, digital innovation services, employment services, innovation and technology services, and change management to hundreds of NHS organisations (NHS Shared Business Services, 2020[45]). Through a partnership with the Royal Papworth Hospital NHS Foundation Trust, NHS SBS has developed a digital patient booking system that can be rolled out to all NHS organisations (ibid). Also in the United Kingdom, the NHS GP IT Futures programme will create a new environment for the supply of clinical ICT systems to general practice, including a new online NHS Digital Buying Catalogue to find PHC technology systems and services (NHS Digital, 2020[46]). In Portugal, the Shared Services of the Ministry of Health (*SPMS*) is the Ministry's central purchasing and ICT authority, providing shared services in the areas of purchasing and logistics, financial services, human resources and ICT. Recently, *SPMS* added new electronic dynamic purchasing systems for NHS organisations to procure consultancy services in blockchain, artificial intelligence, telemedicine and mHealth from providers that have been certified (SPMS, 2020[47]).

Brazil could look to these examples from New Zealand, England and Portugal for a new model of shared services for digital PHC. Given the geography, population and population density of Brazil, shared services and responsibilities could be aggregated at the level of the federal government, state governments or even health macro-regions and regions, depending on the specific service being considered. For example, dynamic purchasing systems can be set up by the federal government, building on the experiences of the *Co-ordenação-Geral de Tecnologia da Informação e Comunicações* (CGTIC), which already plans, co-ordinates, supervises and guides ICT investments for the federal government. For smaller states (like Roraima, Amapá and Acre), health macro-regions and bigger health regions could then set up agencies for shared services, providing specialised human resources, purchasing and management services for digital PHC to municipalities.

There are three important policy levers to carry out this regionalisation of competencies for digital PHC:

- First, it is crucial that standards and interoperability remain a central federal responsibility. This does not mean that these should be developed by only the federal government, but it does mean

that states and municipalities should participate in this process rather than lead it. This would ensure that whatever systems are procured by states and municipalities, the ability to share data and patient mobility remain possible throughout Brazil.

- Second, these new mandates need to be adequately funded and responsibilities be clearly set. This would guarantee that the new shared services agencies are both able to execute their responsibilities and accountable for the results.
- Third, local leadership, community participation and local ownership remain essential (OECD, 2019[38]). A new model of shared services needs to have the buy-in and ownership of the municipalities and PHC units it is supposed to serve.

Larger and smarter investments are needed to deliver on ambitious digital health strategies

Digitalisation requires investments in infrastructure and connectivity (e.g. high speed broadband), in hardware (e.g. computers), software (e.g. EHR systems), specialised human resources (ICT specialists), user training (e.g. digital literacy of professionals and patients), and importantly, though often neglected, change management and implementation. Brazil has invested significantly in connectivity (e.g. *GESAC*) and software (e.g. *e-SUS AB*), as well as providing support for hardware and training (e.g. *Informatiza APS*). However, as seen in previous sections, substantial numbers of PHC units and teams, as well as citizens, remain disconnected, and thus unable to benefit from a digital transformation of PHC. The vision set out in ESD28 and previous digital health strategies requires both larger and smarter investments, tying financial support to effective and equitable use.

The International Telecommunication Union has recently estimated that connecting every Brazilian to the Internet would cost USD 11.1 billion (ITU, 2020[48]). Brazil's Connect SUS programme is likely to involve total investments of USD 0.77-1.16 billion (BRL 4-6 billion) over five years (OECD, 2020[11]). In 2019, according to the World Bank Group, Brazil had a population of 211 million and a gross domestic product (GDP) of USD 1.84 trillion. By comparison, in Sweden, a country that in 2019 had just over 10.2 million inhabitants and a GDP of USD 530 billion, the country's 21 regions invest around USD 1.2 billion annually in health care ICT (U.S. Department of Commerce, 2020[49]). Only 1% of Swedish drug prescriptions are issued in paper format (ibid).

As previously discussed, Brazil instituted an exceptional incentive for municipalities and states digitalise PHC units, budgeting over USD 83.8 million (BRL 432 million) for 2020 (Diário Oficial da União, 2020[50]). In the United States, the FCC's Emergency Broadband Benefit is a USD 3.2 billion progamme to support households struggling to pay for internet service during the pandemic, providing monthly discounts towards broadband service, as well as one-time discounts to purchase equipment like laptops or tablets, with higher discounts on Tribal lands (FCC, 2021[51]). The FCC's COVID-19 Telehealth Program provides USD 200 million in immediate support to nonprofit and public eligible health care providers responding to the COVID-19 pandemic by fully funding their telecommunications services, information services, and devices necessary to provide critical connected care services (FCC, 2021[52]).

While it is challenging to compare investments across different geographies, populations and economies, it is helpful to place financial commitments across countries in the contexts of their digital health strategies. The Brazilian ESD28 sets out an ambitious agenda, including milestones for the achievement of certain capabilities (e.g. ePrescribing by December 2022). Looking to the order of magnitude of investments in countries that have already achieved these milestones is a practical way to assess whether current investments are sufficient. As an example, in the United Kingdom, a USD 33.3 million (GBP 26 million) national fund has been set up to have all NHS doctors, nurses and other clinical staff on e-rostering systems by 2021 (GOV.UK, 2021[53]). E-rostering, which allows clinicians to select shifts digitally, providing them with more flexibility and more efficient work schedules, is just one capability.

Investments should also be comprehensive in their scope. It is often the case that one of the most important steps in implementing new technologies – change management and support for implementation – is not

appropriately funded (Varsamis, 2019[44]). As the pilot project in Alagoas illustrates, it is possible to have buy-in from municipalities, provide funding, and still have limited adoption. While support in the form of capacity building is undoubtedly important, it might need to be combined with financial support for lost productivity and service disruption during periods of change and adaptation (Bakhai et al., 2019[54]).

It is not just the magnitude of investments that matters. Conditions for accessing these funds by the beneficiaries can promote, or hinder, the adoption and everyday use of digital technologies. Tying financial support to the use of specific functionalities or programmes can be a way to target investments and increase their effectiveness. The *Informatiza APS* programme already does this by conditioning eligibility for financial support to the reporting of data to the *SISAB*, but it can potentially go further. The Australian Practice Incentives Program (PIP) eHealth Incentive encourages practices to adopt key digital services, from patient records to secure messaging capabilities (to communicate with both patients and other practices), to ePrescribing, among others (Australian Government, 2016[55]).

Finally, while a digital transformation of PHC has enormous potential (see Box 6.2), there is little high-quality evidence regarding recent digital-first PHC models, such as the one being implemented in the United Kingdom (Rodgers et al., 2019[56]). It is important that funds be made available for continuous monitoring and evaluation of digitalisation in PHC in Brazil.

Box 6.8. Key recommendations for a co-ordinated well-funded digital PHC

Set clear well-funded mandates for digitalisation at the right levels of government

- Consider aggregating shared services and responsibilities related to digitalisation of PHC at less decentralised levels. Build on experiences of the *CGTIC* to explore setting up dynamic purchasing systems at federal level, with appropriately funded agencies at state or regional level providing specialised human resources, purchasing and management services for digital PHC to municipalities.

Make larger and smarter investments to promote baseline digital PHC services for all

- Review magnitude of investments needed to deliver on vision of ESD28, including funding for change management, capacity building, and monitoring and evaluation. Tie financial support to specific milestones in the adoption and use of digital PHC functionalities, starting with ePrescribing, referral management, appointment scheduling and patient access to EHR.

Note: see also recommendations in *Making decentralisation work: A handbook for policy makers* (OECD, 2019[38]) and in the *OECD Digital Government Review of Brazil: Towards the Digital Transformation of the Public Sector* (OECD, 2018[1]).

6.5. Conclusion

Over the last decades, Brazil has been making impressive progress towards a digital transformation of its public sector, and is aiming to offer all of its more than 3 000 public services via digital channels by the end of 2022 as part of its Digital Government Strategy 2020-22. The country has made significant inroads also in building a foundation for digital PHC, with successive ambitious and comprehensive digital health strategies, coupled with vital investments in hardware, interoperability and skills. However, progress towards effective use of digital technologies in PHC has been slow, and fundamentally unequal. Thousands of PHC units have no computers or Internet access. Only 17% of PHC units have speeds over 10 Mbps. Around 18 000 health care facilities (or 18% of all facilities) do not have an EHR system.

The COVID-19 pandemic has likely accelerated the adoption of digital technologies but its true impact remains unclear for now.

At the same time, and despite significant progress in recent years, millions of Brazilians are still digitally excluded. More than two in three Internet users aged 16 or over used electronic government services in 2019, and the share of individuals using the Internet to look for health information more than doubled between 2010 and 2019. However, nearly 47 million Brazilians did not use the Internet in 2019. Digital divides are also clearly associated with social inequalities, with older Brazilians, those from rural areas, those with lower incomes and lower education levels all less likely to use the Internet, and more likely to use mobile phones only. There is thus a serious risk that a digital transformation of PHC will only compound existing social divides.

Against this backdrop, Brazil's decentralised government creates challenges to digitalising PHC. The country's 26 states, one federal district, well over 5 000 municipalities (around 44% of which had less than 10 000 inhabitants), and 438 health regions are very heterogeneous in their demographics, socio-economic indicators and governance structures. The municipality of Serra da Saudade, with around 800 inhabitants, has the same responsibilities to manage the digitalisation of PHC as the municipality of São Paulo, with its over 12 million inhabitants. There are significant risks for the country's ambitious strategy for digital health, including insufficient and geographically imbalanced resource capacity, scarce funding, too broad of an implementation focus, and unavailability of required infrastructure.

Brazil has established a solid basis on which to build an effective, equitable and efficient digital PHC. But, to do so, it must tackle three sets of interconnected challenges: digitalisation of all PHC units and teams; digital inclusion for all Brazilian citizens, especially those that are most vulnerable; and a governance structure that is fit to deliver a digital transformation of PHC, by setting clear well-funded mandates at the right levels of government.

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Notes

[1] Here and throughout this chapter, an exchange rate of BRL 5.155/USD for the year 2020 from https://stats.oecd.org.

[2] The 2020 Brazilian Criteria for Economic Classification (*Critério de Classificação Econômica Brasil*) defines six classes (A, B1, B2, C1, C2, DE) of socio-economic stratificaiton based on a system of points that aggregates survey data on wealth, living conditions, education and income. Category A represents a higher socio-economic status.

[3] See also Table 3.1. in (OECD, 2020[11]).

OECD Reviews of Health Systems

Primary Health Care in Brazil

Primary health care in Brazil is well-organised, the result of sustained commitment to providing high quality primary health care for the whole population. Brazil has implemented a set of reforms over the past decades to improve the distribution of doctors, develop new forms of service organisation, introduce new financing models, and implement a range of quality improvement initiatives. This review uses internationally recognised indicators and policy frameworks to examine the performance of primary health care in Brazil. While the review points to notable successes, Brazil continues to face challenges as its population ages, risk factors such as obesity are on the rise, and emerging pandemic threats require resilience and adaptability. The report points to key actions that Brazil should consider in the coming years to strengthen performance of primary health care, especially screening and prevention for major non-communicable diseases, improve quality of primary health care provision, address workforce shortages and pursue a digital transformation. A companion publication with a health system review of Brazil examines the main challenges and approaches needed to improve the performance of the Brazilian health system.

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