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International Variations in a Selected Number of Surgical Procedures

Klim McPherson,
Giorgia Gon,
Maggie Scott

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INTERNATIONAL VARIATIONS IN A SELECTED NUMBER OF SURGICAL PROCEDURES

Klim McPherson, Giorgia Gon and Maggie Scott

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ABSTRACT

This paper summarises recent international data on rates of five surgical procedures (i.e. caesarean, hysterectomy, prostatectomy, hip replacement and appendectomy) across OECD countries. It examines trends over time and compares age- and sex-specific rates for a recent year, for a sub-set of countries for which data are available. The report shows substantial international variations for most procedures, but also striking similarities between countries; some procedures show universal trends, with trends in rates by sex and age behaving in very similar ways.

A full understanding of the reasons for and consequences of different utilisation rates demands a detailed understanding of patterns of illness and patient preferences, incentives embedded within health systems, and above all mechanisms to link activity to outcomes. While recognising the many limitations of the data that exist, the analyses reported here paint a picture of widespread differences in the rates at which certain procedures are performed (e.g. hysterectomy and prostatectomy) yet, for others (e.g. appendectomy), they indicate the emergence of growing international convergence. It is important to recognise that these findings are simply a stimulus to further enquiry into health services. Where variation is observed, there is no way, using these data alone, of knowing which rate is the "right" one in any country. It is not even possible to say that the presence of variation is a sign of important health service delivery problems.

RESUME

Ce document présente des données récentes concernant les taux d'interventions chirurgicales pour 5 actes (accouchement par césarienne, hystérectomie, prostatectomie, arthroplastie de la hanche et appendicectomie) dans les pays de l'OCDE. Il examine les tendances et compare les taux standardisés par âge et sexe pour un sous-ensemble de pays. Le rapport met en évidence d'importantes variations entre pays pour la plupart des interventions, mais également de frappantes similarités : pour plusieurs interventions, les tendances observées sont universelles et les taux par tranche d'âge (et genre) se comportent de manière similaire.

Une totale compréhension des raisons et des conséquences de ces taux d'utilisation différents requiert une connaissance précise des profils pathologiques et des préférences des patients, des incitations à l'œuvre dans les systèmes de santé, et surtout des mécanismes liant l'activité aux résultats. Toute en reconnaissant les nombreuses limitations inhérentes aux données, les analyses rapportées ici mettent en évidence de larges disparités dans les taux de certaines interventions (par exemple pour l'hystérectomie et la prostatectomie) mais indiquent également l'émergence d'une convergence internationale des pratiques pour d'autres interventions (par exemple pour l'appendicectomie). Il est important de reconnaître que ces résultats ne sont qu'un stimulus pour de futures investigations sur les services de santé. Lorsque des variations sont observées, rien ne permet, à partir de ces seules données, de savoir quel taux est le «bon taux » pour aucun des pays. Il n'est même pas possible de dire que la présence de variations signale un problème important dans la manière dont les services de santé sont dispensés.

EXECUTIVE SUMMARY

In a progressively financially constrained environment, there is an increasing pressure for national health systems to prove their cost-effectiveness. This is coupled with a trend to demonstrate that medical interventions are evidence-based. A large body of research has shown that several discretionary surgical procedure rates are often driven by factors other than patient need or preference. This is evident in surgical rates variation detected intra-nationally and internationally over the past several decades.

This report summarises recent international data on rates for five frequent surgical procedures (i.e. caesarean, hysterectomy, prostatectomy, hip replacement and appendectomy) across OECD countries. It examines trends over time and compares age-and-sex-specific rates for a recent year, for a sub-set of OECD countries for which these more disaggregated data were available.

Key Findings

- For most procedures, there are substantial international variations in rates, but there are also striking similarities between countries; some procedures show universal trends, with trends in rates by sex and age behaving in very similar ways.

- Caesarean sections are now performed for over one-quarter of live births on average across OECD countries. The rate has increased by over 75% over the past two decades among the group of countries that have such long time series (rising from less than 150 caesarean sections per 1 000 live births in 1990 to over 250 in 2009). The highest crude rates of caesarean sections in 2009 were observed in Turkey and Mexico (more than 420 per 1 000 live births) followed by Italy, and the lowest in the Netherlands, Finland and Iceland (less than 160 per 1 000). Age-standardised rates have been computed for a sub-set of 17 countries, and this does not change by much the country ranking or the variations: the highest rate (Italy) remains 2.4 times higher than the lowest (Iceland).

- Hysterectomies are much less frequent than twenty years ago in some countries with initial high rates (e.g. Australia and New Zealand) and a little more in some countries with initial low rates (e.g. Ireland, England), suggesting some convergence in indication and practice across countries. Nonetheless, age-standardised rates of hysterectomy remain 3 times higher in North America (United States and Canada) than in Spain or Ireland. A woman living in the United States has 2.4 times more chances to have a hysterectomy during her lifetime than a woman in Spain or in Ireland.

- In the past decade, the average rate of prostatectomy in OECD countries remained quite stable, as a result of a small decline of transurethral prostatectomy rates in many countries (although it still makes up two-thirds of all prostatectomies) and a significant rise of open (non transurethral) prostatectomy rates in nearly all countries. Crude rates of prostatectomy vary widely across OECD countries (from 35 per 100 000 men in Mexico to 305 per 100 000 in Switzerland), but age standardisation reduces to some extent the range of variation across the sub-set of countries for which these data are available. The age-standardised rates vary from around 60 per 100 000 men in Ireland and Portugal to 205 in Switzerland. A man living in Switzerland has about 3 times

more chances to have a prostatectomy during his lifetime than a man living in Ireland or Portugal.

- Hip replacements are more frequent nowadays than in 2000, and the increase was particularly rapid in Poland and the United States (a growth rate of more than 7% per year between 2000 and 2009). Hip replacement rates increase with age and are, in most countries, higher for women than for men. Age-standardised rates vary from 50 per 100 000 in Portugal (for both men and women) to 161 per 100 000 in Norway (for women) and 167 in Switzerland (for men).

- In most countries, appendectomies are less frequently performed than a decade ago. The pattern of age-specific rates is virtually the same for men and women and across OECD countries. However, the rate of appendectomies remains particularly high for young women in Germany: between ages 15-19, a young woman in Germany has 4.7 more chances to have an appendectomy than a young woman of this age in the United States (the lowest rate for this procedure and age group). Lifetime risks of having an appendectomy are the highest in Germany, Switzerland and France.

Main conclusions

- The analyses presented in this paper show often quite large international variation in the frequency with which a particular surgical intervention is conducted. There are also differences in trends over time. For some procedures (i.e. caesarean section, hip replacement and appendectomy), every country showed similar trends, whereas for other procedures (hysterectomy and prostatectomy) there is a more mixed picture.

- A full understanding of the reasons for and consequences of different utilisation rates would demand a more detailed understanding of patterns of illness and patient preferences, incentives embedded within health systems, and above all mechanisms to link activity to outcomes.

- While recognising the many limitations of the data that exist, the analyses reported here paint a picture of widespread differences in the rates at which certain procedures are performed (e.g. hysterectomy and prostatectomy) yet, for others (i.e. appendectomy), they indicate the emergence of a growing international convergence downward.

- These findings provide simply a stimulus to further enquiry into health services and their measurement. Where variation is observed, there is no way, using these data alone, of knowing which rate is the “right” one in any country. It is not even feasible to say that the presence of variation is a possible sign of important health service delivery problems.

1. INTRODUCTION

1. At a time when all countries face upward pressure on health budgets it is more important than ever that money is spent efficiently and effectively. This has stimulated an often intense debate about how best to finance and deliver care. Yet, remarkably, this debate has been ill informed by evidence of what health care systems do and how well they do it.

2. Several countries such as the United Kingdom (Darzi, 2008) and the Netherlands (Westert *et al.*, 2010) have already undertaken, or plan to undertake, benchmarking of their health systems. To do so, it is or will be essential to understand not just the outcomes of health care, such as survival after cancer or avoidable mortality rates, but also the process of care.

3. This paper examines international variations in some common surgical procedures. Since at least the 1930s, it has been known that rates can vary considerably in different places for reasons other than clinical need. Glover, writing in 1938, showed that rates of tonsillectomy varied widely among English districts in a way that "defies any explanation, save that of variations of medical opinion on the indications for operation" (Glover, 2008). The only factor that could be identified was wealth, with rates typically three times higher among the wealthiest families.

4. The late 1960s and early 1970s witnessed more and more studies documenting unexplained international and intra-national variations in many different surgical rates (Bunker, 1970; Lewis, 1969; Lichtner and Pflanz, 1971; Vayda, 1973; Wennberg and Gittlesohn, 1973). This led to progressive refinements of methods, such as adjustment for previous rates of surgery and the statistical management of data from small geographical areas. More recent work has concentrated on small area differences within a country or region to identify the implied clinical uncertainties of the region concerned. Perhaps the best known contemporary example is the Dartmouth Health Atlas that has assembled data on many aspects of health care across small geographical areas in the United States (www.dartmouthatlas.org). The main purpose of examining small area variations is to identify essentially discretionary differences in the use of health care between neighbouring areas, be they supplier induced or a matter of patient preference.

5. There has been rather less work undertaken using international comparisons. In 1989, McPherson used data collected by the OECD (McPherson, 1989) to make crude (unstandardised) international comparisons. The data then available were limited so, for example, it was not possible to adjust for age of those undergoing procedures. Age standardisation is essential, even where it makes little difference to the comparison of rates, since that cannot be known until it is done. Since then the quality and availability of data on surgical rates have improved, as have the ancillary information required to interpret them. In recognition of the potential value of such analysis in informing health policy, the OECD commissioned an updated analysis of a selected number of procedures. The results are set out in this paper. The research aims to answer the following questions: firstly, are comparable data available to make robust international comparisons? Secondly, what levels of variation exist? Thirdly, how might the observed variations be explained?

6. To some extent, the international variations detected may have their roots embedded in national culture, medical education, organizational structures and contrasting incentives, as well as health beliefs and longstanding tradition.

7. The remainder of this paper examines the extent of variation in the rates of a number of common surgical procedures between OECD countries. First, the methodology used to make the comparisons is described and possible data limitations are discussed. The report then sets out the apparent variations over time, accompanied by a closer inspection of age-standardised rates variations around the year 2008. Finally, consideration is given to possible explanations for the variations, and some conclusions are made.

8. The report focuses on the following surgical procedures: caesarean section, hysterectomy, prostatectomy, hip replacement and appendectomy. Some of these could be described as being conducted largely to improve a patient's quality of life (e.g. hip replacement) whereas others have clearly more to do with addressing acute conditions and extending longevity.

2. DATA SOURCES AND METHODS

9. This paper seeks to analyse the most recent OECD data on a selected set of surgical procedures[1]: caesarean section, hysterectomy, transurethral prostatectomy and open prostatectomy, hip replacement and appendectomy. These procedures were selected by the OECD in consultation with the authors, based mainly on the criteria that these are common procedures with a reasonably high volume.

10. Data extracted from the OECD database provided crude rates for procedures conducted between 1990 and 2009 per 100 000 people – with the exception of caesarean section whose rates are per 1 000 live births. Data are available for more than two-thirds of OECD countries (depending on the procedure). This made it possible to see how trends have varied between countries and over time. Details of definitions, codes and sources behind the data are shown in Appendices 1 and 2 while more detailed information can be obtained from OECD Health Data 2011 (www.oecd.org).

11. The data held in the OECD database are not sufficient to enable calculation of age- and sex-specific rates for all the countries under analysis. Some of the observed variation may be explained by differences in demographic structures of the countries involved. Consequently, statistical authorities in individual countries were approached to obtain more detailed data, by age and sex. It was possible to obtain data (either on-line or following ad-hoc requests) only from those countries or regions and for those years shown in Table 2.1. Data for Canada and the United States were extracted from an earlier unpublished report by Scott *et al.* to the Foundation of Informed Medical Decision Making and added to this analysis; data for these two countries are for the period 2004-2005. In total, half of OECD countries are included in this more detailed analysis (17 out of 34 countries).

12. These more detailed data were disaggregated into sex- and age-specific rates, which were then applied to the WHO Standard Population (Ahmad *et al.*, 2001), and to the English number of live births in the case of caesarean section, to provide age-standardised rates that would enable meaningful comparison between countries. With the age-specific rates available, the cumulative lifetime risk of hysterectomy, transurethral and open prostatectomy, and appendectomy were also calculated. This was not done for caesarean section and hip replacement because for these two procedures the relevant operation can be carried out more than once during a person's lifetime.

13. Some problems encountered in countries whilst gathering these data were as follows: some of the datasets had costs that were too high; a number of country's competent department contacts that were approached did not respond; websites were often only available in the national language which complicates the task of trying to identify relevant contacts and data; some countries did not have the data requested (for example, Estonia, for year 2008, has only disaggregated data for either persons under, or over, 15 years of age). In some countries, there are restrictions on the release of more detailed data for analysis. Moreover, mapping systems between different coding systems or different versions of the same coding system were not always available or free.

[1] Details of the coding framework for data the authors manipulated themselves (rather than pre-coded by the OECD) are provided in Appendix 1.

Table 2.1. Coverage of OECD countries for more detailed data on procedures by age and sex

Country	Year
Australia	2007/2008
Canada (excluding Quebec)	2004/2005
Denmark	2008
Finland	2008
France	2008
Germany	2008
Iceland	2008
Ireland	2008
Italy	2008
New Zealand	2007/2008
Norway	2008
Portugal	2008
Spain	2008
Sweden	2008
Switzerland	2008
United Kingdom **- England** **- Wales** **- Scotland** **- Northern Ireland**	2007/2008
United States	2004

14. More broadly, there are several important points to note about data quality and comparability between countries. These are discussed in detail in Appendix 3, but the key points are:

- Different countries use different coding systems; and countries with the same coding system may use different versions of it.

- The accuracy and interpretation of coding may vary from country to country.

- Countries may include more than one procedure code under the same procedure category in a single episode of care. However, this is a limited matter of concern for the procedures under analysis in this report.

- Countries may or may not include data from private episodes of care (e.g. the data for Ireland only cover public hospitals). For all countries only procedures conducted in hospitals are included; procedures in ambulatory settings are excluded. In some countries increasing use is made of the ambulatory sector and this may affect the completeness of data. These are procedures that can, in some circumstances, be performed without admission and include appendectomy mainly.

Therefore, it is thus possible, that some of the effects illustrated here may be in part artefacts of coding and recording. Their extent and direction requires further special study where appropriate.

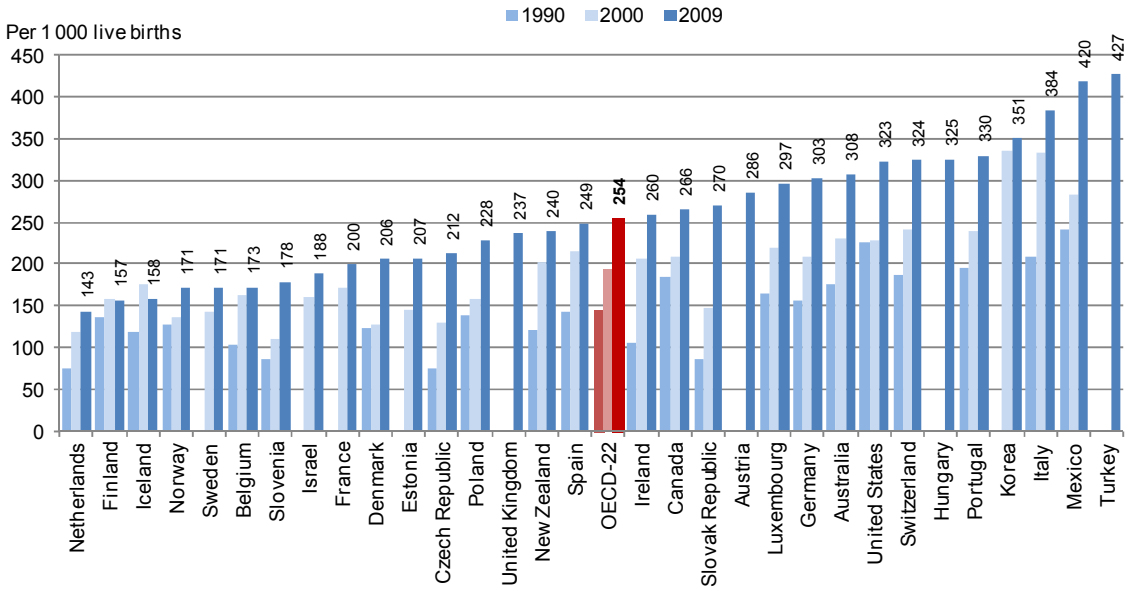
15. Although it is important to keep these limitations in mind, the picture depicted by the figures obtained – with similar age, sex and over time trends – confirm a good degree of reliability. This suggests that the overall picture is representative; nonetheless outliers should be considered with caution.

3. CAESAREAN SECTION

16. There is strong existing evidence for rising rates of caesarean sections worldwide (Lumbiganon *et al.*, 2011, Betrán *et al.*, 2007). Caesarean sections tend to have a negative relationship with maternal and child mortality and a positive relationship with per capita spending (Betrán et al., 2007). Thus, at first glance, rising caesarean sections rates might seem a positive development. However, evidence suggests that when caesarean section rates rise substantially above 15%, risks to reproductive health outcomes may begin to outweigh benefits (Betrán *et al.*, 2007). The World Health Organisation first suggested the 15% cut-off-point in 1985 (WHO, 1985). According to data from the United Kingdom Confidential Enquiry into Maternal Deaths, an elective caesarean section with no emergency presents a 2.8 times greater chance of maternal death than a vaginal birth (Hall and Bewley, 1999). Although observational studies data exist, the Cochrane Collaboration review on caesarean section for non-medical reasons at term could not reach strong conclusions on the best medical indications due to a lack of trials on the topic (Lavender et al., 2012).

17. The rates of caesarean sections have increased over the past two decades in all OECD countries (Figure 3.1). This finding supports the existing evidence (Lumbiganon *et al.*, 2011, Betrán *et al.*, 2007). Caesarean section rates varied in 2009 from a low of 143 per 1 000 live births in the Netherlands to over 400 per 1 000 in Turkey and Mexico (Figure 3.1). Turkey, Mexico, Italy and Korea stand out for having significant higher crude rates per 1 000 live births than elsewhere, and this seems to be a consistent trend over time. Portugal, Hungary, Switzerland, the United States and Australia follow at some distance. At the lower end of the spectrum are the Netherlands, the Scandinavian countries (except Denmark), Belgium and Slovenia.

Figure 3.1. Crude rates of caesarean sections per 1 000 live births, 1990-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.
Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

Table 3.1. Trends in caesarean sections per 1 000 live births, 1990-2009 (or nearest year)

	Average annual growth rates (%)				
	1990-1995	1995-2000	2000-2005	2005-2009	1990-2009
Australia	1.9	3.8	5.4	0.9	3.2
Austria	..	..	..	4.0	..
Belgium	5.2	3.9	2.2	-1.0	3.0
Canada	-1.1	3.7	4.6	0.6	2.1
Chile	..	..	..	..	..
Czech Republic	8.0	2.9	5.9	5.5	5.6
Denmark	0.1	0.6	6.1	4.5	2.7
Estonia	..	..	5.3	2.3	..
Finland	2.8	0.3	0.6	-0.9	0.8
France	..	3.1	2.2	1.2	..
Germany	1.9	3.9	5.1	3.2	3.5
Greece	..	..	..	..	..
Hungary	..	..	..	2.7	..
Iceland	3.6	4.6	-2.5	0.3	1.5
Ireland	4.9	9.1	3.9	0.8	4.9
Israel	..	8.8	4.0	-0.9	..
Italy	4.6	5.0	3.0	-0.2	3.3
Japan	..	..	..	..	..
Korea	..	..	1.9	-0.8	..
Luxembourg	-0.1	6.0	4.5	2.1	3.1
Mexico	4.4	2.3	6.2	2.4	3.7
Netherlands	5.4	4.2	2.7	1.8	3.7
New Zealand	4.6	5.9	2.4	1.3	3.7
Norway	-0.2	1.6	3.0	2.5	1.6
Poland	10.2	0.5	9.6	4.8	3.4
Portugal	5.1	2.0	3.1	4.4	3.3
Slovak Republic	5.7	5.0	7.1	6.8	6.1
Slovenia	1.5	3.6	7.1	3.5	3.9
Spain	5.7	2.7	3.0	0.1	3.0
Sweden	..	8.4	3.5	0.2	..
Switzerland	..	..	3.3	5.0	3.0
Turkey	..	..	..	12.9	..
United Kingdom	..	..	..	0.0	..
United States	-1.7	1.9	5.8	2.2	2.0
OECD-21	**3.5**	**3.5**	**4.2**	**2.2**	**3.2**

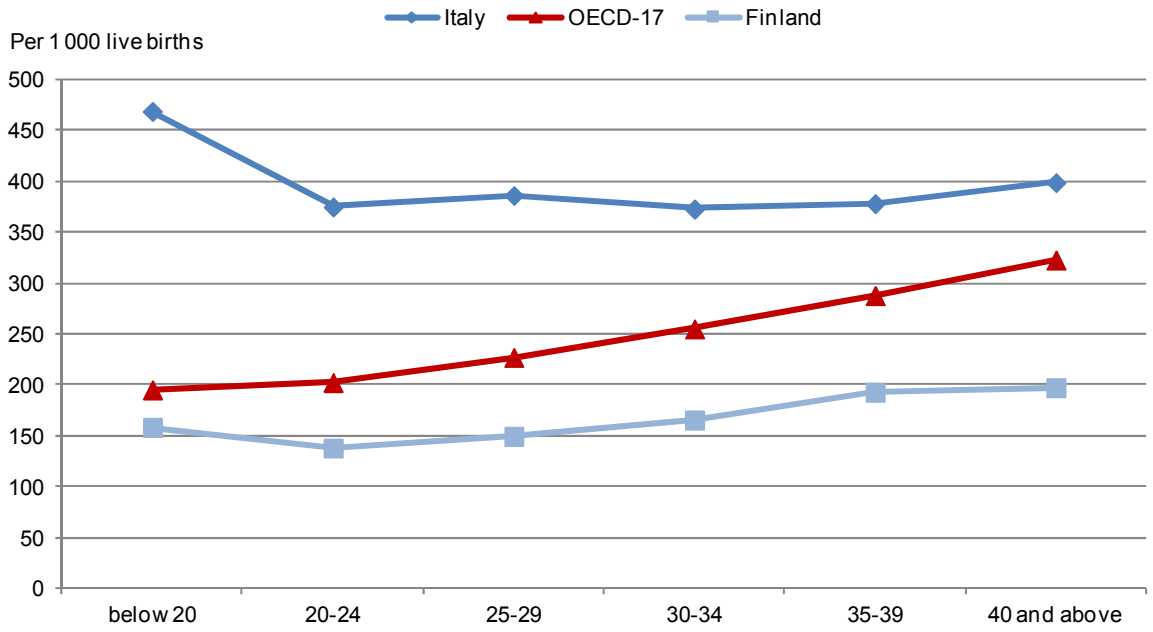
Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

18. For 17 countries it was possible to calculate age-specific rates. Figure 3.2 shows countries with the highest (Italy) and the lowest (Finland) rates, as well as the OECD average age-specific rate. Rates are consistently higher for Italy, Australia and Switzerland and lower for the Scandinavian countries and Spain. Norway exhibits an interesting pattern with very low rates among younger women, but comparatively high rates among older women (see Table 5.A.1., Appendix 5).

19. There are two distinct and recognizable trends. The rates tend to increase as a woman ages, as does her parity on average, hence her opportunity for a previous caesarean section. The degree to which this increase occurs is different in different countries. For example, New Zealand has a 186% increase between the age groups defined as '19 and below' and '40 and above' against the 24% increase experienced by Finland. This is the case for most countries under analysis, but not all: Italy, Germany, Portugal and Spain show a different trend. Their rate is almost constant during a woman's lifetime and in some cases the percentage change is negative such as for Italy and Germany (- 14 and - 0.3% respectively).

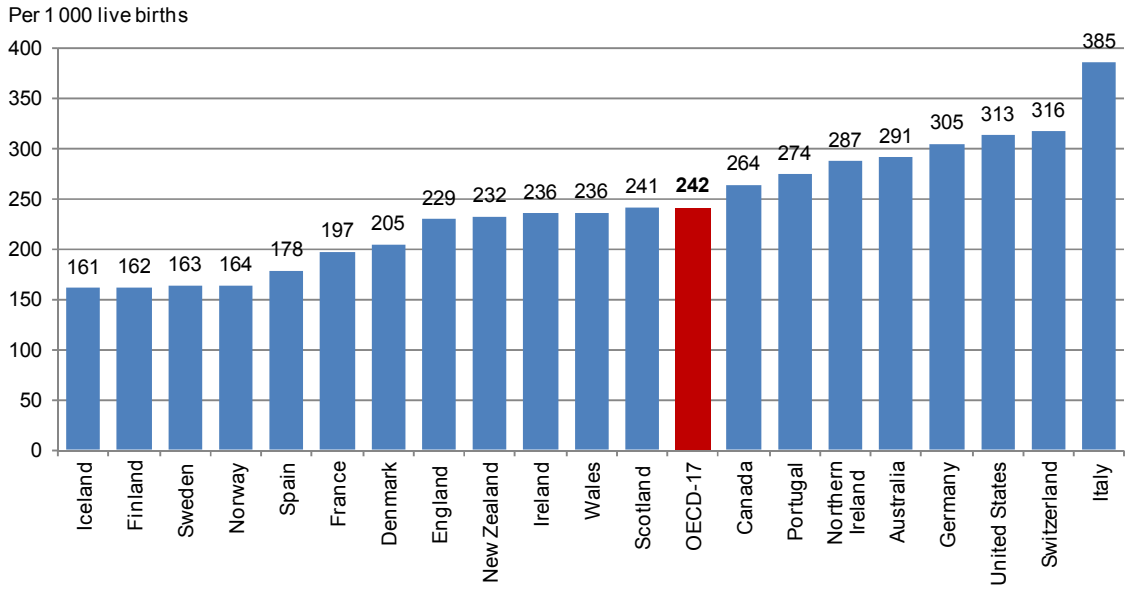
Figure 3.2. Age-specific rates of caesarean sections per 1 000 live births, 2008 or latest year available



Source: National datasets (see Appendix 2).

20. Figure 3.3 shows the age-standardised rates of caesarean sections for the 17 countries for which age-specific data have been collected. The country ranking is almost similar to that obtained with crude rates. Iceland, Finland, Sweden and Norway have the lowest rates while Italy has the highest rate, followed by Switzerland, the United States and Germany. The lowest rate in Scandinavian countries (i.e. Iceland) is 2.4 times lower than the highest rate in Italy. Similar work for Italy supports these findings (OsservaSalute, 2007). In-depth analysis suggests that caesarean section rates have been rising for all age groups and in particular for women above 40 (7.8% increase) between 1999 and 2004 (OsservaSalute, 2007).

Figure 3.3. Age-standardised rates of caesarean sections per 1 000 live births, 2008 or latest year available



Note: Data for Canada refer to 2004/05; data for the United States refer to 2004.

Source: National datasets (see Appendix 2).

21. An increasing number of mothers aged over 40, who have a higher rate of caesarean sections than younger women (Figure 3.2) may explain part of the rise in crude caesarean rates (Table 3.1). But this is certainly not a complete explanation. Rates across a woman's lifetime do not increase consistently across countries. These differences are most likely due to variation in obstetric policies and medical opinion and they reinforce the idea that factors other than obstetric risk and maternal characteristics are contributing to increasing rates of caesarean section. For elective cases, these might include the following reasons:

- Women seem to want what is the perceived to be safest method of birth for a baby. Their perception may be driven by an increasing number of physicians favourable to C-section without medical indications (Faas-Fehervary *et al.*, 2005, Karlstro *et al.*, 2008). High rates of labour force participation among women along with a rise in the increased number of pregnancies later in life may in part explain a woman's preference to opt for a caesarean section - because she perceives it to be the safest option. Technology is usually associated with 'better' and 'more reliable' care.

- The threat of litigation may be a factor in increasing rates of caesarean section in some countries (Shelton Brown, 2007).

- For some women and their carers it is more convenient to be able to plan the date and time of their term birth.

- Women may opt for caesarean section for aesthetic reasons. In the UK, many women want to protect their pelvic floor muscle from damage by opting for a Caesarean. This trend is well embodied by the popular British saying 'too posh to push'.

- Women that previously had a caesarean section are most likely to opt for a second one (Bragg *et al.*, 2010, Librero *et al.*, 2000, OsservaSalute, 2007). This implies that where caesarean section

rate tends to be high, it will continue to increase, as more women that had a first caesarean section will go through their second delivery choosing a caesarean section again.

22. The most recent English NHS guidelines recognise the role played by women's preferences in the rates of elective procedures and indeed stress the importance of a women-centred care approach. "Pregnant women should be offered evidence-based information and support to enable them to make informed decisions about their care and treatment" (NICE, 2011).

23. Caesarean section rates present lower cross-country variation than for other procedures presented in this paper (see section 8); however, within-country variation is significant in several countries. In Italy, within-country variations are striking between southern and northern regions, with southern regions showing much higher caesarean section rates. The Campania region –located in the southern part of the country- exhibited the highest increase and had the highest level at 60% in 2004. Evidence suggests that part of the issue lies in managerial and organizational matters, together with a choice (or preference) on the part of the medical and clinical staff not to comply with the national guidelines. Maternal characteristics or obstetric risks are unlikely to explain such variation (OsservaSalute, 2007). Payment systems that reimburse a caesarean section in several regions at double the rate of a natural delivery to hospitals may also have influence on this country variation (personal communication with Patrizia Quattrocchi).

24. Even when adjusting for maternal characteristics and clinical risk factors, a study of English trusts suggested that variation between them ranged from 14.9% to 32.1% in 2008 (Bragg *et al.*, 2010). Most of the variation in overall rates of caesarean section was associated with rates of emergency caesarean section, which probably reflected the lack of precise criteria for foetal distress or dystocia and differences in management practices (Bragg *et al.*, 2010). One regional study from France supports the same conclusion on the determinants of within-country variation (Rabilloud *et al.*, 1998). Evidence from a study conducted in Wales on the opinion on induction of labour on women who previously had a caesarean section suggests that some of the emergency section variation could be explained by differences in medical opinion (Udayasanikar *et al.*, 2008). The role of diagnosis is also recognized by a study of inter-hospital variation during 1994-1995 in Valencia, Spain. The study suggests an inter-hospital variation range of 14.7% to 25.0% (Librero *et al.*, 2000). After adjusting for the risk factors, the inter-hospital variation in caesarean rates persisted. This variability could not be justified by differences in obstetric risks in the different centres or by other clinical factors, confirming – in a public hospital network without economic incentives – findings published elsewhere in the international literature (Librero *et al.*, 2000). Multivariate analysis showed that also extra-clinical factors, such as the day of the week, correlated positively (Librero *et al.*, 2000). More broadly, in Spain a 3-fold factor in variation across areas is recorded (Bernal-Delgado *et al.*, 2009).

4. HYSTERECTOMY

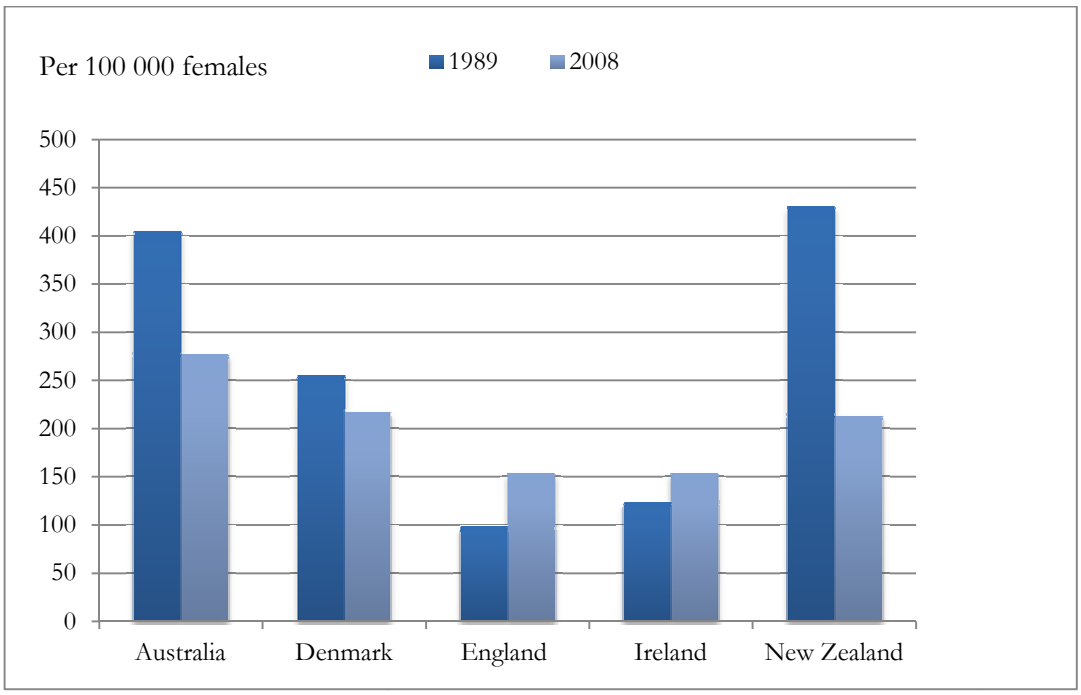
25. A hysterectomy is the surgical removal of the entire uterus – complete hysterectomy – or a part of it - removal of the uterine body while leaving the cervix intact. Hysterectomies are performed for a large number of benign and malignant conditions where the incidence varies by age (MacKenzie *et al.*, 2004, Maresh *et al.*, 2002). The most common are menstrual irregularities, mostly fibroids and dysfunctional uterine bleeding, and symptoms associated with endometriosis. Several new treatments for these conditions have been introduced over the past decade or so. These include: methods of endometrial ablation (Bridgman and Dunn, 2000), laparoscopic laser techniques, the progestogen containing intra-uterine contraceptive coil (Lethaby *et al.*, 2000), gonadotrophin releasing hormone protocols, enthusiasm for myomectomy by laparoscopy (Mais *et al.*, 1996, Narayan *et al.*, 2010) and radiologically guided embolization (Dutton *et al.*, 2007). Other hysterectomies are undertaken for symptoms caused by genital tract prolapse. Again, a number of new interventions have been developed whose use might reduce the number of hysterectomies performed, although these are being subjected to long-term assessment. Hysterectomy for benign conditions such as dysfunctional uterine bleeding or fibroids among pre-menopausal women is increasingly difficult to justify, given the emergence of alternatives such as endometrial ablation and the progestogen releasing IUCD [Mirena®] in the 1990's, myomectomy and embolisation in the 2000's, which can retain fertility (NICE guideline for Heavy Menstrual Bleeding[2]). After menopause, many such conditions become much less common.

26. Hysterectomy includes both abdominal and vaginal procedures. Studies have shown that there are several reasons to prefer vaginal to abdominal hysterectomy, however for example in England the latter is still predominantly performed (Bottle and Alyn, 2005). Rates of these two types of hysterectomy vary from country to country. Thus to avoid misrepresentation of hysterectomy levels across countries, the aggregation of the two is included in the analysis presented here. The OECD database only provides data on vaginal hysterectomy so the data are not shown here as it is not possible to assess levels and trends in overall hysterectomy crude rates (including also abdominal hysterectomy).[3] However, data from 1989 (McPherson, 1989) allow us to delineate some time trends for five countries (Figure 4.1). Australia, Denmark and New Zealand – with high rates in 1989 – have since experienced declining rates of hysterectomy. Conversely, Ireland and England – with extremely low rates in 1989 - show an increase in the rate of hysterectomy, though certainly more moderate than the decrease seen elsewhere. The data suggest that cross-countries variation in hysterectomy rates is decreasing overall.

2 http://guidance.nice.org.uk/CG44/Guidance/pdf/English

3 In 2013, the OECD data collection will be expanded to also include abdominal hysterectomy in order to provide more comprehensive data.

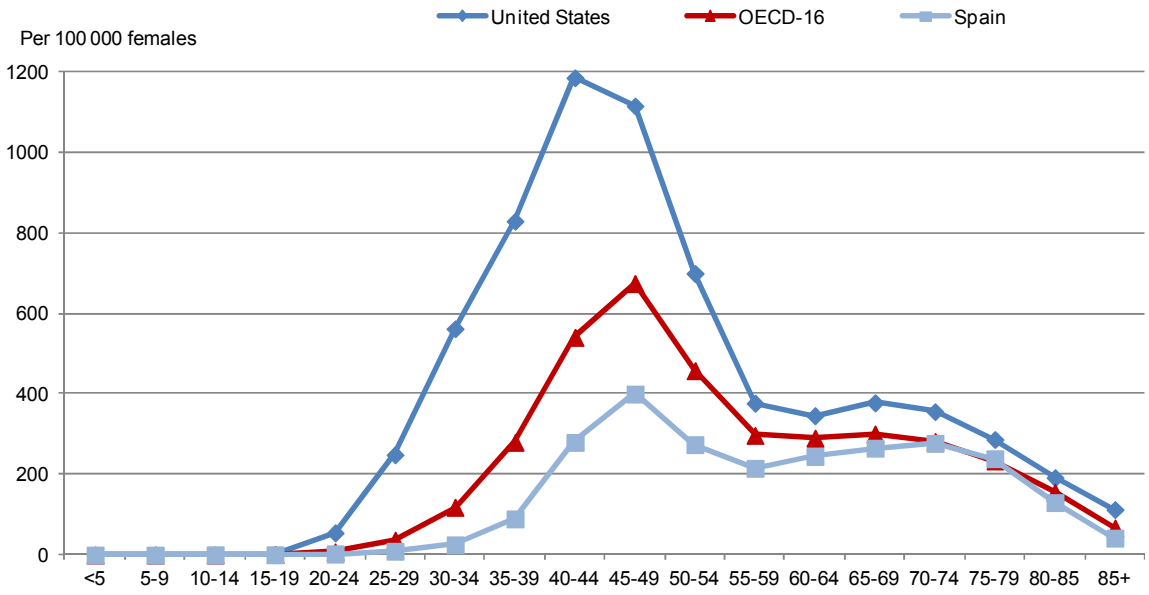
Figure 4.1. Unstandardised rates of hysterectomy: comparison with previous research – 1989 vs. 2008



Source: McPherson (1989); National datasets (for 2008 data; see Appendix 2).

27. The 16 countries for which age-specific data is available show a similar pattern during a woman's lifetime (see Table A5.2, Appendix 5). Figure 4.2 shows the highest (United States), lowest (Spain) and average age-specific rates of hysterectomy. For all countries, hysterectomy rates start increasing between 30 and 39 years of age, to reach a peak at 45-49 and then decline steeply, with a flattening-off between ages 60 and 75, followed again by a steep decline. This occurs with two exceptions: the United States and Canada. Rates in these countries start rising earlier during a woman's lifetime, 20-24, and peak earlier than elsewhere, at 40-44. This is coupled with the much higher rates seen in women under 40 in North America.

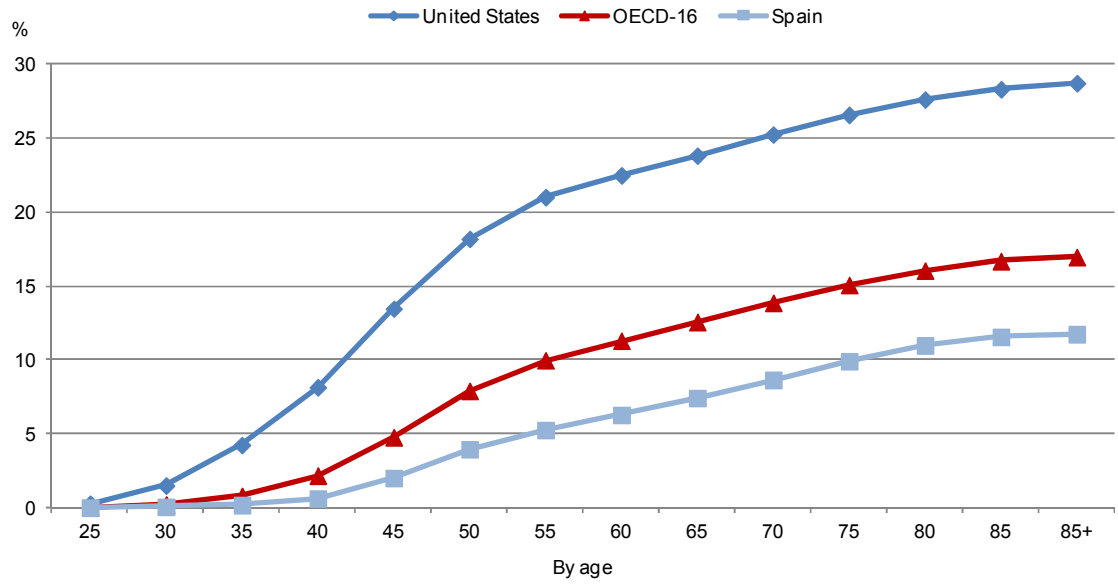
Figure 4.2. Age-specific rates of hysterectomy per 100 000 females, 2008 or latest year available



Note: Data for the United States refer to 2004.
Source: National datasets (see Appendix 2).

28. These age-specific rates of hysterectomy lead to the following lifetime risk for the procedure by country: the Unites States has the highest cumulative risk throughout a woman's lifetime; Ireland, Spain and Scotland are at the lower end (Figure 4.3 and Table A6.1 in Appendix 6). The ratio between the cumulative risk in the United States, compared to that of Ireland and Spain, at age 85 and over, is about 2.4; and compared to that of Scotland, it is 2.7. For the same age group, the ratio between the Canadian cumulative risk - the second highest –, compared to that of Spain is 2.4, Ireland, 2.3 and Scotland, 2.6.

Figure 4.3. Cumulative risk of hysterectomy, by age, 2008 or latest year available

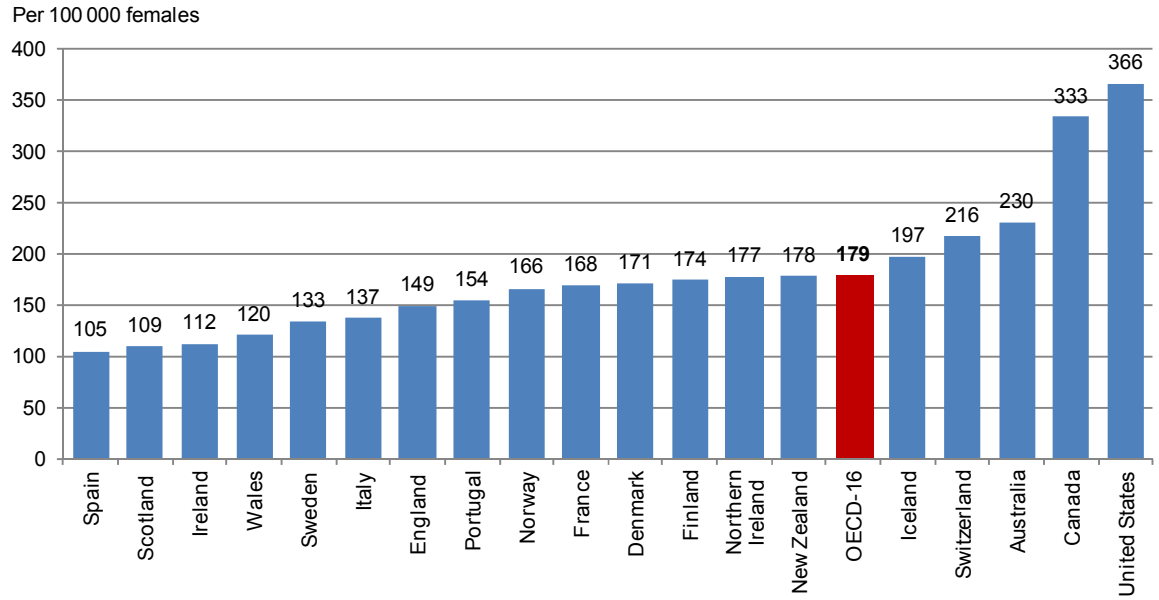


Note: Data for the United States refer to 2004.
Source: National datasets (see Appendix 2).

29. Consistent with observations for age-specific rates, Canada and the United States show the highest age-standardised rates, while Spain, Scotland and Ireland the lowest (Figure 4.4).

30. Figure 4.5 compares the age-standardised rates for 2004 (unpublished work by Scott and McPherson) with those for 2008. Over this period, all countries with the exception of England experienced a decrease in hysterectomy rates. This is consistent with the trends highlighted by Figure 4.1 that compares crude rates in 1989 and 2008 and signals a convergence of rates across countries overtime.

Figure 4.4. Age-standardised rates of hysterectomy per 100 000 females, 2008 or latest year available

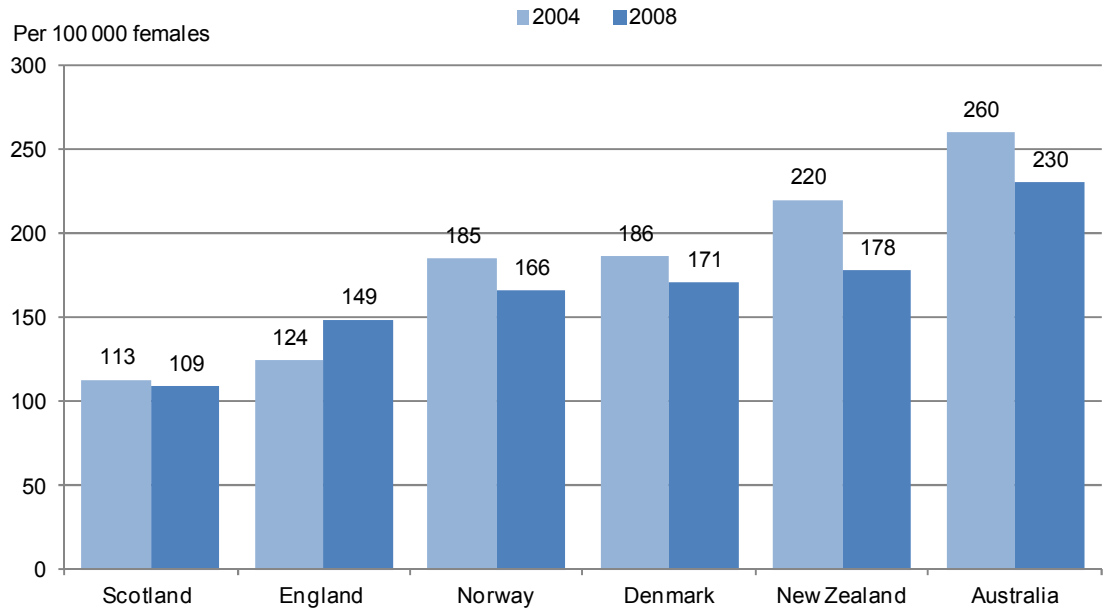


Note: Data for Canada refer to 2004/05; data for the United States refer to 2004.

Source: National datasets (see Appendix 2).[4]

[4] The hysterectomy data for Germany we had available was vaginal only and thus was not included.

Figure 4.5. Standardised rates of hysterectomy: comparison with previous research - 2004



Source: Scott *et al.*, 2008 (for 2004 data); National datasets (for 2008 data; see Appendix 2)

31. Hysterectomies can be performed for various indications, and for these conditions there are several competing treatment options. This in turn leads to variation in medical opinion on which treatment to opt for, and variation in women's choices for the alternatives available. Differences in treatment preferences may also be determined by how severe each woman perceives her condition. Thus, a number of factors contributed and have the potential to contribute further to reduce hysterectomy rates. However, any potential reduction may be counterbalanced by concerns about associated health risks for example with long-term systemic hormone therapies as contraception and the relief of menopausal symptoms.

32. The numbers of hysterectomies performed to treat malignancies will show some small variations. Measures to improve prevention can reduce the incidence of invasive cervical cancer and the introduction of trachelectomy can reduce the numbers of hysterectomies performed for early stage invasive disease. Screening for ovarian cancer might result in the investigation of "small" ovarian cysts leading to higher hysterectomy rates. Increasing longevity will increase the lifetime risk of ovarian and uterine cancer, with the potential for more hysterectomies. However long term follow up of large cohorts of women undergoing either ablation or hysterectomy for heavy bleeding demonstrate no measurable reduction in cancer incidence in those who have had a hysterectomy (McPherson and Maresh, 2007). By the end of the 1990s, private insurers in the United Kingdom withdrew funding for hysterectomy unless there were sound "medical" reasons for the operation. Analysis in the future should distinguish between these different conditions and the rates to which each leads.

33. Age-specific rates for the United States and Canada show different patterns from their counterparts. Rates in these countries start rising earlier during a woman's lifetime, from ages 20-24, and peak earlier than elsewhere, at 40-44. This is coupled with the much higher rates seen in women under 40 in North America. This raises questions on whether hysterectomy is used by women as a way of stopping unwanted pregnancies within a cultural environment adverse to contraceptive methods, or unwanted menstruation (Coulter and McPherson, 1986). The United States with the highest rate at peak is three times (2.8) higher than Spain, with the lowest rate at peak. Overall high rates of hysterectomy in North America

and in particular in the United States have been described by Payer (1996), who argues that this is a manifestation of a more aggressive attitude of American doctors.

34. In the case of Spain, when considering cancer treatment rates, procedures are likely to reflect the lower-than-average incidence of cancer (IARC, 2010). In addition, the lack of specific organizational or economic incentives would tend to explain a conservative approach for hysterectomy in uterus cancer, lowering surgical rates (Oliva *et al.*, 2009).

35. Variation also occurs within-country as per the United States (McPherson *et al.*, 1982; Wennberg and Gittlesohn, 1973), the United Kingdom (Bottle and Alyn, 2005; Coulter *et al.*, 1988), and Australia (Bylesa *et al.*, 2000). Different contributing factors were put forward to explain this variation within specific contexts: for example, in Australia women from rural areas and from a lower educational background tend to undergo more hysterectomies (Bylesa *et al.*, 2000); in the United States, hypotheses include the role of supply (Wennberg and Gittlesohn, 1973) and an inter-hospital variation in practice styles (Arndt *et al.*, 1995). This complex pattern represents presumably underlying differences in the perception of need (by both women and their carers), be it contraception, cautious prophylaxis or convenience.

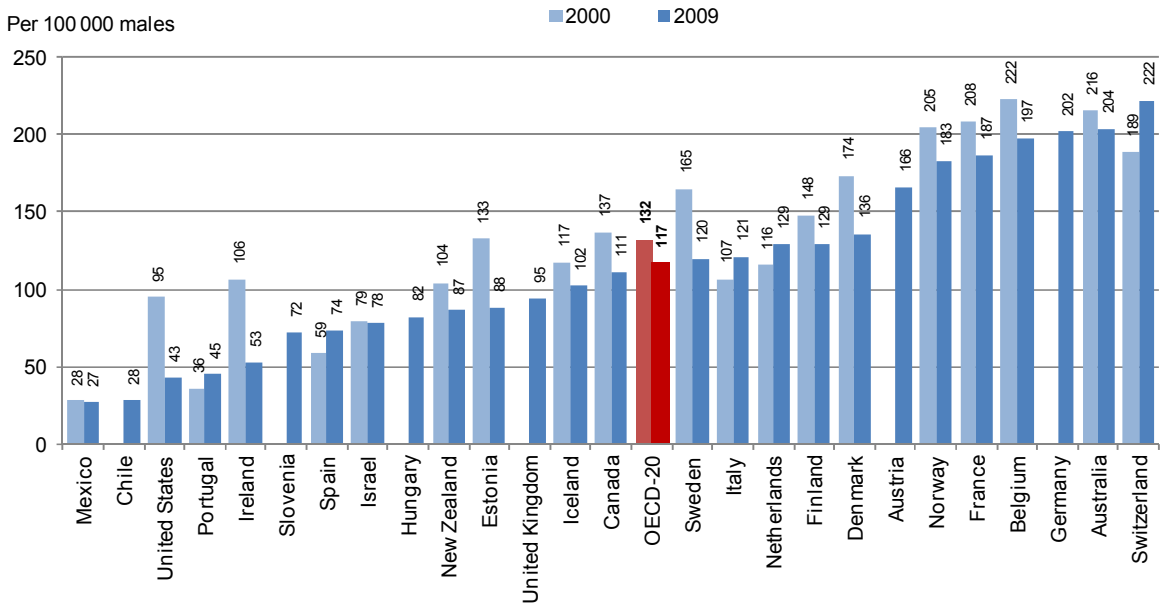
5. PROSTATECTOMY

36. A prostatectomy involves the surgical removal of the prostate gland. It is used to prevent the discomfort and consequences encountered with an enlargement of the prostate. This enlargement occurs commonly through benign prostatic hyperplasia, sometimes through abnormalities such as tumour, or from other causes, that can restrict the normal flow of urine along the urethra, causing discomfort and difficulty voiding. There are two main types of prostatectomy used to treat these symptoms: transurethral and open (non-transurethral) prostatectomy. The former is usually performed for small and medium sized prostates, while the latter for larger prostates. Transurethral prostatectomy is a relatively more complex operation that can induce multiple side effects when compared to open prostatectomy.

37. Between 2000 and 2009, the average rate of prostatectomy in OECD countries remained quite stable, as a result of a decline in rates of transurethral prostatectomy (-1.7% per year) and a significant rise in rates of open (non-transurethral) prostatectomy in most countries (+6.5% per year on average, see Figures 5.1 to 5.3 and Table 5.1). However, transurethral prostatectomies continue to account for, on average, two-third of all prostatectomies in OECD countries.

38. The reduction in transurethral prostatectomy rates was particularly large in many countries between 2005-2009 (a 2.6% drop on average). Some of the countries that had higher rates than others at the beginning of the decade faced a dramatic decline during this period (e.g. the United States). Indeed, the research identifying side effects of transurethral resection of the prostate was performed largely in the United States (Doll *et al.*, 1992). On the other hand, the rates increased in the past decade in some countries that had lower-than-average rates at the beginning of the decade (Portugal, Spain, Italy and the Netherlands), as well as in Switzerland which already had higher-than-average rates and now has the highest crude rate. The rate also increased in Germany between 2005 and 2009 (data for 2000 are not available).

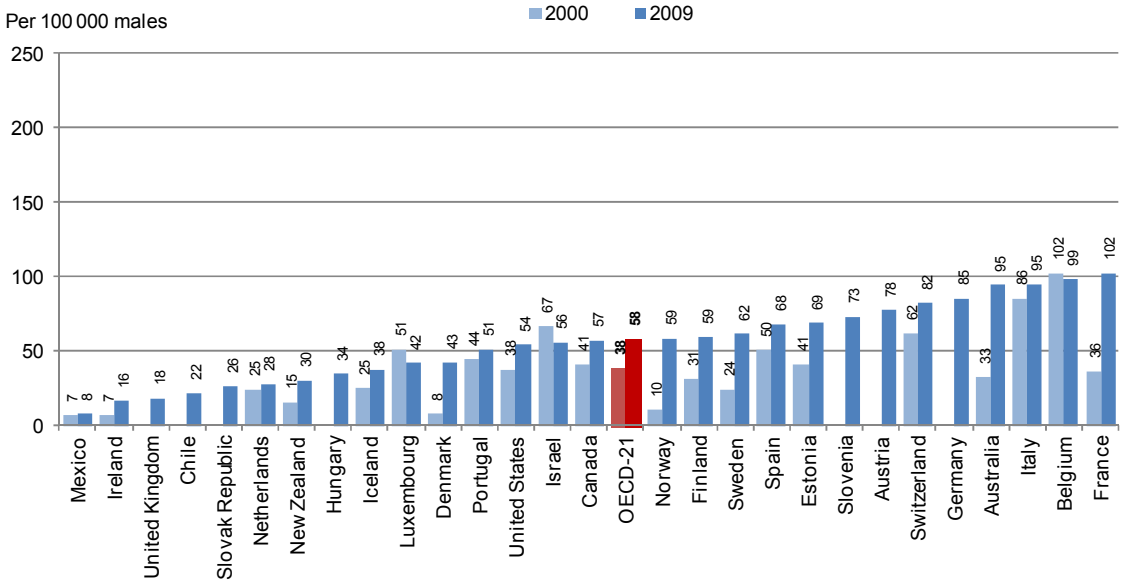
Figure 5.1. Crude rates of transurethral prostatectomy per 100 000 males, 2000-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

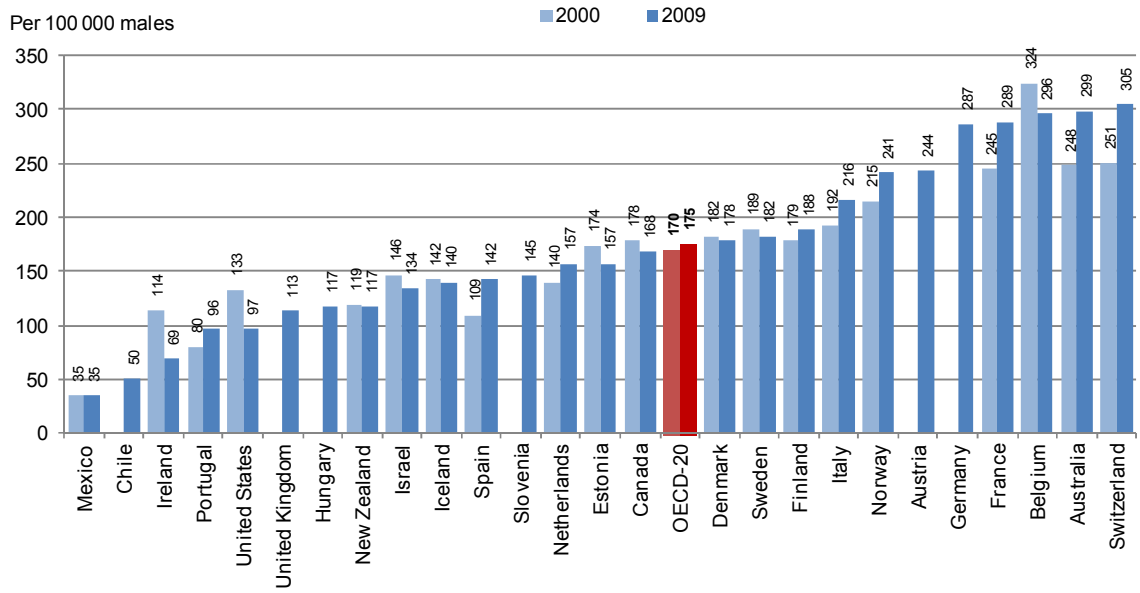
Figure 5.2. Crude rates of open (non-transurethral) prostatectomy per 100 000 males, 2000-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

Figure 5.3. Crude rates of all prostatectomy per 100 000 males, 2000-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

Table 5.1. Trends in transurethral, open (non-transurethral) and all prostatectomy per 100 000 males, 2000-2009 (or nearest year)

	Transurethral prostatectomy			Open (non-transurethral) prostatectomy			All prostatectomy		
	Average annual growth rates (%)			Average annual growth rates (%)			Average annual growth rates (%)		
	2000-2005	2005-2009	2000-2009	2000-2005	2005-2009	2000-2009	2000-2005	2005-2009	2000-2009
Australia	-0.5	-1.0	-0.7	15.1	12.9	14.3	2.1	2.6	2.3
Austria	..	0.7	..	..	-3.1	..	..	-0.6	..
Belgium	0.0	-5.8	-2.4	0.4	-2.4	-0.7	0.1	-4.7	-1.8
Canada	-2.2	-3.3	-2.6	7.1	-0.5	4.2	0.3	-2.3	-0.7
Chile	..	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	..	..	..	..	..
Denmark	-3.5	-1.6	-2.7	18.5	22.8	20.4	-2.1	2.2	-0.2
Estonia	-4.2	-7.7	-6.6	7.7	9.5	8.9	-1.2	-1.9	-1.7
Finland	1.0	-4.6	-1.5	8.2	6.6	7.5	2.4	-1.7	0.6
France	-1.2	-1.2	-1.2	24.2	-1.1	12.2	4.3	-1.2	1.9
Germany	..	2.9	..	..	1.5	..	..	2.5	..
Greece	5.0	..	..	..	..	..	..	..	..
Hungary	..	-4.0	..	..	-0.3	..	..	-3.0	..
Iceland	3.2	-7.2	-1.5	5.8	3.5	4.7	3.7	-4.8	-0.2
Ireland	-7.0	-7.9	-7.4	15.3	1.6	9.0	-4.8	-6.1	-5.4
Israel	-0.1	-0.4	-0.2	-1.3	-3.0	-2.0	-0.6	-1.5	-1.0
Italy	1.6	1.2	1.4	3.5	-1.6	1.2	2.5	-0.1	1.3
Japan	..	..	..	..	..	..	..	..	..
Korea	..	..	..	..	..	..	..	..	..
Luxembourg	..	..	..	1.3	-6.0	-2.9	..	..	..
Mexico	-1.4	1.1	-0.3	-1.1	2.1	0.3	-1.3	1.3	-0.2
Netherlands	2.7	-0.8	1.4	4.8	-3.5	1.6	3.1	-1.3	1.4
New Zealand	-4.1	0.6	-2.0	5.7	10.7	7.9	-2.6	2.8	-0.2
Norway	2.2	-7.2	-1.4	26.8	20.4	24.4	4.0	-2.7	1.4
Poland	..	..	..	..	..	..	..	..	..
Portugal	2.5	2.6	2.6	2.9	0.0	1.6	2.7	1.1	2.0
Slovak Republic	..	..	..	..	..	..	..	..	..
Slovenia	..	-6.1	..	..	19.2	..	..	3.1	..
Spain	0.3	5.4	2.5	4.2	2.5	3.5	2.2	4.0	2.9
Sweden	-1.8	-5.5	-3.5	21.8	-1.2	11.0	2.7	-4.2	-0.4
Switzerland	3.1	1.9	2.4	2.6	5.3	4.1	2.9	2.7	2.8
Turkey	..	..	..	..	..	..	..	..	..
United Kingdom	..	-0.9	..	..	13.8	..	..	1.1	..
United States	-8.1	-11.4	-9.3	2.6	7.9	4.5	-4.5	-2.6	-3.8
OECD-20	**-0.9**	**-2.6**	**-1.7**	**8.4**	**4.1**	**6.5**	**0.8**	**-0.9**	**0.1**

Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602
Source: OECD Health Data 2011, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH PROC.

39. Rates of open (non-transurethral) prostatectomy are, in most countries, much lower than rates of the transurethral procedure, but, irrespective of level, have tended to increase in many countries in recent years, as shown in Figure 5.2. Some of this may be explained by increasing numbers of prostate cancers among aging populations or earlier diagnosis of cancers, related to screening using prostate-specific

antigen. The rise in open prostatectomy is also likely to be influenced by the increasing availability of drug treatment options for conditions otherwise treated with, and often delaying the need for, transurethral prostatectomy.

40. In some cases, average annual growth rates of open prostatectomy show a very substantial increase in the use of this procedure over the past decade as shown Table 5.1 (e.g. Australia, Denmark and Norway). On the other hand, the rates in Austria (2005-2009), Belgium, Israel and Luxemburg decreased.

41. Combining both transurethral and non-transurethral prostatectomy, Figure 5.3 and Table 5.1 show that the overall rates of prostatectomy remained relatively stable between 2000 and 2009 on average across OECD countries. But it is interesting to note that the rates have increased in some countries that already had high rates in 2000, including Switzerland, Australia and France. On the other hand, the overall rates have declined in the United States and Ireland.

42. Age-specific rates for transurethral, open and all prostatectomies are presented in Figures 5.4, 5.6 and 5.8 which plot the highest, lowest and average rates. In most countries, transurethral prostatectomy is performed in the age range between 75 and 85, in contrast with open (non-transurethral) prostatectomy which is performed in younger men (i.e. 65 to 75).

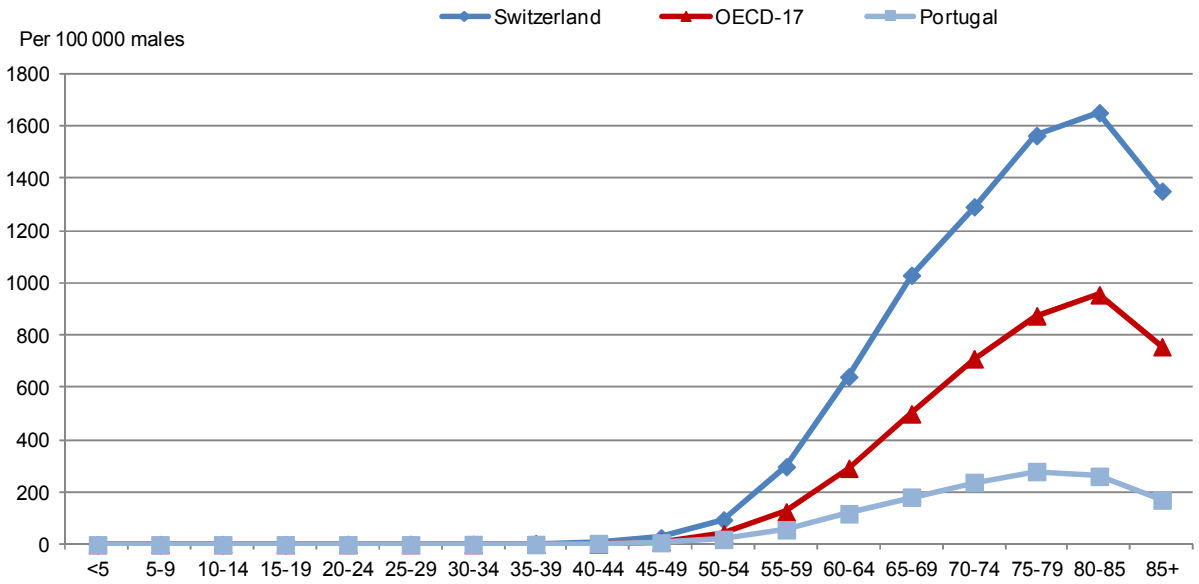
43. For all age groups, the highest rates for transurethral prostatectomy are in Switzerland, Australia and Norway; the lowest in Portugal and Spain. The rate in Portugal is about 6 times lower than in Switzerland at the peak age of 75-85. Although the age-standardised rates of all prostatectomies in the United States continues to be higher than that in England and other regions of the United Kingdom, there is a marked change from the situation in 1980 when the prostatectomy rate in the United States was twice that in England. Part of the explanation lies in the low use of open prostatectomy in the United Kingdom compared to the United States (see Table A5.3 in Appendix 5).

44. These age-specific rates of transurethral prostatectomy lead to the lifetime risk for the procedure presented in Figure 5.5 for Switzerland, Portugal and the OECD-17 average: Switzerland has the highest cumulative lifetime risk, Portugal the lowest; the ratio between the two, at age 85 years and over, being about 5. For all countries under analysis, the risk of undergoing a transurethral prostatectomy rises steeply and consistently during a man's lifetime to peak at 85 years and over.

45. The highest age-specific rates of open (non-transurethral) prostatectomy are in Italy and Switzerland, and the lowest in England as shown in Figure 5.6. The rate for England is about 13 times lower than in Italy, which peaks at ages 65 to 74.

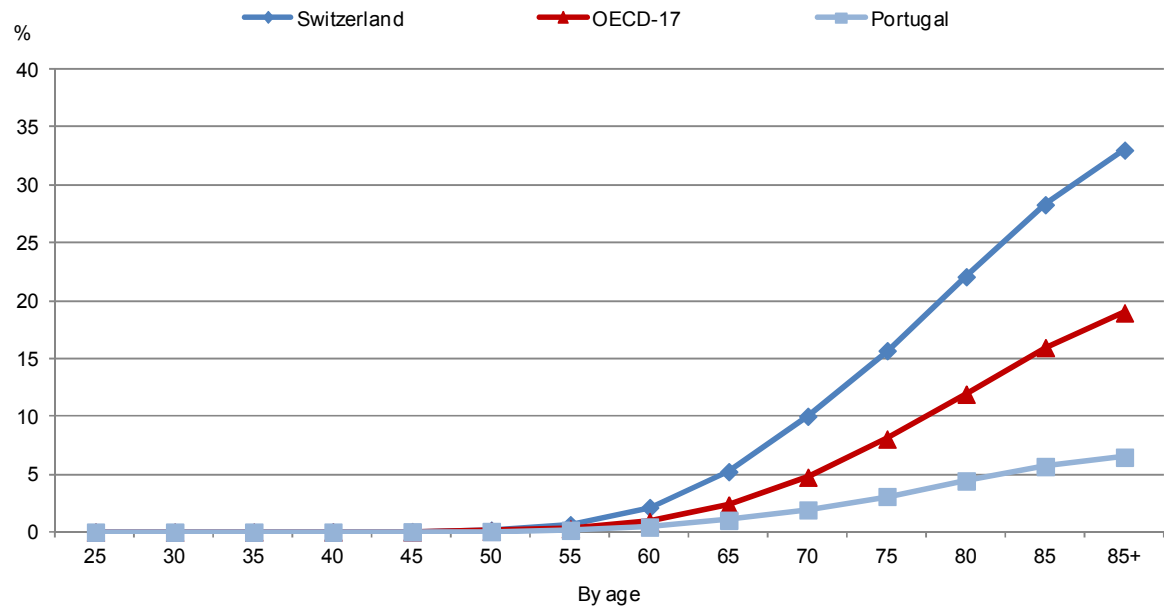
46. These age-specific rates of open prostatectomy lead to the lifetime risk presented in figure 5.7 for Italy, England and the OECD-17 average: Italy has the highest cumulative risk throughout a man's lifetime, Northern Ireland the lowest. The ratio between the Italian cumulative risk, compared to that of Northern Ireland, at age 85 and over is as high as 17. When the ratio is calculated between the respective risks of Italy and Switzerland, the Swiss having the second highest cumulative risk, the result is 1.5 at age 85 and over. For all countries presented in Figure 5.7, the cumulative risk of undergoing open prostatectomy rises steeply and consistently up to 70-75 years of age. At over 75 years, all countries face a much slower increase. The south-western European countries (i.e. Italy, Spain, Portugal and France) stand out for having a much steeper increase above 75 years of age.

Figure 5.4. Age-specific rates of transurethral prostatectomy per 100 000 males, 2008 or latest year available



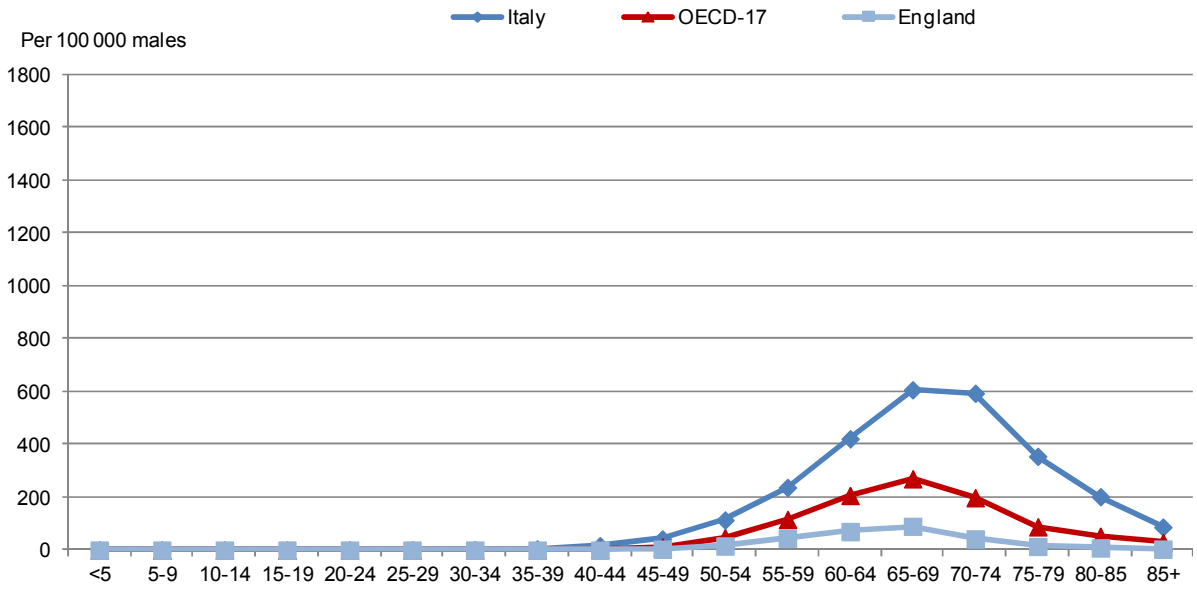
Source: National datasets (see Appendix 2).

Figure 5.5. Cumulative risk of transurethral prostatectomy, by age, 2008 or latest year available



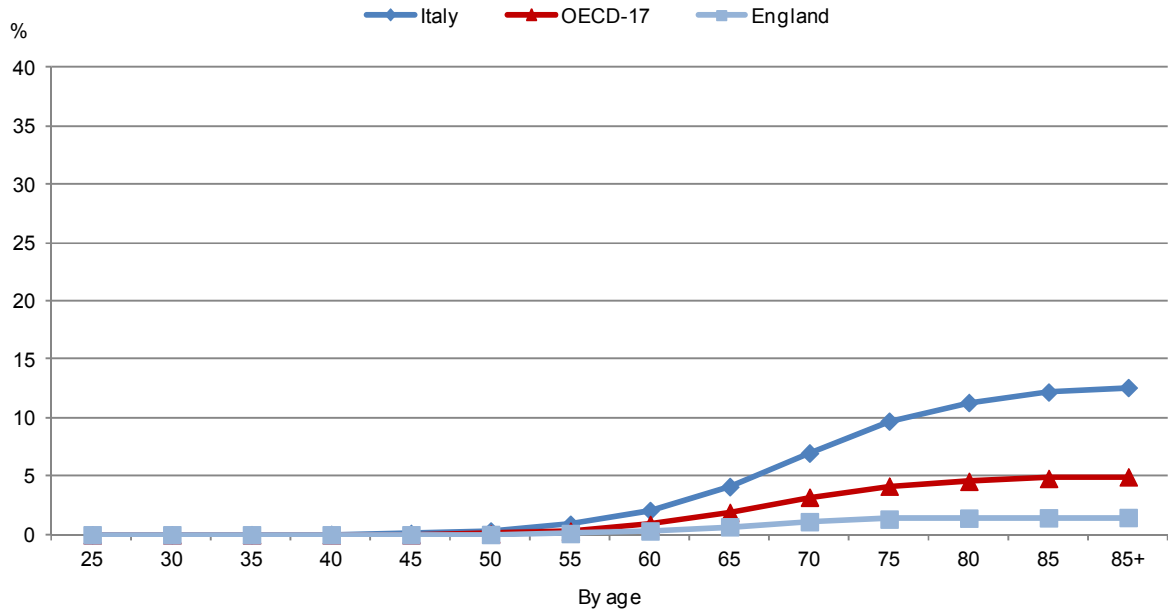
Source: National datasets (see Appendix 2).

Figure 5.6. Age-specific rates of open (non-transurethral) prostatectomy per 100 000 males, 2008 or latest year available



Source: National datasets (see Appendix 2).

Figure 5.7. Cumulative risk of open (non-transurethral) prostatectomy, by age, 2008 or latest year available

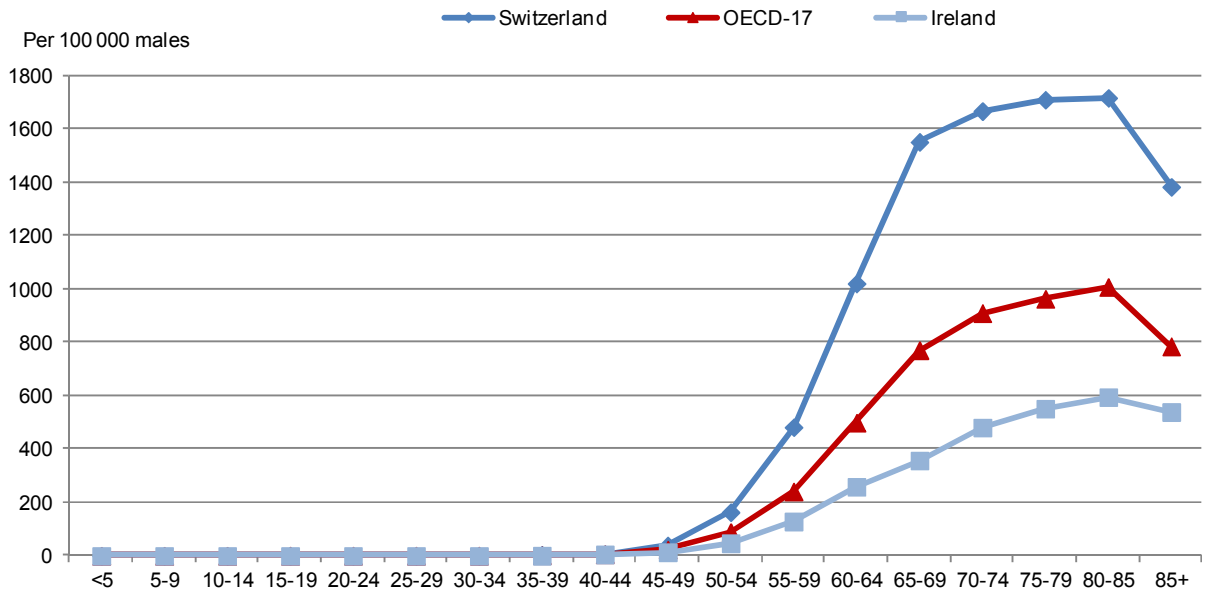


Source: National datasets (see Appendix 2).

47. The age-specific rates of all prostatectomies present similar trends to those described for the age-specific rates of transurethral prostatectomy alone: Ireland has the lowest rates and Switzerland the highest. This reflects the fact that in most countries, the transurethral prostatectomy rate is much higher than that of open prostatectomy.

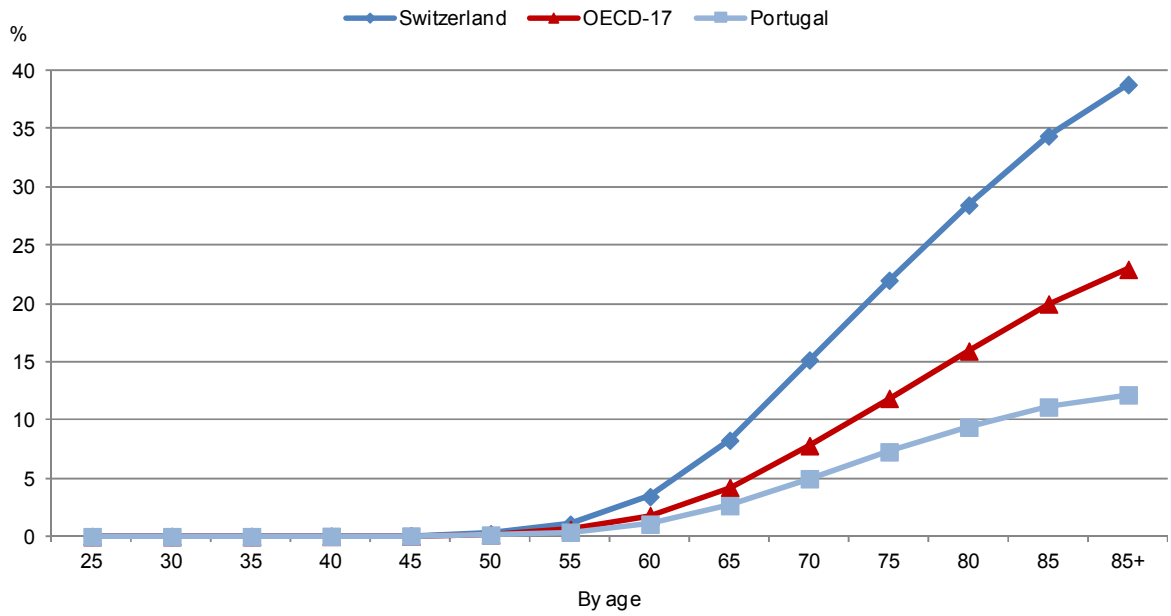
48. The pattern depicted by the lifetime cumulative risk for all prostatectomies is virtually the same as per transurethral cumulative lifetime risk. Switzerland has the highest cumulative risk throughout a lifetime followed by Australia. Portugal, Ireland and Northern Ireland have the lowest. The ratio between the Swiss cumulative lifetime risk, compared that of Portugal, at age 85 and over, is about 3. The variation in overall prostatectomy rates across countries is lower than if the two procedure types are considered individually. The risk of undergoing a prostatectomy rises steeply and consistently during a man's lifetime to peak at 85 years and over for most countries under analysis. Italy, Spain and Portugal face a slower increase after 85 years.

Figure 5.8. Age-specific rates of all prostatectomy per 100 000 males, 2008 or latest year available



Source: National datasets (see Appendix 2).

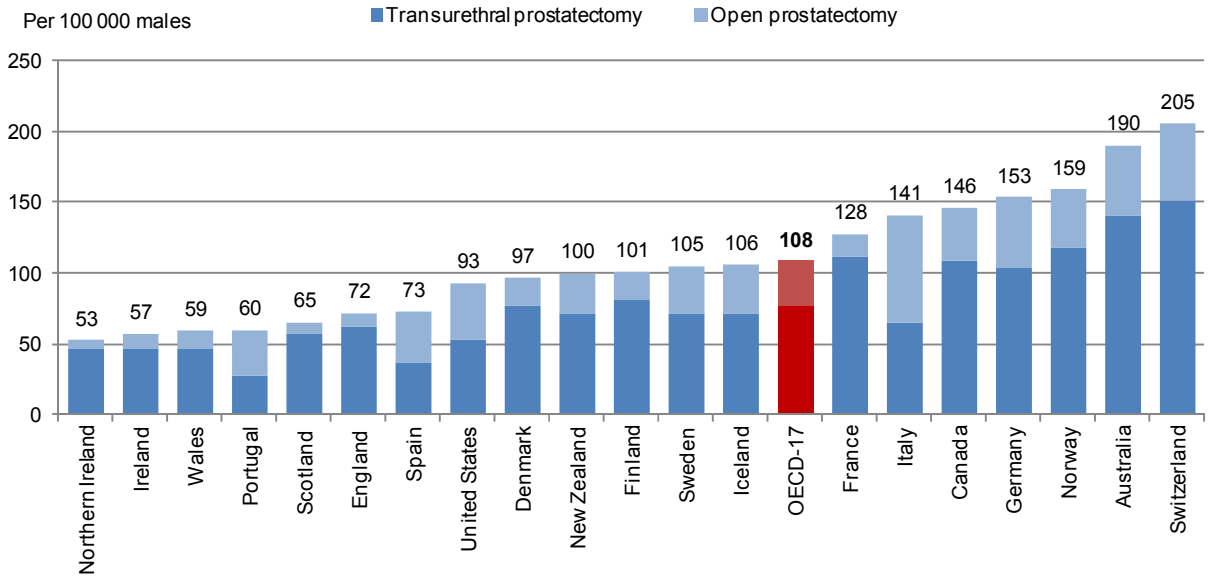
Figure 5.9. Cumulative risk of all prostatectomy, by age, 2008 or latest year available



Source: National datasets (see Appendix 2).

49. Age-standardised rates for prostatectomy are shown in Figure 5.10. Constituents of the United Kingdom, Ireland and Portugal are at the lower end of the spectrum; whilst Switzerland and Australia show the highest standardised rates. This is similar to the trends described in Figure 5.1.

Figure 5.10. Age-standardised rates of prostatectomy per 100 000 males, 2008 or latest year available



Note: Data for Canada refer to 2004/05; data for the United States refer to 2004.
Source: National datasets (see Appendix 2).

50. The decline in the use of transurethral prostatectomy in many countries over the past decade is likely due to advances in drugs that alleviate symptoms, as well as diminishing belief in its advantages over open surgery since record-based observational research suggests higher mortality and reoperation rates (Roos *et al.*, 1989). Following evidence of substantial geographical variations in procedure rates in the United States (Roos *et al.*, 1989), surgical treatment of benign prostatic hyperplasia has been the subject of a major programme of evaluative research (Wennberg *et al.*, 1988). Significant within-country variation (the systematic study of which is rare) has also been reported in Denmark (Sejr *et al.*, 1991). This variation has been declining in Denmark due to technological diffusion, but it is in both cases significant (Sejr *et al.*, 1991). This highlights the importance of institutional, cultural factors, as well as individual patients making treatment choices informed by evidence on the benefits and complications that may arise.

51. In spite of its decreasing rates, transurethral prostatectomy is still the main procedure used across countries. This is partly because an adopted technology takes time to lose popularity once side effects begin to be noted. Transurethral prostatectomy was the standard reference treatment for moderate-sized prostates and only recently evidence has shown the suitability of open prostatectomy for this type of prostate enlargement (Simforoosh *et al.*, 2010).

52. Rates of transurethral prostatectomy are higher than open prostatectomy with the exception of Italy, Spain, and Portugal.[5] Upon examination of the standardised rates for both types of prostatectomy procedures when aggregated, it is possible to identify the following trends:

- Among countries with lower (i.e. Spain and Portugal), or medium (Italy) rates of prostatectomy, the difference between absolute levels of transurethral and open prostatectomy is not significant. Spain, Italy and Portugal are also the only countries for which the age-standardised rate of open prostatectomy is unambiguously higher than the rate of transurethral prostatectomy.

- Among countries with higher rates of prostatectomy, the difference between transurethral and open (non-transurethral) prostatectomy rates is higher.

53. There seems to be an association between a greater use of open prostatectomy and lower rates of all prostatectomy overall. Open prostatectomy is a more radical and invasive operation; and possibly when this is culturally the preferred option, a higher threshold of urinary dysfunction may be required in order that physicians recommend it in general .

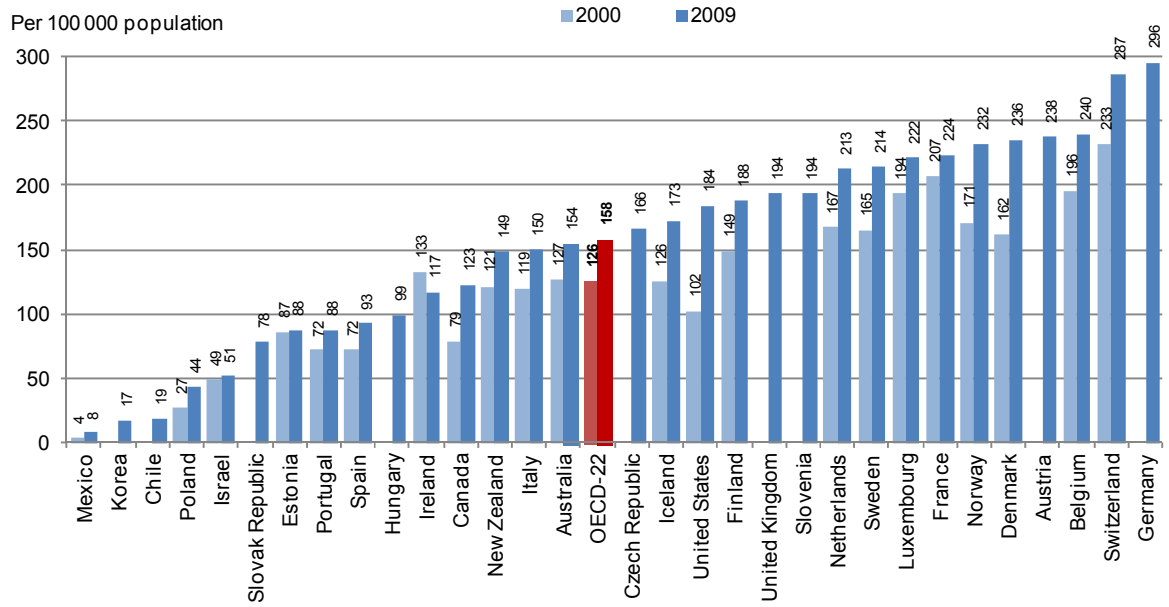
[5] In the United States, crude rates of open prostatectomy exceeded transurethral operations by 2008, as shown in Figures 5.1 and 5.2.

6. HIP REPLACEMENT

54. Hip replacement is considered an effective intervention to treat severe osteoarthritis and certain hip fractures. It can help reduce pain and disability, and restore some patients to near full mobility. Age is the strongest predictor of the development and progression of osteoarthritis. It is more common in women.

55. The crude rate of hip replacement has increased in all OECD countries for which data are available between 2000-2009, with the exception of Ireland[6] (Figure 6.1). The most rapid increase has occurred in Poland, the United States and Mexico. Based on these crude data, it is not possible to assess the extent to which these changes are due to ageing populations.

Figure 6.1. Crude rates of hip replacement per 100 000 population, 2000-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

56. Age-specific rates for both men and women follow similar trends as shown in Figures 6.2 and 6.3. These figures plot the highest, lowest and average age-specific rates for the sample of countries studied. For both sexes, the rates start increasing steeply at 50 years of age to then reach the peak for people age 80 and over. The increase is more pronounced for women, who have higher rates of hip replacement at older ages in most countries. Men experience a slower rate of increase at age 80-84 to then increase again at 85+. All countries except Switzerland experience this pattern among men.

6 In Ireland, the data only cover interventions in public hospitals. It is unknown whether a growing share of hip replacements are performed in private hospitals.

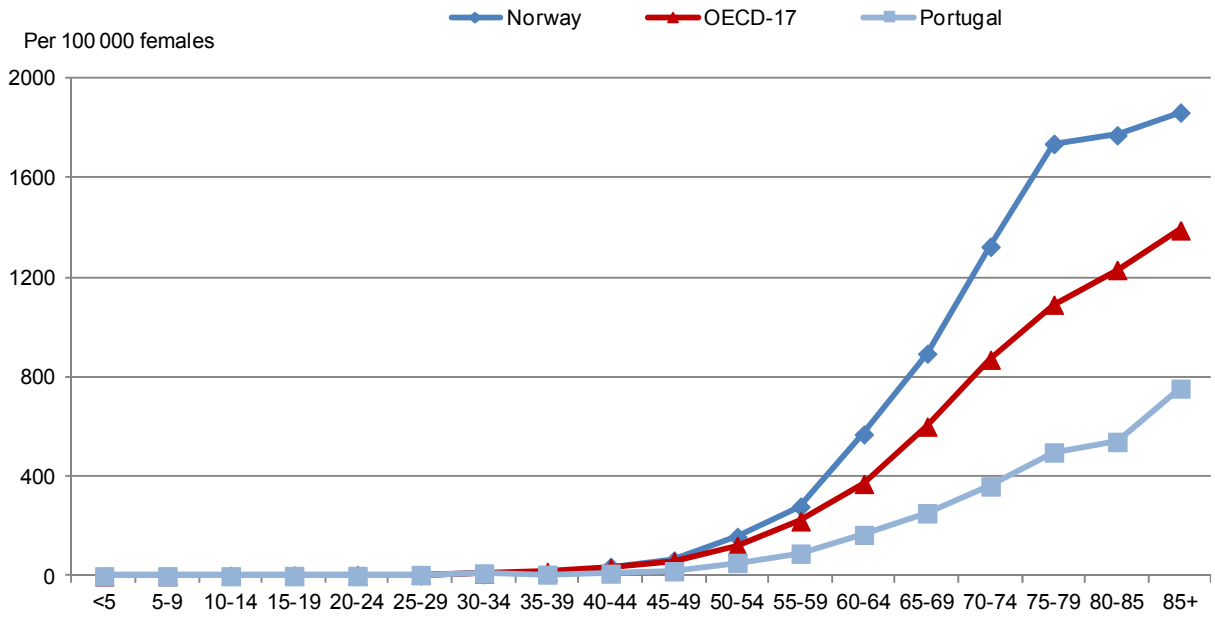
Table 6.1. Trends in hip replacement per 100 000 population, 2000-2009 (or nearest year)

	Average annual growth rates (%)		
	2000-2005	2005-2009	2000-2009
Australia	3.4	1.0	2.5
Austria	..	0.4	..
Belgium	3.9	0.6	3.0
Canada	8.2	1.5	5.6
Chile	..	..	..
Czech Republic	..	..	..
Denmark	5.0	3.4	4.3
Estonia	-3.4	2.0	0.2
Finland	4.3	0.5	2.6
France	0.9	0.8	0.9
Germany	..	3.0	..
Greece	10.3	..	..
Hungary	..	-0.8	..
Iceland	6.7	-0.2	3.6
Ireland	0.9	-4.1	-1.4
Israel	2.3	-1.5	0.6
Italy	3.9	0.9	2.6
Japan	..	..	..
Korea	..	12.4	..
Luxembourg	2.8	-0.1	1.5
Mexico	9.3	4.0	6.9
Netherlands	3.5	2.4	3.1
New Zealand	2.2	2.3	2.3
Norway	3.4	4.6	3.9
Poland	-1.7	13.5	8.2
Portugal	1.5	3.2	2.2
Slovak Republic	..	..	..
Slovenia	..	4.8	..
Spain	3.8	1.6	2.8
Sweden	3.5	2.3	2.9
Switzerland	3.4	2.8	3.0
Turkey	..	..	..
United Kingdom	..	1.3	..
United States	10.6	2.8	7.6
OECD-22	**3.6**	**2.0**	**3.1**

Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

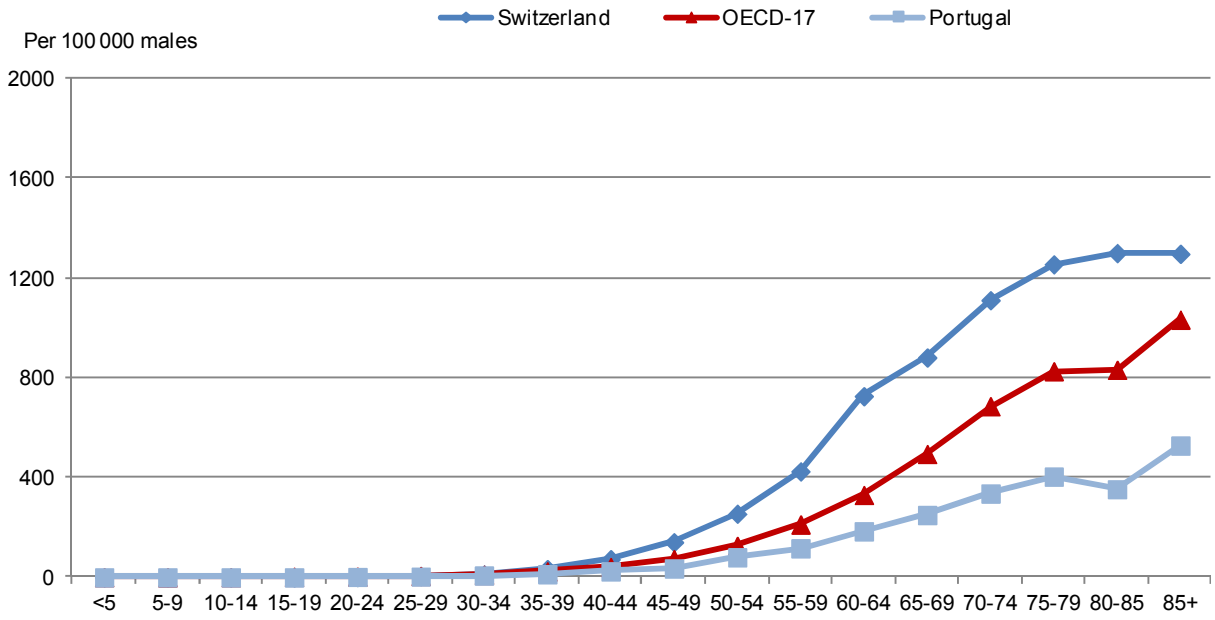
Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

Figure 6.2. Age-specific rates of hip replacement per 100 000 females, 2008 or latest year available



Source: National datasets (see Appendix 2).

Figure 6.3. Age-specific rates of hip replacement per 100 000 males, 2008 or latest year available



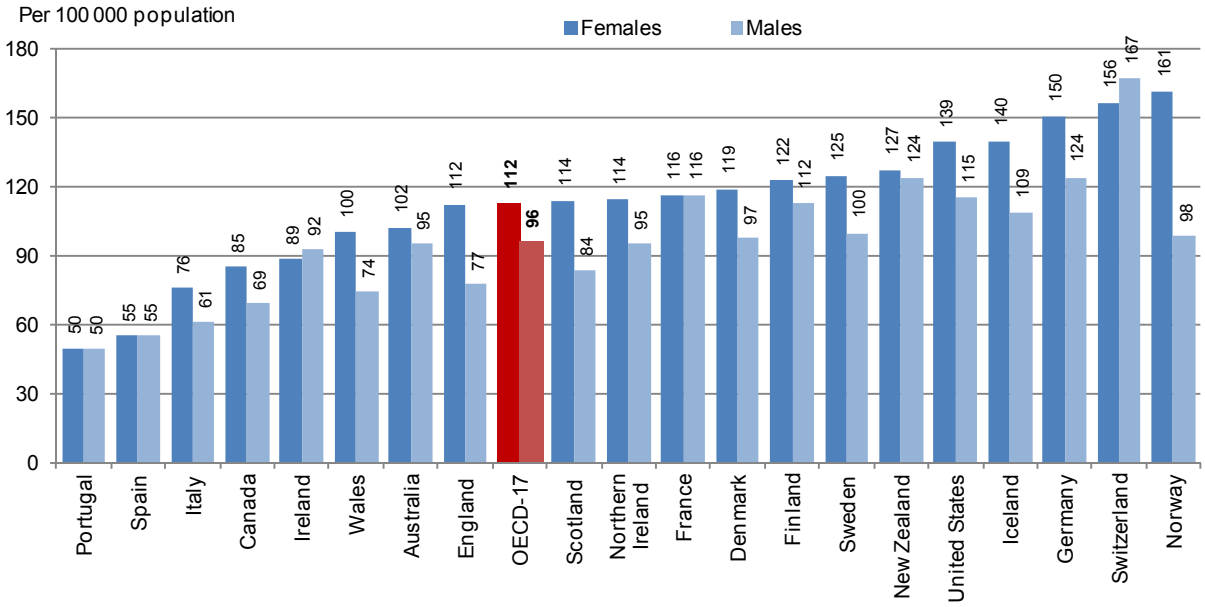
Source: National datasets (see Appendix 2).

57. In most countries, age-standardised rates are higher for women than for men as shown in Figure 6.4. The most striking example is Norway where women receive 1.6 times more hip replacement procedures than men. Higher standardised rates for men can be found in Switzerland and Ireland, although the gender difference in these countries is minimal. Portugal and Spain have similar age-standardised rates

for men and women, and the lowest rates for both sexes. Compared with Norway that has the highest rate for women and Switzerland that has the highest rate for men, the age-standardised rates of hip replacement in Portugal and Spain are about 3 times lower.

Figure 6.4. Age-standardised rates of hip replacement per 100 000 population, 2008 or latest year available

Countries are ranked in ascending order for females



Note: Data for Canada refer to 2004/05; data for the United States refer to 2004.

Source: National datasets (see Appendix 2).

58. The crude rate of hip replacement has increased in almost all OECD countries. The increasing use of hip replacement among people 80 years and over seems to be one of the main underlying causes together with increasing numbers of people reaching this age group. In the case of Spain, part of the increase may be linked to the adoption of a fee-for-service basis programme for hip replacement that aims at reducing waiting lists (Librero *et al.*, 2005).

59. Contrary to expectations, countries with taxation-based systems operate at levels comparable with those whose systems are funded through social insurance. Similarly, the data from the United States relevant to 2004 show unexpectedly low rates. Therefore, the data suggest most likely a widespread pattern of coherent and internally consistent responses to clinical need in the countries studied.

60. Low age-standardised rates in Portugal and Spain might be explained by the greater availability of informal care-giving by family and friends (Colombo *et al.*, 2010), which may reduce the risk of accidents and injuries among elderly people and therefore the need for hip replacement.

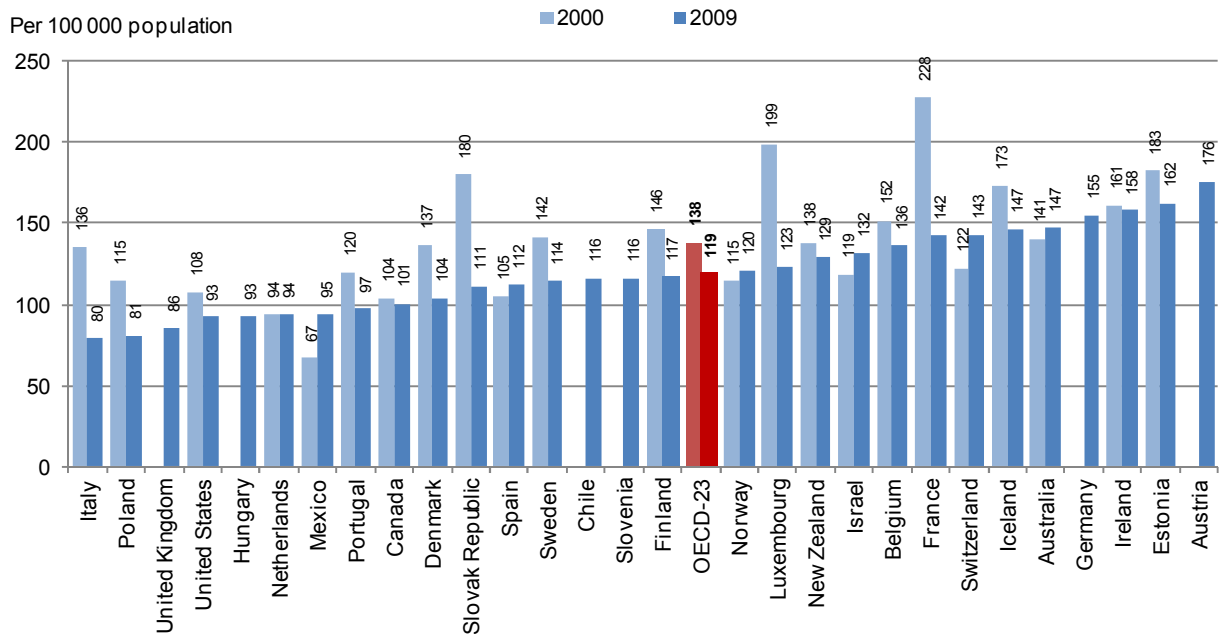
61. Within-country variation is significant in some countries. Extensive variation has been documented in the United States, with rates of hip replacement being 4 to 5 times higher in some regions compared with others in 2005-06 (Elliott *et al.*, 2010). Variation seems greater among hip replacement rates due to osteoarthritis as opposed to fracture. For example, in Spain while hip replacement following fracture is relatively homogeneous across the country, those linked to osteoarthritis seem to be 4 to 5 times higher in some regions than in others (Librero *et al.*, 2005). In the United Kingdom, people seem to receive treatment for arthritis in the form of a hip replacement earlier or later during their condition according to their geographical region (NHS, 2010).

7. APPENDECTOMY

62. An appendectomy involves the surgical removal of the appendix. This procedure is normally performed as an emergency procedure, when the patient is suffering from acute appendicitis. Intravenous antibiotics are used to delay or avoid the onset of sepsis. Rates of appendectomy decreased virtually everywhere in the past decade as shown in Figure 7.1.

63. Most OECD countries experienced a decrease in rates of appendectomy between 2000 and 2009 as observed in the average annual growth rates presented in Table 7.1.

Figure 7.1. Crude rates of appendectomy per 100 000 population, 2000-2009 (or nearest year)



Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

Table 7.1. Trends in appendectomy per 100 000 population, 2000-2009 (or nearest year)

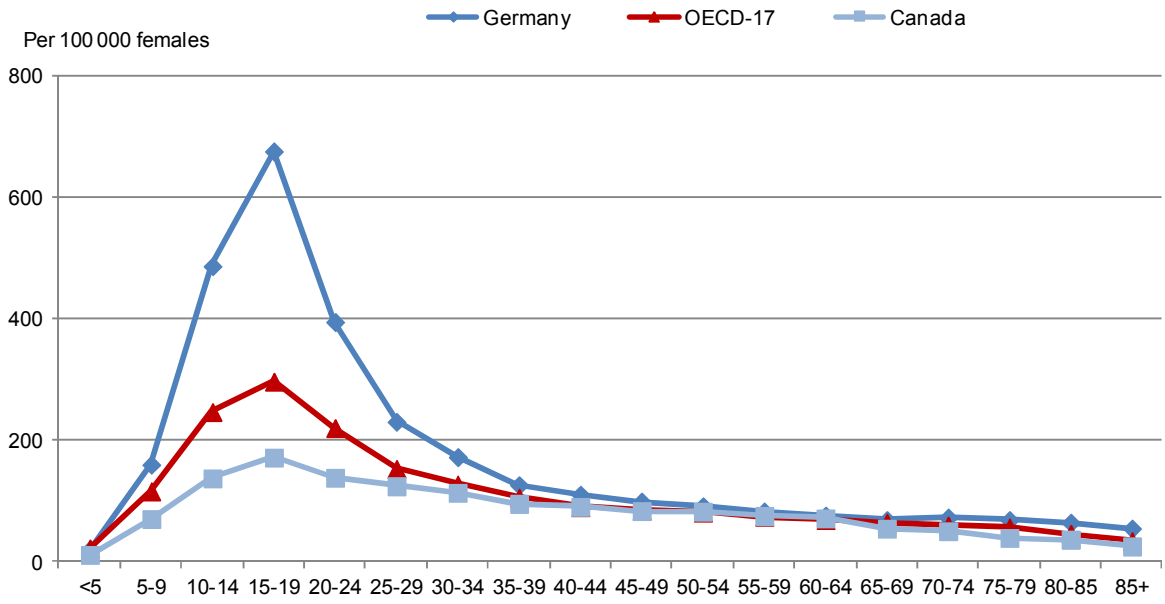
	Average annual growth rates (%)		
	2000-2005	2005-2009	2000-2009
Australia	-0.6	2.5	0.6
Austria	..	..	..
Belgium	-1.5	-1.5	-1.5
Canada	-1.1	0.8	-0.4
Chile	..	..	..
Czech Republic	..	..	..
Denmark	-4.6	-0.9	-3.0
Estonia	-6.0	0.1	-1.9
Finland	-3.0	-1.9	-2.5
France	-6.8	-2.9	-5.1
Germany	..	-1.9	..
Greece	-3.3	..	..
Hungary	..	-1.9	..
Iceland	-3.1	-0.2	-1.8
Ireland	-1.1	0.9	-0.2
Israel	0.9	1.5	1.2
Italy	-7.3	-3.7	-5.7
Japan	..	..	..
Korea	..	..	..
Luxembourg	-5.3	-5.2	-5.2
Mexico	3.1	4.7	3.8
Netherlands	-0.4	0.6	0.0
New Zealand	-0.4	-1.2	-0.7
Norway	0.2	1.2	0.6
Poland	-9.2	-3.7	-5.6
Portugal	-0.6	-4.3	-2.3
Slovak Republic	-6.3	-3.8	-5.2
Slovenia	..	-1.1	..
Spain	0.2	1.4	0.7
Sweden	-4.3	0.1	-2.3
Switzerland	3.6	1.2	2.2
Turkey	..	..	..
United Kingdom	..	1.2	..
United States	1.1	-6.6	-1.8
OECD-23	**-2.3**	**-0.9**	**-1.6**

Note: Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: *OECD Health Data 2011*, http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC.

64. The pattern of age-specific rates of appendectomy is virtually the same for both sexes as shown in Figures 7.2 and 7.3 that plot the highest, lowest and average rates. Appendectomy rates increase since birth to reach a peak in the 10 - 19 age band. In most countries, the peak for women occurs later than for men. Germany has the highest rates for both sexes between 10 and 19. The German rate for women at age 15-19 is 1.5 times higher than for German men. In comparison with the United States that has the lowest rate in that age band, the German rate is 4.7 times higher. German appendectomy rates are known to be particularly high since the 1970s (Lichtner and Pflanz, 1971).

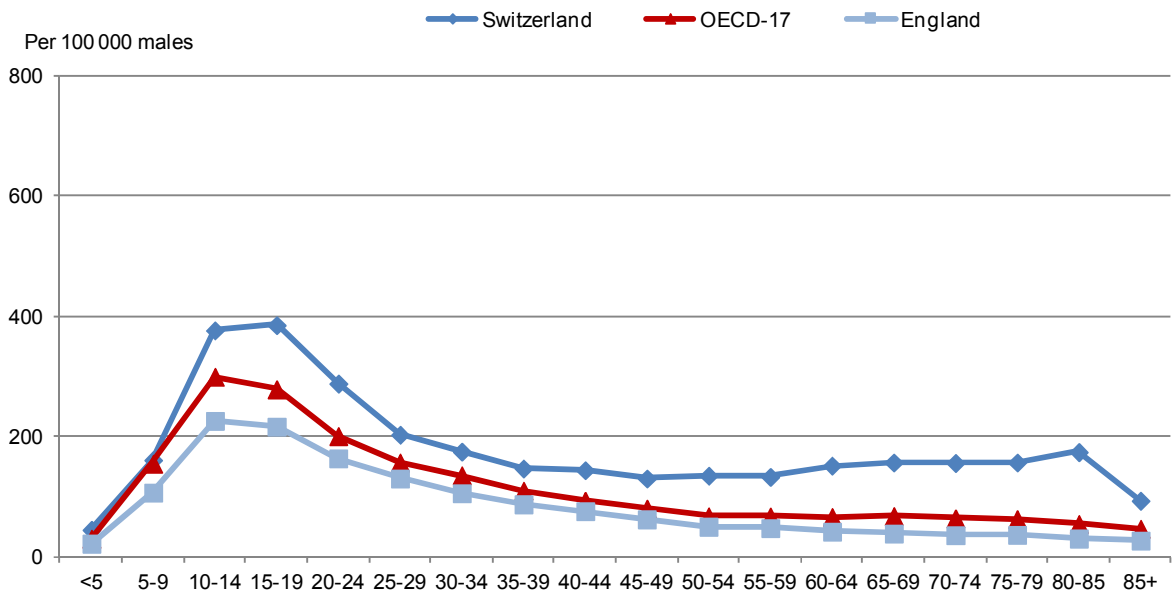
Figure 7.2. Age-specific rates of appendectomy per 100 000 females, 2008 or latest year available



Note: Data for Canada refer to 2004/05.

Source: National datasets (see Appendix 2).

Figure 7.3. Age-specific rates of appendectomy per 100 000 males, 2008 or latest year available

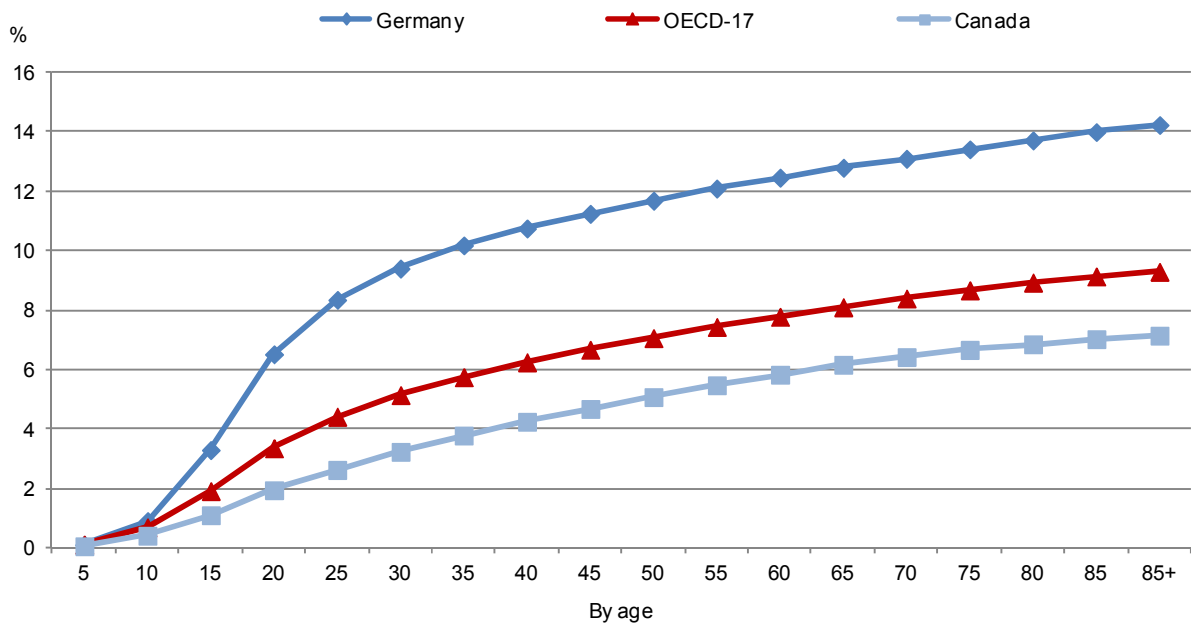


Source: National datasets (see Appendix 2).

65. These age-specific rates of appendectomy lead to the following lifetime risk for the procedure by country (Figures 7.4 and 7.5). Trends are similar for both sexes: all countries show a steep increase in risk until age 15-19. Later in a person's lifetime, the risk continues increasing but at a much slower rate. For men, countries with higher cumulative risk for appendectomy are Switzerland, Germany and France. At the

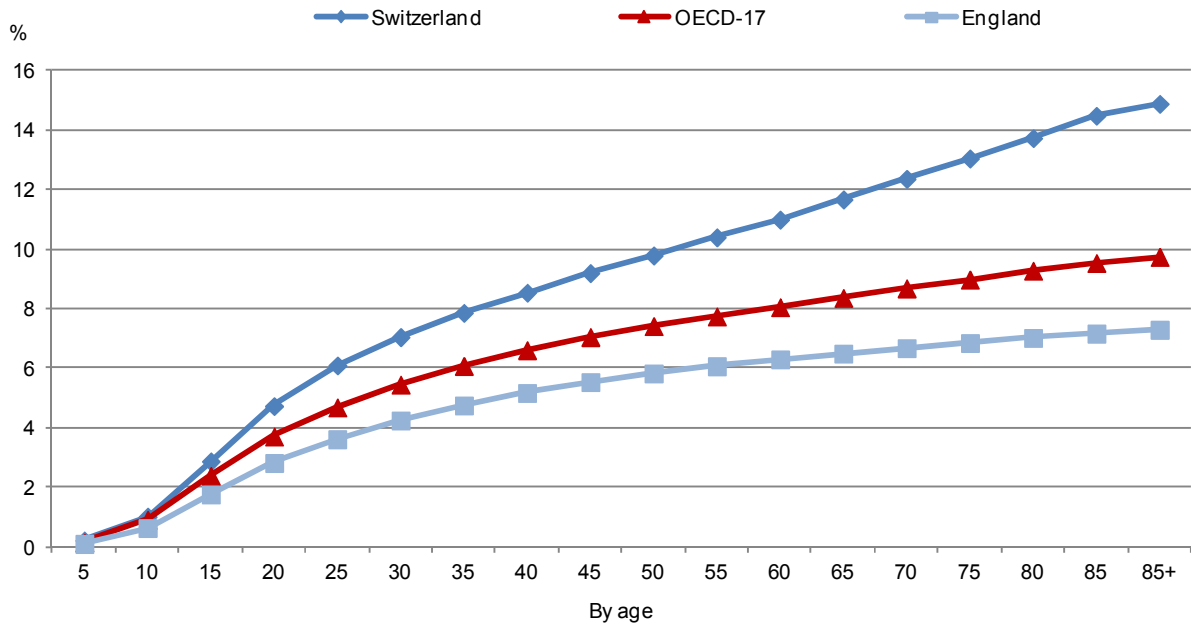
lower end of the spectrum are Scotland, Wales and Canada. For the female population, at the peak age group, the ratio between the German cumulative risk and that of Scotland is 2.6; for the male population, at the peak age group the ratio between the Swiss cumulative risk and that for Scotland is 2.3.

Figure 7.4. Cumulative risk of appendectomy, by age, female population, 2008 or latest year available



Source: National datasets (see Appendix 2).

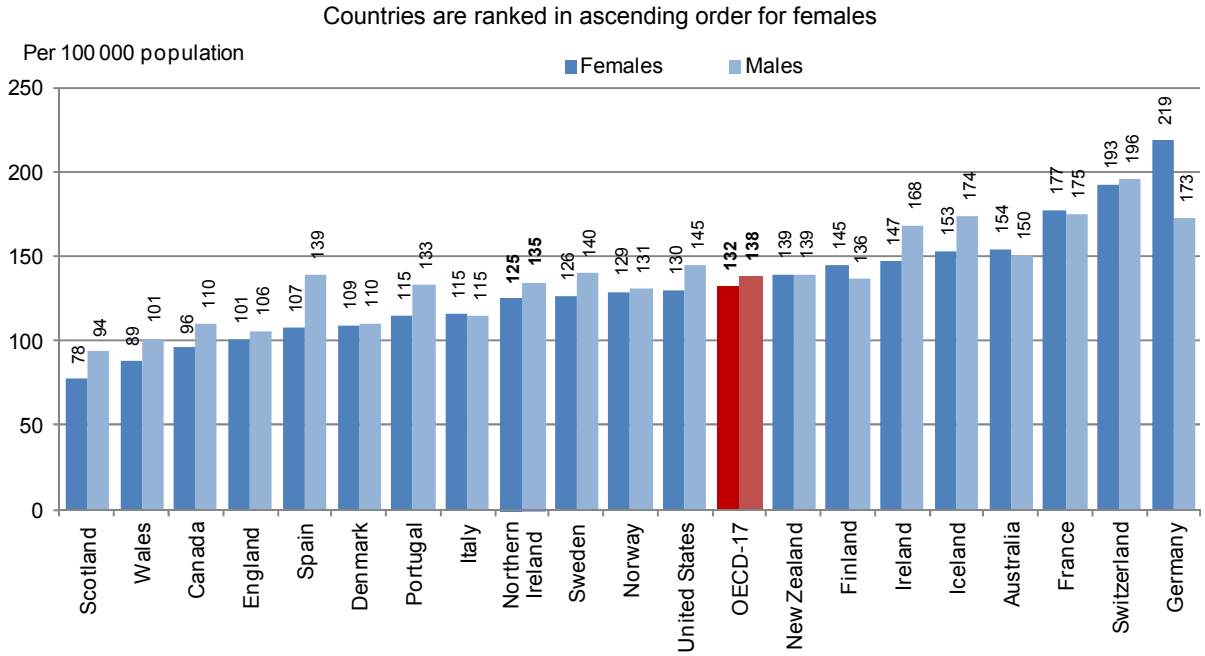
Figure 7.5. Cumulative risk of appendectomy, by age, male population, 2008 or latest year available



Source: National datasets (see Appendix 2).

66. Age-standardised rates are shown in Figure 7.6. Germany and Switzerland have the highest rates while the United Kingdom (except Northern Ireland) and Canada have the lowest rates.

Figure 7.6. Age-standardised rates of appendectomy per 100 000 population, 2008 or latest year available



Note: Data for Canada refer to 2004/05; data for the United States refer to 2004.
Source: National datasets (see Appendix 2).

67. Most OECD countries experienced a decrease in rates of appendectomy between 2000 and 2009. Such trends might be explained in part by technological diffusion that allows physicians to rule out false positive cases of an inflamed appendix with more precision, in particular for women.

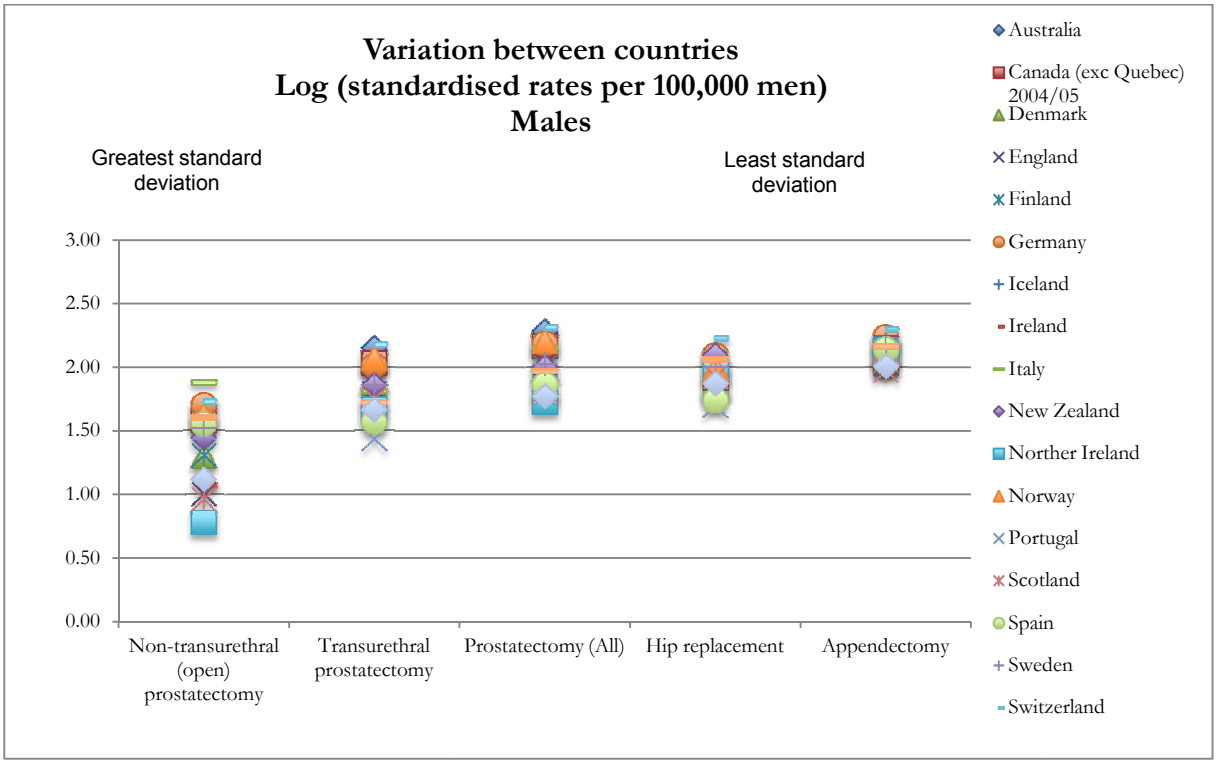
68. It seems that the variation for appendectomy between countries represents, rather like hip replacement, an increasingly coherent response to recognised symptoms of an inflamed appendix in virtually all the countries studied, perhaps with the only exception of German female rates - possibly explained by persisting cultural determinants (Lichtner and Pflanz, 1971). The scale of variation observed is consistent with plausible differences in the incidence of this condition in each population, but clearly there is room for considerable national variation in diagnostic reliability as well. Appendectomy has the lowest variation among all the procedures analysed; similarly to previous unpublished work by Scott *et al.* (2008), this paper suggests countries rate convergence.

8. EXTENT OF VARIATION BETWEEN PROCEDURES

69. The extent of variation across countries for the five procedures studied differs. In Figures 8.1 and 8.2, procedures are displayed left to right from that which exhibits the greatest level of variation across countries to that which exhibits the lowest. The procedure with the largest vertical distance reflects the largest variation across countries.

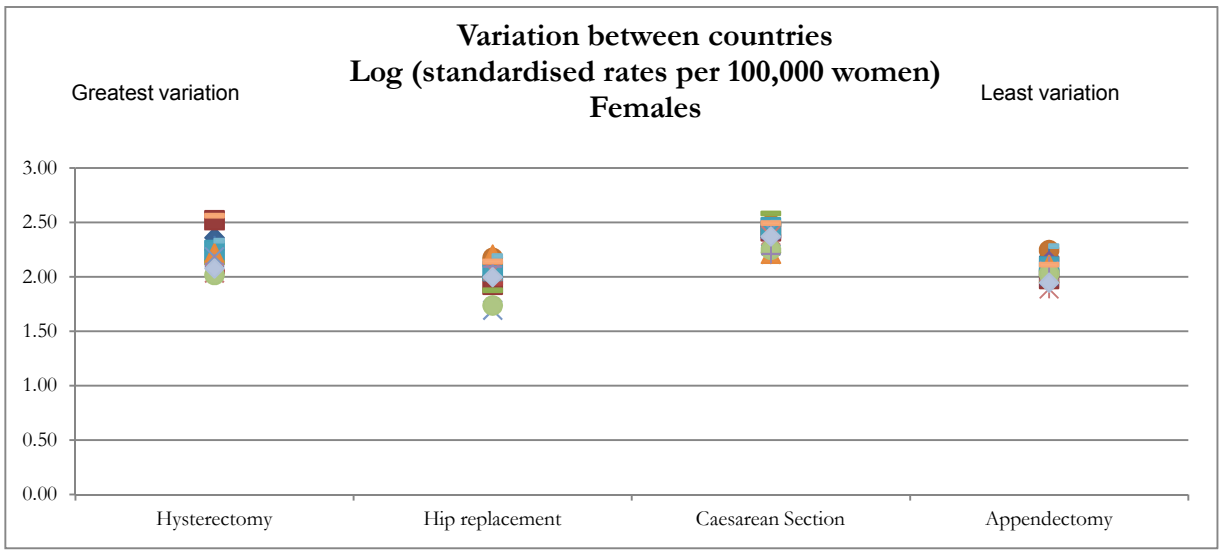
70. Rates were scaled to show their multiplicative relationship, i.e. how many times higher the rate is in one country compared with another. While the random component of this variation in small area analyses should be accommodated (McPherson *et al.*, 1982), the random component of variation in these data is minimal. Accordingly, Figures 8.1 and 8.2 plot the logarithm of the age-standardised rates. This enables the multiplicative variation of procedures across countries to be compared between procedures without reference to intrinsic population rates, where higher rates will be logically associated with high absolute variation. These figures demonstrate on a logarithmic scale the standardised rates for each county and hence the amount of variation between countries irrespective of the magnitude of the prevailing rates. Thus for men, open prostatectomy show the most-across country variation and appendectomy the least. For women, hysterectomy is the most variable and appendectomy the least, but in fact all nowadays exhibit quite similar variation between countries, once standardised.

Figure 8.1. Variation between countries, Log (standardised rates per 100 000 men), Males



Source: National Datasets (See Appendix 2)

Figure 8.2. Variation between countries, Log (standardised rates per 100 000 women; with exception for Caesarean section standardised per 1 000 live births), Females



Source: National Datasets (See Appendix 2)

Table 8.1. Rank of standard deviations of log rates by sex

Rank of standard deviations of log rates by sex	Female procedures	Male procedures
Non-transurethral (open) prostatectomy		0.33
Transurethral prostatectomy		0.19
Prostatectomy (both)		0.18
Hysterectomy	0.14	
Hip replacement	0.13	0.14
Caesarean	0.11	
Appendectomy	0.10	0.09

Source: Authors' calculations from National Datasets (See Appendix 2)

71. The standard deviation of the logarithm of the rates for each procedure was calculated to rank the procedures and summarise the variation level for each one. Procedures with large standard deviations reflect high intrinsic variation of a procedure across countries. For example, the standard deviation for non-transurethral prostatectomy is 3.8 times higher than the one for male appendectomy rates. Table 8.1 shows that the prostatectomy procedures show the greatest variation followed by hysterectomy. As explained earlier in this paper, there are more and more treatment alternatives for these two procedures (i.e. prostatectomy and hysterectomy) and indications for their utilisation vary substantially between countries. This is coupled with their potential to be used as a prophylactic, but medical opinion varies substantially from country to country. Caesarean rates are an interesting case. In some countries much of the variation is governed by electives as previously described, in some others, by emergency cases. The lower level of variation, combined with rising rates, may be a strong signal of a widespread trend among women and physicians to favour this procedure. Hip replacement exhibits similar levels of variation as per hysterectomy. Appendectomy, however, displays the least variation between countries by sex and indicates a tendency for convergence.

9. FACTORS INFLUENCING VARIATION

72. The analyses presented in this paper show often quite large international variation in the frequency with which a particular surgical intervention is conducted. There are also differences in trends over time. For some procedures (i.e. caesarean section, hip replacement and appendectomy), every country showed similar trends, whereas for other procedures (hysterectomy and prostatectomy) there is a more mixed picture. Whilst there are many differences between countries, it is also important to note that the 'shape' of intervention rates by sex and age is very similar between countries, albeit often at different levels, which would be consistent with disease patterns by age and sex but differences in the probability of surgical intervention. The exception is for caesarean sections, whose age-specific rates present two distinct patterns; such patterns presumably reflect differences in obstetric policies and culture.

73. These analyses should be interpreted in the light of the known difficulties of comparing health care in different countries. Most previous research on variations in surgical procedures has compared neighbouring hospital service areas within the same country, where the methodological considerations are quite different. They tend to represent differences in individual clinical enthusiasms or uncertainties or aspects of the local supply of facilities or manpower (de Jong, 2008). International comparisons invoke these determinants too, but much else besides. For this reason, identifying dominant causes is much more complex because of high levels of confounding between competing explanations, such as payment systems, implicit rationing, and culturally patterned expectations. The analyses presented here illustrate the combination of these diverse influences in different countries. However, while noting the many limitations, these analyses should provide a basis for discussion, not least on how to ensure greater data comparability.

74. It is hard to identify overall trends but it would appear that, of the countries for which age-standardised rates are available, Germany, Switzerland, and Australia tend to have higher rates; while the United Kingdom, Portugal and Spain tend to have the lowest. It is important to consider the reasons behind such variation. Seven possible factors were identified, as outlined below.

75. Artefactual reasons: as discussed in the methods section, different coding systems mean that, for some procedures, it has been difficult to ensure that like is being compared with like. Additionally, the accuracy and consistency of coding at the individual patient level is likely to vary. These effects are difficult to quantify and in general impossible to accommodate in any comparison. It is also important to bear in mind the nature of some interventions, particularly those where an organ is removed (i.e. prostatectomy, hysterectomy and appendectomy), may mean that a high rate in previous years may lead to low levels now because the population at risk of that procedure has been diminished.

76. Random variation: there is always a random element to the occurrence of rare events across time or space, though examination of trends in national rates over time should minimise this. These data are from national sources and hence include very large numbers of procedures. It can be seen from the time trends that stability from year to year hardly fluctuates at all, except in some smaller countries such as Switzerland and Iceland.

77. Clinical needs differences: there may be real differences in levels of morbidity from a particular condition for which surgery is thought to be appropriate – either due to genetic or environmental / lifestyle factors. For conditions where there may be a strong genetic factor in individuals' susceptibility, the homogeneity or diversity of a country's' gene pool is likely to be an important factor. For example, Iceland

is well known for its relatively closed genetic pool and genetic factors may be a more significant explanatory factor there than in other countries such as the United States where the gene pool is far more heterogeneous. Environmental factors such as diet and levels of exercise are also likely to play a role in explaining some of the variation in morbidity levels. However differences in underlying disease rates are rarely an important unambiguous explanation for observed differences in surgical rates. However, it is clear that a tenfold variation in surgical rates can rarely be explained by differences, however caused, in intrinsic morbidity.

78. Tradition and culture: countries will vary in the extent that some surgical interventions are what patients and/or doctors expect or prefer given particular symptoms. Different approaches to medical training are likely to be very important in explaining some of the variation as are patients' expectations that surgery is or is not an acceptable solution to given symptoms. For example, in *Medicine and culture*, Payer (1996) describes British doctors as the ones with the most conservative attitude, the ones who do "less of everything". The analysis presented in this volume reflects this attitude that the author links to the following British features: the value of evidence-based action, the careful attitude toward interpreting research, a strong sense of rationing and the concept of societal health over individual'. On the contrary, Payer described the United States medical attitude as "aggressive and invasive" (Payer, 1996) and this is certainly reflected in some of the procedures presented here.

79. Supply: Resource availability impacts on the likelihood that certain procedures will be conducted. Rationing of some sort exists in every health system and probably varies significantly between countries. The structure of the healthcare system is also likely to be important and, in particular, the payment system, which may create incentives to operate (fee per procedure for surgeon) or wider incentives not to operate (limited health budgets).

80. The following health system characteristics are expected to influence the type and level of care provided:

- The referral system may be important. Countries with primary care gate-keeping may lead to lower rates than where there is direct access to specialists. The distribution of specialists may also have an impact on surgical rates; patients may be more likely to seek treatment if they can consult with a specialist close to home.

- A thorough control on health care providers' activity through incentives or obligations to comply with treatment guidelines or practice protocols may lead to a more appropriate level of care.

- The payment methods of hospitals and/or surgeons may create an incentive structure to carry out more or less procedures. If the hospital or the surgeon is paid on the basis of the number of procedures carried out for example, rates for procedures are likely to be higher.

81. Demand: patients may be discouraged from seeking treatment if they suspect they will have to wait a long time. Alternatively, where supply is plentiful and insurance relatively unconstrained, then surgery can be used more commonly.

82. This study looked at different interventions and it is very unlikely that a single factor can explain the variation between countries, especially given the considerable limitations of the underlying data. At best, all that can be said is that it is probable that there are different reasons behind the observed rates for different types of procedure.

10. CONCLUSION: WHAT IS THE APPROPRIATE RATE?

83. Which rate is 'appropriate' is a common but misconstrued question. Clearly, a high rate of a particular procedure is not necessarily better, in part because it does not guarantee that those patients who will benefit do receive the treatment, nor that those who will not do not. The correct rate must rely on knowledge of clinical interventions' outcomes given symptoms, both for surgery and its avoidance, which is lacking in many instances. The benefits of surgery are in general often both obvious and yet poorly understood at the margin. Exactly the same applies to the costs and risks; some costs are obvious while other costs and risks remain unexplored for important groups of patients who presumably would receive surgery in one country but not in another. The uncertainty exists at the margin, however large the margin of real uncertainty may be. It also may depend crucially on exogenous factors associated with delivery of surgical services and these may vary systematically by country. It is argued persuasively that a less acceptable reason for interventions can systematically exploit these uncertainties (Deyo and Patrick, 2005).

84. The data presented here provide contemporary assessments of the size of the clinical margins of uncertainty for the procedures studied. These may also in part be a consequence of varying legal constraints, methods of payment, availability of cover and patient preferences. They therefore provide basic evidence for research priorities in an increasingly evidence-based medicine paradigm. The only way to make proper judgements on the optimal level for a particular procedure is to have national longitudinal data linking individuals' treatment (and deliberate withholding of treatment) to outcomes. Such data do not exist in most countries. This is a critical deficiency in health service delivery, which means current policy on which procedures to fund, for whom, is formulated in circumstances based more upon local custom and scientific tradition than empirical effectiveness data.

85. Another important deficiency that this work has highlighted is uncertainty about the data quality from individual countries and comparability between different coding systems. We would urge countries to assess the accuracy of their data and international bodies to consider whether it is feasible to encourage countries to use a more standard method of coding medical and surgical procedures, or at a minimum having a standard method of conversion between them. Such steps will enable more accurate future assessments of international variations.

86. Summarising the variation in rates for a number of procedures is a necessary first step in getting information on the extent of international variation more widely into the public domain and scrutiny. It is hoped that this work will act as a catalyst and enable patients and researchers to further question the reasons behind the rates in their country and what they might mean for them. Routine and periodic publication of surgical rates across countries will serve to enhance understanding of need and appropriateness and enable greater benefit from new technology that works.

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APPENDIX 1 CODING INFORMATION

Table A1.1 Coding systems and code procedures for countries

Procedures	Coding system							
	Nomesco	**OPSC** (data below 5 not coded as <5 that was changed to 4 for the purpose of the calculations in this volume)		**CHOP**	**ICD-9-CM**	**ICD-10-AM**	**CCAM**	**OPS**	**ICD-10-CA / CCI**
	Denmark, Finland, Iceland, Norway, Sweden	England, Northern Ireland, Scotland	Wales	Switzerland	Italy, Portugal, Spain, France, the United States	Australia, New Zealand, Ireland	France	Germany	Canada
Caesarean section	MCA00, MCA10, MCA20, MCA30, MCA33, MCA96	R17, R18	R17, R19	74.0, 74.1, 74.2, 74.4, 74.99	74.0, 74.1, 74.2, 74.4, 74.99	1340	JQGA002; JQGA003, JQGA004, JQGA005	5-740; 5-741; 5-745; 5-749.1	1.RM.87.DA-GX, 1.RM.87.BA-GX, 1.RM.87.CA-GX, 1.RM.87.LA-GX, 1.RM.89.^^, 1.RM.91.^^, 5.MD.60.RC, 5.MD.60.RD, 5.MD.60.KE, 5.MD.60.CB, 5.CA.89.GB, 5.CA.89.WJ, 5.CA.89.CK
Hysterectomy	LCC00-01, LCC05, LCC10-11, LCC20, LCC96-97, LCD00-01, LCD04, LCD10-11, LCD30-31, LCD40, LCD96-97	Q07 and Q08	Q07m Q08 with Y508, Q08 & Y752	68.3, 68.4, 68.5, 68.6, 68.7, 68.8, 68.9	68.3, 68.4, 68.5, 68.6, 68.7, 68.8, 68.9	1268-1269	JKFA001, JKFA002, JKFA003, JKFA004, JKFA005, JKFA006, JKFA007, JKFA012, JKFA013, JKFA014, JKFA015, JKFA018, JKFA020, JKFA021, JKFA023, JKFA024, JKFA025, JKFA026, JKFA027, JKFA028, JKFA029, JKFA032, JKFC002, JKFC003, JKFC005, JKFC006, JFFA001, JFFA002, JFFA003, JFFA004, JFFA005, JFFA008, JFFA009, JFFA011, JFFA013, JFFA016, JFFA018, JFFA019, JFFA022		5.MD.60.^^

Table A1.1 Coding systems and code procedures for countries (cont.)

Procedures	Coding system								
	Nomesco	**OPSC** (data below 5 not coded as <5 that was changed to 4 for the purpose of the calculations in this volume)		**CHOP**	**ICD-9-CM**	**ICD-10-AM**	**CCAM**	**OPS**	**ICD-10-CA / CCI**
	Denmark, Finland, Iceland, Norway, Sweden	England, Northern Ireland, Scotland	Wales	Switzerland	Italy, Portugal, Spain, France, the United States	Australia, New Zealand, Ireland	France	Germany	Canada
Hip replacement	NFB00-03, NFB09-13, NFB19-20, NFB30, NFB40, NFB59, NFB62, NFB99, NFC00-03, NFC09-13, NFC19-23, NFC29-33, NFC39-43, NFC40, NFC49, NFC59, NFC90-93, NFC99	W37, 38, 39, 46, 47, 48 (for Northern Ireland also W93-W95)	W37-W39, W93-W95, W46-W48	00.7.-, 81.51, 81.52, 81.53	00.7 (only where it has already been introduced as part of a newer ICD-9 version) 8.51-53	1489 & 1492	NEKA001, NEKA002, NEKA003, NEKA004, NEKA005, NEKA006, NEKA007, NEKA008, NEKA009, NEKA010, NEKA011, NEKA012, NEKA013, NEKA014, NEKA015, NEKA016, NEKA017, NEKA018, NEKA019, NEKA020, NEKA021, NEKA022, NELA001, NELA002, NEMA011	5-820, 5-821.1 up to 5-821.6, .f, .g	1.VA.53.^^, 1.SQ.53^^
Appendectomy	JEA00-01, JEA10	H011, H012, H013, H018, H019, H021, H022, H023, H024, H028, H029	H011, H012, H013, H018, H019, H021, H022, H023, H024, H028, H030	47.01, 47.09, 47.11, 47.19	47.01, 47.09, 47.11, 47.19	926	HHFA001, HHFA011, HHFA016, HHFA020, HHFA025	5-470	1.NV.89.^^ without STATUS ATTRIBUTE = B
Prostatectomy									
Transurethral Prostatectomy	KED22, KED52, KED62, KED72, KED98	M65	M65, M67	60.21, 60.29	60.2	1167 (Ireland also 1166)	JGFA014, JGFA015, JGFE001, JGFE002, JGND001, JGND002, JGND003, JGNE003, JGNJ001, JGNJ900	5-601	1.QT.59.BA-AD, 1.QT.59.BA-GX, 1.QT.59.BA-AG, 1.QT.59.BA-CG, 1.QT.59.BA-AW, 1.QT.59.BA-AZ
Open(non-transurethral) Prostatectomy	KEC00-01, KEC10, KEC20, KED00, KED96	M61	M61	60.3, 60.4, 60.5, 60.6	60.3, 60.4, 60.5, 60.6	1165	JGFA005, JGFA009	5-603, 5-604	1.QT.59.HA-AD, 1.QT.59.HA-CG 1.QT.91.^^

APPENDIX 2 SOURCES OF INFORMATION

Table A2.1 Sources of Information

Country	Procedure data sources and year	Population source and year	Procedure coding system
Australia	National Hospital Morbidity Database, http://www.aihw.gov.au/procedures-data-cubes/#ICD10 Up to 2007-2008 data (5th edition)	Australian Bureau of Statistics, 2008	ICD-10-AM fifth edition
Canada	DAD (Discharge Abstract Database) 2004-5 and NACRS (National Ambulatory Care Reporting System) 2004-5 Provided by Canadian Institute for Health Information	Statistics Canada, July 2004 population estimates for Canada excluding Quebec	ICD-10-CA / CCI
Denmark	NOMESCO (Nordic Medico-Statistic Committee) 2008	Eurostat, 2008	NOMESCO Classification of Surgical Procedures (NCSP) Version 1.14
England	NHS England. Hospital Episode Statistics, 2007-8	Office for National Statistics, mid-2008 population	OPCS4
Finland	NOMESCO (Nordic Medico-Statistic Committee) 2008	Eurostat, 2008	NOMESCO Classification of Surgical Procedures (NCSP) Version 1.14
France	Ministère du travail, de l'emploi et de la santé - DREES, BESP Base PMSI-MCO 2008	Eurostat, 2008	ICD-9-CM, 1996 version
Germany	Federal Statistical Office, DRG-statistics, 2008	Eurostat, 2008	Amtlicher Operationen- und Prozedurenschlüssel - OPS -
Iceland	NOMESCO (Nordic Medico-Statistic Committee) 2008	Eurostat, 2008	NOMESCO Classification of Surgical Procedures (NCSP) Version 1.14
Ireland	The Information Unit, Department of Health, and is based on Hospital Inpatient Enquiry (HIPE) data, 2008	Eurostat, 2008	ICD-10-AM fourth version
Italy	Ministero della Salute Dipartimento della Qualità Direzione Generale della Programmazione, dei Livelli essenziali di assistenza e dei Principi etici di Sistema Ufficio VI, 2008	Eurostat, 2008	ICD-9-CM 2002 version
New Zealand	National Minimum Dataset, publicly funded care 2007/2008, privately funded care 2008	Statistics New Zealand, 2008 population	ICD-10-AM third edition
Northern Ireland	Hospital Inpatient System	General Register Office Mid-Year Estimates, 2008	OPSC
Norway	NOMESCO (Nordic Medico-Statistic Committee) 2008	Eurostat, 2008	NOMESCO Classification of Surgical Procedures (NCSP) Version 1.14
Portugal	Administração Central do Sistema de Saúde, 2008	Eurostat, 2008	ICD-9-CM version 2008
Scotland	NHS Scotland. Scottish Morbidity Record (SMR01 for acute NHS hospital discharges, SMR02 for maternity hospital discharges), 2007-8	Office for National Statistics, mid-2008 population	OPSC
Spain	Ministerio de Sanidad, Política Social e Igualdad. Instituto de Información Sanitaria. Registro de altas – CMBD, 2008	Eurostat, 2008	ICD-9-CM version 2008
Sweden	NOMESCO (Nordic Medico-Statistic Committee) 2008	Eurostat, 2008	NOMESCO Classification of Surgical Procedures (NCSP) Version 1.14
Switzerland	Medizinische Statistik der Krankenhäuser, 2008	Eurostat, 2008	CHOP
United States	National Hospital Discharge Survey, 2004	United States Bureau of Census, mid-2004 civilian population	ICD-9-CM
Wales	NHS Wales Informatics Service Information & Statistics, 2007-2008	Statistical Directorate, Welsh Assembly Government, Mid 2008 Population Estimates	OPSC

APPENDIX 3 DATA LIMITATIONS

Definitions and accuracy of coding

In the 17 countries providing more detailed data seven different systems are used to code surgical procedures (see Appendix 2). Creating comparable definitions is difficult: different words are often used to describe the same procedure and the structure of the coding systems vary, meaning it is not always possible to identify the same specific procedures. Although the OECD data are coded to ICD-9-CM, and definitions appear robust, of course in reality the 34 OECD countries have had to translate their own coding systems into ICD-9-CM and one would expect some difference in interpretation of particular definitions between countries.

Accuracy of coding

The robustness of data capture and coding varies from country to country. For example in some cases, caesarean deliveries were found for the 5-9 age group. Figures have not been adjusted to reflect these inadequacies. The data are only as good as the accuracy of the coding, and this is unknown, though one could hypothesise that it may be likely to be more accurate in countries like the United States where there is a direct link between the type of procedure conducted and an individual physician's payment than in countries where coding accuracy has little direct benefit to those conducting the procedure.

All procedures/main procedure

For most patients and procedures only a single surgical intervention will be conducted per episode of care. However different countries take a different approach to counting those cases where multiple procedures are conducted. In the United Kingdom only the main procedure is ever recorded. In New Zealand and Australia all procedures are. The work conducted by the OECD on the matter will ensure this limitation to be at least largely overcome in the future.

Ambulatory clinics

Only procedures conducted in hospitals are included, ambulatory settings are excluded. In some countries increasing use is made of the ambulatory sector and this may affect data completeness.

Sample versus full counts

The United States data used by the OECD come from the National Hospital Discharge Survey. This collects data from 270 000 inpatient records acquired from a national sample of about 500 hospitals. Caution is needed when looking at detailed age/sex breakdowns for some of the rarer procedures as small numbers will have a large sampling error. Data for other countries are based on full counts.

Exclusion of some private care

Privately funded episodes of care conducted outside NHS hospitals are not included in the United Kingdom datasets. Williams *et al.* (2000) estimate that in 1997-98, 13.4% of surgical patients in England

and Wales had private funding, though no estimate is made for what proportion of these were treated outside NHS hospitals. No similar estimates have been found for Scotland but it is thought to have lower levels of private treatment than England. The data have not been adjusted to reflect these estimates so it is likely that the United Kingdom figures throughout this work underestimate the total rates of procedures conducted, with the extent of the undercount likely to vary by procedure. Similarly, Portugal, Spain, and Ireland do not record episodes in private hospitals. On average, probably 10% of the episodes occur in such settings; again, adjustments were not carried out to reflect these estimates.

APPENDIX 4 WORLD-AGE-STANDARDISED RATES-SUMMARY

Table A4.1 Age-standardised rates of procedures for the set of countries/regions studies

Procedure	Australia	Canada (exc Quebec) 2004/05	Denmark	England	Finland	France	Germany	Iceland	Ireland	Italy
Caesarean section	291	264	205	229	162	197	305	161	236	385
Hysterectomy	230	333	171	149	174	168		197	112	137
Transurethral Prostatectomy	141	108	77	62	81	111	103	71	46	65
Open Prostatectomy	49	38	20	10	20	17	50	35	12	76
Prostatectomy Both (Transurethral + Open)	190	146	97	72	101	128	153	106	57	141
Hip replacement Females	102	85	119	112	122	116	150	140	89	76
Hip replacement Males	95	69	97	77	112	116	124	109	92	61
Appendectomy Females	154	96	109	101	145	177	219	153	147	115
Appendectomy Males	150	110	110	106	136	175	173	174	168	115
	New Zealand	Northern Ireland	Norway	Portugal	Scotland	Spain	Sweden	Switzerland	United States 2004	Wales
Caesarean section	232	287	164	274	241	178	163	316	313	236
Hysterectomy	178	177	166	154	109	105	133	216	366	120
Transurethral Prostatectomy	72	47	118	27	56	37	72	151	53	46
Open Prostatectomy	28	6	42	33	9	36	33	54	40	13
Prostatectomy Both (Transurethral + Open)	100	53	159	60	65	73	105	205	93	59
Hip replacement Females	127	114	161	50	114	55	125	156	139	100
Hip replacement Males	124	95	98	50	84	55	100	167	115	74
Appendectomy Females	139	125	129	115	78	107	126	193	130	89
Appendectomy Males	139	135	131	133	94	139	140	196	145	101

APPENDIX 5 AGE-SPECIFIC RATES

Table A5.1 Age-specific rates of caesarean sections per 1 000 live births, 2008 or latest year available

	<20	20-24	25-29	30-34	35-39	40+	
						40-44[1]	45-49[1]
Australia	166	212	265	326	379	433	
Canada[2]	170	200	240	290	340	400	450
Denmark	164	181	203	208	233	253	
Finland	159	138	150	166	193	198	
France	192	183	186	195	224	255	
Germany	337	295	294	298	326	325	
Iceland	114	152	139	164	201	242	
Ireland	190	189	226	257	276	276	
Italy	469	375	386	373	379	399	
New Zealand	135	156	201	266	314	386	
Norway	115	126	147	170	214	286	
Portugal	262	265	286	268	273	298	
Spain	177	176	195	170	164	198	
Sweden	129	126	151	178	198	237	
Switzerland	305	289	293	324	362	390	
United Kingdom							
- England	136	166	204	259	303	349	
- Northern Ireland	172	212	260	329	366	392	
- Scotland	136	179	211	269	327	370	
- Wales	169	172	207	268	308	331	
United States[3]	210	260	300	330	380	440	790
OECD-17	**195**	**203**	**227**	**255**	**288**	**323**	

1. For Canada and the United States, the last two age groups refer to 40-44 and 45-49. For the other countries, the last age group includes population aged 40 and over. 2. Data for Canada refer to 2004/05. 3. Data for the United States refer to 2004.

Table A5.2 Age-specific rates of hysterectomy per 100 000 females, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	1	4	34	147	381	701	869	603	388	366	396	344	303	194	84
Canada[1]	0	0	1	6	35	170	412	744	1018	1019	662	481	441	429	386	321	199	78
Denmark	0	0	1	1	3	23	103	248	529	698	443	260	256	284	285	239	194	95
Finland	0	0	0	2	3	12	65	206	555	792	496	294	244	274	265	225	137	65
France	0	0	0	1	2	7	29	148	493	760	523	280	299	331	338	305	222	103
Iceland	0	0	0	0	0	0	121	369	717	808	547	355	206	179	220	71	94	35
Ireland	0	0	0	1	1	7	29	113	269	382	342	270	325	298	212	195	82	22
Italy	0	0	0	1	2	7	19	79	313	624	469	286	307	317	301	218	116	41
New Zealand	0	0	0	0	7	35	124	313	551	650	439	284	283	301	272	214	142	56
Norway	0	0	0	1	7	20	82	234	510	693	447	242	279	301	253	227	165	86
Portugal	0	0	1	1	2	10	35	136	414	707	526	296	272	265	245	230	131	61
Spain	0	0	0	1	3	9	26	90	280	400	274	216	245	265	278	239	130	42
Sweden	0	0	0	2	6	21	51	164	372	510	373	223	243	291	280	233	190	74
Switzerland	0	0	0	0	4	16	89	325	690	874	573	358	333	373	356	342	246	110
United Kingdom																		
- England	0	0	0	1	3	22	89	243	440	503	340	292	298	302	293	229	149	65
- Northern Ireland	0	0	0	6	6	18	117	274	470	572	425	378	417	389	318	283	170	72
- Scotland	0	0	0	3	2	18	71	193	361	404	247	186	159	167	178	130	93	44
- Wales	0	0	0	0	1	26	83	232	404	432	270	181	194	170	172	143	105	30
United States[2]	0	0	0	1	55	249	562	829	1185	1115	699	377	346	378	356	287	192	113
OECD-16	**0**	**0**	**0**	**1**	**8**	**37**	**119**	**280**	**541**	**674**	**458**	**297**	**290**	**301**	**282**	**233**	**155**	**67**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.3 Age-specific rates of transurethral prostatectomy per 100 000 males, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	0	0	0	0	0	4	16	68	231	502	916	1286	1683	1756	1525
Canada[1]	0	0	0	0	0	0	1	1	3	10	48	151	359	661	997	1329	1510	1409
Denmark	0	0	0	0	0	0	0	2	3	15	43	112	307	486	725	914	901	652
Finland	0	0	0	0	0	1	1	1	1	11	43	111	287	499	777	871	1122	1022
France	0	0	0	0	0	0	1	2	4	19	76	210	456	725	961	1181	1221	1137
Germany	0	0	0	0	0	0	1	2	5	19	60	169	399	670	967	1155	1219	856
Iceland	0	0	0	0	0	0	0	0	0	9	9	78	282	474	632	819	1213	684
Ireland	0	0	0	0	0	0	0	1	5	4	19	62	169	273	464	542	583	527
Italy	0	0	0	0	0	0	1	2	7	20	62	165	328	484	573	550	389	200
New Zealand	0	0	0	0	0	0	0	1	3	8	38	118	248	423	679	884	947	786
Norway	0	0	0	1	1	0	1	1	3	8	51	148	417	815	1099	1393	1547	1270
Portugal	0	0	0	0	0	0	1	0	4	7	20	57	119	182	238	279	261	171
Spain	0	0	0	0	0	0	0	1	2	7	28	82	173	251	331	386	317	184
Sweden	0	0	0	1	0	0	1	1	1	6	29	107	255	437	696	915	991	663
Switzerland	0	0	0	0	0	0	1	4	5	26	95	298	643	1031	1293	1565	1653	1353
United Kingdom																		
- England	0	0	0	0	0	0	0	0	2	8	34	106	229	402	583	736	747	524
- Northern Ireland	0	0	0	0	0	0	0	6	6	7	21	69	156	284	417	498	736	534
- Scotland	0	0	0	0	0	0	0	2	2	10	29	98	193	379	496	683	695	528
- Wales	0	0	0	0	0	1	0	0	1	3	24	71	179	321	423	540	510	444
United States[2]	0	0	0	0	3	0	0	0	1	6	37	60	145	299	589	583	797	670
OECD-17	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**11**	**42**	**125**	**292**	**500**	**711**	**875**	**956**	**757**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.4 Age-specific rates of open (non-transurethral) prostatectomy per 100 000 males, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	0	0	0	0	1	6	30	95	231	343	423	211	81	29	13
Canada[1]	0	0	0	0	0	0	0	0	4	19	71	171	265	338	160	46	28	24
Denmark	0	0	0	0	0	0	0	1	0	8	20	64	157	211	138	12	7	19
Finland	0	0	0	0	0	0	1	0	2	11	40	101	150	165	67	26	18	16
France	0	0	0	0	0	0	0	0	0	1	6	26	80	128	169	174	137	94
Germany	0	0	0	0	0	0	0	0	2	14	55	154	318	465	444	189	95	44
Iceland	0	0	0	0	0	0	0	0	0	9	47	167	226	247	340	55	43	0
Ireland	0	0	0	0	0	0	0	0	1	10	29	67	90	85	17	10	12	12
Italy	0	0	0	0	0	0	2	5	17	43	115	238	422	607	595	356	203	87
New Zealand	0	0	0	0	0	0	0	1	3	11	35	100	169	259	204	85	52	39
Norway	0	0	0	0	0	1	1	1	3	11	51	150	315	416	239	60	61	35
Portugal	0	0	0	0	0	0	0	0	2	11	28	82	207	297	254	179	125	68
Spain	0	0	0	0	0	0	0	0	1	8	35	109	236	328	262	181	111	44
Sweden	0	0	0	0	0	0	0	0	2	13	50	131	244	325	176	33	24	19
Switzerland	0	0	0	0	0	0	0	0	2	12	69	184	379	522	375	146	65	31
United Kingdom																		
- England	0	0	0	0	0	0	0	0	1	4	16	46	70	91	43	14	8	4
- Northern Ireland	0	0	0	0	0	0	0	0	6	7	17	33	43	28	14	0	0	0
- Scotland	0	0	0	0	0	0	0	0	2	5	13	43	71	73	38	21	9	0
- Wales	0	0	0	0	0	0	0	0	1	8	31	68	88	106	49	2	16	18
United States[2]	0	0	0	0	1	0	0	2	2	18	115	162	270	300	184	107	13	4
OECD-17	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**13**	**47**	**116**	**207**	**271**	**199**	**89**	**53**	**29**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.5 Age-specific rates of all prostatectomy per 100 000 males, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	0	0	0	0	1	9	46	163	462	844	1339	1497	1764	1784	1538
Canada[1]	0	0	0	0	0	0	1	1	7	29	119	322	624	999	1157	1375	1538	1433
Denmark	0	0	0	0	0	0	0	3	3	23	63	176	464	697	863	926	908	670
Finland	0	0	0	0	0	1	1	1	3	22	83	212	437	663	844	896	1140	1038
France	0	0	0	0	0	0	1	2	4	20	82	236	537	853	1130	1355	1357	1231
Germany	0	0	0	0	0	0	1	2	7	33	114	323	716	1134	1411	1343	1314	901
Iceland	0	0	0	0	0	0	0	0	0	17	56	245	508	721	972	874	1256	684
Ireland	0	0	0	0	0	0	0	1	5	13	47	129	259	357	482	552	595	539
Italy	0	0	1	0	1	1	3	7	23	62	177	403	750	1091	1168	905	591	287
New Zealand	0	0	0	0	0	0	0	2	5	19	74	218	418	683	883	969	999	824
Norway	0	0	0	1	1	1	1	1	7	19	103	297	732	1230	1337	1453	1608	1305
Portugal	0	0	0	0	0	0	1	1	6	18	48	139	325	479	493	458	386	239
Spain	0	0	0	0	0	0	0	1	3	15	64	191	409	580	593	567	428	228
Sweden	0	0	0	1	0	0	1	1	3	19	79	238	498	761	873	948	1015	682
Switzerland	0	0	0	0	0	0	1	4	6	38	164	483	1022	1553	1668	1711	1718	1384
United Kingdom																		
- England	0	0	0	0	0	0	0	1	3	12	51	151	299	493	626	750	756	528
- Northern Ireland	0	0	0	0	0	0	0	6	12	13	37	102	199	313	431	498	736	534
- Scotland	0	0	0	0	0	0	0	2	4	15	42	141	264	452	534	704	704	528
- Wales	0	0	0	0	0	1	0	0	2	11	55	138	267	427	472	542	526	462
United States[2]	0	0	0	0	4	0	0	2	3	24	152	222	415	598	773	690	811	674
OECD-17	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**6**	**24**	**89**	**241**	**499**	**771**	**910**	**964**	**1009**	**786**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.6 Age-specific rates of hip replacement per 100 000 females, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	1	2	5	8	16	28	54	108	209	345	546	775	958	1122	1264
Canada[1]	0	0	0	2	3	5	8	12	23	43	85	143	259	422	636	865	1122	1280
Denmark	0	0	1	1	3	3	7	10	29	49	101	217	398	601	1002	1277	1393	1546
Finland	0	0	0	1	4	5	11	13	47	79	149	258	403	620	944	1179	1267	1361
France	0	0	1	2	3	4	7	13	27	57	118	210	379	596	894	1197	1388	1656
Germany	0	0	1	2	4	6	11	20	38	83	182	310	505	768	1217	1468	1566	1687
Iceland	0	0	0	0	0	0	19	10	36	37	172	378	531	974	1076	1015	1197	1255
Ireland	0	0	1	3	1	5	6	17	28	43	124	209	296	461	703	945	875	1060
Italy	0	0	0	2	3	5	7	11	22	43	81	141	228	374	583	788	884	1020
New Zealand	0	0	0	3	2	3	12	18	36	75	126	243	410	720	954	1296	1340	1572
Norway	0	0	1	1	5	3	8	11	37	63	158	279	570	894	1323	1736	1771	1862
Portugal	0	0	0	1	1	5	11	7	11	20	54	91	166	253	361	497	539	753
Spain	0	0	0	1	3	5	7	10	16	26	42	80	144	241	407	628	794	967
Sweden	0	0	0	3	4	2	10	15	29	53	129	232	425	695	1009	1237	1387	1481
Switzerland	0	0	0	1	4	6	12	24	43	94	180	328	606	820	1162	1448	1644	1578
United Kingdom																		
- England	0	0	0	1	3	6	9	16	25	48	99	194	342	598	863	1153	1440	1659
- Northern Ireland	0	0	0	0	0	13	21	25	24	46	115	169	338	629	861	1072	1407	1839
- Scotland	0	0	0	3	5	7	12	18	18	45	111	225	381	610	859	1139	1262	1621
- Wales	0	0	0	0	3	2	6	13	28	54	98	162	317	602	871	969	1066	1097
United States[2]	0	3	25	32	8	22	24	67	115	156	202	323	372	592	882	934	1126	1211
OECD-17	**0**	**0**	**2**	**3**	**3**	**6**	**11**	**17**	**33**	**59**	**122**	**220**	**371**	**601**	**869**	**1090**	**1229**	**1388**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.7 Age-specific rates of hip replacement per 100 000 males, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	0	0	0	2	3	5	9	20	38	81	132	217	342	501	664	789	815	964
Canada[1]	0	0	0	1	3	5	7	14	30	55	88	143	233	351	455	605	700	882
Denmark	0	0	0	2	5	1	7	21	45	55	120	211	346	537	706	877	843	1123
Finland	0	0	1	1	4	8	11	24	44	74	136	254	407	588	817	1019	909	1316
France	0	0	1	2	3	6	15	30	57	99	175	265	392	578	779	968	1012	1166
Germany	0	0	0	2	3	5	10	23	49	97	189	315	449	599	901	1030	1034	1200
Iceland	0	0	0	0	0	0	0	17	34	94	102	223	395	680	972	901	1040	684
Ireland	0	0	1	1	1	5	6	17	28	43	124	209	296	461	703	945	875	1060
Italy	0	0	1	1	3	6	10	19	30	51	78	133	212	293	420	490	514	714
New Zealand	0	0	1	2	2	7	9	28	52	111	195	300	410	665	838	1063	862	1326
Norway	1	0	0	2	3	3	13	16	36	59	111	193	308	458	734	939	1105	1471
Portugal	0	0	0	0	2	3	7	13	24	36	80	116	185	250	336	403	353	528
Spain	0	0	0	1	2	5	9	18	32	56	84	126	187	235	335	459	475	621
Sweden	0	0	0	2	3	4	6	18	29	66	118	207	341	539	756	909	954	1196
Switzerland	0	0	0	0	1	5	12	33	73	141	255	425	726	881	1111	1254	1300	1296
United Kingdom																		
- England	0	0	0	1	2	5	8	15	22	35	77	156	252	421	630	718	770	1023
- Northern Ireland	7	0	0	6	0	7	14	39	34	57	108	182	298	506	658	930	842	1235
- Scotland	0	3	0	0	7	8	10	16	27	39	80	179	291	466	652	743	761	1053
- Wales	0	0	0	3	3	3	3	20	26	41	102	145	243	428	624	656	599	722
United States[2]	1	0	4	16	10	22	36	73	124	171	163	240	285	448	624	824	872	1070
OECD-17	**0**	**0**	**0**	**2**	**3**	**6**	**10**	**24**	**42**	**73**	**126**	**212**	**330**	**494**	**686**	**826**	**832**	**1033**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.8 Age-specific rates of appendectomy per 100 000 females, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	16	95	258	356	272	202	172	142	122	99	94	85	75	69	66	56	46	33
Canada[1]	12	71	138	172	139	125	114	96	91	84	83	76	72	55	51	40	37	26
Denmark	16	110	178	192	149	124	105	93	79	92	90	87	91	89	91	78	89	62
Finland	13	77	158	270	254	203	193	147	131	133	121	107	105	98	75	66	60	33
France	26	259	477	415	283	184	123	96	74	73	67	61	62	55	50	45	46	39
Germany	21	160	487	676	395	231	173	127	111	100	92	84	77	69	73	69	65	55
Iceland	28	133	308	373	245	163	121	136	72	93	91	106	74	80	66	142	31	35
Ireland	18	169	368	385	253	163	126	98	81	55	42	38	40	27	25	31	10	17
Italy	22	160	311	353	206	116	70	50	38	30	22	18	17	14	12	13	12	11
New Zealand	16	92	244	336	246	162	138	139	105	89	87	65	71	61	56	57	51	30
Norway	9	57	157	246	263	173	152	127	87	100	104	109	110	105	80	65	56	44
Portugal	42	167	222	227	164	116	97	85	77	77	74	56	57	46	50	49	35	31
Spain	39	140	210	208	156	111	90	78	71	70	67	62	57	57	61	54	48	39
Sweden	25	96	164	244	194	164	157	106	96	99	105	98	96	93	87	72	69	30
Switzerland	35	133	287	409	354	231	175	149	140	154	135	139	143	124	123	124	120	84
United Kingdom																		
- England	14	70	185	240	179	128	101	80	73	61	56	54	47	43	41	41	30	22
- Northern Ireland	22	89	277	291	208	138	114	108	88	61	87	68	40	44	51	35	36	41
- Scotland	20	61	145	169	115	94	74	76	58	44	51	52	46	35	38	24	26	16
- Wales	4	78	206	238	154	101	88	63	51	50	35	32	22	22	16	10	10	8
United States[2]	57	112	161	143	187	139	174	129	167	126	123	98	88	113	91	75	52	38
OECD-17	**23**	**117**	**247**	**297**	**221**	**153**	**128**	**106**	**91**	**84**	**81**	**75**	**69**	**65**	**60**	**57**	**46**	**35**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A5.9 Age-specific rates of appendectomy per 100 000 males, 2008 or latest year available

	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-85	85+
Australia	27	134	307	298	215	182	162	135	117	96	81	81	77	77	74	81	62	56
Canada[1]	15	105	193	202	158	141	127	107	89	82	75	67	61	55	55	49	49	42
Denmark	17	105	197	217	166	137	113	91	85	76	65	52	62	84	69	91	48	72
Finland	12	86	187	248	207	190	163	142	123	114	97	107	100	92	90	108	70	49
France	36	287	525	350	219	166	131	102	83	73	67	62	65	63	61	67	60	51
Germany	24	193	449	365	250	176	148	113	105	95	82	81	80	82	83	81	80	69
Iceland	34	215	408	409	273	183	146	124	90	76	57	49	41	37	51	22	12	12
Ireland	34	215	408	409	273	183	146	124	90	76	57	49	41	37	51	22	12	12
Italy	25	216	323	236	169	112	80	66	52	45	36	30	30	26	23	21	21	19
New Zealand	21	95	261	293	241	147	153	137	112	90	79	77	67	70	81	75	83	53
Norway	13	88	218	242	227	165	173	121	105	99	75	89	80	72	52	78	52	25
Portugal	47	226	329	259	160	118	100	85	66	65	68	65	62	72	57	71	53	56
Spain	58	214	319	271	183	137	110	92	78	69	63	65	69	65	70	73	66	62
Sweden	36	115	261	254	232	166	169	123	112	85	73	74	79	84	80	62	49	51
Switzerland	45	161	377	385	288	203	175	147	144	131	135	133	152	157	157	157	175	94
United Kingdom																		
- England	23	107	227	217	164	131	106	88	76	63	51	48	42	39	36	37	31	28
- Northern Ireland	33	143	325	311	174	164	144	104	87	57	47	56	41	46	53	38	30	95
- Scotland	22	97	202	201	134	118	88	77	62	60	42	52	41	35	27	28	27	27
- Wales	7	100	221	244	158	143	92	84	69	62	42	41	29	21	18	15	13	9
United States[2]	80	202	256	164	130	179	190	142	126	101	66	69	113	151	100	90	110	62
OECD-17	**31**	**155**	**300**	**279**	**201**	**157**	**136**	**110**	**94**	**81**	**68**	**67**	**67**	**68**	**64**	**63**	**55**	**47**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

APPENDIX 6 CUMULATIVE RISK

Table A6.1 Cumulative risk of hysterectomy (%), by age, 2008 or latest year available

	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.02	0.19	0.92	2.79	6.16	10.17	12.84	14.52	16.07	17.72	19.12	20.34	21.11	21.44
Canada[1]	0.17	1.02	3.04	6.60	11.25	15.69	18.44	20.38	22.12	23.78	25.24	26.43	27.16	27.44
Denmark	0.02	0.13	0.64	1.87	4.43	7.72	9.75	10.91	12.05	13.29	14.52	15.54	16.35	16.75
Finland	0.02	0.07	0.40	1.42	4.13	7.86	10.13	11.44	12.51	13.71	14.84	15.80	16.37	16.64
France	0.01	0.05	0.19	0.93	3.34	6.96	9.37	10.63	11.95	13.40	14.86	16.15	17.07	17.50
Iceland	0.00	0.00	0.60	2.42	5.87	9.61	12.06	13.61	14.49	15.26	16.18	16.48	16.87	17.02
Ireland	0.00	0.04	0.18	0.75	2.07	3.93	5.56	6.83	8.34	9.70	10.65	11.52	11.88	11.98
Italy	0.01	0.05	0.14	0.54	2.09	5.10	7.31	8.62	10.02	11.43	12.76	13.71	14.20	14.38
New Zealand	0.03	0.21	0.83	2.37	5.03	8.08	10.08	11.35	12.60	13.90	15.07	15.98	16.57	16.81
Norway	0.04	0.13	0.54	1.70	4.18	7.46	9.51	10.59	11.83	13.15	14.24	15.21	15.91	16.27
Portugal	0.01	0.06	0.24	0.91	2.95	6.33	8.77	10.11	11.33	12.49	13.56	14.55	15.11	15.37
Spain	0.01	0.06	0.19	0.63	2.02	3.96	5.27	6.29	7.43	8.65	9.91	10.98	11.56	11.74
Sweden	0.03	0.13	0.39	1.20	3.03	5.47	7.22	8.25	9.36	10.67	11.92	12.94	13.77	14.08
Switzerland	0.02	0.10	0.54	2.15	5.48	9.54	12.10	13.66	15.09	16.66	18.13	19.52	20.50	20.94
United Kingdom														
- England	0.01	0.12	0.57	1.77	3.91	6.31	7.89	9.22	10.57	11.91	13.19	14.18	14.82	15.09
- Northern Ireland	0.03	0.12	0.71	2.06	4.34	7.05	9.01	10.71	12.56	14.25	15.60	16.79	17.49	17.79
- Scotland	0.01	0.10	0.45	1.41	3.18	5.12	6.28	7.15	7.89	8.65	9.46	10.05	10.47	10.66
- Wales	0.00	0.13	0.55	1.69	3.67	5.73	6.99	7.83	8.73	9.50	10.27	10.91	11.38	11.51
United States[2]	0.27	1.51	4.25	8.15	13.47	18.18	21.00	22.48	23.81	25.24	26.56	27.61	28.30	28.71
OECD-16	**0.04**	**0.22**	**0.81**	**2.18**	**4.77**	**7.91**	**9.98**	**11.29**	**12.57**	**13.86**	**15.06**	**16.04**	**16.68**	**16.95**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A6.2 Cumulative risk of transurethral prostatectomy (%), by age, 2008 or latest year available

	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.00	0.00	0.00	0.00	0.02	0.10	0.44	1.59	4.03	8.35	14.09	21.08	27.77	33.11
Canada[1]	0.00	0.00	0.00	0.01	0.02	0.07	0.31	1.06	2.83	6.00	10.59	16.38	22.50	27.81
Denmark	0.00	0.00	0.00	0.01	0.02	0.10	0.32	0.87	2.38	4.73	8.14	12.26	16.14	18.84
Finland	0.00	0.00	0.01	0.01	0.01	0.07	0.28	0.84	2.25	4.66	8.31	12.23	17.05	21.20
France	0.00	0.00	0.00	0.01	0.03	0.13	0.51	1.55	3.77	7.21	11.58	16.68	21.65	26.00
Germany	0.00	0.00	0.01	0.01	0.04	0.14	0.44	1.27	3.23	6.42	10.86	15.89	20.89	24.22
Iceland	0.00	0.00	0.00	0.00	0.00	0.04	0.09	0.48	1.87	4.18	7.16	10.91	16.18	19.01
Ireland	0.00	0.00	0.00	0.00	0.03	0.04	0.14	0.44	1.28	2.62	4.86	7.41	10.08	12.43
Italy	0.00	0.00	0.01	0.02	0.05	0.15	0.46	1.28	2.89	5.21	7.90	10.40	12.13	13.00
New Zealand	0.00	0.00	0.00	0.01	0.02	0.06	0.25	0.84	2.06	4.12	7.33	11.36	15.48	18.75
Norway	0.00	0.00	0.01	0.01	0.03	0.07	0.32	1.05	3.10	6.98	11.98	17.94	24.10	28.80
Portugal	0.00	0.00	0.00	0.01	0.03	0.06	0.16	0.44	1.03	1.93	3.09	4.44	5.68	6.48
Spain	0.00	0.00	0.00	0.00	0.01	0.05	0.19	0.60	1.46	2.69	4.29	6.13	7.61	8.46
Sweden	0.00	0.00	0.01	0.01	0.02	0.05	0.19	0.73	1.98	4.10	7.40	11.56	15.85	18.60
Switzerland	0.00	0.00	0.01	0.03	0.05	0.18	0.65	2.13	5.23	10.02	15.68	22.08	28.31	33.03
United Kingdom														
- England	0.00	0.00	0.00	0.00	0.01	0.05	0.22	0.75	1.88	3.84	6.61	10.00	13.31	15.56
- Northern Ireland	0.00	0.00	0.00	0.03	0.06	0.10	0.20	0.54	1.31	2.71	4.72	7.07	10.45	12.81
- Scotland	0.00	0.00	0.00	0.01	0.02	0.07	0.21	0.70	1.65	3.50	5.87	9.04	12.16	14.46
- Wales	0.00	0.01	0.01	0.01	0.01	0.03	0.14	0.50	1.39	2.96	4.99	7.53	9.87	11.85
United States[2]	0.02	0.02	0.02	0.02	0.02	0.05	0.23	0.53	1.25	2.72	5.54	8.27	11.87	14.78
OECD-17	**0.00**	**0.00**	**0.00**	**0.01**	**0.03**	**0.08**	**0.29**	**0.91**	**2.34**	**4.75**	**8.05**	**11.93**	**15.95**	**18.96**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A6.3 Cumulative risk of open (non-transurethral) prostatectomy (%), by age, 2008 or latest year available

	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.00	0.00	0.00	0.01	0.03	0.18	0.66	1.80	3.47	5.49	6.48	6.86	6.99	7.05
Canada[1]	0.00	0.00	0.00	0.00	0.02	0.11	0.47	1.32	2.62	4.25	5.02	5.23	5.37	5.48
Denmark	0.00	0.00	0.00	0.00	0.00	0.05	0.15	0.46	1.24	2.28	2.95	3.01	3.04	3.13
Finland	0.00	0.00	0.00	0.00	0.01	0.07	0.27	0.78	1.52	2.32	2.65	2.78	2.86	2.94
France	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.16	0.56	1.20	2.03	2.88	3.54	4.00
Germany	0.00	0.00	0.00	0.00	0.01	0.08	0.35	1.12	2.68	4.92	7.01	7.89	8.32	8.53
Iceland	0.00	0.00	0.00	0.00	0.00	0.04	0.27	1.11	2.22	3.42	5.05	5.31	5.51	5.51
Ireland	0.00	0.00	0.00	0.00	0.00	0.05	0.20	0.53	0.97	1.39	1.48	1.53	1.59	1.65
Italy	0.00	0.00	0.01	0.04	0.12	0.34	0.91	2.08	4.13	7.00	9.74	11.33	12.23	12.61
New Zealand	0.00	0.00	0.00	0.00	0.02	0.07	0.25	0.75	1.59	2.85	3.84	4.25	4.50	4.68
Norway	0.00	0.00	0.01	0.01	0.03	0.08	0.34	1.08	2.63	4.63	5.76	6.05	6.33	6.49
Portugal	0.00	0.00	0.00	0.00	0.02	0.07	0.21	0.62	1.64	3.09	4.32	5.17	5.76	6.08
Spain	0.00	0.00	0.00	0.00	0.01	0.05	0.22	0.77	1.93	3.53	4.79	5.64	6.17	6.37
Sweden	0.00	0.00	0.00	0.00	0.01	0.08	0.32	0.97	2.18	3.75	4.60	4.76	4.87	4.96
Switzerland	0.00	0.00	0.00	0.00	0.01	0.07	0.41	1.33	3.18	5.68	7.44	8.11	8.41	8.55
United Kingdom														
- England	0.00	0.00	0.00	0.00	0.01	0.03	0.11	0.34	0.69	1.14	1.35	1.42	1.46	1.48
- Northern Ireland	0.00	0.00	0.00	0.00	0.03	0.06	0.15	0.32	0.53	0.67	0.74	0.74	0.74	0.74
- Scotland	0.00	0.00	0.00	0.00	0.01	0.04	0.10	0.31	0.67	1.03	1.22	1.32	1.36	1.36
- Wales	0.00	0.00	0.00	0.00	0.00	0.04	0.20	0.54	0.97	1.50	1.74	1.75	1.83	1.92
United States[2]	0.00	0.00	0.00	0.01	0.02	0.11	0.68	1.48	2.81	4.25	5.13	5.64	5.70	5.72
OECD-17	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.08**	**0.31**	**0.89**	**1.91**	**3.22**	**4.17**	**4.58**	**4.83**	**4.96**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A6.4 Cumulative risk of all prostatectomy (%), by age, 2008 or latest year available

	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.00	0.00	0.00	0.01	0.06	0.29	1.10	3.36	7.37	13.41	19.70	26.53	32.86	37.86
Canada[1]	0.00	0.00	0.00	0.01	0.04	0.19	0.78	2.37	5.38	10.01	15.10	20.78	26.68	31.79
Denmark	0.00	0.00	0.00	0.01	0.03	0.15	0.46	1.33	3.60	6.91	10.86	14.91	18.70	21.39
Finland	0.00	0.00	0.01	0.01	0.03	0.14	0.55	1.60	3.74	6.89	10.75	14.68	19.43	23.53
France	0.00	0.00	0.00	0.01	0.03	0.13	0.54	1.71	4.32	8.33	13.39	19.10	24.45	28.98
Germany	0.00	0.00	0.01	0.02	0.05	0.22	0.79	2.38	5.83	11.05	17.15	22.57	27.52	30.73
Iceland	0.00	0.00	0.00	0.00	0.00	0.09	0.36	1.58	4.05	7.46	11.87	15.66	20.82	23.49
Ireland	0.00	0.00	0.00	0.00	0.03	0.10	0.33	0.97	2.25	3.98	6.27	8.83	11.51	13.87
Italy	0.00	0.01	0.02	0.06	0.17	0.48	1.36	3.33	6.90	11.87	16.90	20.59	22.91	24.01
New Zealand	0.00	0.00	0.00	0.01	0.04	0.13	0.50	1.58	3.62	6.87	10.91	15.14	19.30	22.57
Norway	0.00	0.01	0.01	0.02	0.05	0.14	0.66	2.12	5.65	11.32	17.09	22.94	28.94	33.45
Portugal	0.00	0.00	0.01	0.01	0.04	0.13	0.37	1.06	2.66	4.97	7.28	9.39	11.12	12.18
Spain	0.00	0.00	0.00	0.01	0.02	0.10	0.41	1.36	3.36	6.13	8.88	11.44	13.32	14.30
Sweden	0.00	0.00	0.01	0.01	0.03	0.12	0.52	1.69	4.12	7.71	11.67	15.78	19.97	22.66
Switzerland	0.00	0.00	0.01	0.03	0.06	0.25	1.06	3.43	8.26	15.16	22.01	28.46	34.39	38.81
United Kingdom														
- England	0.00	0.00	0.00	0.00	0.02	0.08	0.33	1.08	2.56	4.93	7.87	11.28	14.58	16.81
- Northern Ireland	0.00	0.00	0.00	0.03	0.09	0.16	0.35	0.86	1.84	3.36	5.43	7.76	11.11	13.46
- Scotland	0.00	0.00	0.00	0.01	0.03	0.11	0.31	1.01	2.31	4.50	7.02	10.25	13.36	15.63
- Wales	0.00	0.01	0.01	0.01	0.02	0.07	0.34	1.03	2.35	4.41	6.65	9.15	11.52	13.54
United States[2]	0.02	0.02	0.02	0.03	0.04	0.16	0.91	2.01	4.02	6.86	10.41	13.45	16.91	19.67
OECD-17	**0.00**	**0.00**	**0.01**	**0.01**	**0.04**	**0.16**	**0.60**	**1.79**	**4.21**	**7.81**	**11.86**	**15.93**	**19.97**	**22.94**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A6.5 Cumulative risk of appendectomy (%), by age, female population, 2008 or latest year available

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.08	0.55	1.83	3.57	4.87	5.83	6.64	7.30	7.86	8.32	8.75	9.13	9.47	9.78	10.08	10.33	10.54	10.68
Canada[1]	0.06	0.41	1.10	1.95	2.63	3.23	3.78	4.25	4.68	5.08	5.47	5.83	6.17	6.43	6.67	6.85	7.02	7.15
Denmark	0.08	0.63	1.51	2.45	3.18	3.78	4.28	4.73	5.10	5.54	5.96	6.37	6.79	7.20	7.63	7.99	8.39	8.67
Finland	0.06	0.44	1.23	2.56	3.79	4.76	5.68	6.37	6.98	7.60	8.16	8.65	9.13	9.57	9.91	10.21	10.48	10.62
France	0.13	1.42	3.75	5.73	7.06	7.91	8.47	8.91	9.25	9.58	9.88	10.15	10.43	10.68	10.90	11.10	11.30	11.47
Germany	0.11	0.90	3.29	6.52	8.35	9.40	10.18	10.75	11.25	11.69	12.09	12.46	12.80	13.10	13.42	13.72	14.00	14.23
Iceland	0.14	0.80	2.32	4.13	5.30	6.06	6.63	7.26	7.59	8.02	8.44	8.93	9.26	9.62	9.92	10.56	10.70	10.85
Ireland	0.09	0.93	2.74	4.60	5.80	6.57	7.15	7.61	7.98	8.23	8.42	8.60	8.78	8.91	9.02	9.16	9.21	9.28
Italy	0.11	0.91	2.44	4.15	5.13	5.68	6.01	6.25	6.42	6.56	6.66	6.75	6.82	6.89	6.94	7.00	7.06	7.11
New Zealand	0.08	0.54	1.75	3.39	4.57	5.34	5.99	6.64	7.13	7.54	7.95	8.24	8.57	8.84	9.10	9.36	9.59	9.73
Norway	0.05	0.33	1.11	2.32	3.60	4.43	5.16	5.76	6.17	6.63	7.12	7.62	8.13	8.61	8.98	9.27	9.52	9.73
Portugal	0.21	1.04	2.13	3.24	4.03	4.58	5.05	5.45	5.82	6.18	6.53	6.79	7.05	7.26	7.49	7.72	7.88	8.02
Spain	0.20	0.89	1.93	2.94	3.70	4.23	4.66	5.03	5.37	5.70	6.01	6.30	6.57	6.84	7.12	7.37	7.59	7.77
Sweden	0.12	0.60	1.42	2.61	3.55	4.34	5.09	5.59	6.04	6.51	6.99	7.45	7.89	8.32	8.72	9.05	9.36	9.50
Switzerland	0.17	0.83	2.25	4.23	5.91	7.00	7.81	8.49	9.13	9.83	10.43	11.06	11.69	12.24	12.77	13.31	13.83	14.19
United Kingdom																		
- England	0.07	0.42	1.34	2.52	3.39	4.00	4.49	4.87	5.22	5.51	5.77	6.03	6.25	6.45	6.64	6.83	6.97	7.07
- Northern Ireland	0.11	0.55	1.93	3.34	4.34	5.00	5.54	6.05	6.46	6.75	7.15	7.46	7.65	7.85	8.09	8.25	8.41	8.60
- Scotland	0.10	0.41	1.13	1.96	2.52	2.98	3.34	3.70	3.98	4.19	4.44	4.68	4.90	5.07	5.25	5.36	5.48	5.56
- Wales	0.02	0.41	1.43	2.60	3.35	3.83	4.25	4.56	4.80	5.04	5.20	5.35	5.46	5.56	5.64	5.68	5.73	5.77
United States[2]	0.28	0.84	1.64	2.34	3.25	3.92	4.75	5.36	6.15	6.74	7.31	7.76	8.17	8.69	9.10	9.44	9.68	9.85
OECD-17	**0.11**	**0.69**	**1.91**	**3.36**	**4.42**	**5.14**	**5.75**	**6.25**	**6.67**	**7.06**	**7.44**	**7.78**	**8.10**	**8.40**	**8.67**	**8.93**	**9.14**	**9.29**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

Table A6.6 Cumulative risk of appendectomy (%), by age, male population, 2008 or latest year available

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	85+
Australia	0.14	0.80	2.32	3.76	4.80	5.66	6.42	7.05	7.60	8.04	8.41	8.78	9.14	9.48	9.82	10.18	10.46	10.71
Canada[1]	0.08	0.60	1.56	2.55	3.32	4.00	4.60	5.11	5.54	5.92	6.27	6.59	6.87	7.13	7.38	7.61	7.83	8.02
Denmark	0.09	0.61	1.58	2.65	3.45	4.11	4.65	5.09	5.49	5.85	6.15	6.40	6.69	7.08	7.40	7.82	8.04	8.37
Finland	0.06	0.49	1.42	2.63	3.64	4.55	5.32	5.99	6.57	7.10	7.55	8.05	8.51	8.93	9.34	9.83	10.14	10.36
France	0.18	1.60	4.16	5.82	6.85	7.62	8.23	8.69	9.07	9.41	9.71	9.99	10.28	10.56	10.84	11.13	11.40	11.63
Germany	0.12	1.08	3.28	5.03	6.22	7.04	7.73	8.24	8.72	9.16	9.53	9.89	10.25	10.62	10.99	11.35	11.71	12.01
Iceland	0.18	1.10	3.10	4.48	6.08	7.34	7.76	8.60	9.10	9.37	9.75	10.05	10.31	10.67	11.00	11.36	11.56	11.56
Ireland	0.17	1.24	3.24	5.20	6.49	7.34	8.02	8.59	8.99	9.34	9.60	9.82	10.00	10.17	10.40	10.49	10.55	10.60
Italy	0.13	1.20	2.79	3.93	4.73	5.27	5.65	5.96	6.20	6.41	6.58	6.72	6.86	6.98	7.09	7.19	7.28	7.37
New Zealand	0.10	0.58	1.87	3.29	4.45	5.15	5.87	6.51	7.04	7.45	7.81	8.17	8.48	8.80	9.17	9.51	9.88	10.12
Norway	0.07	0.51	1.59	2.77	3.87	4.66	5.48	6.05	6.54	7.01	7.36	7.76	8.13	8.46	8.70	9.06	9.29	9.41
Portugal	0.24	1.36	2.97	4.22	4.99	5.55	6.02	6.42	6.73	7.03	7.34	7.64	7.93	8.26	8.52	8.85	9.09	9.35
Spain	0.29	1.36	2.92	4.22	5.10	5.75	6.26	6.69	7.06	7.37	7.66	7.96	8.28	8.58	8.90	9.23	9.53	9.81
Sweden	0.18	0.75	2.04	3.28	4.40	5.19	5.99	6.57	7.09	7.48	7.82	8.16	8.52	8.91	9.27	9.55	9.77	10.00
Switzerland	0.23	1.03	2.88	4.74	6.10	7.05	7.86	8.54	9.20	9.79	10.40	11.00	11.67	12.36	13.05	13.73	14.48	14.88
United Kingdom																		
- England	0.11	0.65	1.77	2.83	3.62	4.25	4.76	5.18	5.54	5.84	6.07	6.30	6.50	6.68	6.85	7.03	7.17	7.30
- Northern Ireland	0.16	0.87	2.48	3.98	4.81	5.59	6.27	6.76	7.16	7.42	7.64	7.90	8.09	8.30	8.54	8.71	8.85	9.28
- Scotland	0.11	0.59	1.59	2.58	3.23	3.80	4.22	4.59	4.88	5.17	5.37	5.61	5.81	5.97	6.10	6.23	6.35	6.48
- Wales	0.03	0.53	1.63	2.82	3.58	4.27	4.71	5.11	5.44	5.73	5.93	6.13	6.26	6.36	6.45	6.52	6.58	6.62
United States[2]	0.40	1.40	2.66	3.45	4.08	4.93	5.83	6.50	7.09	7.56	7.86	8.18	8.70	9.38	9.84	10.24	10.73	11.01
OECD-17	**0.15**	**0.92**	**2.39**	**3.71**	**4.69**	**5.46**	**6.08**	**6.61**	**7.05**	**7.42**	**7.74**	**8.06**	**8.36**	**8.68**	**8.98**	**9.28**	**9.53**	**9.74**

1. Data for Canada refer to 2004/05. 2. Data for the United States refer to 2004.

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