

# **5**

## **Present and future health care services costs and access**

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This chapter analyses geographical differences in the demand, cost and access to health services in Europe, focusing on the case of cardiology and maternity and obstetrics (M&O). The chapter further analyses potential future changes driven by demographic change, providing estimates on future changes in demand for both services and the consequent adjustment in provision across degrees of urbanisation. The chapter concludes with insights on the balance between accessibility and cost-efficiency in the provision of health services across territories.

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## Main takeaways

- On average, an estimated 9 to 11 people per 1 000 inhabitants use cardiology services in EU27+UK countries, using local death rates to approximate demand. Demand is relatively lower in cities and relatively larger in sparse rural areas and villages, especially in countries with comparatively high death rates such as Bulgaria.
- The number of M&O service locations are larger in cities than in other areas on average for EU27+UK and across all countries except in Italy (where demand is low but similar across all types) and Ireland (where demand is similar everywhere except sparse rural areas).
- The number of service locations per users does not depend so much on total population across countries than on sparsity and demographic profiles. Countries with extensive areas with a low demand density, driven by the presence of older people in the case of cardiology or women in the case of M&O, have low service provision in proximity.
- According to the estimates, users in EU27+UK countries travel on average 32 km to access cardiology services and 36 km to access M&O services. In sparsely populated countries, over 40% of the sparse rural population lives far from locations offering either service.
- While distance to services is generally lower in towns and suburbs compared to rural areas, for both cardiology and M&O services, accessibility for towns and suburbs is worse when accessibility for rural areas is low because users have to travel to the next location to access the service.
- Service provision outside of cities is a balance between accessibility and cost-efficiency: countries may have service locations that are close or service locations that are cost-efficient, but, relative to cities, no country has low distances and low costs simultaneously.
- Demand for cardiology services is expected to increase substantially in EU27+UK countries, in particular in cities and in towns and suburbs, except in rural areas of countries expecting considerable rural-to-urban migration. For M&O services, a smaller aggregate overall reduction is expected, driven by lower demand in cities in many countries.
- On average across EU27+UK countries, the number of service locations per user is expected to increase by 0.16 and 0.1 locations per 10 000 users for cardiology and M&O services respectively.
- While travel distances to locations offering cardiology services are expected to decrease following the expected increase in demand due to ageing, distances to M&O service locations are generally expected to increase, particularly in cities due to the projected move of a share of women away from cities.
- Increase in demand for cardiology services means that many countries can foresee an improvement in accessibility paired with a decrease in average cost per user. On the other hand, many countries will see a decline in demand for M&O services, potentially resulting in less service locations and reduced cost efficiency in the remaining service locations.

## Introduction

Rural inhabitants often experience the greatest barriers to accessing services including reduced service availability, limited choice of services or providers, and the need for greater travel to access health care (McGrail and Humphreys, 2014<sup>[1]</sup>). Furthermore, many rural residents have poorer health conditions and a shorter life expectancy, when compared to their urban counterparts (OECD, 2021<sup>[2]</sup>; Mitton et al., 2011<sup>[3]</sup>; WHO Regional Office for Europe, 2010<sup>[4]</sup>). Geographical access is critical also to ageing societies; (Deborah, Chiu and Cao, 2018<sup>[6]</sup>; Wu and Tseng, 2018<sup>[5]</sup>; Doetsch et al., 2017<sup>[7]</sup>).

Improving access to health care services is fundamental to enhancing health outcomes and quality of life (OECD, 2021<sup>[2]</sup>; Zhao, Li and Liu, 2020<sup>[8]</sup>). Better accessibility to health care services contributes to higher health care utilisation, especially for people with chronic diseases, and helps to lower infant, maternal and emergency mortality. Achieving an equitable geographic distribution of health care resources can help cost containment by decreasing oversupply as well as improve access by increasing supply to underserved areas (Yang, Goerge and Mullner, 2006<sup>[9]</sup>).

Chapter 4 outlines a method to estimate present and future cost and access using fine-grained population grids of two health services: cardiology and maternity and obstetrics (M&O). This chapter discusses the results of this estimation for EU27+UK countries, placing emphasis on the geographical differences in both dimensions. The unit of analysis is the degree of urbanisation. The analysis highlights the important role geography and demography play in shaping service provision areas, and emphasises the balance between accessibility and cost-efficiency. To guide policies on future provision, the analysis examines expected changes in demand and supply of cardiology and M&O services following projected demographic changes across territories from EU27+UK countries.

The chapter also undertakes analysis of current estimated cost and access to cardiology and maternity and obstetrics services: it starts by outlining the results for the demand for services and continues with the results for supply, followed by a discussion on the balance between costs and access. The third section gives future estimates and the last section presents some conclusions.

## Estimated current health care services access and costs

This section focuses on how the geographical distribution of demand for health services translates into differences in cost and access across EU27+UK countries. In the analysis, while accessibility is measured through kilometres travelled, costs are presented as deviations from national average costs per users in cities. Box 5.1 explains why it is necessary to index the cost data for the analysis.

This section discusses first the estimated demand for services as captured by estimated number of users. It then presents the “supply” of health services as captured by the number of locations offering cardiology or M&O services in each country. Finally, it introduces a discussion on the balance between costs and access and concludes with the analysis of accessibility and cost results.

### Box 5.1. International comparability of estimated health cost data

#### Why is it necessary to index the cost per user results to cities?

When compared with schools, health service locations have a much larger scale, and the numbers of health service locations that are modelled are consequently much smaller. A limited number of modelled service locations, combined with the yes-or-no thresholds that are at the basis of the service location modelling, have the effect that relatively small differences in countries' geographical distribution of demand can have a big impact on the modelled supply per capita in a country.

Cost variations across the degrees of urbanisation within a country, and the tension between accessibility and cost-efficiency that are the centrepiece of this report, are not affected by overall supply per capita. However, the method may exaggerate cost differences between countries, as small differences between countries can have a big impact on the total number of service locations. An alternative set up that would, for instance, bound access to shorter travel distances "by definition" (for example being required by law), would give a different picture. For this reason, the results outlined here should be considered taking into consideration the assumptions outlined in Chapter 4. Absolute monetary costs per head are therefore not a meaningful indicator for health services, in contrast to schools, where demand differences between countries have a much more moderate effect on cost differences.

The indexing works by making all costs in a country relative to the average costs per users living in cities in a country. For instance, considering a service that would on average cost EUR 3 000 per user in cities and 4 500 in sparse rural areas in one country, and EUR 4 000 and EUR 6 000 in another country: all costs will be expressed as an index relative to the national city average, so that in both countries, user costs in cities would be 100, and user costs in sparse rural areas would be 150.

### *Demand for health services*

How many people use cardiology and M&O services, and how many service locations would cover the demand for cardiology and M&O services in EU27+UK countries? In this chapter, the expected number of users for each service, depending on age and sex distribution in the population, approximates the demand for the service.

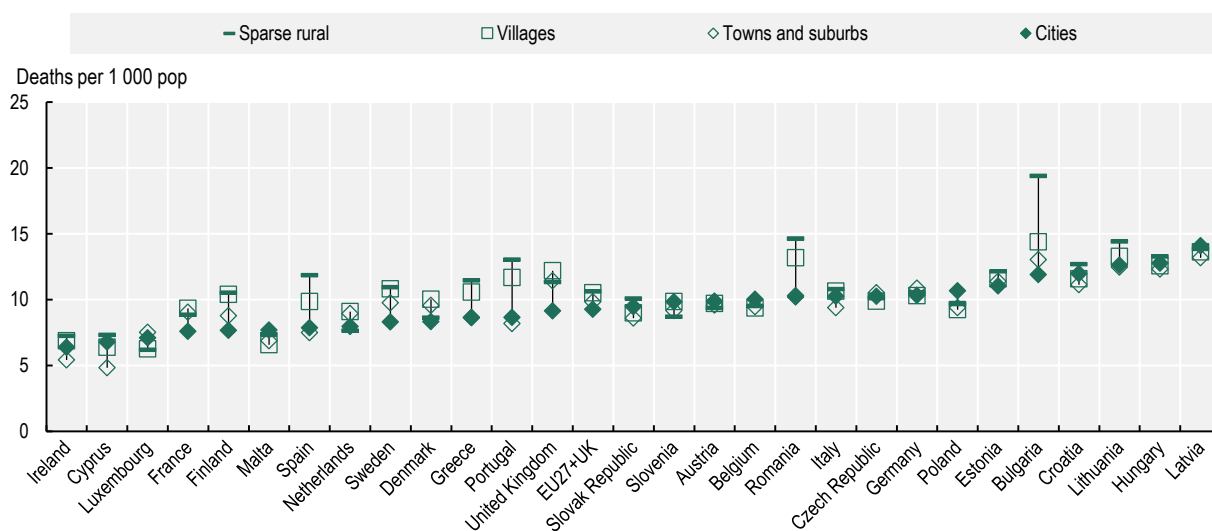
As explained in Chapter 4, a person's time-to-death rather than their age, is the most accurate predictor of demand for many health services, including for cardiology. In fact, cardiovascular diseases are the leading cause of death in the EU (Eurostat, 2021<sup>[10]</sup>). Demand for cardiology services is therefore proxied by expected number of deaths in a catchment area. Higher crude death rates are likely to be due to an older population and do not necessarily reveal a higher age-adjusted mortality rate. Across EU27+UK countries, crude death rates are larger in Germany and Eastern European countries including Latvia, Hungary, Lithuania, Croatia, Bulgaria, Estonia and Poland (Figure 5.1). These countries also had higher than average hospital discharge rates for in-patients with diseases of the circulatory system in 2018 (Eurostat, 2021<sup>[10]</sup>). The variation across degrees of urbanisation is largest in Bulgaria where death rates in sparse rural areas are almost twice as large as the average for sparse rural areas in Europe (19.4 versus 10.6 deaths per 1 000 population). Other countries with significantly higher death rates in rural areas compared to cities include Romania, Portugal, and Spain.

Concerning M&O services, the predictor for demand is local birth rates. Crude birth rates, measured as the number of live births over total population in 2011, are on average higher in cities than in other areas for EU27+UK countries (Figure 5.2). Among countries with high fertility rates in 2010, they were significantly higher in cities in France, Sweden and Denmark, and similar in villages, towns and suburbs,

and cities in Ireland. Countries with low fertility rates generally show less geographical variation in crude birth rates, with the largest gaps observed in Germany, Portugal, and Bulgaria.

**Figure 5.1. Crude death rates by country and degree of urbanisation, EU27+UK**

2011

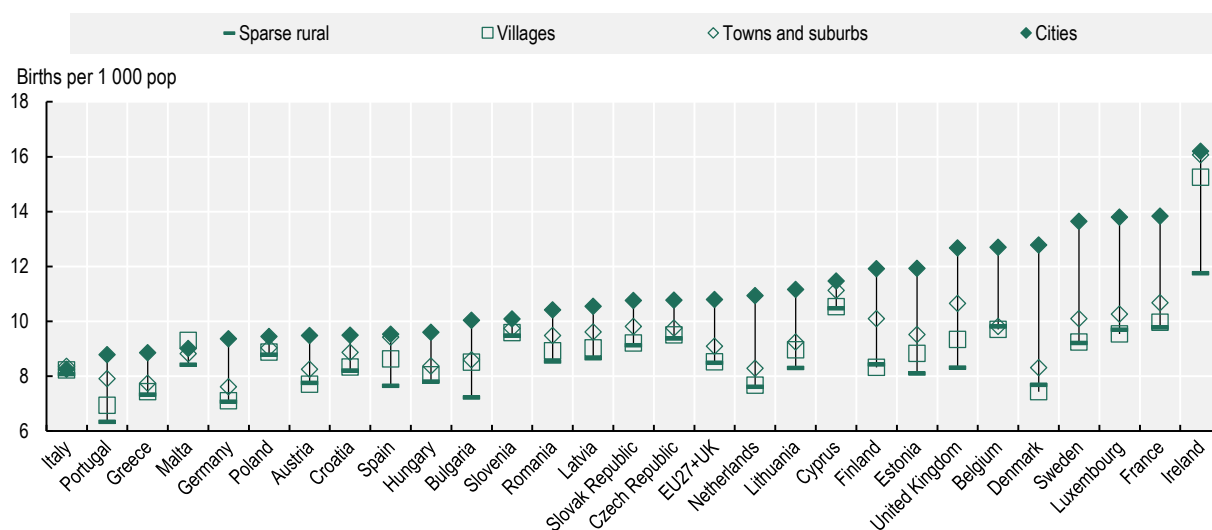


Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.2. Crude birth rates by country and degree of urbanisation, EU27+UK**

2011



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

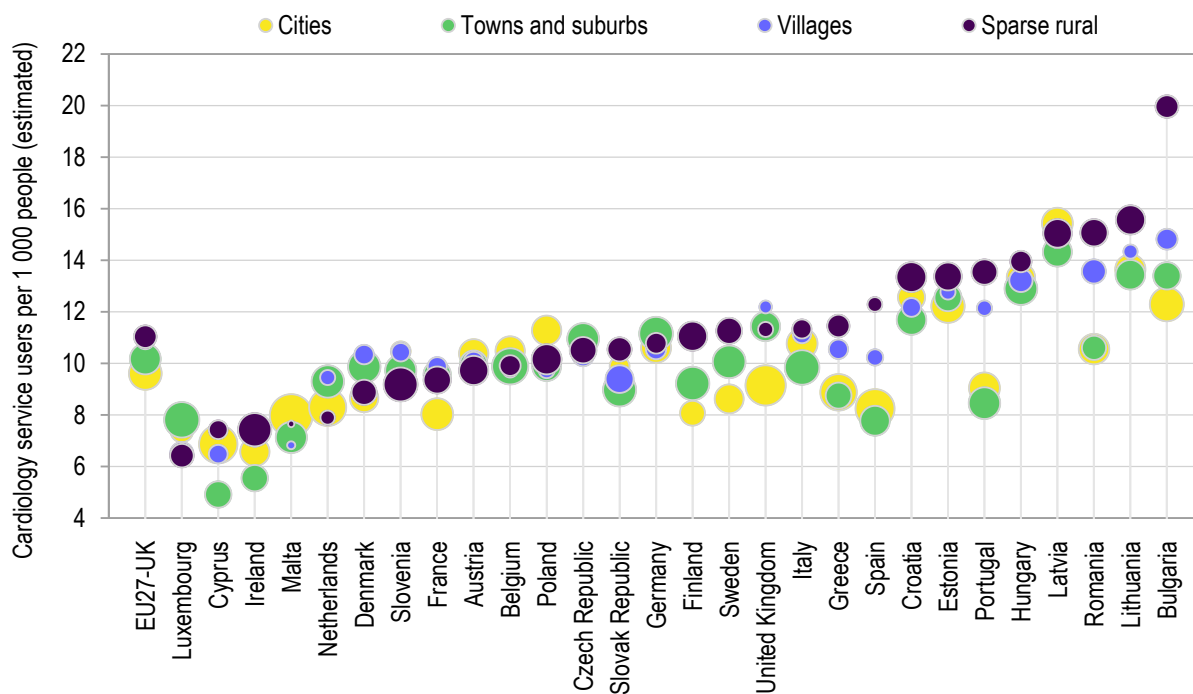
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On average, an estimated 9 to 11 people per 1 000 inhabitants use cardiology services in EU27+UK countries, with relatively less demand in cities, and relatively more demand in sparse rural areas and villages (Figure 5.3). The demand for cardiology services differs substantially across countries according to the age and sex composition of the population, with generally higher relative demand in Eastern European countries and sparse rural areas of Portugal and Spain. As expected from differences in death rates, the largest gap in demand occurs in sparse rural areas of Bulgaria that have almost twice as many estimated users than the EU27+UK average.

Compared to cardiology, M&O services show similar user rates but a different distribution of demand across degrees of urbanisation. M&O user rates are larger in cities than in other areas on average for EU27+UK and across all countries except in Italy where demand is low but similar across all types, and Ireland, where demand is similar in cities, towns and suburbs, and villages (Figure 5.4).

**Figure 5.3. Cardiology users per 1 000 people (estimated) by country and degree of urbanisation, EU27+UK**

2011



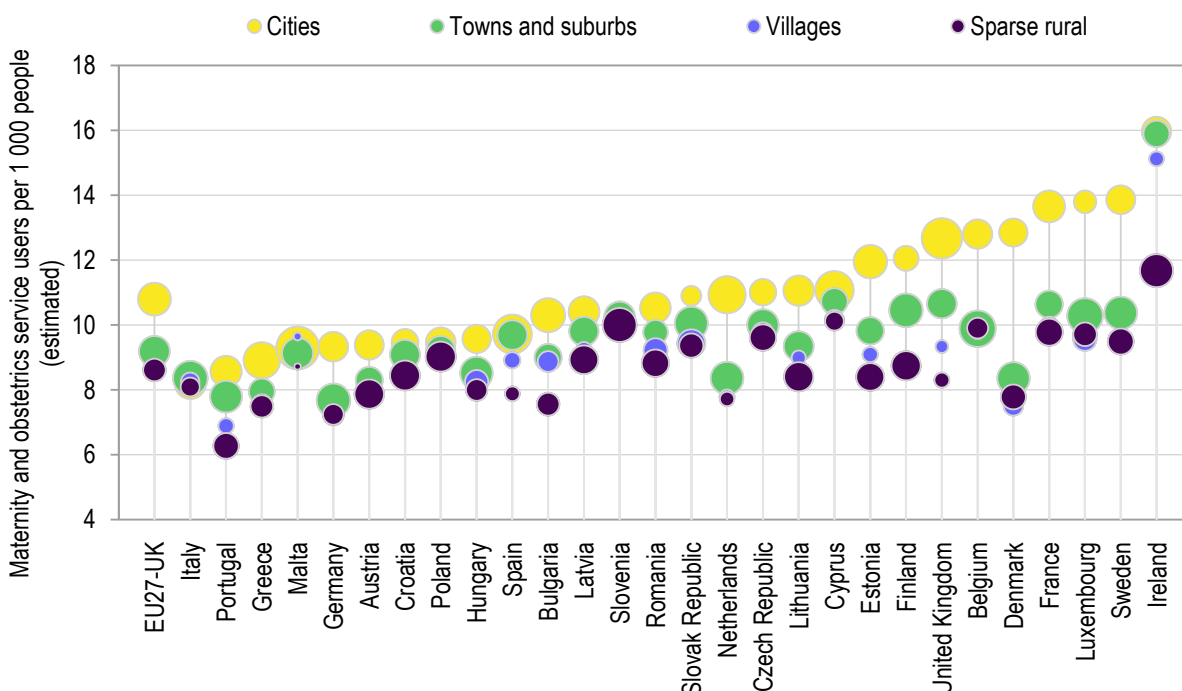
Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.4. Maternity and obstetrics service users per 1 000 people (estimated) by country and degree of urbanisation, EU27+UK**

2011



Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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## Service locations

From estimated demand, it is possible to estimate the service locations and their catchment areas for cardiology and M&O services. As described in Chapter 4, service locations are not categorised according to the degree of urbanisation in each country because service locations may be in a specific area but serve a mix of population coming from different areas. Table 5.1 confirms that cardiology and M&O services placed in a given degree of urbanisation serve a mix of population coming from different areas. This is particularly true for services placed in rural areas: for instance, over 40% of users of services located in sparse rural areas travel from towns and suburbs and cities.

**Table 5.1. Composition of catchment areas of cardiology and maternity and obstetrics service locations by degree of urbanisation, EU27+UK**

2011

Location by degree of urbanisation	Population in catchment area living in sparse rural areas (%)	Population in catchment area living in villages (%)	Population in catchment area living in towns and suburbs (%)	Population in catchment area living in cities (%)
<b>Cardiology</b>				
Sparse rural	36.3	20.6	40.7	2.4
Villages	37.1	26.0	33.9	3.1
Towns and suburbs	26.7	18.8	49.1	5.4
Cities	11.1	7.1	18.2	63.6
<b>Maternity and obstetrics</b>				
Sparse rural	35.3	17.5	43.5	3.7
Villages	36.9	25.4	33.8	4.0
Towns and suburbs	25.0	17.4	51.9	5.6
Cities	8.7	6.1	18.1	67.0

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

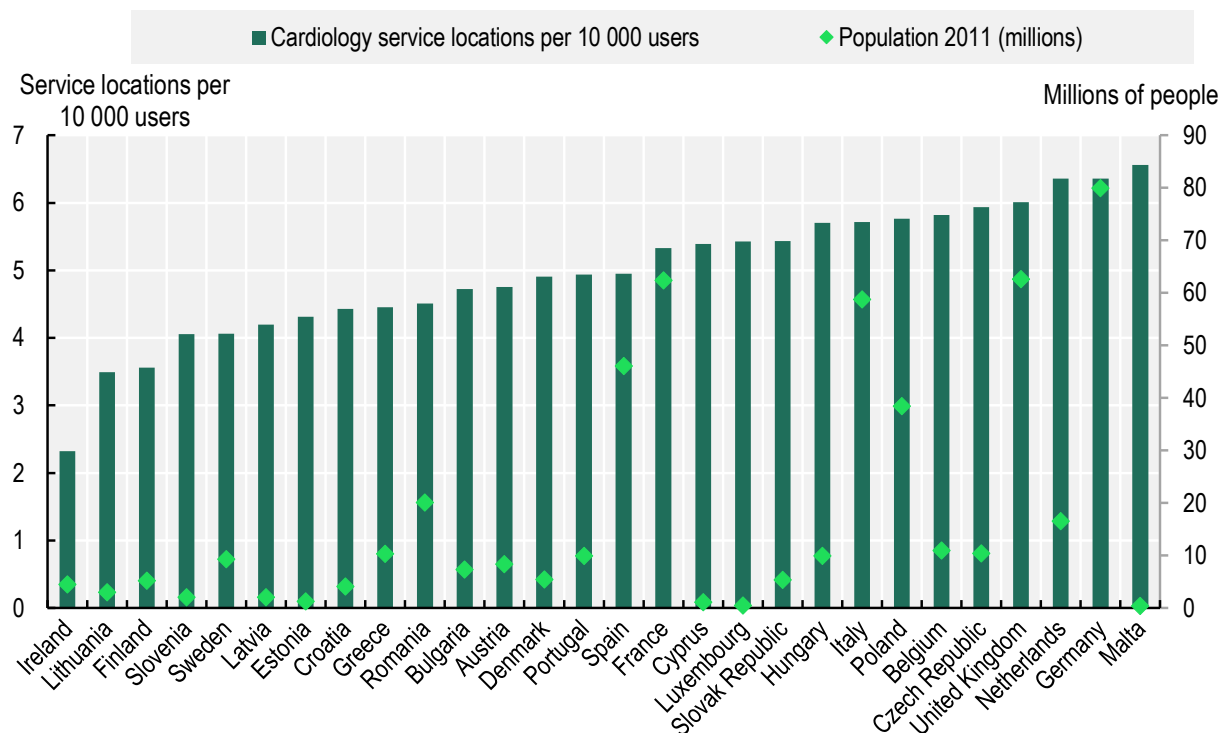
Estimates of cardiology and M&O service locations per 10 000 users plotted against country's total population show that for both services, the number of service locations per users has no clear relationship with total population across countries (Figure 5.5 and Figure 5.4). The number of service locations can be relatively high in relatively small countries like Malta, the Netherlands, and the Czech Republic. This happens because the placement of cardiology or M&O service locations depends not only on absolute demand, but also on sufficient density of users in the service catchment area. The consequence is that countries with extensive areas with a low demand density have low service provision in proximity.

Moreover, low demand results not only from the general distribution of population over space, but also from demographic profiles. The most striking example is the case of cardiology services in Ireland, where due to relatively low population densities and a young population, the demand for cardiology services in the modelled catchments is too low in rural areas and even in some cities, so that cardiology services exist only on the largest cities.



**Figure 5.5. Cardiology locations per 10 000 users (estimated) by country, EU27+UK**

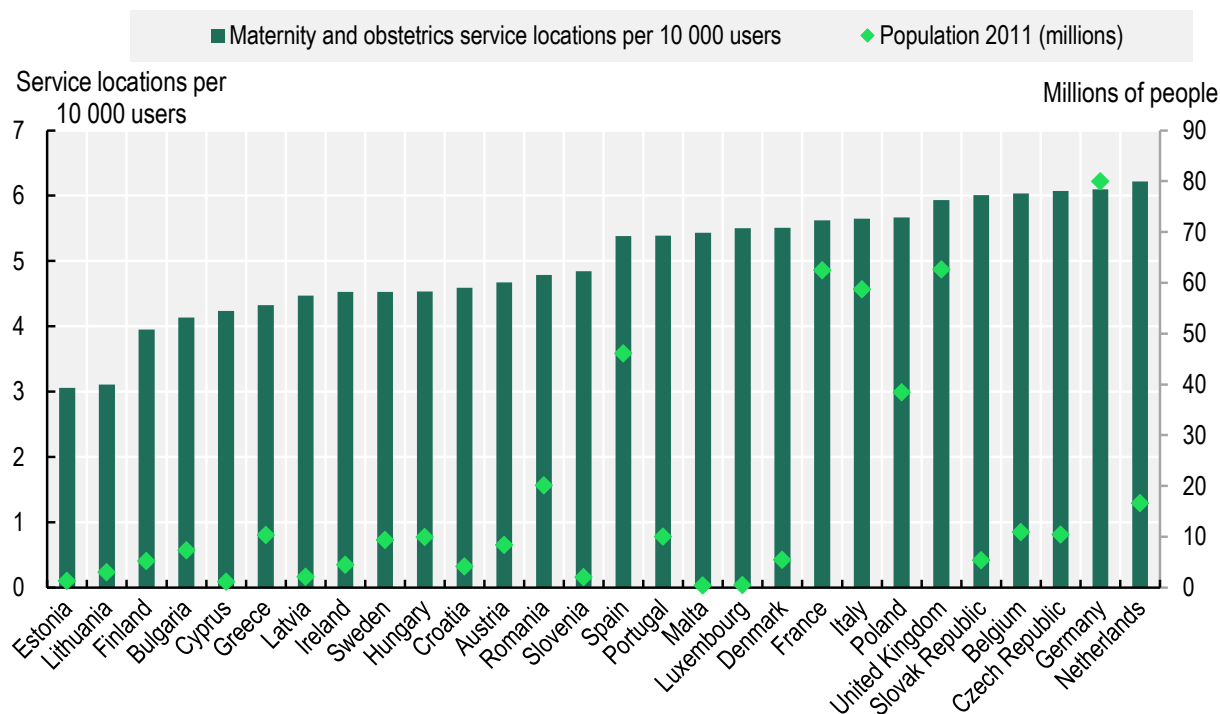
2011



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.6. Maternity and obstetrics locations per 10 000 users (estimated) by country, EU27+UK 2011**



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246640>

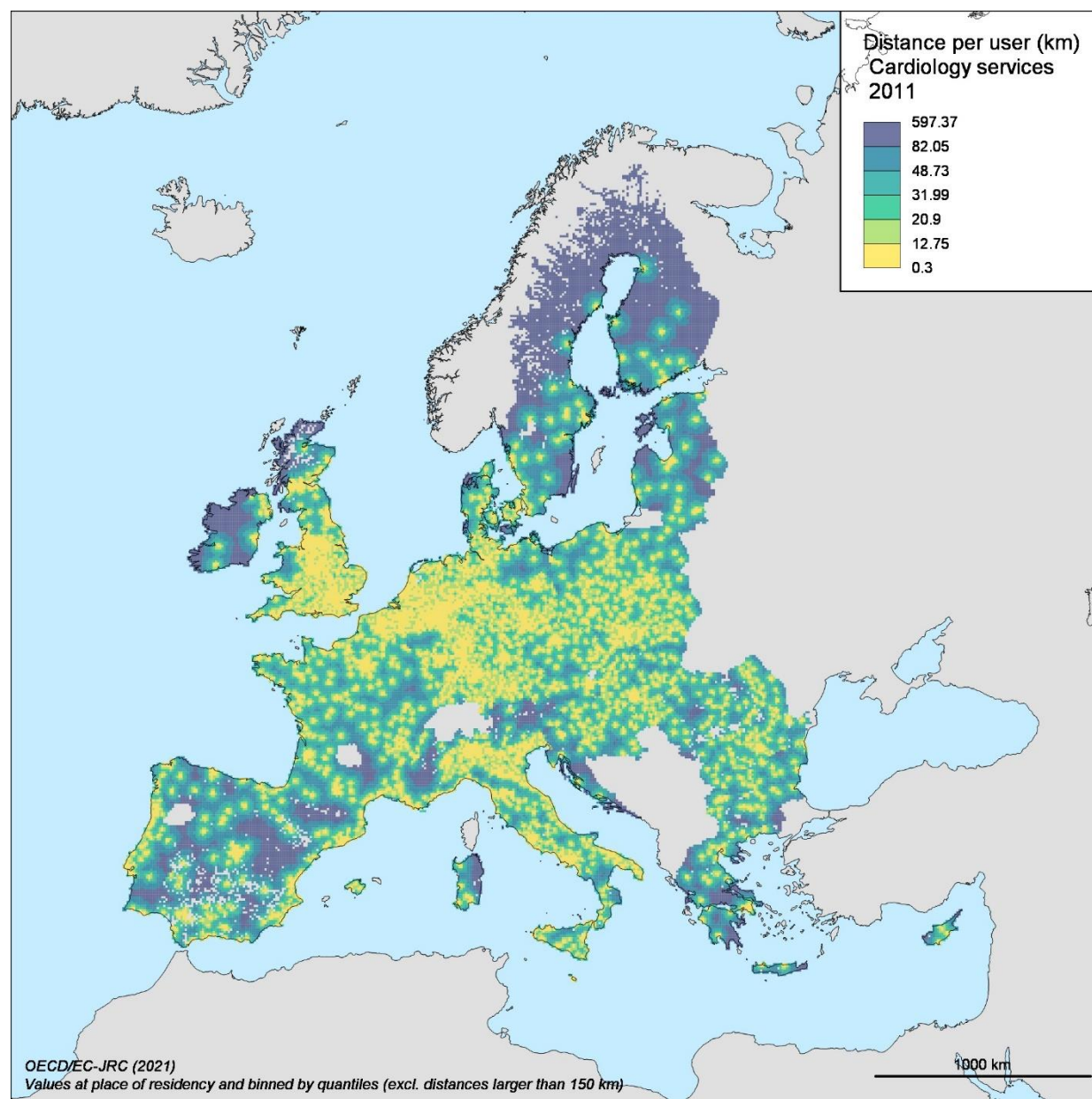
### Geographical differences in access to services

This section discusses the results of the estimates of geographical differences in accessibility to present-day services obtained from the method outlined in Chapter 4. According to the estimates, users in EU27+UK countries travel on average 32 km to access cardiology services (Figure 5.7) and 36 km to access M&O services (Figure 5.8).<sup>1</sup> Urban areas with high density of demand show the lowest distances across degrees of urbanisation. Distances are low across the board in countries where sparse rural areas are scarce, such as Belgium, the Netherlands, and the United Kingdom. Spain and France, on the other hand, have a mix of areas with relatively low and high access, while Nordic and Baltic countries, Ireland, and parts of Spain and Portugal stand out as areas with considerably longer distances.

While the general pattern of accessibility is similar for both cardiology and M&O services, there are some notable differences. Ireland, with its relatively young and disperse population, has better access to M&O services than to cardiology services. In contrast, in the east of Portugal, with an older population, access to cardiology is higher than access to M&O services.

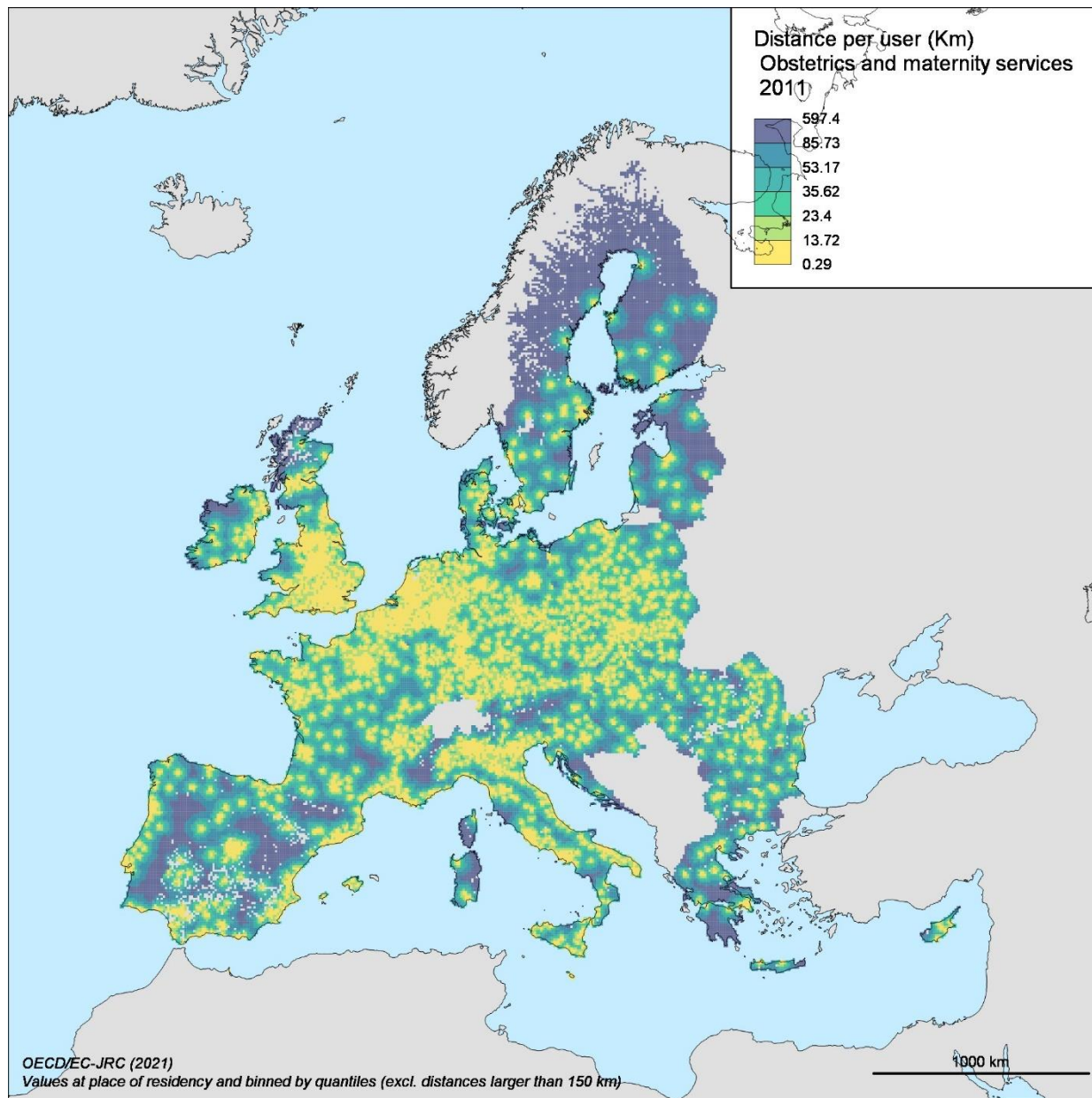
**Figure 5.7. Distance to cardiology service locations per user (estimated), EU27+UK**

2011



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

**Figure 5.8. Distance to maternity and obstetrics service locations per user (estimated), EU27+UK**  
2011



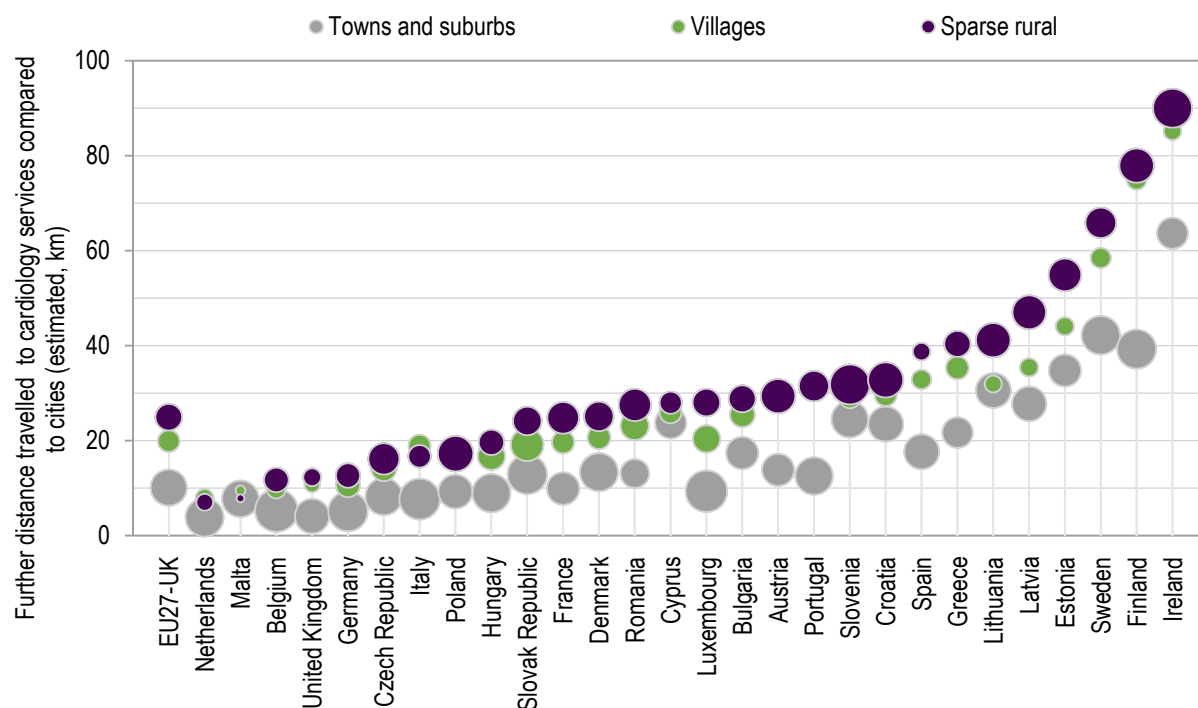
Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

While distances outside of cities are always larger, the penalty of living outside of cities in terms of travelled distance to services differs substantially across countries. In relatively dense countries where large expanses of sparse rural areas are rare, such as the Netherlands, Malta, Belgium, and the United Kingdom, users are fairly close to health services regardless of where they live (Figure 5.9 and Figure 5.10). On the other hand, in countries with large sparsely populated areas such as the Nordic and Baltic countries, rural-urban disparities in accessibility are much larger. In the extreme cases, users of cardiology living in sparse rural areas in Sweden, Finland and Ireland have to travel at least 60 km more than users in cities, as do users of M&O services in Finland and Latvia.

While distance to services is generally lower in towns and suburbs compared to rural areas, for both cardiology and M&O services, accessibility for towns and suburbs is worse when accessibility for rural areas is low (Figure 5.9 and Figure 5.10). This result contrasts with the schools accessibility results presented in Chapter 3. In fact, service provision in towns and suburbs depends not only on demand from the towns and suburbs themselves but from demand in surrounding areas. This means that limited demand in surrounding rural areas can imply that no service is present in a given town or suburb, in which case users from these areas have to travel longer to the next available location.

**Figure 5.9. Further distance travelled to cardiology service locations relative to cities (estimated) by country and degree of urbanisation, EU27+UK**

2011



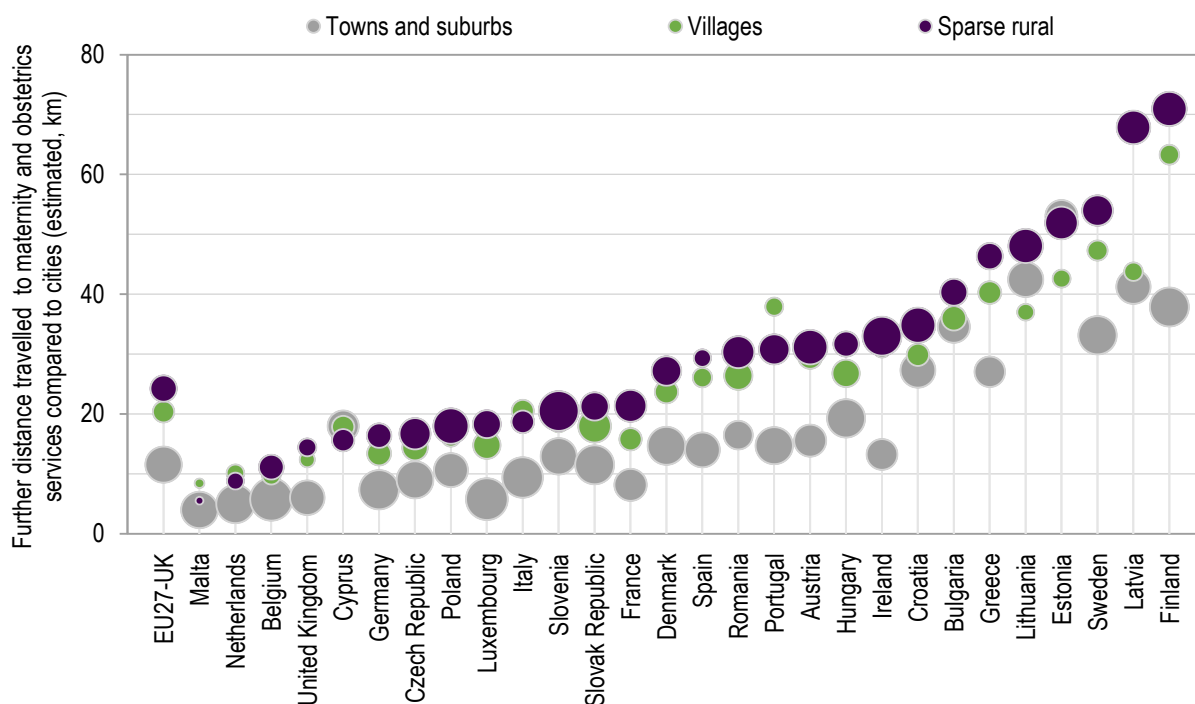
Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246659>

**Figure 5.10. Further distance travelled to maternity and obstetrics service locations relative to cities (estimated) by country and degree of urbanisation, EU27+UK**

2011



Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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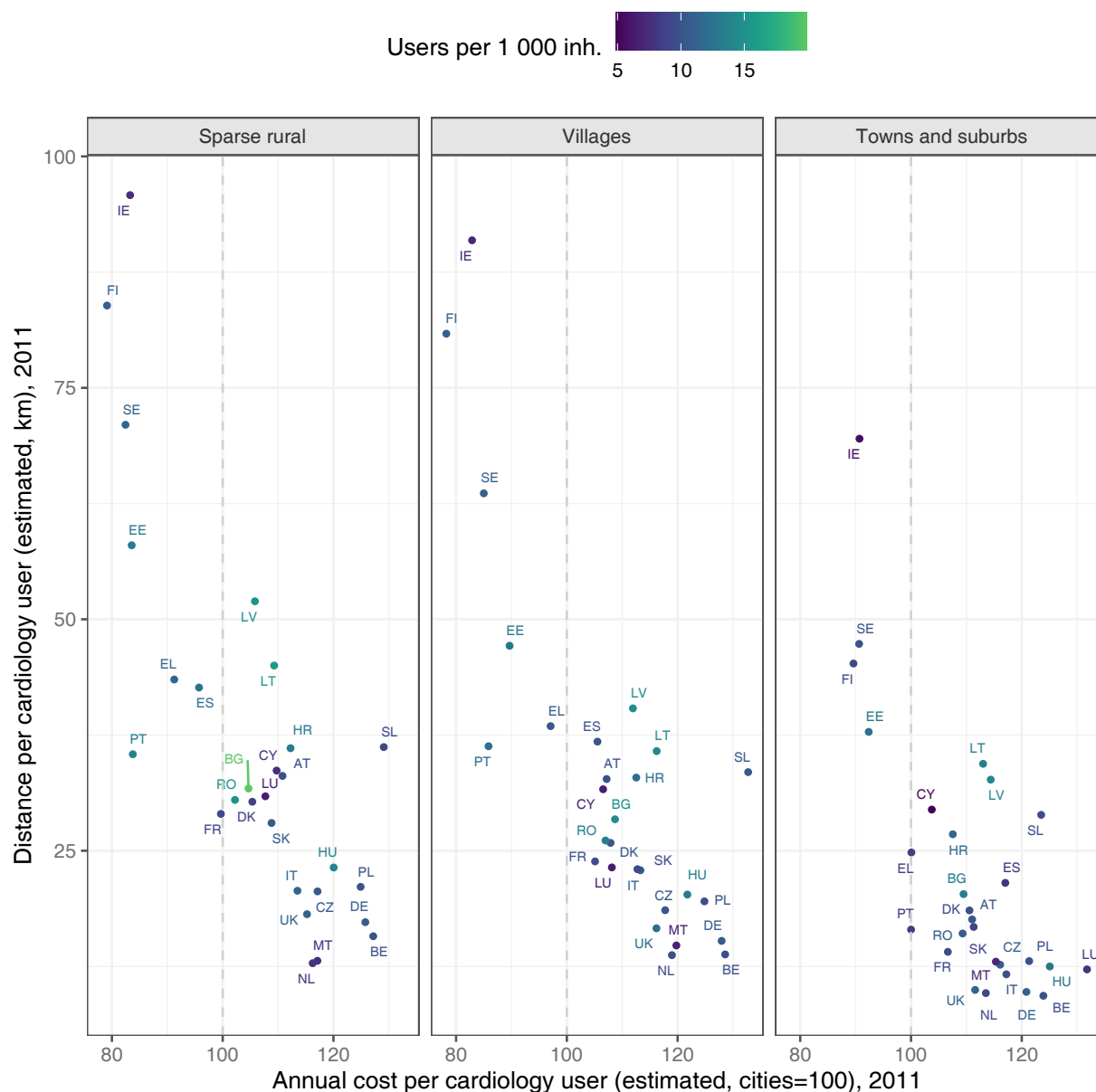
### **Relation between costs and accessibility**

To study the relationship between costs and distances, annual costs are expressed as indexes relative to costs per user in cities, while distances are expressed as the average additional distance relative to distances travelled by city dwellers.

In general, service provision outside of cities is a balance between accessibility and cost-efficiency: countries may have service locations that are fairly close or service locations that are cost-efficient, but, relative to cities, no country has low distances and low costs at the same time (Figure 5.11 and Figure 5.12). However, there are important differences between cardiology and M&O services. For cardiology services, while many countries have lower annual costs per user outside cities, in most cases users outside of cities have to travel over 25 km more on average to access the service (Figure 5.11). For M&O services, travelled distances are generally shorter compared with cardiology service locations, but this higher access is paired with higher annual costs per user (Figure 5.12).

**Figure 5.11. Cardiology services annual cost versus distance per user relative to cities by country and degree of urbanisation, EU27+UK**

2011



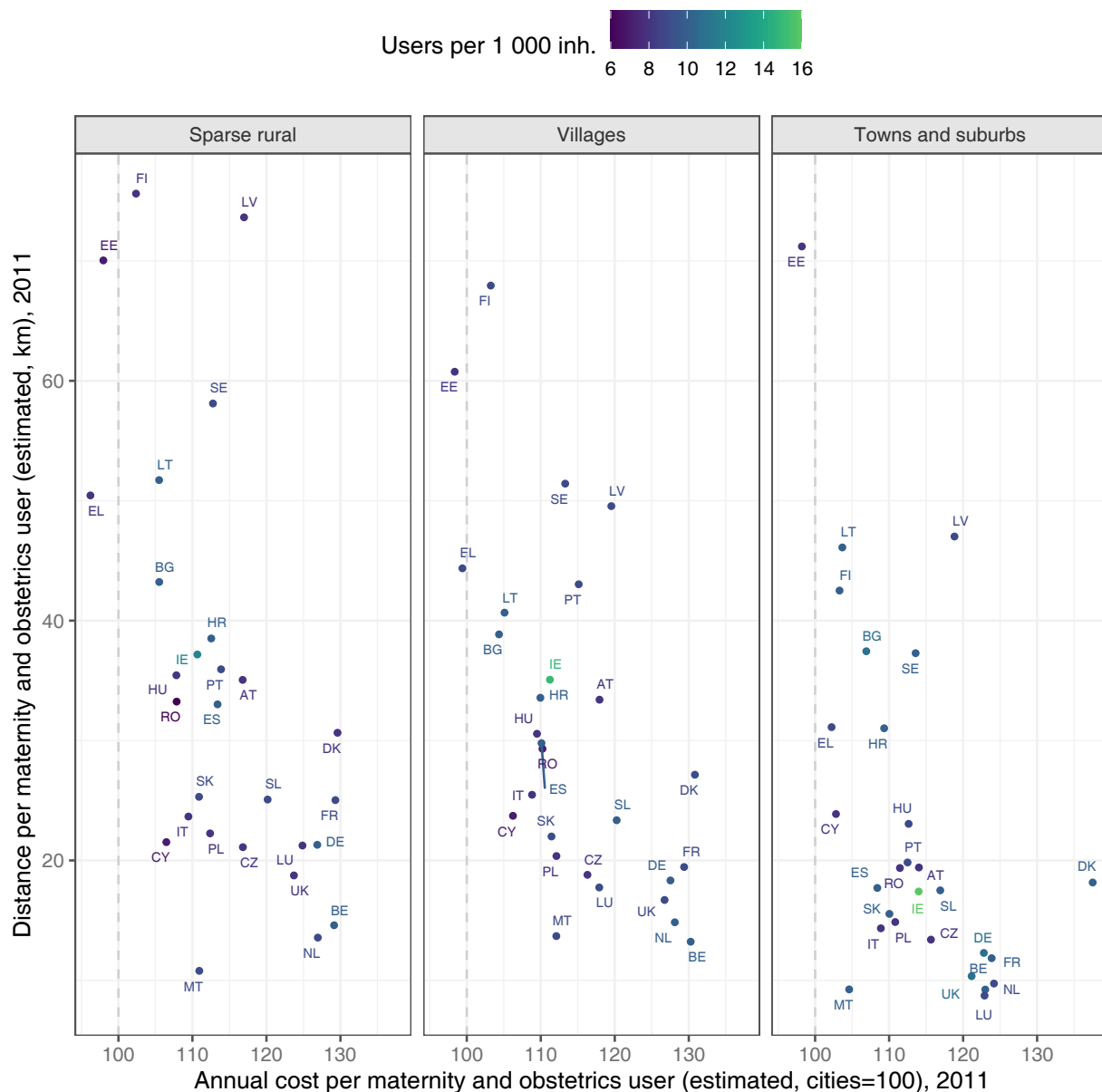
Note: In the figure, all bubbles for cities would score 100 on the x-axis and 0 on the y axis, and therefore city results are not shown.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).



**Figure 5.12. Maternity and obstetrics services annual cost versus distance per user relative to cities by country and degree of urbanisation, EU27+UK**

2011



Note: In the figure, all bubbles for cities would score 100 on the x-axis and 0 on the y axis, and therefore city results are not shown.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

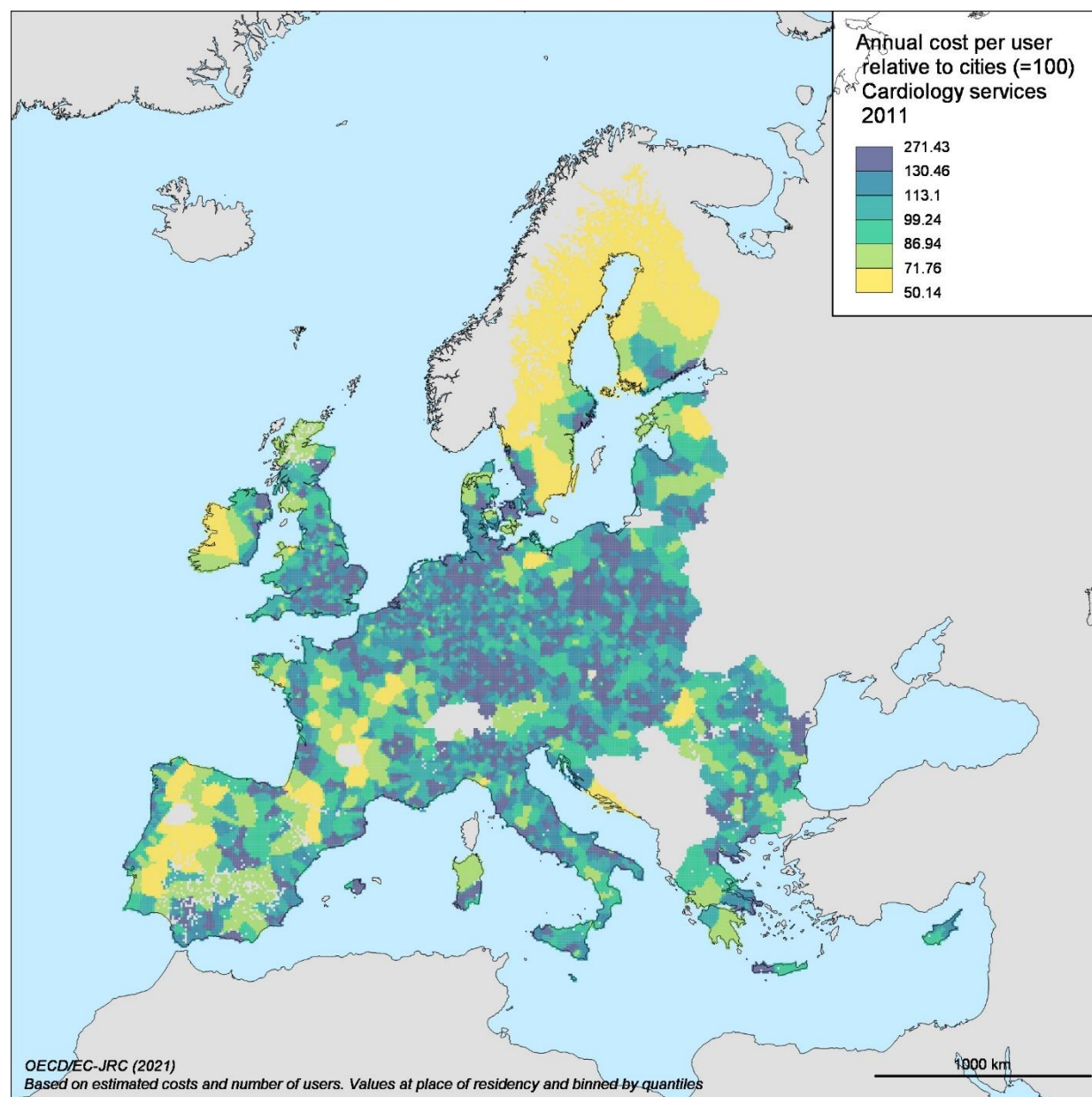
The map of average annual costs per user by degree of urbanisation shows that for both services, catchment areas are large where costs are low, for example in the north of Sweden and Finland, the west of Ireland and in the centre of France (Figure 5.13 and Figure 5.14). In these cases, cost-efficiency is high at the expense of considerable travel distances for users. On the other hand, the main cities in Europe are typically served at relatively low costs per user in relatively small catchment areas. These cities are surrounded by suburban service locations that operate at an often much higher cost because they serve



relatively small catchments with a lower density user base. This is visible in London and Madrid, where the difference between urban core and urban periphery stands out both for cardiology and M&O services.

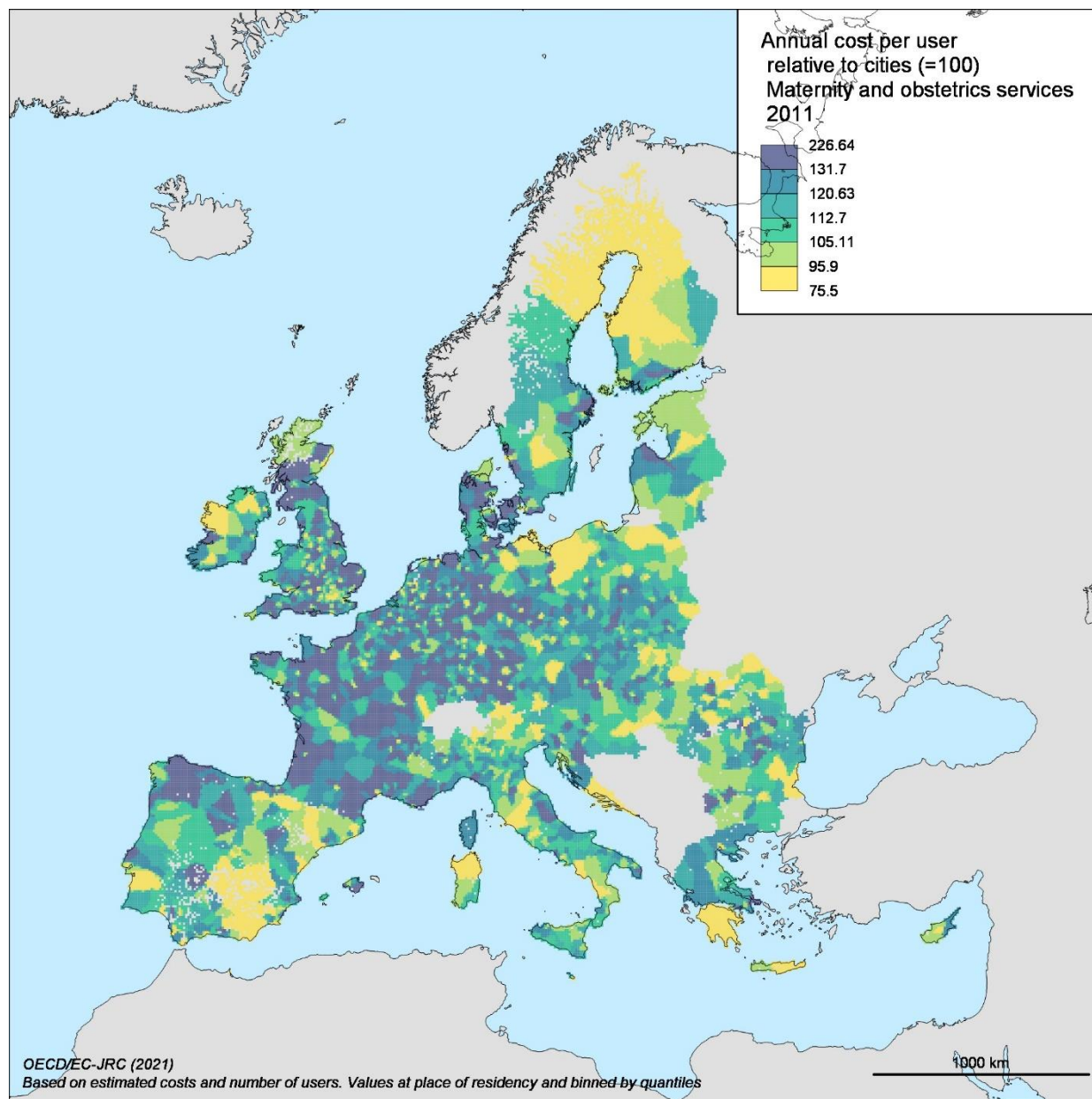
**Figure 5.13. Annual costs per cardiology user relative to cities (estimated), EU27+UK**

2011



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

**Figure 5.14. Annual costs per maternity and obstetrics user relative to cities (estimated), EU27+UK 2011**

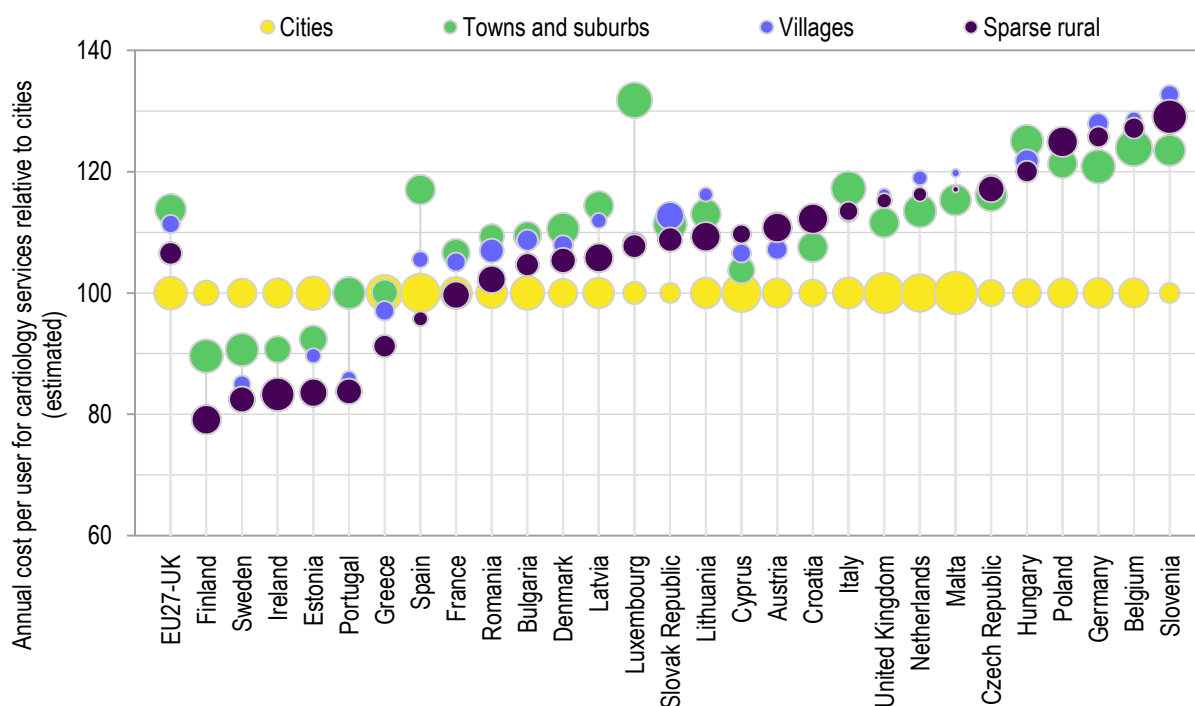


Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

When summarised by degree of urbanisation, the results show that, in all countries, provision of health services to cities is relatively cost-efficient compared to health service provision outside of cities. For cardiology, a limited number of countries have relatively expensive service provision in cities (Figure 5.15). These countries have generally service locations serving a large sizeable catchment area, which implies more cost-efficiency but also much longer travel distances to services for users outside cities. These large catchment areas are common for cardiology services, with service provision costs undershooting the costs for towns and suburbs in many countries. For M&O services, while cities generally have relatively lower costs (Figure 5.16), the majority of countries do not exhibit a similar pattern, with altogether less differences in costs between the different non-urban degrees of urbanisation and costs for towns and suburbs typically slightly lower than for rural areas.

**Figure 5.15. Annual costs per user for cardiology services relative to cities (estimated) by country and degree of urbanisation, EU27+UK**

2011



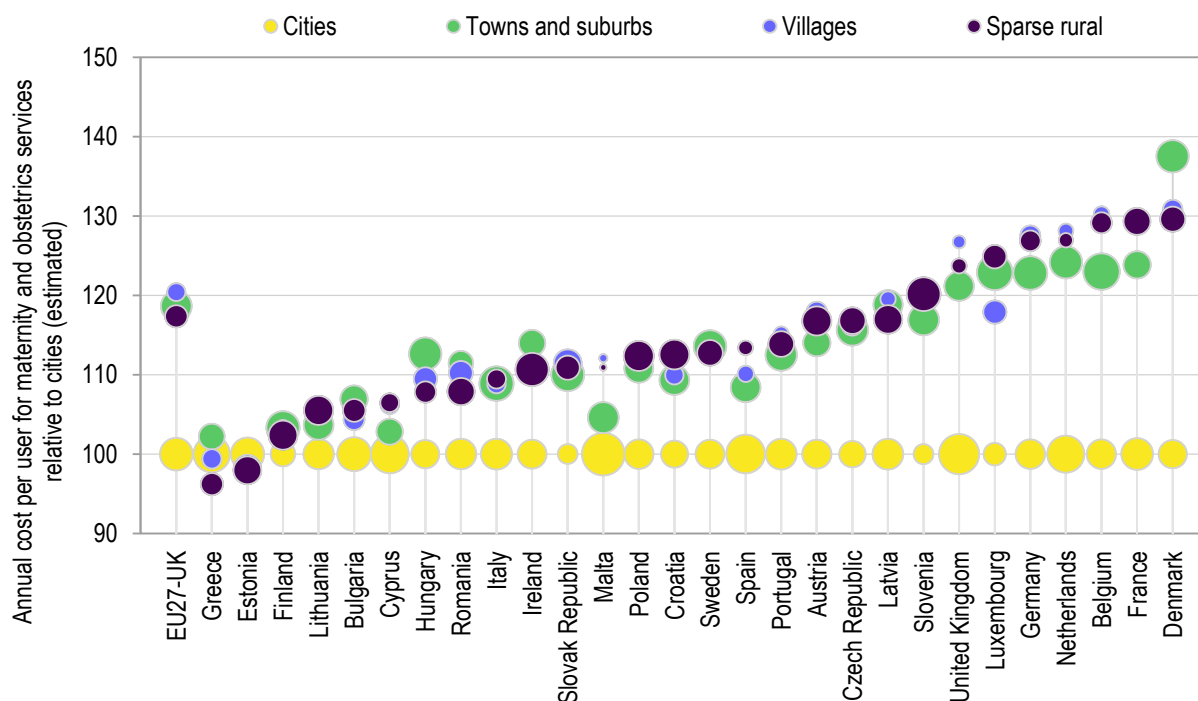
Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.16. Annual costs per user for maternity and obstetrics services relative to cities (estimated) by country and degree of urbanisation, EU27+UK**

2011



Note: Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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## Estimated future health care services access and costs in EU27+UK

Expected ageing, fertility changes and migration will contribute to considerable demographic changes in EU27+UK countries. These changes will affect demand for services, hence also for cardiology and M&O services. Ageing for instance reduces the demand for M&O services but increases the demand for cardiology services. International migration may exacerbate drops in demand in some countries, while offsetting the effect of ageing in others.

This section describes projected changes in the number of users and service locations across countries, and subsequent changes in the access and cost of cardiology and M&O services.

## Changes in health services demand and supply

Demand for cardiology services is expected to increase substantially in EU27+UK countries, in particular in cities and in towns and suburbs (Figure 5.17). Drops in cardiology demand are limited to rural areas in countries where considerable outmigration is foreseen, such as Romania, Hungary, Latvia, Lithuania and Spain. Changes in demand for M&O services are less straightforward, with a much smaller aggregate negative change that possibly hides a substantial geographical redistribution of demand due to opposing trends (Figure 5.18).

**Figure 5.17. Change in number of cardiology users (estimated) by country and degree of urbanisation, EU27+UK**

2011-35

Country name	Sparse rural	Villages	Towns and suburbs	Cities
EU27-UK	96800	100051	359383	328695
Spain	-6595	215	19678	57532
Italy	10376	11394	55789	52044
Germany	9386	25491	57462	37635
France	59955	22189	41015	32522
Poland	-652	6723	32651	28952
United Kingdom	21951	9267	25072	23710
Netherlands	8768	6691	24939	19820
Romania	-16267	-6775	9291	15309
Greece	219	2375	5996	11955
Portugal	-2060	550	9048	10262
Czech Republic	8712	5291	9862	5978
Bulgaria	-10379	-2507	2597	5602
Austria	5151	3179	6010	4394
Finland	5417	2698	9082	3750
Belgium	2340	3128	15353	3248
Sweden	6456	3562	10076	2817
Ireland	3454	757	2739	2673
Slovak Republic	1409	2832	6715	2645
Denmark	4808	3262	6619	2047
Cyprus	-1157	308	846	1413
Malta	116	55	659	1340
Hungary	-3544	-673	3897	1291
Croatia	-1219	387	1315	888
Slovenia	2722	462	1545	729
Lithuania	-8737	-938	208	675
Luxembourg	248	480	1046	438
Estonia	-461	29	314	422
Latvia	-3617	-382	-441	-1396

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246735>

**Figure 5.18. Change in number of maternity and obstetrics users (estimated) by country and degree of urbanisation, EU27+UK**

2011-35

Country name	Sparse rural	Villages	Towns and suburbs	Cities
EU27-UK	44476	13672	17245	91082
Spain	-12098	-12040	-39062	-68184
Poland	-21493	-3869	-17252	-30612
Germany	-6068	-4098	-14021	-25357
France	43887	17764	19660	-17413
Romania	-800	278	-2726	-15844
Greece	-1439	-517	-1426	-12213
Netherlands	6878	2993	11528	-8497
Ireland	660	-530	-3173	-7895
Bulgaria	-3494	-2537	-3673	-6453
Czech Republic	358	-654	-2952	-5144
Lithuania	-5074	-902	-3041	-3775
Sweden	8612	2634	8220	-3446
Slovak Republic	-2795	-3171	-7102	-3384
Portugal	-2809	-764	-4823	-3099
Latvia	-2376	-349	-1420	-2976
Finland	4672	1745	1885	-2182
Hungary	-1181	-925	919	-2014
Estonia	-447	-104	-457	-1735
Croatia	-1417	-214	-1498	-1560
Cyprus	-2685	-152	-306	-1090
Slovenia	-1376	-471	-1061	-530
Malta	138	5	6	-51
Denmark	3955	3199	5746	45
Luxembourg	838	823	2122	407
Austria	3646	728	1233	2861
Italy	15232	5440	16217	7432
Belgium	4475	2482	10232	8443
United Kingdom	16677	6878	8980	13184

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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Changes in demand, combined with the geographical distribution of population, imply changes in the number of projected cardiology and M&O service locations. Such changes are substantial for a number of countries.

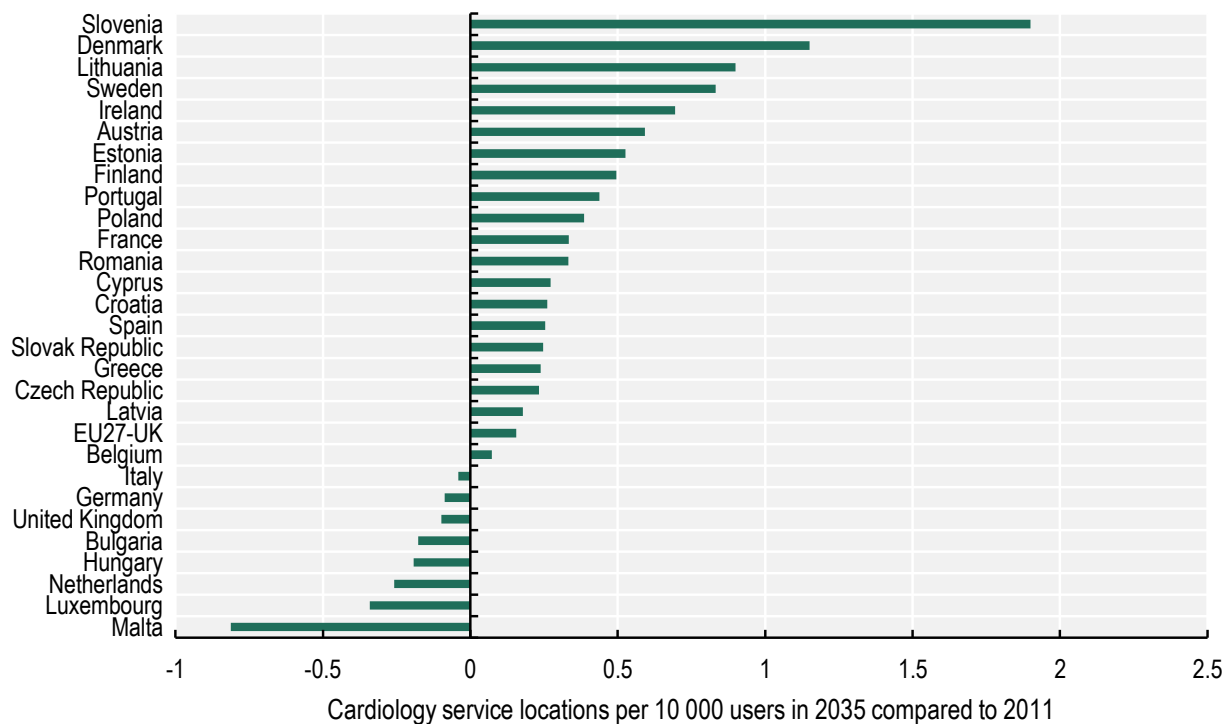
For cardiology services, the number of service locations per user is expected to increase by 0.16 locations per 10 000 users in EU27+UK countries, with changes ranging from 1.9 in Slovenia to -0.8 in Malta (Figure 5.19). In absolute terms, the number of cardiology service locations is expected to increase from 2 798 to 3 379. The increases in the number of service locations per 10 000 users are largest in Slovenia, Denmark, Lithuania and Sweden. For Slovenia, a change of about 2 service locations per 10 000 users represents an increase from 8 to 15 service locations between 2011 and 2035. In some countries, changes in levels and distribution of demand are projected to lead to a lower number of service locations per user in the future. This is the case for Malta, Luxemburg, the Netherlands, Bulgaria, the United Kingdom, and Germany.

For M&O services, on the other hand, the number of service locations per user is expected to decrease by 0.1 service locations per 10 000 users on average for EU27+UK countries (in absolute terms a decrease from 2 650 to 2 539 M&O service locations), with changes ranging from 1 in Cyprus to -2.2 in the Slovak Republic (Figure 5.20). The reductions are largest in the Slovak Republic, Latvia, Croatia, and Slovenia. While the largest reduction represents a projected decrease from 32 to 14 M&O service locations in the Slovak Republic, smaller changes in the number of service locations per user may still represent a significant reduction in absolute terms: in Spain, for instance, the M&O service locations are projected to fall from 235 in 2011 to 161 in 2035. On the other hand, a group of 10 countries is expected to have more service locations per user in the future, including Cyprus, Estonia, Luxemburg, and Bulgaria.



**Figure 5.19. Change in cardiology service location counts per 10 000 users (estimated) by country, EU27+UK**

2011-35

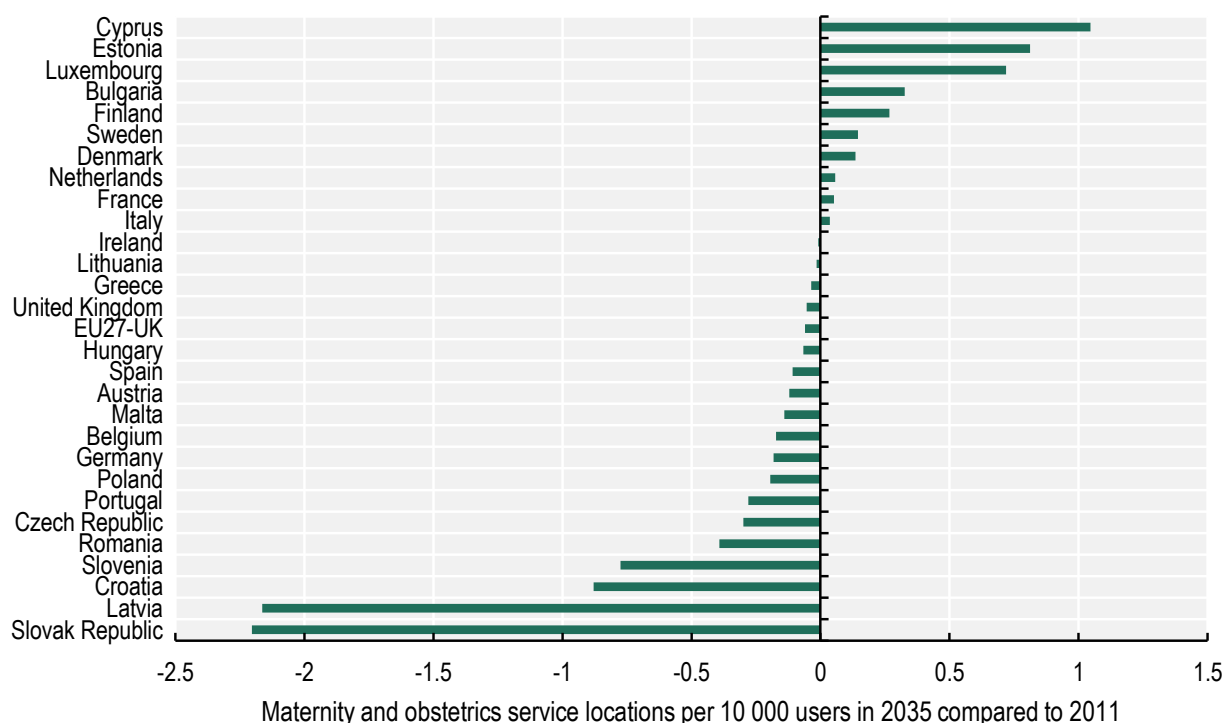


Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246773>

**Figure 5.20. Change in maternity and obstetrics service locations counts per 10 000 users (estimated) by country, EU27+UK**

2011-35



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246792>

### **Consequences for accessibility**

The foreseen changes discussed previously will affect access to health care services substantially. Accessibility improvements are expected where increases in demand allow for additional service locations, while decreases can be expected in places where future local demand is expected to decline. This section focuses on the changes in accessibility to cardiology and M&O services following population changes between 2011 and 2035.

For cardiology services, travel distances to locations offering the service are expected to decrease across most EU27+UK countries because of the expected increases in demand and supply, following ageing (Figure 5.21). In this context, however, some countries may face a decline in accessibility. This is the case in most of Estonia, and areas outside cities in the other Baltic countries, Bulgaria, Hungary and Romania. In general, accessibility improvements following the appearance of additional future service locations are most noticeable outside of cities, because modelled travel distances in cities are already low, and some of the additional future demand may be covered with existing service locations.

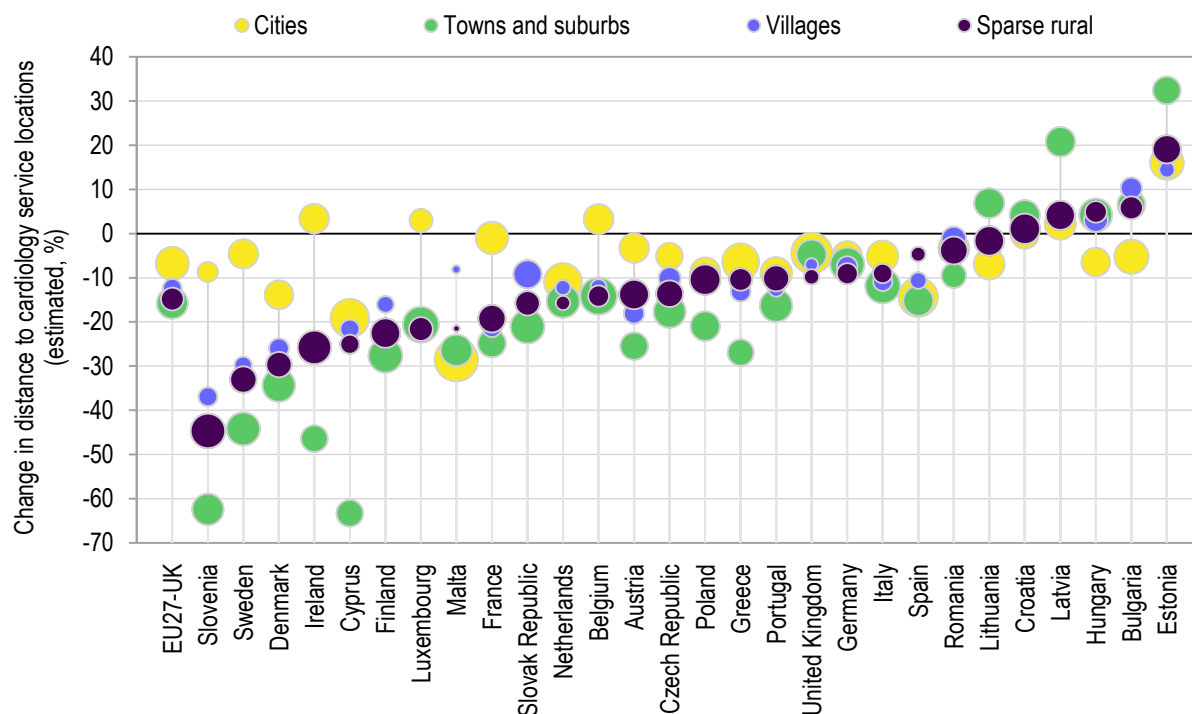
While in general terms access to M&O service locations is expected to decline, the patterns are more mixed than for the case of cardiology, owing to different trends in future demand across countries (Figure 5.22). In a limited set of countries including Austria, Belgium, France and Italy, access to M&O services is expected to be stable or improve slightly across the territory. In the majority of EU27+UK



countries, accessibility to M&O services is expected to decline the most in cities, due to the projected move of a share of women away from cities.

**Figure 5.21. Change in distance to cardiology service locations (estimated) by country and degree of urbanisation, EU27+UK**

2011-35



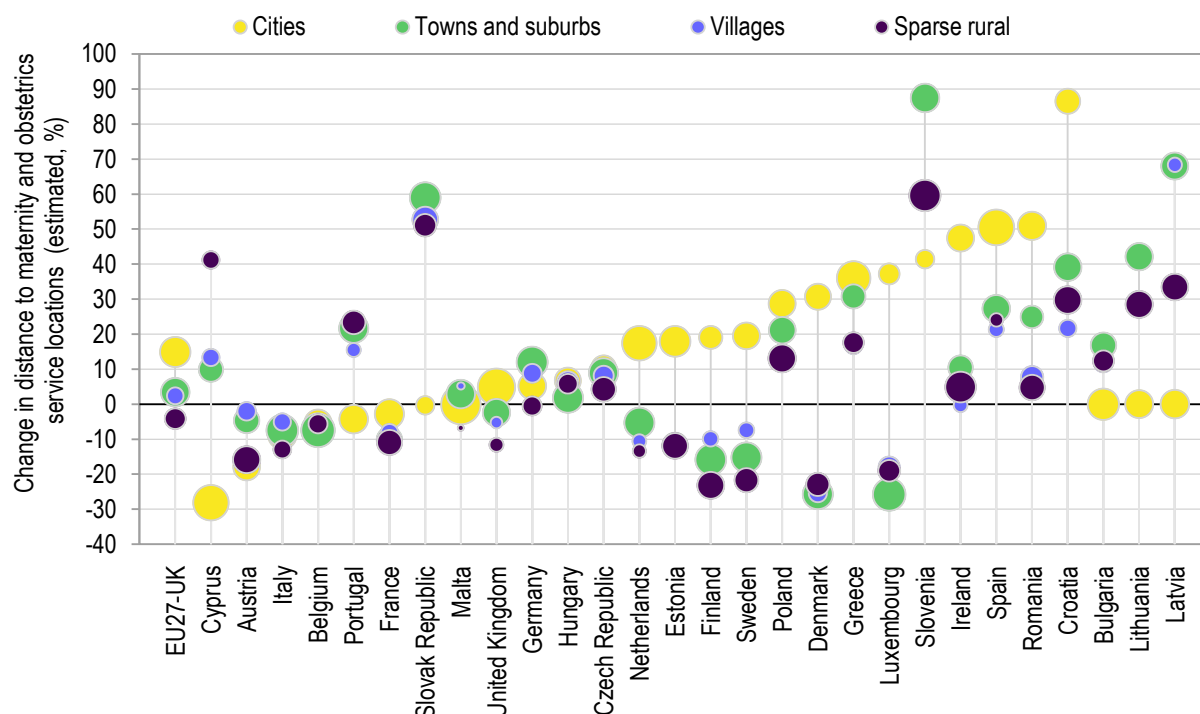
Note: For readability of the figure, values above 100% are not shown. Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.22. Change in distance to maternity and obstetrics service locations (estimated) by country and degree of urbanisation, EU27+UK**

2011-35



Note: For readability of the figure, values above 100% are not shown. Bubble areas represent the share of national population.

Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

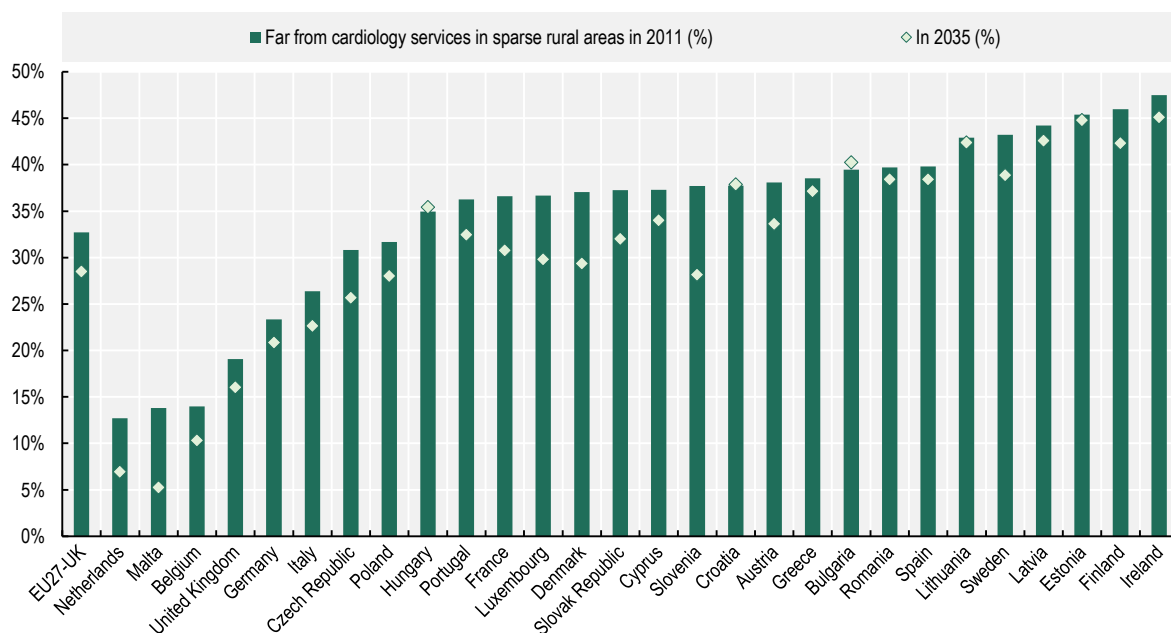
StatLink  <https://doi.org/10.1787/888934246830>

While users in sparse rural areas are the most disadvantaged in access to health care services, future access is projected to increase for services experiencing demand increases. For cardiology, the share of sparse rural population that lives far from a cardiology service location is expected to decline by 2035 in most countries (Figure 5.23). Bulgaria, Croatia, Estonia, Hungary, and Lithuania are exceptions to this pattern. In those countries, population change is projected to worsen access to cardiology in sparse rural areas.

For M&O services, the future access projections are more mixed, with a slight overall decrease in the sparse rural population living far from these service locations, but considerable variance across countries (Figure 5.24). In countries with an urbanised and dense population distribution including Belgium, Malta, the Netherlands, and the United Kingdom, less than 20% of the sparse rural population lives far from a cardiology service location, and less than 30% lives far from an M&O service location. On the other hand, in Nordic and Baltic countries, over 40% of the sparse rural population is expected to live far from service locations by 2035.

**Figure 5.23. Share of users living far from cardiology services in sparse rural areas (estimated) by country, EU27+UK**

2011-35

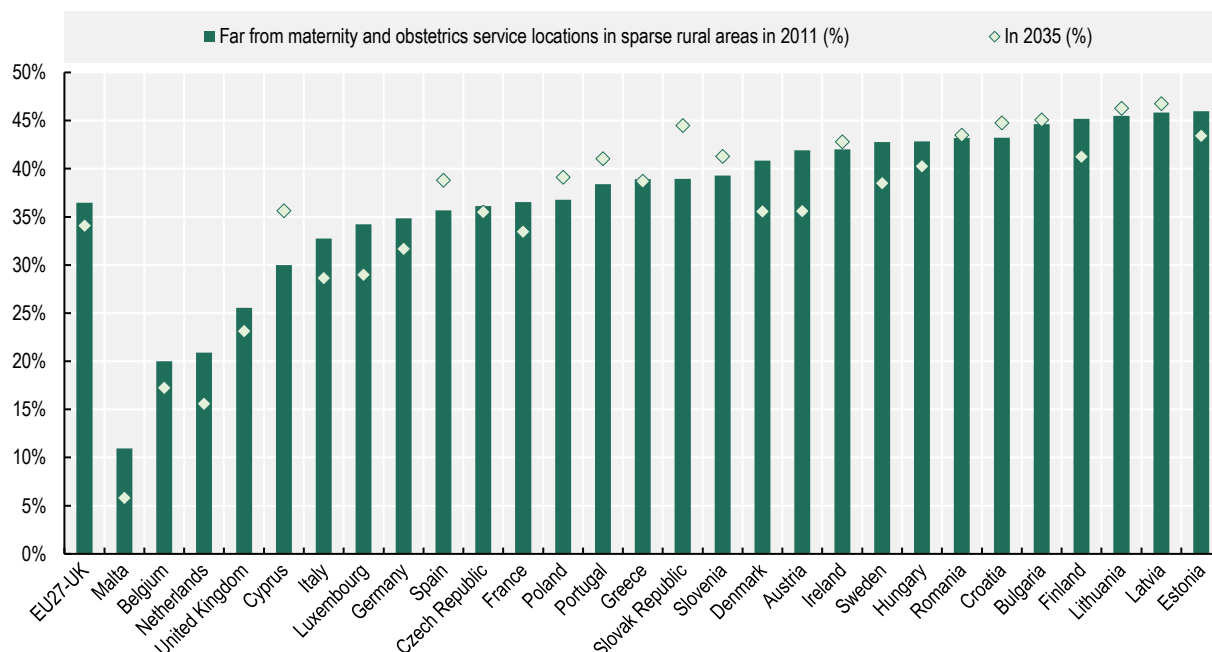


Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

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**Figure 5.24. Share of users living far from maternity and obstetrics services in sparse rural areas (estimated) by country, EU27+UK**

2011-35



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).

StatLink  <https://doi.org/10.1787/888934246868>

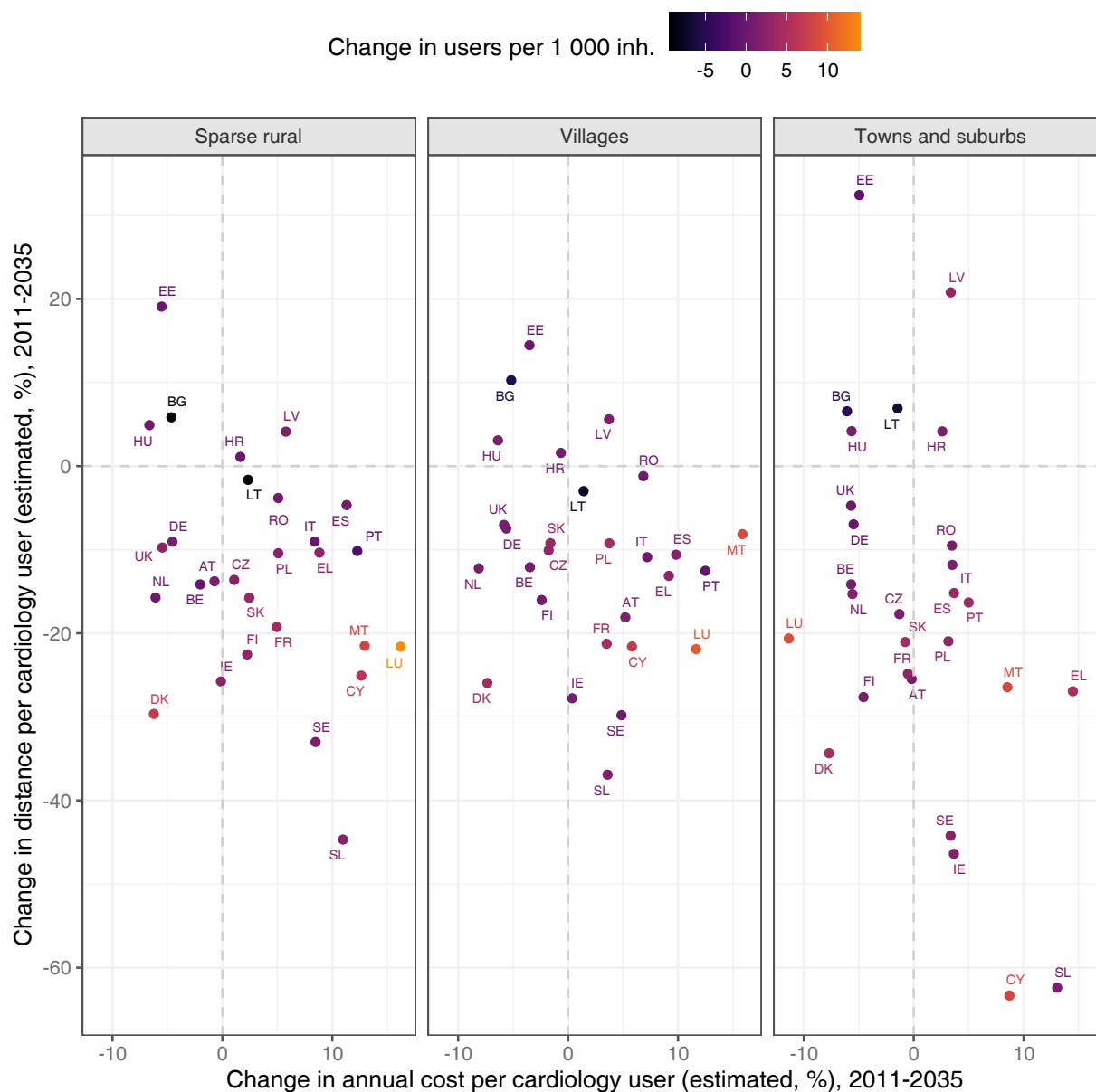
### **Changes in the relation between costs and accessibility**

The foreseen changes in demand and supply will likely affect the balance between costs and access in the EU27+UK. For cardiology, the increase in demand means that many countries can foresee an improvement in accessibility paired with a decrease in average cost per user (Figure 5.25). This happens under the assumption that new service locations may appear to partly satisfy additional demand. However, countries expected to face considerable outmigration, including Bulgaria, Estonia and Latvia, may see a decline in access to cardiology services because the reduction of demand is expected to lead to further concentration of supply in cities. On the other hand, countries with relatively large cardiology demand increases in rural areas including Ireland, Slovenia and Sweden may experience increased access in towns and suburbs due to additional service locations serving these areas and their rural hinterland. These accessibility gains come however at the cost of higher costs per user.

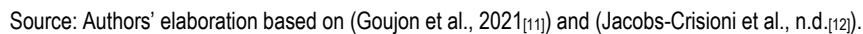
M&O services have almost the opposite trends to cardiology, following the expected changes in demand for these services (Figure 5.26). Future accessibility improvements are much more limited in scope, with a limited number of countries seeing increased demand for this service, and consequently both accessibility and cost-efficiency improvements. Many EU27+UK countries will see a decline in demand for M&O services, potentially resulting in less service locations and reduced cost efficiency in the remaining service locations. In Estonia, however, accessibility is expected to improve, despite an overall decrease in demand, although at a much-reduced cost efficiency.

**Figure 5.25. Changes in cardiology annual costs versus distance per user relative cities (estimated), EU27+UK**

2011-35



Source: Authors' elaboration based on (Goujon et al., 2021<sup>[11]</sup>) and (Jacobs-Crisioni et al., n.d.<sup>[12]</sup>).



## Conclusion

This chapter applies the method outline in Chapter 4 to estimate access and costs of cardiology and maternity and obstetrics (M&O) services to EU27+UK countries. The estimations aim to capture how the geographical distribution of the population and demographic factors affects the present and future demand for services, and how these demand patterns translate into differences in cost and access across places.

The results for cardiology and M&O services in this chapter demonstrate that low demand for a service is not only driven by the general distribution of population over space, and also by the demographic profiles. On average for EU27+UK countries, the demand for cardiology services, approximated by local death rates, is relatively larger in rural areas and lower in cities. In contrast, the demand for M&O services, approximated by local birth rates, is larger in cities than in rural areas.

The simulated placement of service location results in median user travel distances of about 32 km for cardiology and 37 km for M&O services. These figures however mask significant geographical variations. While users outside cities always have to travel longer distances, the difference is small in relatively dense countries against countries with large sparsely populated areas, reaching an additional 60 km in some cases.

Importantly, this chapter highlights that, because of the relatively large catchment areas of the services considered, health services placed in a given degree of urbanisation serve a mix of population coming from different areas. This is particularly true for services placed in rural areas: for instance, over 40% of users of services located in sparse rural areas travel from towns and suburbs, and cities. This insight has relevance for service provision in towns and suburbs, as some will be serving relatively sparse rural hinterlands, and others will not reach sufficient user demand and will have their population also travelling long distances to access specific health services. In this sense, as accessibility for towns and suburbs is worse when accessibility for rural areas is low, access does not directly depend on local densities but also on what happens in surrounding areas.

The results in this chapter clearly show that health service provision outside cities is a balancing act between costs and access. In sparsely populated areas, the implication is that good access to health services is possible only at a much higher cost or vice-versa, that relatively more cost-efficient provision comes at the cost of significant distance to services. There are important differences in this general principle between cardiology and M&O services. For cardiology services, while many countries have lower costs per user outside cities, in most cases users outside of cities have to travel over 25 km more on average to access the service. For M&O services, travelled distances are generally shorter compared with cardiology service locations, but this higher access is paired with higher costs per user.

Foreseen demographic changes will have mixed effects on services cost and access. Demand for cardiology services and consequently the number of service locations are expected to increase substantially in EU27+UK countries as a result of ageing, in particular in cities and in towns and suburbs. Fertility trends expressed in lower expected births will decrease the demand and service locations for M&O services in many countries, and particularly in cities. International migration may exacerbate drops in demand in some countries, while offsetting the effect of ageing in others. Changes in demand will certainly increase the pressure of decisions between accessibility and cost efficiency, especially in places experiencing the largest demographic changes.

The data elaborated in this chapter also can help to undertake more refined analysis in specific countries to better understand the costs and access implications of current and future cardiology and M&O services.

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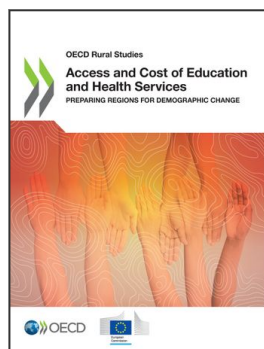
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<https://doi.org/10.1016/j.healthplace.2020.102406>.

## Note

<sup>1</sup> A few very large distances (close to 600 km) are present in isolated islands and border communities that, due to geography, typically have to make a long detour to reach services in the simulated access set up.



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