

Environmental health inequalities

Fact sheet series

Context

This fact sheet series documents the magnitude of environmental health inequalities within countries in the WHO European Region.

Environmental health inequalities relate to socioeconomic, sociodemographic or spatial differences in exposure to environmental health risk factors and to differences in health status caused by environmental conditions.

The household utility costs and energy poverty fact sheet provides available data on the unequal distribution of arrears on utility bills (such as heating, electricity, gas and water); energy expenditure; and primary reliance on polluting fuels for cooking, space heating and lighting within countries in the Region, updating earlier assessments.

An overview of environmental health inequalities covered by the fact sheets and earlier assessments is available at: <https://www.who.int/europe/activities/reducing-environmental-health-inequalities>

Inequalities in household utility costs and energy poverty

Key messages

1

Household utility costs present a major challenge for many households in Europe. South-eastern European countries have the highest prevalence of arrears on utility bills and the largest absolute inequalities by relative poverty level.

2

Households below the relative poverty level suffer much more often from difficulties paying utility bills than households above it, and single-parent households below the relative poverty level are often by far the most disadvantaged group.

3

In many central and south-eastern European countries low-income households spend more than 10% of their income on energy. Often, their energy expenditure is twice as high as that of affluent households.

4

In many countries the rural population, certain ethnic groups and people living in poverty rely more often on polluting fuels that are harmful for health.

Household utility costs and energy poverty are linked to Sustainable Development Goals 3, 7, 10 and 11, and support the identification of national challenges to “leave no one behind”.



Methodological notes

Defining inequalities

Environmental health inequalities are the differences in environmental health conditions between population groups. They can be quantified as absolute and relative inequalities.

Absolute inequalities are quantified by differences in the prevalence of a risk factor or disease between population groups (e.g. between poor and rich households). Relative inequalities, in contrast, are quantified as ratios between population groups.

To provide an accurate assessment, absolute and relative inequalities are equally important. The data in this fact sheet thus aim (when possible) to provide information on both measures.

Further information on defining and assessing environmental health inequalities is available from WHO's environmental health inequalities resource package (1).

Indicator data

The data source for Fig. 1 to Fig. 5 is the European Union Statistics on Income and Living Conditions (EU-SILC) (2020 data), based on self-reported data from households on their housing and social situation (2). EU-SILC defines arrears on utility bills as the inability to pay utility bills (such as heating, electricity, gas and water) for the main dwelling in the past 12 months due to financial difficulties.

The data source for Fig. 6 is the Eurostat Consumption expenditure of private households database (data from 2015/2020), which is based on national household budget surveys (3). These surveys define energy expenditure as the costs of electricity, gas and other fuels.

The data source for Table 2 is the United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Surveys (MICS) (data from 2018–2022) (4).

These provide internationally comparable data on diverse social and environmental aspects, including primary reliance on polluting fuels such as coal, wood, plastic or other materials that are burned to produce energy for cooking, space heating and lighting.

Indicator	Description	Source and variable code
Household utility costs	Population with arrears on utility bills (such as heating, electricity, gas and water) in the past 12 months	EU-SILC: ilc_mdcs07 (2)
Energy poverty	Energy expenditure as a percentage of household income	Eurostat Consumption expenditure of private households database: hbs_str_t223, code CP045 (3)
	Percentage of household members in households with primary reliance on polluting fuels for cooking, space heating and lighting	UNICEF MICS (4)

Methodological notes

Inequality stratifications

To show inequalities within countries, prevalence data can be compared between population subgroups, stratified by:

- socioeconomic determinants (e.g. income, poverty, education or employment);
- sociodemographic determinants (e.g. age, gender, ethnicity or household type); or
- spatial determinants (e.g. place of residence).

Box 1 shows the inequality stratifications used in this fact sheet.

Box 1. Inequality stratifications

Ethnicity

This fact sheet presents data for different ethnic groups, including the most disadvantaged ethnic group in a country or area.

Household type

This fact sheet differentiates between single-parent households and the general population.

Income

The population is divided into income quintiles, each covering a fifth of the total population.

Place of residence

The population is divided into three groups of urbanization (cities, towns and suburbs, and rural areas).

Poverty

Households are divided into those living at or above and those living below the poverty threshold of 60% of the national median equivalized income.

To provide an overview and compare inequality conditions by geopolitical subregion, countries were grouped into four subregions to provide population-weighted subregional averages (**Table 1**). Countries with available data are shown in **bold**.

Table 1. European subregions used for the assessment

Subregion	Coverage	Countries included
Subregion 1 (21 countries)	All countries belonging to the European Union (EU) before May 2004 and western European countries at comparable developmental level	EU countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands (Kingdom of the), Portugal, Spain, Sweden Non-EU countries: Andorra, Iceland , Monaco, Norway , San Marino, Switzerland, United Kingdom
Subregion 2 (13 countries)	All countries joining the EU after May 2004	Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia
Subregion 3 (12 countries)	All countries belonging to the Commonwealth of Independent States, and Georgia and Ukraine	Armenia, Azerbaijan, Belarus, Georgia , Kazakhstan, Kyrgyzstan , Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
Subregion 4 (7 countries)	All countries that are part of the South-eastern Europe Health Network, and Türkiye	Albania , Bosnia and Herzegovina, Israel, Montenegro, North Macedonia, Serbia, Türkiye

Note: The EU-SILC data and the Eurostat Consumption expenditure of private households database do not cover Subregion 3 countries. UNICEF MICS include four Subregion 3 and three Subregion 4 countries.

Status of inequalities in household utility costs and energy poverty

Introduction and health relevance

Household utility costs encompass the issues of availability and affordability of basic services, such as energy or water. Inadequate or unaffordable basic services can have direct impacts on health. Living in cold and damp homes contributes to a variety of mental stressors, as well as physical discomfort. An adequately warm home with temperatures above at least 18 °C contributes to higher life expectancy and to mental and physical well-being (5). It also reduces excess winter deaths and health risks associated with cardiovascular and respiratory diseases (6).

Availability and affordability of clean energy, water and sanitation vary between and within countries, and less affluent households often cannot afford these basic services. Within the WHO European Region, prevalence of arrears on utility bills varied

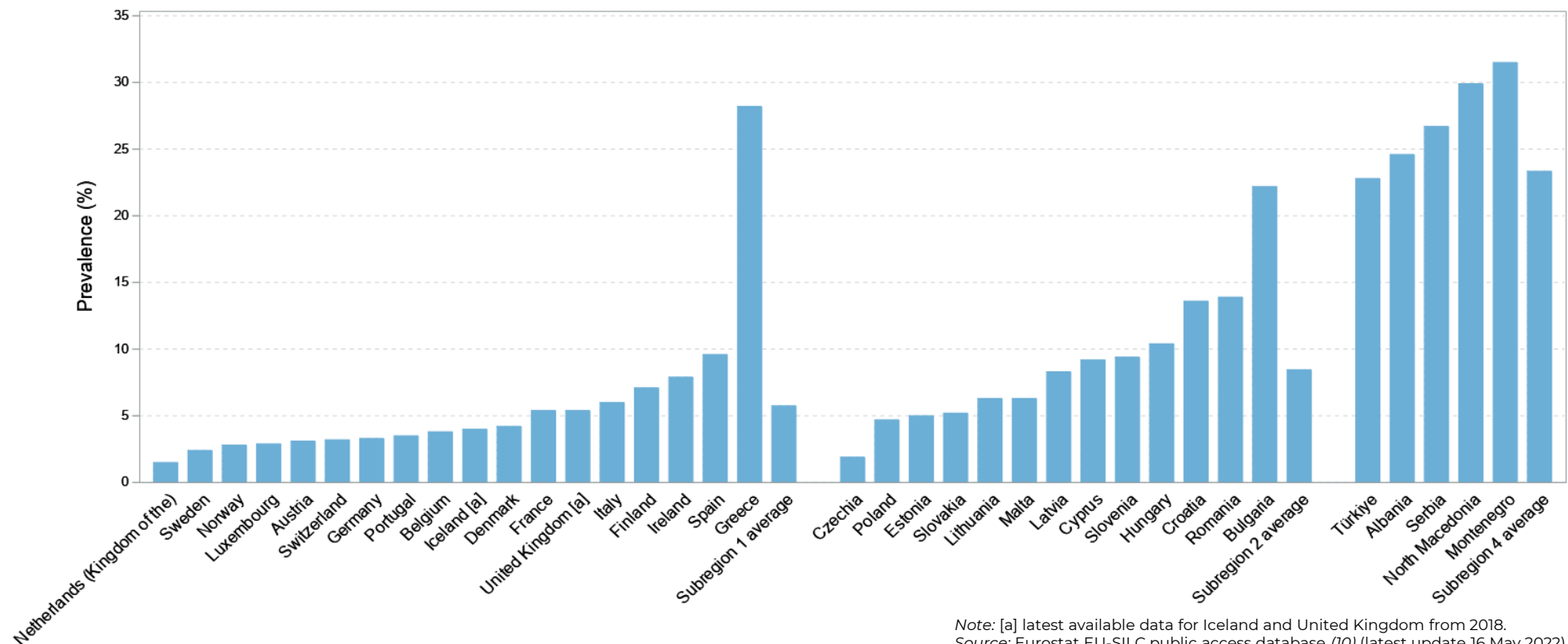
widely between subregions and countries in 2020, ranging from 1.5% in the Netherlands (Kingdom of the) to 28.2% in Greece in Subregion 1; from 1.9% in Czechia to 22.2% in Bulgaria in Subregion 2; and from 22.8% in Türkiye to 31.5% in Montenegro in Subregion 4 (Fig. 1).

Household utility costs are often driven by costs for different energy supplies (such as heating, electricity and gas), although water supply and sanitation services come at additional cost, and affordability of these services should also be considered (7). While arrears on utility bills represent an indicator of unaffordable basic services in general, they are closely related to energy poverty. Being in debt can give rise to mental health concerns and may lead to people cutting back on food to save for energy bills.

Almost 3 billion people worldwide use polluting fuels for cooking and heating. This contributes to household air pollution and has diverse negative health consequences, including respiratory and cardiovascular diseases and mortality (8).

Energy poverty definitions, and definitions of affordability of water and sanitation services, vary across countries, both conceptually and in the ability to measure and monitor this phenomenon (7,9). This fact sheet describes inequalities in household utility costs and energy poverty based on data from households reporting arrears on utility bills; energy expenditure; and primary reliance on polluting fuels for cooking, space heating and lighting.

Fig. 1. Prevalence of arrears on utility bills among the general population (2020)



Note: [a] latest available data for Iceland and United Kingdom from 2018.

Source: Eurostat EU-SILC public access database (10) (latest update 16 May 2022).

Inequalities in arrears on utility bills by poverty

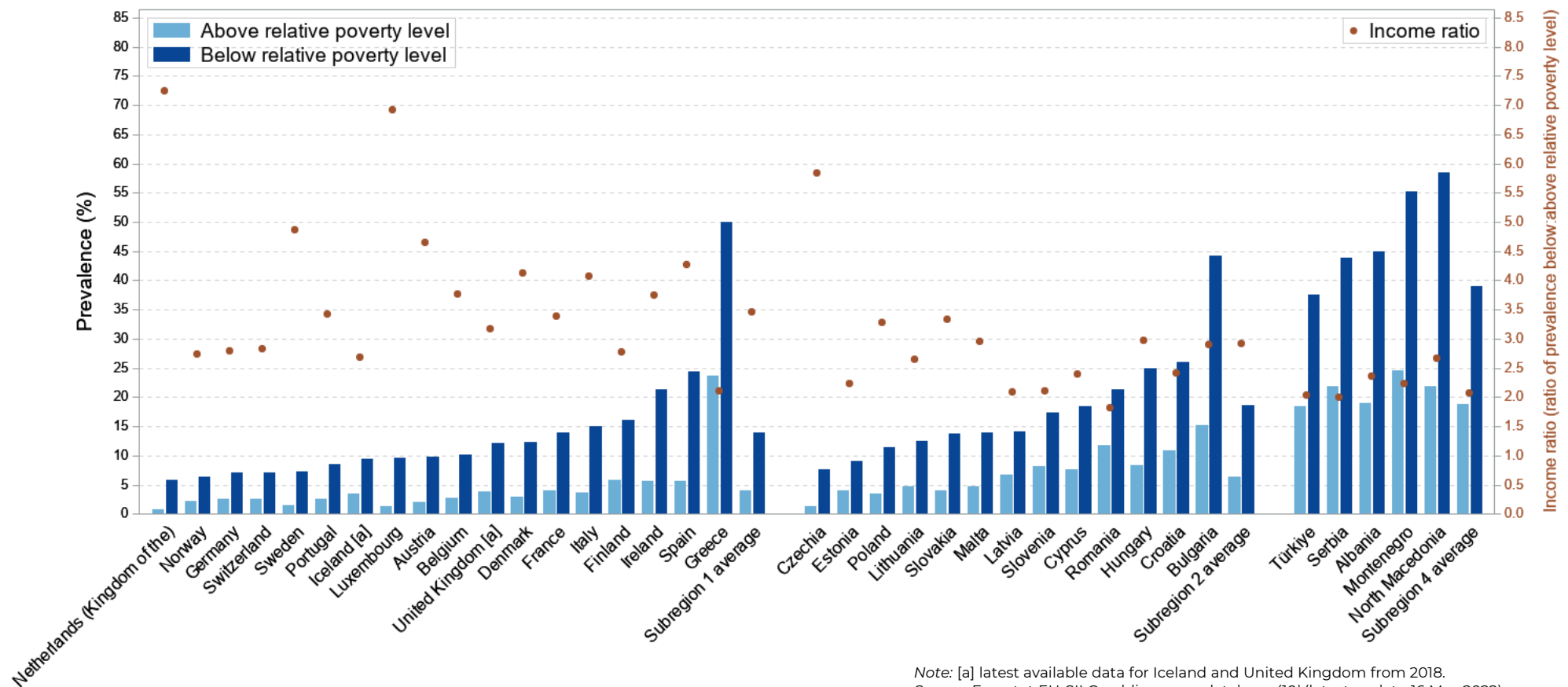
Across all countries in Subregions 1, 2 and 4, households below the relative poverty level had a much higher prevalence of arrears on utility bills than households above it, indicating economic challenges to pay for basic services (Fig. 2).

Subregion 4 had by far the highest prevalence of arrears on utility bills: almost one in five households above the relative poverty level (18.8%) and two in five households below it (39.0%) reported difficulties paying utility bills in 2020. In individual countries, the highest prevalence rates were observed among households below the relative poverty level in North Macedonia (58.5%), Montenegro (55.2%) and Greece (50%).

Absolute inequalities between households below and above the relative poverty level were largest among countries within Subregion 4, led by a difference of 36.6 percentage points in North Macedonia and 30.6 percentage points in Montenegro. Within Subregions 1 and 2, Greece (26.4 percentage points) and Bulgaria (29.1 percentage points) showed by far the highest absolute inequalities. The smallest absolute inequalities were found in Estonia, Germany, the Netherlands (Kingdom of the), Norway and Switzerland, where differences between households below and above the relative poverty level were 5.0 percentage points or less.

The highest relative inequalities were observed in Subregion 1, with an average inequality ratio of 3.5:1, while the ratios were 2.9:1 in Subregion 2 and 2.1:1 in Subregion 4. Across all countries except Romania, households below the relative poverty level suffered from arrears on utility bills more than twice as often as households above it. At the national scale, the Netherlands (Kingdom of the) (inequality ratio of 7.3:1) and Luxembourg (6.9:1) had the largest relative inequalities, followed by Czechia (5.8:1). The lowest inequality ratios were observed in Romania (1.8:1), Serbia (2.0:1) and Türkiye (2.0:1). However, it should be noted that these low inequality ratios are mainly driven by high prevalence among households above the relative poverty level.

Fig. 2. Prevalence of arrears on utility bills by relative poverty level (2020)



Note: [a] latest available data for Iceland and United Kingdom from 2018.
Source: Eurostat EU-SILC public access database (10) (latest update 16 May 2022).

Time trend of inequalities in arrears on utility bills by poverty

Prevalence of arrears on utility bills decreased among households above and below the relative poverty level in Subregions 1 and 2 between 2011 and 2020, and in Subregion 4 between 2013 and 2020 (Fig. 3).

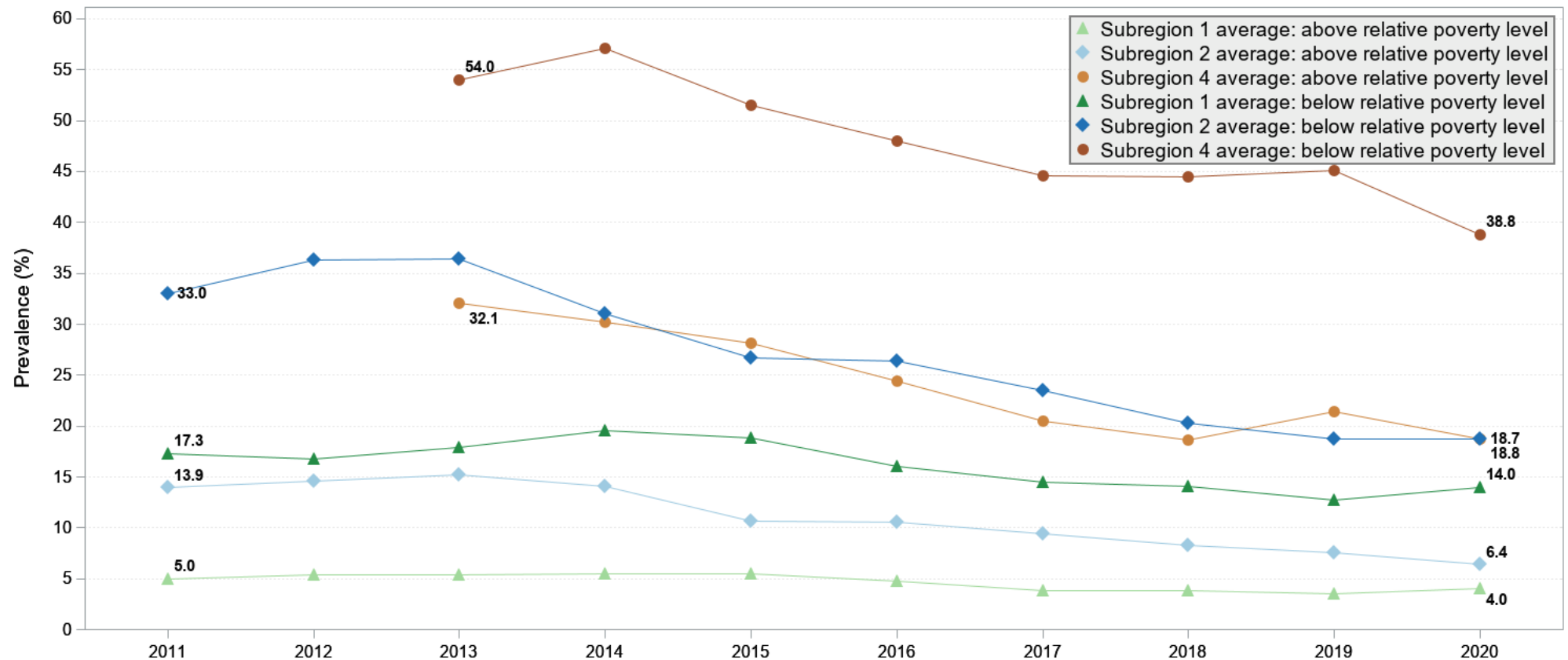
In Subregion 1, prevalence of arrears on utility bills decreased slightly from 5.0% to 4.0% among households above the relative poverty level and from 17.3% to 14.0% among those below it. In Subregion 2 prevalence of arrears on utility bills decreased sharply from 13.9% to 6.4% among households above the relative poverty level and from 33.0% to 18.7% among those below it. The largest reductions occurred in Subregion 4, where prevalence

decreased from 32.1% in 2013 to 18.8% in 2020 among households above the relative poverty level and from 54.0% to 38.8% among those below it.

Absolute inequalities between households below and above the relative poverty level decreased in all three subregions. The largest reduction was observed in Subregion 2, where the difference in absolute inequalities decreased from 19.0 percentage points to 12.3 percentage points. Absolute inequalities decreased from 12.3 percentage points in 2011 to 9.9 percentage points in 2020 in Subregion 1 and from 21.9 percentage points in 2013 to 20.0 percentage points in 2020 in Subregion 4.

Nevertheless, relative inequalities by poverty changed little in Subregion 1, and even increased in Subregions 2 and 4. In Subregion 1 households below the relative poverty level had over three times higher prevalence of arrears on utility bills than those above it in both 2011 (inequality ratio of 3.4:1) and 2020 (3.5:1). In Subregion 2 households below the relative poverty level had 2.4 times higher prevalence of arrears on utility bills in 2011, but 2.9 times higher prevalence in 2020, showing an increasing disadvantage for poorer households. In Subregion 4 the relative inequalities increased even further, with inequality ratios of 1.7:1 in 2013 and 2.1:1 in 2020.

Fig. 3. Time trend of prevalence of arrears on utility bills by relative poverty level (2011–2020)



Notes: Subregion 1 figures exclude Iceland and United Kingdom and Subregion 4 figures exclude Albania due to lack of data (2019–2020). Source: Eurostat EU-SILC public access database (10) (latest update 16 May 2022).

Inequalities in arrears on utility bills by household type and poverty

Within the WHO European Region the proportion of single-parent households among the general population ranged from 1.0% in North Macedonia to 7.4% in Luxembourg. In Subregions 1, 2 and 4, single-parent households suffered more often from difficulties paying utility bills than all households, and single-parent households below the relative poverty level were even more often affected (Fig. 4). Prevalence of arrears on utility bills among single-parent households was highest in Subregion 4: more than a third of all single-parent households (34.2%) and more than half of all single-parent households below the relative poverty level (52.3%) were affected in 2020.

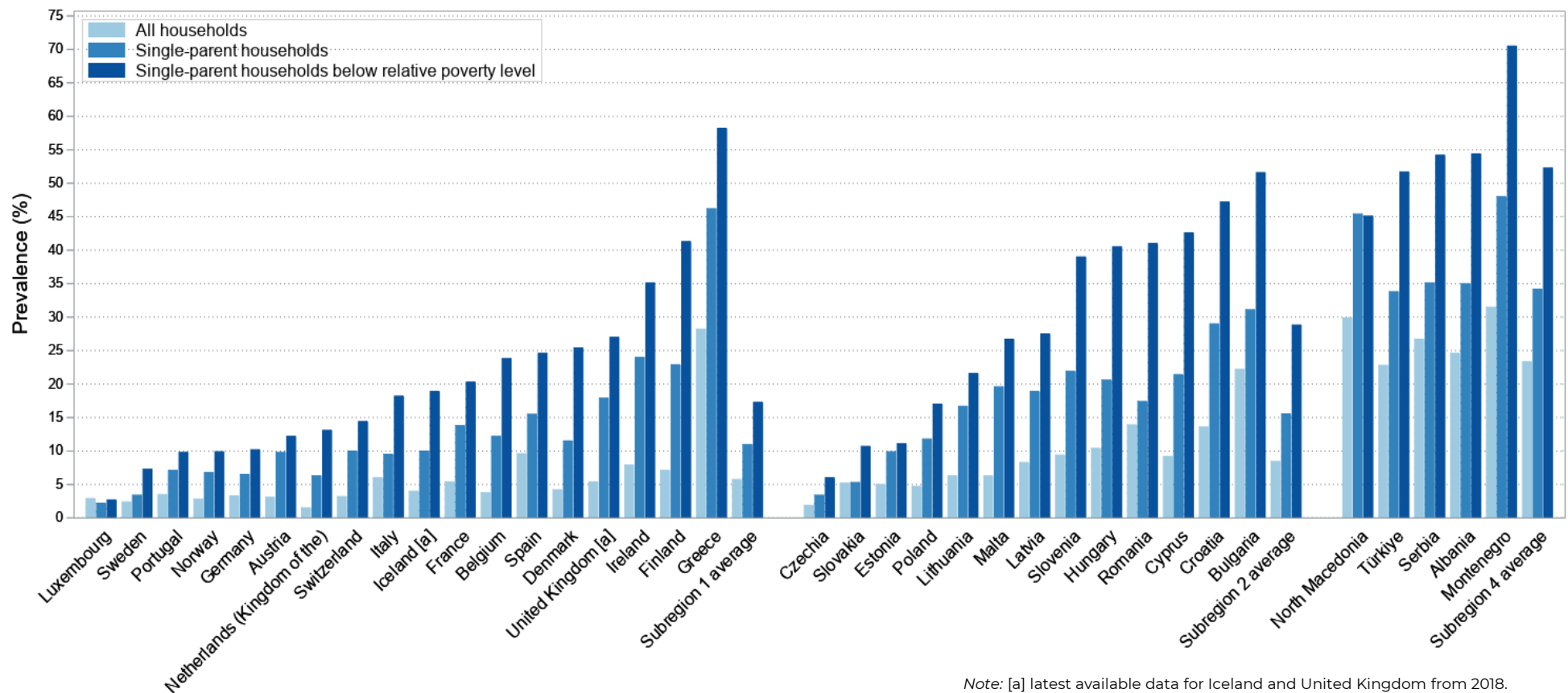
At the national level the highest prevalence rates of arrears on utility bills among single-parent households below the relative poverty level were observed in Montenegro (70.5%) and Greece (58.2%).

Absolute inequalities were highest in Subregion 4, with absolute differences of 10.8 percentage points between single-parent households and all households, and 28.9 percentage points between single-parent households below the relative poverty level and all households. Montenegro showed the largest absolute inequality between single-parent households below the relative poverty level and all households, with an absolute difference in prevalence of 39.0 percentage points (followed by

Finland with a difference of 34.2 percentage points). Only Luxembourg had no higher prevalence for single-parent households.

Relative inequalities between single-parent households below the relative poverty level and all households were larger in Subregion 1 (3.0:1) and Subregion 2 (3.4:1) than Subregion 4 (2.2:1). The highest relative inequality was observed in the Netherlands (Kingdom of the) – where single-parent households below the relative poverty level had nearly nine times higher prevalence of arrears on utility bills than all households (13.1% versus 1.5%) – followed by Belgium, Denmark and Finland.

Fig. 4. Prevalence of arrears on utility bills among single-parent households, single-parent households below the relative poverty level and the general population (2020)



Note: [a] latest available data for Iceland and United Kingdom from 2018. Source: Eurostat EU-SILC public access database (10) (latest update 16 May 2022).

Time trend of inequalities in arrears on utility bills by household type

Prevalence of arrears on utility bills decreased among both single-parent households and all households in Subregions 1 and 2 between 2011 and 2020, and in Subregion 4 between 2013 and 2020. The largest reduction was observed among all households in Subregion 4 (Fig. 5).

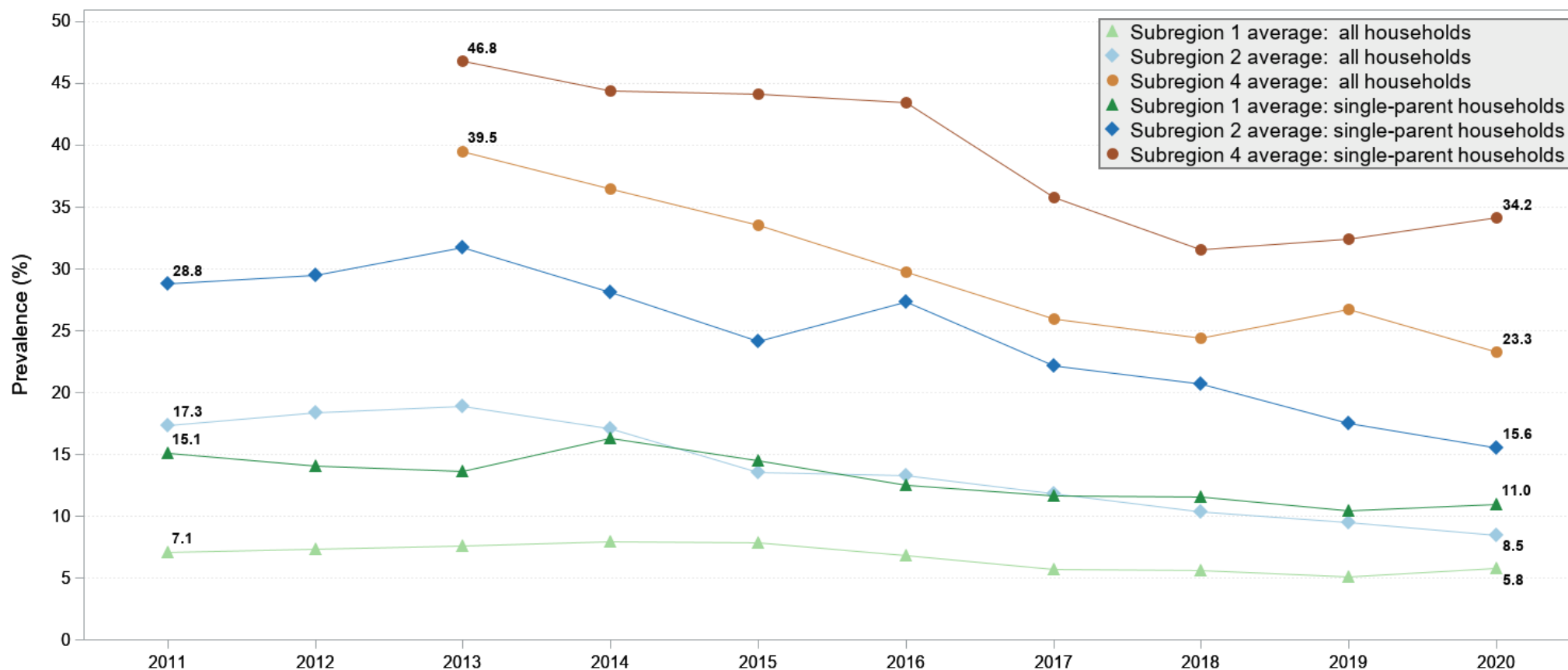
In Subregion 1 prevalence of arrears on utility bills decreased from 7.1% in 2011 to 5.8% in 2020 among all households, and from 15.1% in 2011 to 11.0% in 2020 among single-parent households. In Subregion 2 prevalence decreased significantly from 17.3% in 2011 to 8.5% in 2020 among all households and from 28.8% in 2011 to 15.6% in 2020 among single-parent households.

28.8% in 2011 to 15.6% in 2020 among single-parent households. In Subregion 4 prevalence decreased from 39.5% in 2013 to 23.3% in 2020 among the general population and from 46.8% in 2013 to 34.2% in 2020 among single-parent households.

Absolute inequalities between single-parent households and all households decreased from 8.1 to 5.2 percentage points in Subregion 1 and from 11.5 to 7.1 percentage points in Subregion 2 between 2011 and 2020. In contrast, absolute inequalities increased from 7.3 percentage points to 10.9 percentage points in Subregion 4 between 2013 and 2020.

Relative inequalities by household type changed little: the Subregion 1 inequality ratio slightly fell from 2.1:1 in 2011 to 1.9:1 in 2020; the Subregion 2 ratio was 1.7:1 in 2011 and 1.8:1 in 2020. In Subregion 4, the relative inequality ratio increased slightly from 1.2:1 in 2013 to 1.5:1 in 2020. The significant reduction of utility bill arrears has therefore unfortunately not resulted in a parallel reduction of relative inequalities, and even led to a slight increase in Subregion 4.

Fig. 5. Time trend of prevalence of arrears on utility bills by household type (2011–2020)



Notes: Subregion 1 figures exclude Iceland and United Kingdom and Subregion 4 figures exclude Albania due to lack of data (2019–2020). Source: Eurostat EU-SILC public access database (10) (latest update 16 May 2022).

Inequalities in energy expenditure by income

Across the WHO European Region the trend that lower income groups spend a greater proportion of their household income on energy and the lowest income groups have by far the highest burden due to energy costs is clear (Fig. 6). Finland and Sweden are the only countries with a different pattern.

In Subregion 1 the average proportion of household income spent on energy was least affected by income, ranging from 3.7% for the highest income quintile to 5.9% for the lowest. At the national level energy expenditure varied from 2.1% for the highest income quintile in Luxembourg to 9.5% for the lowest in Denmark and Portugal.

In Subregion 2 average energy expenditure ranged much more widely from 7.4% to 11.9%, depending on household income. The lowest proportion of energy expenditure was 2.2% for the richest households in Malta and the highest was 17.7% for the poorest households in Czechia.

In Subregion 4 average energy expenditure ranged from 9.3% to 12.3%. At the national level it was as low as 3.8% among the highest income quintile in Türkiye but reached 14.0% and 13.9% among the second lowest and lowest income quintiles in North Macedonia.

Within countries, the highest absolute difference (9 percentage points) was observed in Czechia, where the highest income quintile spent 8.7% of household income on energy and the lowest income quintile spent 17.7%. Latvia had the second largest absolute difference of 7.8 percentage points, while Finland and Sweden had the lowest absolute differences.

The highest relative inequality was observed in Latvia, with an inequality ratio of 2.5:1 between the lowest (12.9%) and highest (5.1%) income quintiles. Türkiye, Bulgaria and the United Kingdom also had high inequality ratios of 2.1:1.

Fig. 6. Energy expenditure as a percentage of household income, by income quintile (2020)



Notes: [a] latest available data from 2015; Albania, Iceland, Italy and Switzerland were excluded from the chart due to lack of data.
 Source: Eurostat Consumption expenditure of private households database (10) (latest update 13 February 2023).

Sociodemographic, spatial and socioeconomic inequalities in primary reliance on polluting fuels

Primary reliance on polluting fuels such as coal, wood, plastic or other materials that are burned to produce energy for cooking, space heating or lighting is a major issue for many countries worldwide, endangering population health status – especially among women and children. Use of polluting fuels affects countries in Subregions 3 and 4 (Table 2). Primary reliance on polluting fuels for cooking, space heating and lighting can affect the majority of the population, reaching 80.8% in Kyrgyzstan and 72.0% in Montenegro.

Across all countries rural populations suffer much more often than urban ones from primary reliance on polluting fuels. The largest difference was observed in Georgia, where primary reliance on polluting fuels to provide energy was reported by 81.2% of the rural and 13.9% of the urban population,

followed by Kyrgyzstan, where it was reported by 96.8% of the rural and 52.5% of the urban population.

Prevalence of primary reliance on polluting fuels also differs significantly by income. Across all countries listed in Table 2, the lowest wealth quintile reported much higher prevalence than the highest. The largest differences were observed in North Macedonia, where 97.4% of the lowest and 4.9% of the highest wealth quintile reported primary reliance on polluting fuels, and in Georgia, where 92.7% of the lowest and only 0.4% of the highest wealth quintile reported it. In Kyrgyzstan, 99.0% of the population in the lowest wealth quintile reported primary reliance on polluting fuels, meaning that this proportion is exposed to serious health risks.

Finally, the data show that certain ethnic groups suffer much more often from primary reliance on

polluting fuels than the general population. In Kyrgyzstan, the most disadvantaged group was those of Uzbek ethnicity, with a prevalence of primary reliance on polluting fuels of 90.6% (versus 80.8% among the general population), while in Serbia prevalence among Roma groups (89.2%) was almost double that among the general population (47.6%). Specific data collections in Montenegro, North Macedonia and Serbia show that the average prevalence of primary reliance on polluting fuels among Roma settlements was at very high levels (ranging from 87.6% to 88.9%), and considerably higher than the national average of the countries. For the lowest income populations within Roma settlements, and for Roma settlements in rural areas, prevalence levels were above 90% in all cases for which data are available.

Table 2. Prevalence of household members with primary reliance on polluting fuels for cooking, space heating and lighting

Country	National average (%)	Urban (%)	Rural (%)	Lowest wealth quintile (%)	Highest wealth quintile (%)	Most disadvantaged ethnic group (%)
Uzbekistan, 2021–2022 (Subregion 3)	43.4	28.1	57.0	89.7	0.9	Tajik ethnicity: 54.6
Serbia, 2019 (Subregion 4)	47.6	30.6	71.5	93.9	2.6	Roma ethnicity: 89.2
Belarus, 2019 (Subregion 3)	15.6	5.1	47.4	74.8	0	no data
North Macedonia, 2018–2019 (Subregion 4)	61.8	47.2	87.2	97.4	4.9	Other (not Macedonian/Albanian): 73.0
Kyrgyzstan, 2018 (Subregion 3)	80.8	52.5	96.8	99.0	23.1	Uzbek ethnicity: 90.6
Georgia, 2018 (Subregion 3)	41.2	13.9	81.2	92.7	0.4	Azerbaijani ethnicity: 65.1
Montenegro, 2018 (Subregion 4)	72.0	62.9	90.1	89.8	42.8	no data
Roma settlements	Average (%)	Urban (%)	Rural (%)	Lowest wealth quintile (%)	Highest wealth quintile (%)	Most disadvantaged ethnic group (%)
Roma settlements in Serbia, 2019	87.6	83.4	96.0	93.0	75.1	not applicable
Roma settlements in North Macedonia, 2018–2019	88.3	no data	no data	91.4	77.7	not applicable
Roma settlements in Montenegro, 2018	88.9	88.4	91.4	90.4	87.0	not applicable

Source: UNICEF MICS database (11).

Conclusions and suggested mitigation actions

Availability and affordability of basic services are fundamental needs of households, and inability to secure these services can be harmful for health. Given the recent rises in energy costs, energy poverty is of specific concern as it increases the risk of low indoor temperatures, dampness in the home and indoor air pollution, and their negative health consequences. Further, costs for other basic services, such as water and sanitation, may exacerbate energy poverty. Discussion of issues around affordability of these services is increasing, and relevant policy options and good practices have been compiled (7).

A clear trend across all subregions and almost all countries is that socioeconomically disadvantaged population groups are much more often affected by difficulties paying utility bills, and report significantly higher energy expenditure. Problems with household utility costs for basic services are especially prevalent among single-parent households below the relative poverty level, indicating that inadequate water and energy services may disproportionately affect the vulnerable population group of children living in poverty. Ensuring affordability of basic services and reducing energy poverty should therefore be at the

top of the agenda to reduce social and environmental health inequalities in Europe – acknowledging that over the last decade relative inequalities in arrears on utility bills have remained consistently strong, and have even risen in some countries.

Use of polluting fuels within the home is a highly relevant example of energy-related inequalities, and directly links to the risk of air pollution and its detrimental effects on health. In many Subregion 3 and Subregion 4 countries with available data, rural populations, people living in poverty and certain ethnic groups rely much more often than the general population on polluting fuels for space heating, cooking and lighting.

With the ongoing European energy crisis, it is likely that overall prevalence of energy poverty – and the existing inequalities highlighted in this fact sheet – will increase again in the near future across many countries in the WHO European Region, with even worse consequences for the most deprived population groups. It is therefore vital that policy interventions focus initially on the most vulnerable households to mitigate the unequal effects of the energy crisis on energy poverty and health.

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Further reading on the subject is available at: Universität Bremen: WHO Collaborating Centre for Environmental Health Inequalities [website]; 2023 (<https://www.uni-bremen.de/en/who-collaborating-centre-for-environmental-health-inequalities>, accessed 3 July 2023)

Suggested mitigation actions are:

- establishing appropriate metrics to measure and monitor energy poverty and household utility cost trends (such as energy audits);
- protecting the most vulnerable households – for example, prohibiting disconnection of basic services for vulnerable households;
- providing social security measures or support payments to ensure that energy and household utility costs are met – for example, via use of social tariffs or energy bill protection measures;
- improving energy efficiency in the housing sector, especially in relation to social and low-cost housing; and
- increasing the availability and affordability of clean energy and basic services for all.

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves

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Environmental health inequalities

Fact sheet series

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