

HEALTH INEQUALITIES IN THE HEALTH STATUS REPORT

HOW TO UNDERSTAND INEQUALITY MEASURES

The chapter “Health inequality” of the Health Status Report provides an overview of the indicators in which socio-economic health inequalities are observed. It also describes, when possible, the evolution of those inequalities over time.

Results about the health inequalities are displayed on the following pages of the website :

[Life expectancy, health expectancy and quality of life](#)

[Mortality](#)

[Non-communicable diseases](#)

[Mental health](#)

[Determinants of health](#)

The purpose of this methodological document is to define the indices and concepts linked to the health inequalities as well as the data and methods used for the Health Status Report’s inequality chapter.

1. WHAT ARE SOCIO-ECONOMIC HEALTH INEQUALITIES?

Socio-economic (SE) health inequalities refer to systematic disparities in health between SE groups, most often in disfavour of social groups lower on the social scale. SE health inequalities have been consistently observed throughout societies for the whole scope of health topics, ranging from health determinants to mortality [1,2]. Tackling health inequalities is a priority for the WHO [3], the European Union [4], and for Belgium [5–7]. In order to assess progress towards reducing health inequalities, it is important to measure and monitor them [8,9].

2. HOW TO ANALYSE SOCIO ECONOMIC HEALTH INEQUALITIES

2.1.1. Step 1: Define socio-economic position

Preliminary to the inequality measurement, a marker of the socio-economic position has to be chosen. Several indicators can be used to assess SE position because the position of an individual within the social hierarchy may be determined by many dimensions such as occupation, income, or education.

2.1.1.1. Educational level

The educational level (EL) is often used as socio-economic variable (SE). It presents the advantages of being obtained early in life, of being less dependent on health problems acquired later in life, is easy to collect and is less sensitive than measures like income. The EL is measured using the International Standard Classification of Education (ISCED).

ISCED is the international reference classification for organizing educational programs and related qualifications by levels and fields. It contains categories from 0 to 6:

0: Early childhood education ('less than primary')

1: Primary education

2: Lower secondary education

3: Upper secondary education

4: Post-secondary non-tertiary education

5: Short-cycle tertiary education, Bachelor's, Master's

6: Doctoral or equivalent level

The educational level (EL) used to be grouped into four levels: primary education or less, lower secondary education, higher secondary education, and higher education. It is displayed as such in the health interviews surveys. Since the lowest educational level (primary education or less) is progressively disappearing in societies where the education is mandatory until 18 years, the EL is more and more grouped into three levels, by pooling together the two lowest levels: lower secondary education or less (“Low EL”), higher secondary education (“Mid EL”) and higher education (“High EL”).

2.1.1.2. Income

Decoster et al. [10] used data from the income register linked to the mortality register to examine inequalities in mortality by income. They used the total net taxable income, which refers to income before tax, after social security contribution. This includes labour income, unemployment benefits, sickness benefits and pensions but excludes benefits like child benefits and living wages. To obtain household income, they aggregated personal income over households (except for nursing home residents).

2.1.1.3. Multidimensional socio-economic indicators

Aerden et al. [11] created a multidimensional socio-economic indicator based on the census 2011 linked with a five-year mortality follow-up. This indicator includes information on educational level, socio-professional category and housing characteristics and weights this information to obtain a score. It is then possible to create quartiles based on the individual scores. The first quartile groups the 25% of people with the lowest scores while the fourth quartile groups the 25% of people more advantaged on this socio-economic scale.

Bourguignon et al. [12] used the same multidimensional indicator for 2019 and 2020 to examine mortality inequalities. Besides the four quartiles groups, they created a fifth group “the undetermined” that includes people with missing information on at least two dimensions.

2.1.1.4. Other measures of socio-economic position

Other measures of socio-economic position can also be used to assess inequalities, but the availability and quality of those are often scarce for health indicators. In the census linked with mortality follow-up, various indicators are available and have been explored by Eggerickx et al. [13] in the calculation of life expectancy.

- Housing tenure status: owners versus renters
- Employment status: employee in the private sector versus unemployed

2.1.2. Step 2: Stratification of the health outcome by each SE level

Prevalence estimates for specific health indicators by socio-economic groups are presented on their respective pages on the HSR website. This provides descriptive information about the inequalities in health indicators. In the inequality chapter, we go further with step 3.

2.1.3. Step 3: Computation of inequality measures

The inequality chapter aims to measure the extent of the inequality using several inequality measures depending on the nature of the indicator. Many inequality indices have been described in the literature [14,15]. It is currently acknowledged that the optimal approach to evaluate and track inequalities is through relying on a set of inequality measures rather than on a single measure because the measures of inequalities differ substantially in at least two important aspects [14]:

- **The relative vs. absolute nature of the comparison:** to assess health inequalities, relative measures of inequalities (e.g. rate ratios) have been more commonly used in the literature, but inequalities can also be presented in absolute terms (e.g. rate difference) to account for the prevalence of the outcome in each group. Both measures are important, some authors accorded even more importance to the absolute measures in terms of public health and in terms of people’s point of view.
- **The scope:** on one side, “absolute rate difference” or “rate ratios” are simple pairwise comparisons of health outcomes between two SE groups; on the other side, more complex indices take also into account the distribution of the SES in the population, like the population attributable fraction (PAF) and the composite inequality index (CII). Some indices are based on the measure of a gradient, namely the slope index of inequality (SII) and the relative index on

inequality (RII), but their interpretation is difficult when the SE structure of the population changes over time.

We used the following measures to analyse health inequalities in the HSR:

1. **Absolute difference:** It represents the difference between the values of a given health indicator in two given SE levels. This difference can be calculated for any pair of SE levels, although it is most common to compare the two extreme SE levels, that is the low-versus-high absolute difference. Absolute rate differences relate to indicators expressed as a proportion (prevalence, incidence, mortality rates). Absolute differences in years are used to compare indicators expressed in terms of years of life (e.g. life expectancy, health expectancy).
2. **Relative difference/ rate ratios:** It represents the ratio of the values of a given health indicator in two given SE levels. This ratio can be calculated for any pair of SE levels, although it is most common to compare the two extreme SE levels, that is the low-versus-high rate ratio.
3. **Composite Index of Inequality (CII):** The CII can be measured in an absolute or relative version. In this report, we calculated the absolute CII (CII_{abs}). The CII_{abs} expresses the differences in years of life expectancy (LE) or health expectancy (HE) among the whole population; it is also the number of years of LE or HE that could be gained, at population level, if there was no inequality and everybody had the life/health expectancy of the highest educated group. It is obtained by summing up the differences in life/health expectancy of each EL group as compared to the group with the highest EL, weighted by the size of each group.
4. **Population Attributable Fraction (PAF):** The PAF corresponds to the relative gain in health (or health determinant) that would be expected for the whole population if all groups experienced the value of the more advantaged social group. It is computed as the difference between the overall value in the population and the value in the more advantaged group, divided by the overall value in the population.
5. **Slope Index of Inequality (SII):** After graphically ordering the rates by increasing socio-economic status, the SII measures the slope of the gradient, and is an absolute measure of inequality.
6. **Relative Index of Inequality (RII):** After graphically ordering the rates by increasing socio-economic status, and measuring the slope of the gradient, the RII is the ratio of the rates situated at the extreme position, it is a relative measure of inequality.
7. **Percentage-point:** The percentage-point (ppt) is the arithmetic difference between two percentages, for instance with 16% in group A and 8% in group B, the difference is 8 ppt, corresponding to a relative difference of 100%.

2.1.4. Assessing the evolution of inequality measures

The changes in inequalities for the indicators with large inequalities are measured using a z-test when only two measurements are available over time, or by fitting a linear model when more than two measurements are available. The evolution is commented as statistically significant ($p < 0.05$), borderline significance ($p = 0.05 - < 0.10$), or no statistically significant change.

3. HEALTH INEQUALITIES IN THE HEALTH STATUS REPORT

1.1.1. Data and measures used to compute health inequalities in the Health Status Report

Several data sources were used depending on the type of indicator.

Page	Indicator	Sources	Inequality measures
Life expectancy and quality of life	Life expectancy	Censuses 2001 and 2011 linked with the mortality information (a) based on a study by Eggerickx et al. [13] for other SES marker (b) based on a study by Renard et al. [16] for educational levels	1. Absolute difference in years between the lowest and the highest EL groups 2. CI_{abs}
	Health expectancy (here: "Life expectancy without disability")	Censuses 2001 and 2011 linked with the mortality information and the indicator GALL, measuring the incapacity, derived from the Health Interview Surveys (HIS)	1. Absolute difference in years between the lowest and the highest EL groups 2. CI_{abs}
	Self-rated health	HIS 1997-2018, own calculations	1. Absolute difference in age-adjusted rates between the lowest and the highest EL groups 2. Rate ratios of age-adjusted rates between the lowest and the highest EL groups 3. PAF
Mortality	Mortality rates by income	Based on a study by Decoster et al. [10]	1. SII: absolute difference in mortality 2. RII: relative difference in mortality
	Mortality by causes of death (COD) and quartiles of a multidimensional SE indicator	Based on a study by Eggerickx et al. [13]	1. Ratio of the probability of dying in SES groups
	Mortality rates by COD	Based on a study by Renard et al. [16]	1. Ranking of COD by their contributions to the global inequality
Non communicable diseases	Prevalence of reporting a chronic disease, multimorbidity, osteoarthritis, high blood pressure, diabetes, urinary incontinence, migraine-like headache, COPD, asthma, and myocardial heart infarction	HIS 1997-2018	1. Absolute difference in age-adjusted rates between the lowest and the highest EL groups 2. Rate ratios of age-adjusted rates between the lowest and the highest EL groups 3. PAF
Mental health	Depression in the last two weeks (% people \geq	HIS 1997-2018	1. Absolute difference in age-adjusted

	<p>15) based on the PHQ-9 scale</p> <p>Anxiety in the last two weeks (% people ≥ 15) based on the GAD-7 scale</p> <p>Suicidal thoughts in the last twelve months (% people ≥ 18)</p>		<p>rates between the lowest and the highest EL groups</p> <p>2. Rate ratios of age-adjusted rates between the lowest and the highest EL groups</p> <p>3. PAF</p>
Health determinants	<p>Prevalence of daily smoking, obesity, moderate physical activity, daily consumption of 5 portions of fruits and vegetables, daily consumption of sugar-sweetened beverages</p>	HIS 1997-2018	<p>1. Absolute difference in age-adjusted rates between the lowest and the highest EL groups</p> <p>2. Rate ratios of age-adjusted rates between the lowest and the highest EL groups</p> <p>4. PAF</p>

By convention, relative inequalities across different indicators are expressed in terms of adverse events [9] (for instance, self-rated health is expressed as the proportion of persons rating their health as less than good).

1.1.2 Indicators presented

- For the life and health expectancy disparities, no threshold criteria are fixed.
- Among the numerous HIS indicators, the emphasis is placed on health indicators with at least moderate inequalities (RR ≥ 1.3 or a difference of 10 percentage points at least in one HIS wave).

References

1. Mackenbach J. Health inequalities: Europe in profile. Expert Report commissioned by the EU. Department of Health Publications; 2006 p.
2. Feinstein JS. The relationship between socioeconomic status and health : A review of the literature. *The Milbank Quarterly*. 1993;71:279–94.
3. WHO Commission on Social Determinants on Health. Closing the gap in a generation: health equity through action on the social determinants of health. Geneva: WHO; 2008.
4. Executive Agency for Health and Consumer. Second Programme of Community Action in the Field of Health 2008-2013. European Commission; 2007.
5. Vlaamse overheid. Vlaamse Actieplan Geestelijke Gezondheid, Strategisch plan 2017-2019. 2017.
6. Gouvernement wallon. Plan prévention et promotion de la santé en Wallonie. Partie 1: définition des priorités en santé. Namur; 2017. 1–105 p.
7. Arrêté royal du 18 juillet 2013 portant fixation de la vision stratégique fédérale à long terme de développement durable: http://www.etaamb.be/fr/arrete-royal-du-18-juillet-2013_n2013011468.html. *Moniteur Belge*. 2013 Oct 8;
8. Braveman PA. Monitoring equity in health and healthcare: a conceptual framework. *JHealth PopulNutr*. 2003 Sep;21(3):181–92.
9. Maeseneer JD, Willems S. Terugdringen Sociale Gezondheidskloof: van concept naar politieke implementatie. Gent: Ghent University; 2021 p. 34.
10. Decoster A, Minten T, Spinnewijn J. The Income Gradient in Mortality during the Covid-19 Crisis: Evidence from Belgium. *J Econ Inequal*. 2021 Sep 1;19(3):551–70.
11. Aerden KV, Damiens J, Moortel DD, Eggerickx T, Gourbin C, Huegaerts K, et al. Causes of health and mortality inequalities in Belgium: multiple dimensions, multiple causes. :106.
12. Bourguignon M, Damiens J, Doignon Y, Eggerickx T, Fontaine S, Lusyne P, et al. Variations spatiales et sociodémographiques de mortalité de 2020-2021 en Belgique. L'effet de la pandémie Covid-19, Document de travail 27. Louvain-la-Neuve: Centre de recherche en démographie; 2021 Sep p. 39.
13. Eggerickx T, Sanderson JP, Vanderschrick C. Les inégalités sociales et spatiales de mortalité en Belgique : 1991-2016; DOI: 10.4000/eps.7416. *Espace Population et Société*. 2018;
14. Mackenbach JP, Kunst AE. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *SocSciMed*. 1997 Mar;44(6):757–71.
15. Harper S, Lynch J. Methods for Measuring Cancer Disparities: Using Data Relevant to Healthy People 2010 Cancer-Related Objectives. Bethesda, MD: National Cancer Institute, 2005: NIH Publication No. 05-5777.; 2005. 61–64 p.
16. Renard F, Devleeschauwer B, Van Oyen H, Gadeyne S, Deboosere P. Evolution of educational inequalities in life and health expectancies at 25 years in Belgium between 2001 and 2011: a census-based study. *Arch Public Health*. 2019;77(6).