Life Expectancy of Roma People in Europe: Indirect Estimations for 17 Countries

– Paper presented at the IPC 2025, Brisbane, Australia, 13-18 July 2025 –

Marc Luy, Paola Di Giulio, Lina Lasar, Tianyu Shen, Tamara Vaz de Moraes Santos
Vienna Institute of Demography of the Austrian Academy of Sciences

1. Introduction

The Roma are Europe's largest ethnic minority.[1] Out of an estimated total of 10-12 million in Europe, some 6 million live in the EU, and most of them are citizens of an EU country. The estimated share of the Roma in EU countries in 2012 ranges from 10.3% in Bulgaria, 9.1% in Slovakia, 8.3% in Romania, 7% in Hungary, 2.5% in Greece, 2% in Czechia and 1.6% in Spain, to less than 1% in most of the other countries (European Commission 2020). Several studies suggest that the population of Roma in Europe is severely disadvantaged in health compared to the non-Roma population and face a range of barriers in accessing health care (e.g., Bogdanović et al. 2007; de Graaf et al. 2016; La Parra-Casado et al. 2020; Parekh and Rose 2011). With regard to the mortality of the Roma population, a large part of the reported numbers is based on very crude indicators, such as the longevity rate (the proportion aged 75 and older), the overall death rate (total number of deaths divided by the total living population), or the average age at death. All these indicators are strongly affected by the age structure of the population. This complicates a comparison between the Roma people and the non-Roma population because the former is significantly younger than the latter (see, e.g., Hablicsek 2008).

An indicator that eliminates the effect of the age structure in comparisons is "life expectancy" (LE). Unfortunately, estimates of LE for the Roma population are rare. The most widely cited and generally accepted data stems from the Council of Europe and suggests the LE of Roma to be 10-15 years lower than that of the general population (European Commission 2014, p. 38). Estimates exist also for some national subpopulations of Roma which suggest a huge variation regarding the extent of their disadvantage in LE, ranging from two to twenty years (European Public Health Alliance 2018). However, all

[1] 'Roma' is used as an umbrella term, according to the definition of the Council of Europe. It encompasses Roma, Sinti, Kale, Romanichals, Boyash/Rudari, Balkan Egyptians and Eastern groups (Dom, Lom and Abdal); groups such as Travellers, Yenish and the populations designated under the administrative term Gens du voyage; and people who identify themselves as Gypsies.

these reports about levels and trends of Roma's LE are substantially limited in the comprehensiveness and quality of the available European or nationwide data on the Roma population (European Public Health Alliance 2018).

As a consequence of this "disjointed and ad hoc" information on LE and mortality for the Roma community within Europe (European Public Health Alliance 2018, p. II) it is not clear whether its disadvantage in life years is actually that high. The aim of the present work is therefore to provide additional estimates derived by a different approach and for subpopulations of Roma. For this purpose, the European Union Agency for Fundamental Rights (FRA) included specific questions to the 2019 Roma and Travellers Survey (RTS 2019) and Roma Survey 2020-21 (RS 2020-21) which allow the application of so-called "indirect estimation techniques".

2. Data and methods

2.1 Data on the Roma population

The present study is based on data from the 2019 Roma and Travellers Survey (RTS 2019) and Roma Survey 2020-21 (RS 2020-21). The RTS 2019 includes in total 4,658 individuals aged 15 or older (2,564 women and 2,094 men). The survey was conducted in six western and northern European countries: Belgium, France, Ireland, the Netherlands, Sweden and the United Kingdom. The RTS 2019 includes only the questions required for the estimation of adult mortality. The RS 2020-21 was conducted in ten southern and eastern European countries: Croatia, Czech Republic, Greece, Hungary, Italy, North Macedonia, Portugal, Romania, Serbia and Spain. The data includes the questions required for the estimation of adult mortality and those required for the estimation of child mortality (see Sections 2.4 and 2.5). The RS 2020-21 was supplemented by a national survey from Slovakia, which also includes the questions needed to estimate adult mortality. However, the questions required for the indirect estimation of child mortality are not included in the Slovakian survey. Pooled together, the surveys from all 17 countries include information from 14,398 respondents. The country-specific sample sizes vary between 404 in Sweden and 1,695 in Romania. Details about the two surveys can be found in the corresponding data reports (European Union Agency for Fundamental Human Rights 2021, 2023).

2.2 Indirect estimation approach

Indirect techniques for the estimation of mortality are based on retrospective questions about the survival of respondents' family members like children and parents. An important feature of such information is that respondents of different ages report deaths which occurred at different times. Thus, on average, younger respondents report deaths that occurred in more recent years before the survey, whereas deaths of family members reported by older respondents occurred earlier, i.e., more years before the time of the survey. Therefore, indirect estimation techniques include the estimation of “reference periods” which is the time before the survey to which an estimate for child or adult mortality of respondents of a certain age group refers. This has the advantage that the information derived from one survey provides a series of estimates of child and adult mortality with associated reference periods, what enables the estimation of a time trend. Moreover, the time trend balances the fluctuations which occur in the single estimates derived from the information given by respondents in different age groups. The smaller the sample sizes and number of observations, the larger the fluctuations. Thus, the more survey information is available, the more robust become the estimates.

2.3 Estimation of life expectancy at birth

Human mortality has a typical age pattern which is characterised by high mortality in young child ages, much lower mortality in ages 5-15, and regular increasing mortality with age in adulthood. Therefore, LE can be estimated quite accurately on the basis of information about mortality levels in broad age segments even if no detailed data on age-specific mortality is available. Indirect estimation techniques make use of the regular age pattern of human mortality by relating such broad mortality indicators—i.e., mortality indicators for broad age segments—to this known age pattern. The best fitting results can be gained when information about mortality is available for both child and adult mortality. These can then be combined to derive (i) the overall mortality level for the whole lifespan and (ii) a particular age pattern of mortality for the studied population. For the present study we used the “flexible two-dimensional mortality model” proposed by Wilmoth et al. (2012). This model was designed to fit all period life tables included in the Human Mortality Database (HMD).[2]

2.4 Estimation of child mortality

The first input parameter for the flexible two-dimensional mortality model is the probability of dying between birth and the fifth birthday (${}_5q_0$). We estimated the ${}_5q_0$ parameter with the Trussell-variant of the “Brass method” (BM) which is based on reports of mothers about the survivorship of their children (Brass 1975; Trussell 1975). The central idea behind this method is that the proportion of surviving (deceased) children reflects the level of child mortality. To use this relationship, it must be taken into account that young mothers have on average fewer and younger children than older mothers. In addition, the children of young mothers have been exposed to the risk of dying for shorter. Consequently, the

[2] We used an updated version of the log-quadratic model parameters based on the 968 life tables that were available in HMD in December 2019 (see https://github.com/timriffe/DemoTools/tree/master/data). The same parameters were used for the analysis of the RS 2020-21.

reported child mortality of younger mothers refers to younger childhood ages and more recent periods than the child mortality reported by older mothers. Two kinds of information from interviews with women aged 15-49 are necessary: (i) the number of live-born children they have given birth to, and (ii) the number of those children that have survived until the time of the interview (see also Preston et al. 2001).

The RS 2020-21 included these questions for all ten country samples. Information from women aged 15-19 was excluded because of too low case numbers and the well-documented over-estimation of child mortality with the BM derived from women below age 20 (for details, see Moultrie et al. 2013). Due to the generally low level of child mortality in recent years, the case numbers of reported deaths of children in the RS 2020-21 were too low to estimate the ${}_5q_0$ parameter for individual country samples. Therefore, we used all data available from the RS 2020-21 to estimate child mortality with the BM on the basis of the four age-specific mortality patterns of the Princeton model life tables (Coale et al. 1983) and the age-specific mortality patterns from the UN model life tables (United Nations Department of International Economic and Social Affairs 1982). The resulting estimates for ${}_5q_0$ and corresponding reference periods from the individual 5-year age groups of respondents were used to estimate a linear trend in ${}_5q_0$ for the total sample of Roma populations by taking the logit transformation of ${}_5q_0$ fitted robust linear mixed effect models. This overall trend in ${}_5q_0$ was then transferred into country-specific trends by adjusting the ${}_5q_0$ estimates for the total Roma sample with the country-sample/total-sample ratio of the proportion of surviving children reported by women aged 20-49. In this way, it was at least approximately possible to take different levels of child mortality into account as they were reported by women in the country samples of the RS 2020-21. In addition, we estimated child mortality separately for females and males by applying the annual average female/male ratio of national populations' ${}_5q_0$ values to the ${}_5q_0$ trend of the total Roma population. Child mortality for the six populations included in the RTS 2019 and Slovakia were estimated from the child mortality/adult mortality relationship of the ten populations included in the RS 2020-21, using the RTS 2019 populations and Slovakia's estimates for adult mortality.

2.5 Estimation of adult mortality

The second input parameter we used for the flexible two-dimensional mortality model is LE at age 30 (e_{30}), estimated with the Orphanhood Method (OM). In a nutshell, the OM is based on survey information on maternal and paternal survival, i.e., whether respondents' mothers and fathers were still alive at the time of the survey (see, e.g., Hill et al. 1983). The basic idea of the OM is that the age of respondents represents the survival time of the mother (or father). Consequently, the proportion of respondents of a given age whose mother (or father) is still alive approximates a survivorship ratio from an average age at childbearing (of mothers/fathers when respondents were born) to that age plus the age of the respondents. The OM converts the proportions of those with a surviving parent into life table survivorship probabilities for pre-defined adult ages by controlling for the prevailing pattern of childbearing (methodological descriptions can be found, e.g., in Hill et al. 2005; Moultrie et al. 2013; Preston et al. 2001). We used a variant of the OM which transfers the proportion of respondents aged 20-64 with still living parents into survivorship probabilities from age 30 to age 33+n (l_{33+n}/l_{30}), with n being the starting age of each 5-year age group of respondents (Luy 2009, 2010). The four kinds of information needed to apply this method—(i) proportion of still living mothers, (ii) proportion of still living fathers, (iii) average age of still living mothers, (iv) average age of still living fathers—were available for all 17 countries included in the RTS 2019 and the RS 2020-21 plus Slovakia.

The complete survival functions from age 30 for the Roma population, from which LE at age 30 can be calculated, were derived by transferring the four survival functions of the Princeton model life tables (Coale et al. 1983) and the five survival functions from the UN model life tables (United Nations Department of International Economic and Social Affairs 1982) with the logit life table model (Brass 1971, 1975) to match the estimated survivorship probabilities l_{33+n}/l_{30} for the Roma population (a detailed description of the procedure can be found in European Union Agency for Fundamental Human Rights 2021). The resulting estimates for e_{30} and corresponding reference periods from the individual 5-year age groups of respondents were used to estimate a time trend in e_{30} by fitted robust linear mixed effect models for two groups of populations: eastern European populations and western European populations. These trends were then adjusted to match the country-specific series of e_{30} values.

3. Results

Table 1 gives the estimated LE at birth in 2010—i.e., the most recent year for which empirical estimations are available for all countries included in RTS 2019 and RS 2020-21—separated by sex, for each of the national Roma subsamples in comparison to the corresponding total populations. Among the female populations of Roma, the estimated LE at birth ranges between 66.9 and 75.8 years, and among men between 61.9 and 71.4 years. All these values lie distinctly below of those for the corresponding total populations. The disadvantages of Roma people in LE at birth vary from 5.5 years for male Roma in Portugal to 16.8 years for female Roma in Italy. The differences between the reference populations and Roma people for all 17 countries combined (unweighted averages) are 9.7 years among women and 9.4 years among men.

The estimated gaps in LE between Roma people and the general populations correspond to the existing estimates for earlier years, thus confirming the existence of an extraordinary disadvantage of Roma in the total number of life years. Our estimates are in line with the commonly stated gap of 10-15 years in LE at birth. According to our estimates, the extent of Roma's disadvantage varies between countries and is somewhat larger among women than among men. Among women, they range from -6.6 years in the UK to -16.8 years in Italy. Among men, the disadvantage of the Roma varies between -5.5 years in Portugal to -14.1 years in Italy. Note, however, that these variations are strongly determined by the LE levels of the national populations. In particular, the smaller differences among men are not a result of the estimates for the Roma people. The male national populations of central and eastern Europe are characterized by considerably higher mortality levels compared to their western European counterparts. By contrast, the LE levels of female national populations from central and eastern Europe are much closer to those of western European populations. Thus, the smaller differences in LE between Roma and national populations among men are a result of the higher mortality of the male national populations, and not of the comparatively lower mortality of the male Roma people. Likewise, the huge disadvantage of the Roma population in Italy among both sexes is partly due to the high LE of the national Italian population.

4. Limitations and conclusions

Naturally, results obtained with indirect estimation techniques like the OM must be interpreted with caution. Indirect methods always entail several drawbacks and must be seen primarily as an alternative to having no information (see, e.g., Luy 2012; Timæus 1991). They cannot be—and they are not supposed to be—an alternative to estimates based on vital registration data or census data linked to subsequent deaths with high matching rates. The most apt formulation of indirect techniques' characteristics and the potentials they offer can be found in Hill (2006, p. 631): "Indirect estimation procedures […] remain important as ways of producing estimates for small population subgroups and for tracking trends. […] Purists sometimes find this indirectness distressing, whereas pragmatists accept what they can get."

With regard to the estimation of LE of the Roma population we conclude that indirect estimation can be applied successfully and provides meaningful results. Therefore, the use of indirect methods helps to fill an important knowledge gap regarding the health of Roma people in Europe. The reported data in the FRA surveys turned out to be a reliable basis for the estimation of LE for most of the subsamples and most age groups. The possibility to merge the data from RTS 2019 and RS 2020/21 for the derivation of regional trends in child and adult mortality further improves the robustness of the estimations. Moreover, the completeness of the data was very high (i.e., almost no cases with missing information). The problems which make the data from some country samples too unreliable for estimating country-specific trends are most likely due to the low case numbers in some countries. Thus, the most effective way to overcome these issues would be to further repeat the survey in the same countries and, if possible, increase the sample sizes.

References

Bogdanović, D., D. Nikić, B. Petrović, B. Kocić, J. Jovanović, M. Nikolić, and Z. Milošević. 2007. "Mortality of Roma population in Serbia, 2002-2005." *Croatian Medical Journal* 48(5): 720.

Brass, W. 1971. "On the scale of mortality." Pp. 69-110 in *Biological Aspects of Demography*, edited by W. Brass. London: Taylor and Francis.

—. 1975. *Methods for estimating fertility and mortality from limited and defective data*. Chapel Hill: University of North Carolina.

Coale, A.J., P. Demeny, and B. Vaughan. 1983. *Regional model life tables and stable populations. Second edition*. New York et al.: Academic Press.

de Graaf, P., D. Rotar Pavlič, E. Zelko, M. Vintges, S. Willems, and L. Hanssens. 2016. "Primary care for the Roma in Europe: Position paper of the European forum for primary care." *Zdravstveno varstvo* 55(3): 218-224.

European Commission. 2014. *Roma health report: health status of the Roma population. Data collection in the member states of the European Union*. Brussels: European Union.

—. 2020. *EU Roma strategic framework for equality, inclusion and participation for 2020-2030*. Brussels: European Commission.

European Public Health Alliance. 2018. *Closing the life expectancy gap of Roma in Europe. Roma Health and Early Childhood Development Study*. Brussels: EPHA.

European Union Agency for Fundamental Human Rights. 2021. *Roma and Travellers in six countries. Technical Report*. Luxembourg: Publications Office of the European Union.

—. 2023. *Roma Survey 2021. Technical Report*. Luxembourg: Publications Office of the European Union.

Hablicsek, L. 2008. "The development and the spatial characteristics of the Roma population in Hungary - experimental population projections till 2021." *Demográfia English Edition* 51(5): 85-123.

Hill, K. 2006. "Indirect estimation methods." Pp. 619-631 in *Demography: analysis and synthesis. Volume IV*, edited by G. Caselli, J. Vallin, and G. Wunsch. London: Academic Press.

Hill, K., Y. Choi, and I.M. Timæus. 2005. "Unconventional approaches to mortality estimation." *Demographic Research* 13(12): 281-300.

Hill, K., H. Zlotnik, and J. Trussell. 1983. *Manual X. Indirect techniques for demographic estimation*. Population Studies 81. New York: United Nations.

La Parra-Casado, D., J. Arza-Porras, and J.F. Estévez. 2020. "Health indicators of the National Roma Integration Strategy in Spain in the years 2006 and 2014." *European Journal of Public Health*.

Luy, M. 2009. *Estimating mortality differentials in developed populations from survey information on maternal and paternal orphanhood*. European Demographic Research Papers 3-2009. Vienna: Vienna Institute of Demography.

—. 2010. *Estimating mortality differentials in developed populations from survey information on maternal and paternal orphanhood. Supplement*. European Demographic Research Papers Vienna: Vienna Institute of Demography.

—. 2012. "Estimating mortality differences in developed countries from survey information on maternal and paternal orphanhood." *Demography* 49(2): 607-627.

Moultrie, T., R. Dorrington, A. Hill, K. Hill, I. Timæus, and B. Zaba. 2013. *Tools for demographic estimation*. Paris: IUSSP.

Parekh, N. and T. Rose. 2011. "Health inequalities of the Roma in Europe: a literature review." *Central European Journal of Public Health* 19(3): 139-142.

Preston, S.H., P. Heuveline, and M. Guillot. 2001. *Demography. Measuring and Modeling Population Processes*. Oxford: Blackwell.

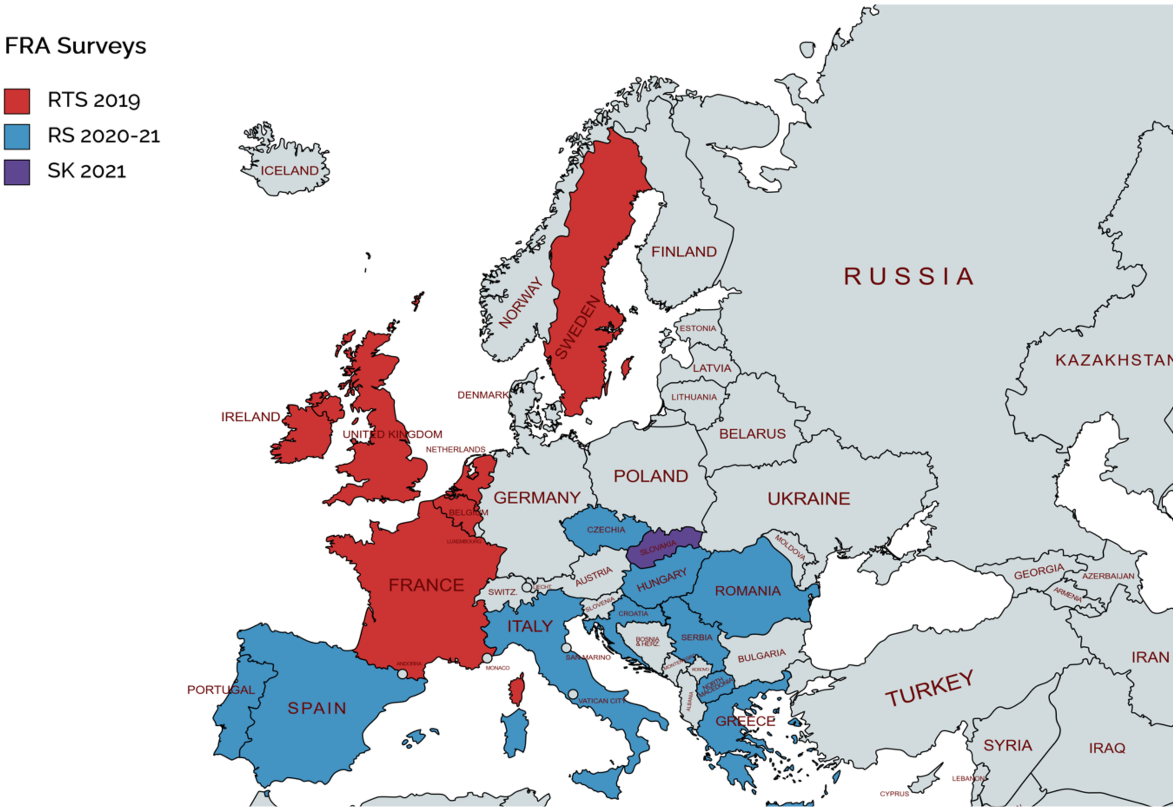
Timæus, I.M. 1991. "Measurement of adult mortality in less developed countries: a comparative review." *Population Index* 57(4): 552-568.

Trussell, T.J. 1975. "A re-estimation of the multiplying factors for the Brass technique for determining childhood survivorship rates." *Population Studies* 29(1): 97-107.

United Nations Department of International Economic and Social Affairs. 1982. *Model life tables for developing countries*. Population Studies New York: United Nations.

Wilmoth, J., S. Zureick, V. Canudas-Romo, M. Inoue, and C. Sawyer. 2012. "A flexible two-dimensional mortality model for use in indirect estimation." *Population Studies* 66(1): 1-28.

Figure 1: Countries included in the surveys on the Roma people of the European Union Agency for Fundamental Rights (FRA)



Source: authors' own; Notes: RTS 2019 = 2019 Roma and Travellers Survey, RS 2020-21 = Roma Survey 2020-21, SK 2021 = Slovakian National Survey 2021.

Table 1: Life expectancy at birth of Roma people in 17 European countries in comparison to the national general populations, 2010

	Roma people		General population		Difference	
	Women	Men	Women	Men	Women	Men
Belgium	70.7	66.6	82.6	77.4	–11.9	–10.7
Croatia	66.9	61.9	80.0	73.2	–13.1	–11.3
Czechia	69.4	63.7	80.7	74.4	–11.2	–10.7
France	73.3	68.0	84.7	78.0	–11.4	–10.0
Greece	73.3	66.2	83.4	77.7	–10.1	–11.5
Hungary	68.8	64.1	78.3	70.6	–9.5	–6.4
Ireland	75.0	70.1	82.8	78.3	–7.8	–8.2
Italy	67.7	65.4	84.5	79.5	–16.8	–14.1
North Macedonia	72.9	67.4	82.7	78.8	–9.9	–11.4
Portugal	70.1	64.5	77.3	72.6	–7.2	–8.2
Romania	75.7	71.4	83.2	76.9	–7.5	–5.5
Serbia	70.4	64.2	77.3	69.9	–7.0	–5.7
Slovakia	68.9	64.3	77.6	71.2	–8.7	–6.9
Spain	71.7	64.2	79.2	71.7	–7.4	–7.5
Sweden	74.9	67.1	85.0	79.0	–10.1	–11.9
The Netherlands	75.2	68.8	83.5	79.5	–8.3	–10.7
United Kingdom	75.8	69.0	82.3	78.3	–6.6	–9.4
Average (unweighted)	71.8	66.3	81.5	75.7	–9.7	–9.4

Data: RTS 2019, RS 2020/21, UN World Population Prospects 2024 revision; own estimations