

Mortality and the economic crisis in Greece

In 2008, Greece entered a deep financial crisis, which has raised concerns about severe public health consequences,^{1,2} economic downturns historically being associated with increases in mortality.^{3,4} In 2012, there were 116 670 deaths in Greece, the highest number since 1949. The 2008–12 rise in the number of deaths (figure) is attributed to the increase in the number of deaths in the oldest individuals, with 12.5% and 24.3% increases in people aged 80–84 years and older than 85 years, respectively (appendix).

Analysis of mortality data obtained from the Hellenic Statistical Authority shows that in 2012, after 4 years of austerity, age-adjusted mortality in Greece was lower than in 2008. Age-specific mortality rates decreased for all age groups, with the exception of slight increases for individuals aged 5–9 years, 35–39 years, 55–59 years, and 65–69 years. Furthermore, between 2008 and 2011, all-cause mortality was essentially unaffected, declining at a slightly higher rate (6.3%) than in the 3-year precrisis period (2005–08, 5.7%). This trend was reversed during 2011–12, driven by an increased mortality in individuals older than 55 years, but continued to decrease in

people younger than 55 years. Almost two thirds of the additional deaths in 2012 are attributed to demographic ageing, whereas almost a third (about 2000 deaths) could be linked to austerity. Notably, a mortality increase of a smaller magnitude to that of 2011–12 was seen in 2006–07 (1.2% vs 1.7%), but was more marked in people younger than 55 years than in those older than 55 years (+2.9% vs +1.1%).

The 2011–12 increased mortality in people older than 55 years (about 2200 excess deaths) probably constitutes the first evident short-term consequence of austerity on mortality in Greece. Although deeper investigation into changes in cause-specific mortality rates is needed, this trend is probably related to barriers to access health care for chronically ill patients because of the drastic restrictions in health policies and the increase in uninsured individuals.^{1,2,4}

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- 1 Kondilis E, Giannakopoulos S, Gavana M, Ierodiakonou I, Waitzkin H, Benos A. Economic crisis, restrictive policies, and the population's health and health care: the Greek case. *Am J Public Health* 2013; **103**: 973–79.

- 2 Kentikelenis A, Karanikolos M, Papanicolas I, Basu S, McKee M, Stuckler D. Health effects of financial crisis: omens of a Greek tragedy. *Lancet* 2011; **378**: 1457–58.

- 3 Falagas ME, Vouloumanou EK, Mavros MN, Karageorgopoulos DE. Economic crises and mortality: a review of the literature. *Int J Clin Pract* 2009; **63**: 1128–35.

- 4 Stuckler D, Basu S, Suhrcke M, Coutts A, McKee M. The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet* 2009; **374**: 315–23.

Maternal and child mortality in Greece

Financial crisis can be a threat to health,¹ and International Monetary Fund programmes have been associated with impeded efforts to control child and maternal mortality.² In 2008, Greece entered the most serious socioeconomic downturn in the country's modern history, which has steadily worsened over the following years.³ Vlachadis and Kornarou⁴ reported that an increase in stillbirths in Greece was linked to the economic crisis; stillbirth rate increased from 3.31 per 1000 livebirths in 2008 to 4.36 in 2010, but the study included only the first 2 years of the crisis.⁴ Data for maternal health have not been analysed since 2006.⁵ In light of the socioeconomic crisis taking place in Greece, our aim was to investigate whether this crisis had an effect on stillbirths, and infant, child, and maternal mortality.

We investigated the potential association between the financial crisis (2008–12) and stillbirths, and infant, child, and maternal mortality, using the precrisis period (2003–07) as the referent. Stillbirth, infant and child mortality (per 1000 livebirths), and maternal mortality (number of maternal deaths per 100 000 livebirths) are shown in the table.

Infant mortality rate and child mortality rate did not differ between the precrisis and crisis periods (3.83 [95% CI 3.56–4.10] vs 3.17 [2.63–3.72], and 4.56 [4.18–4.93]



See Online for appendix

For the Hellenic Statistical Authority see <http://www.statistics.gr/portal/page/portal/ESYE>

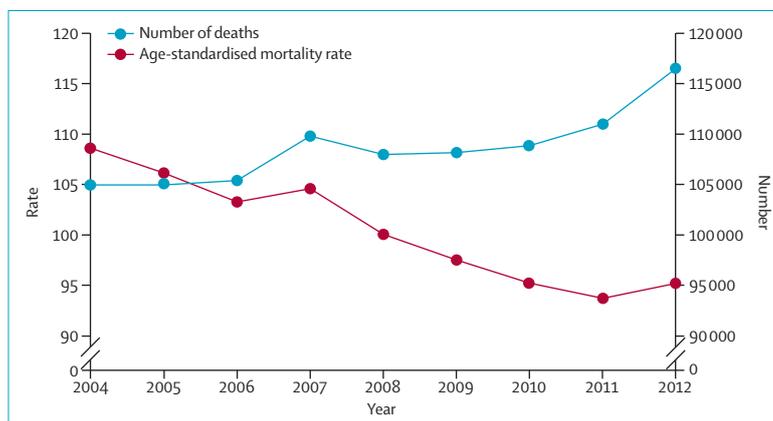


Figure: Mortality in Greece (2004–12)

Mortality rate is standardised to the 2008 age structure of the Greek population (2008=100).

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	Infant deaths (<1 year)	Child deaths (<5 years)	Stillbirths	Maternal deaths	Livebirths	Infant mortality	Child mortality	Stillbirth rate	Maternal mortality ratio
2003	420	494	504	1	104 420	4.02	4.73	4.83	1.0
2004	429	523	477	2	105 655	4.06	4.95	4.51	1.9
2005	409	493	421	0	107 545	3.80	4.58	3.91	0
2006	415	479	376	2	112 042	3.70	4.28	3.36	1.8
2007	397	474	434	2	111 926	3.55	4.23	3.88	1.8
2008	314	393	392	0	118 302	2.65	3.32	3.31	0
2009	371	456	505	4	117 933	3.15	3.87	4.28	3.4
2010	436	513	500	5	114 766	3.80	4.47	4.36	4.4
2011	357	437	431	3	106 428	3.35	4.11	4.05	2.8
2012	293	369	446	0	100 371	2.92	3.68	4.44	0

Infant mortality, child mortality, and stillbirth rate are expressed per 1000 livebirths, whereas maternal mortality is expressed per 100 000 livebirths. Data for infant, child, and maternal deaths, stillbirths, and livebirths are derived from the Hellenic Statistical Authority (ELSTAT; the 2012 data are correct as of Aug 23, 2013).

Table: Stillbirths and infant, child, and maternal mortality in Greece (2003–12)

vs 3.89 [3.35–4.43], respectively). However, a closer look at the data shows that child mortality rates have been steadily declining since the 1950s, and were historically low in 2008—when the crisis struck. In the first 2 years of the crisis (2009–10), infant mortality rate and child mortality rate gradually increased, and after 2010 they started to decline again. Likewise, stillbirth rate and maternal mortality ratio did not differ between the two periods (4.10 [95%CI 3.38–4.82] vs 4.09 [3.52–4.66] and 1.20 [0.44–2.61] vs 2.20 [1.09–3.94], respectively). The trends for stillbirth rate are more complex: low in 2006 and 2008, there has been a clear increase since then. Furthermore, although in 2009 and 2010 maternal mortality ratio increased, the small numbers of maternal deaths do not allow for firm conclusions to be drawn.

Although infant and child mortality decreased after 2010, stillbirths remain high. There is an urgent need to strengthen public health measures in order to secure the quality of child and maternal health in Greece in the long term.

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- Horton R. The global financial crisis: an acute threat to health. *Lancet* 2009; **373**: 355–56.
- Stuckler D, Basu S. The International Monetary Fund's effects on global health: before and after the 2008 financial crisis. *Int J Health Serv* 2009; **39**: 771–81.
- Hellenic Statistical Authority. Statistics 2013. <http://www.statistics.gr/portal/page/portal/ESYE> (accessed Sept 25, 2013).
- Vlachadis N, Kornarou E. Increase in stillbirths in Greece is linked to the economic crisis. *BMJ* 2013; **346**: f1061.
- Vrachnis N, Iliodromiti S, Samoli E, Iliodromiti Z, Dendrinos S, Creatsas G. Maternal mortality in Greece, 1996–2006. *Int J Gynaecol Obstet* 2011; **115**: 16–19.

Greece's birth rates and the economic crisis

According to the latest data from the Hellenic Statistical Authority, there were 100 371 registered livebirths in 2012.¹ This is the lowest number recorded in Greece since 1955 (the first year for which reliable data are available). While 1999–2008 witnessed an accelerating upward trend in number of births (from 100 643 to 118 302), the 2008 economic crisis has been accompanied by a dramatic reversal; births decreased by 15.2% between

2008 and 2012 (figure). Notably, 2010–12 saw a 12.5% decrease, the largest biennial fall in the past six decades.

The economic crisis does not explain the whole story. Although the fertility rate remained essentially unchanged between 2008 and 2010 (1.47 and 1.49) and decreased to 1.34 in 2012 (appendix), these fertility rates are substantially higher than those of 1999 (1.28) and 2001 (1.26, the historical low). Much of the problem lies in the concurrent decrease of 6.1% in the population of women of childbearing age (15–44 years). It is estimated that without this drop, about 7200 more births would have occurred in 2012 (appendix). Hence, lower fertility accounts for just 60% of the total reduction in births in 2012 compared with 2008, while the decrease in women of childbearing age explains the remaining 40%.

The relation between livebirth rates and maternal age during 2008–12 is interesting. The number of births fell further in younger women: births decreased by 31.8%, 23.2%, 10.6%, and 2.5% in women younger than 25 years, 25–29 years, 30–34 years, and 35–39 years, respectively. By contrast, fertility rate increased for women older than 40 years. Specifically, livebirths and fertility rate in women aged

For more on **child mortality rates** see http://www.childmortality.org/index.php?r=site/graph#ID=GRC_Greece

See Online for appendix

