What was Killing Babies in Hermoupolis, Greece? An Investigation of Infant Mortality Using Individual Level Causes of Death, 1861–1930

By Michail Raftakis

To cite this article: Raftakis, M. (2022). What was Killing Babies in Hermoupolis, Greece? An Investigation of Infant Mortality Using Individual Level Causes of Death, 1861–1930. *Historical Life Course Studies, 12*, 205–232. https://doi.org/10.51964/hlcs11601

HISTORICAL LIFE COURSE STUDIES

What was Killing Babies?
European Comparative Research on Infant Mortality
Using Individual Level Causes of Death

VOLUME 12, SPECIAL ISSUE 6,
2022

GUEST EDITORS
Angélique Janssens
Alice Reid

EHPS NETWORK

MISSION STATEMENT

HISTORICAL LIFE COURSE STUDIES

Historical Life Course Studies is the electronic journal of the *European Historical Population Samples Network* (EHPS-Net). The journal is the primary publishing outlet for research involved in the conversion of existing European and non-European large historical demographic databases into a common format, the Intermediate Data Structure, and for studies based on these databases. The journal publishes both methodological and substantive research articles.

Methodological Articles

This section includes methodological articles that describe all forms of data handling involving large historical databases, including extensive descriptions of new or existing databases, syntax, algorithms and extraction programs. Authors are encouraged to share their syntaxes, applications and other forms of software presented in their article, if pertinent, on the EHPS-Net website.

Research articles

This section includes substantive articles reporting the results of comparative longitudinal studies that are demographic and historical in nature, and that are based on micro-data from large historical databases.

Historical Life Course Studies is a no-fee double-blind, peer-reviewed open-access journal supported by the European Science Foundation (ESF, http://www.esf.org), the Scientific Research Network of Historical Demography (FWO Flanders, http://www.historicaldemography.be) and the International Institute of Social History Amsterdam (IISH, http://socialhistory.org/). Manuscripts are reviewed by the editors, members of the editorial and scientific boards, and by external reviewers. All journal content is freely available on the internet at hlcs.nl.

The European Science Foundation (ESF) provides a platform for its Member Organisations to advance science and explore new directions for research at the European level. Established in 1974 as an independent non-governmental organisation, the ESF currently serves 78 Member Organisations across 30 countries. EHPS-Net is an ESF Research Networking Programme.

The European Historical Population Samples Network (EHPS-net) brings together scholars to create a common format for databases containing non-aggregated information on persons, families and households. The aim is to form an integrated and joint interface between many European and non-European databases to stimulate comparative research on the micro-level.
Visit: http://www.ehps-net.eu.

HISTORICAL LIFE COURSE STUDIES
VOLUME 12 (2022), published 21-07-2022

What was Killing Babies in Hermoupolis, Greece?

An Investigation of Infant Mortality Using Individual Level Causes of Death, 1861–1930

Michail Raftakis
University of Sassari

ABSTRACT

This paper employs individual level cause of death data from the port city of Hermoupolis on the Greek island of Syros, in order to test the newly-constructed ICD10h coding system. By constructing cause specific death rates for infants from the late 19th century to early 20th century, the paper contributes to a comparative approach, which aims to show how causes of death differ across several locations within Europe and how they develop over time. Given the scarcity of cause of death data both at the individual and aggregate level in Greece roughly prior to the 1920s, the availability of such data in the draft death registers (for sporadic runs of years in the second half of the 19th and early 20th century) and the civil registration (from 1916 onwards) in Hermoupolis provides a deeper understanding of the history of cause-of-death reporting in the country. Infant mortality in Hermoupolis was relatively high throughout the study period, with water-food borne diseases accounting for the highest number of infant deaths, especially during the hot and dry summer months. While the prominent winter peak of neonatal mortality but also congenital-birth disorders could be partially associated with birth seasonality and/or low temperatures over the winter months. Finally, certain vague terms such as 'atrophy' and 'athrepsy', but especially 'drakos' require further investigation until they are firmly understood.

Keywords: Infant mortality, Causes of death, Individual level data, Greece, Hermoupolis, ICD10h

e-ISSN: 2352-6343
DOI article: https://doi.org/10.51964/hlcs11601

1 INTRODUCTION

This paper employs individual level cause of death data from the port city of Hermoupolis on the Greek island of Syros, in order to test the newly-constructed ICD10h coding system (Janssens, 2021). By constructing cause specific death rates for infants from the late 19th century to early 20th century, the paper contributes to a comparative approach, which aims to show how causes of death differ across several locations within Europe and how they develop over time. Despite the limitations of cause-of-death reporting in past populations (due to their large numbers attributed to 'undefined' or vague description of symptoms rather than actual diseases) (Alter & Carmichael, 1999; Kintner, 1986; Reid & Garrett, 2012; Williams, 1996), the ICD10h system, by coding 'words' rather than 'diseases' in order to avoid unjustifiable interpretations of disease descriptions, aims to bring new insights into the study of historical causes of death. Given the scarcity of cause of death data both at the individual and aggregate level in Greece roughly prior to the 1920s, the availability of such data in the draft death registers (for sporadic runs of years mainly in the second half of the 19th and early 20th century) and civil registration (from 1916 onwards) in Hermoupolis provides a deeper understanding of the history of cause-of-death reporting in the country.

This paper first offers an essential historical background to the city of Hermoupolis and a descriptive account of the data sources used in the study. The second part of the paper gives a brief overview of the development of infant mortality over time, while the remaining parts of the paper discuss the cause-specific analysis in infancy, neonatal and post-neonatal period along with their seasonal patterns during the years, when cause-of-death information is available.

1.1 HERMOUPOLIS AND SOURCES

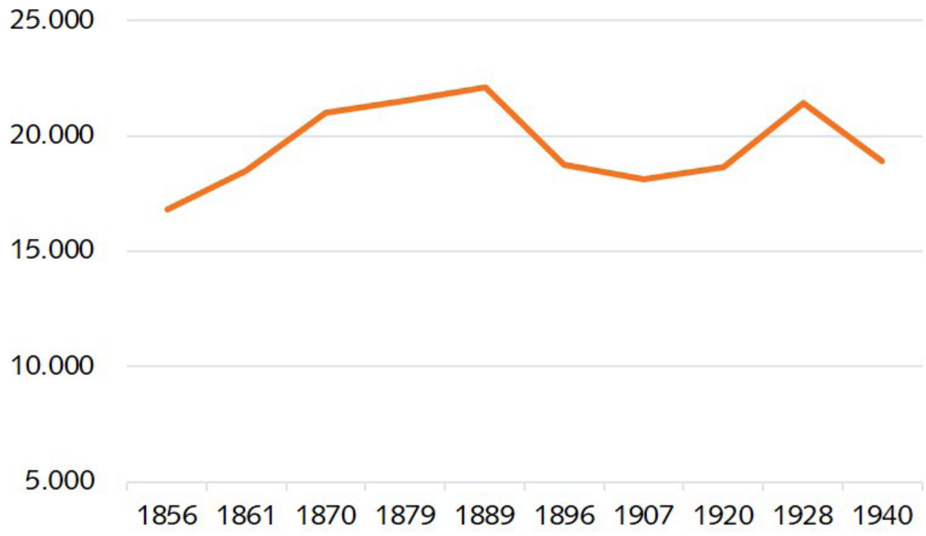
Hermoupolis is the capital city of the island of Syros and of the Cycladic group of islands. It was one of the first urban centres of Greece, founded by refugees during the Greek Revolution of the 1820s. With a population of over 20,000 inhabitants between 1870 and 1890 (see Figure 1), it was the second largest city in the country, next only to Athens. Hermoupolis was without a doubt the most significant Greek port of the mid-19th century. It developed all the services of a typical 19th-century port city, such as marine insurance companies, a trade in second-hand vessels, a maritime loan market, a depot for ship supplies and similar initiatives (Delis, 2015b, p. 258). As a port, its principal function was distributive since it was the largest centre of transit trade in the Eastern Mediterranean. It was also an effective commercial and maritime crossroads between the Mediterranean and the Black Sea. Hermoupolis also had a ship-building and repair zone for the construction and repair of sailing ships (Delis, 2015a, pp. 229–231).

The city's importance had already started to decline in the last quarter of the 19th century, although it maintained its prominence until the opening of the Corinth Canal in 1893. A major reason for its decline was the expansion of steamboat services and the opening up of other ports on the coast of Asia Minor which attracted much of the commerce that Hermoupolis had previously monopolized (Kolodny, 1974, p. 327; Travlos & Kokkou, 1980, p. 40). Other important reasons included the development of the railway network and the rise of Athens and its port of Piraeus, which led to reduced commercial activity through the port at Hermoupolis (Kolodny, 1969, pp. 256–257; Travlos & Kokkou, 1980, p. 40). After enjoying a period of economic development, Hermoupolis entered a long phase of decline. In this period, the city's attraction as a labour destination for internal migrants decreased dramatically. By the early 20th century, Hermoupolis had transformed into a rather insignificant Greek town, albeit with extensive administrative responsibilities as the capital of the Cyclades Islands. The population of the city stabilized at almost 18,000 inhabitants until 1920. In the interwar period, Hermoupolis experienced an extended financial and social crisis. The Great Depression was evident in every aspect of Hermoupolis life: the port's activity reduced dramatically and almost every industrial sector declined, apart from the textile mills, the output of which was increasing constantly until the early 1930s (Papastefanaki, 2008, pp. 159–160). In 1922–1923 more than 7,000 refugees arrived on the island, not all of whom stayed, increasing the population of the city to 21,156. By 1940, the population had decreased again to 18,925 inhabitants.

Hermoupolis experienced higher mortality (with a crude death rate of 32‰ in 1897) than the national average (22–25‰ at the time) for most of the study period. Life expectancy at birth in Hermoupolis was also found to be significantly lower than any other available rate that has been calculated for any Greek population: 32.3 years for both sexes in 1879, while it gradually increased to 44.1 years in 1928.

Comparisons of Hermoupolis time-series with other semi-urban and rural Greek populations suggested that an urban penalty was operating in the city even during the first decades of the 20th century (Raftakis, 2019). Main reasons that have been associated with the high levels of mortality levels in Hermoupolis include unhealthy working conditions, low living standards among the lower strata, lack of public hygiene, lack of a water supply system, inefficient sewage disposal, high in-migration and high population density (Fragkides, 1894; Kolodny, 1969; Raftakis, 2019; Tsakalotos, 1914).

Figure 1 *Population of Hermoupolis around each census year, 1856–1940*



Source: Kolodny, 1969, *p. 255*

In Hermoupolis, even though civil registration records have been available continuously since 1859, cause of death has been consistently reported in the civil death registers only since 1916, when the name of the physician who confirmed the death and specified the cause was included on the certificate (*Leksiarchika Vivlia Apovioseon*). Each death certificate contains information about the informant as well as the deceased person (full name, age in days, weeks or months for infants, marital status, place of origin, occupation, relationship to the informant, mother's full name, cause and place of death from 1916 onwards, date of death and reporting). Prior to that, so-called draft death registers, in which cause-of-death information was reported, are available but only for sporadic runs of years (*Proheira Vivlia Apovioseon*). In particular, they are available for the years: 1876–1879, 1892–1898, 1902–1903 and 1912–1913 (see also Figure 2). The draft death registers listed all deaths which occurred in Hermoupolis (Hietala, n.d.). By linking the draft death registers to the civil registration data, it was possible to confirm that all information (full name, age in days, weeks or months for infants, marital status, place of origin, occupation, relationship to the informant, parents' full names, date of death and reporting) given in the death records was correct. While for most years there was full correspondence between the two sources, there was a significant proportion of missing infant deaths in the draft death registers for three years, during certain months either at the beginning or at the end of each year and therefore cause-of-death information is not available for such deaths. More specifically, in Table 1, it is evident that one-third of infant deaths (between January and April) in 1876, almost one-fourth of infant deaths (between September and December) in 1879 and more than half of infant deaths (between January and July) in 1892 were not linked to the draft death registers either because such deaths were not reported there or simply because the manuscript books have not survived. The lack of cause-of-death information around these years is very likely to affect the seasonality patterns of certain causes of death, therefore it was decided to exclude incomplete years (i.e., 1892) or to employ unconventional time periods (i.e., Sep. 1876–Aug. 1879). In any case, the availability of cause of death data is very rare in Greece prior to 1921, when the first national cause-of-death statistics were published (NSSG, 1925). Therefore, this paper is expected to contribute substantially to the history of cause-of-death reporting in Greece.

Table 1 *Successful linkage ratio (%) between civil registration and draft death registers*

Year	Linked (%)	Not linked (%)	Month missing
1876	**63.8**	**36.2**	**January–April**
1877	97.0	3.0	
1878	95.3	4.7	
1879	**71.1**	**28.9**	**September–December**
1892	**46.3**	**53.8**	**January–July**
1893	99.3	0.7	
1894	100.0	0.0	
1895	100.0	0.0	
1896	100.0	0.0	
1897	100.0	0.0	
1898	94.3	5.7	
1902	99.1	0.9	
1903	100.0	0.0	
1912	100.0	0.0	
1913	100.0	0.0	

Source: Hermoupolis Mortality Database

All death certificates for the period 1859–1940 were transcribed by the author into the Hermoupolis Mortality Database and have been employed for the purposes of this study (for a detailed description of the database, see Raftakis (2019, 2021)) (see Table 2). In addition, for the years when draft death registers are available, they were also linked to the death certificates, as described above. Sex at birth is unavailable because birth registers (*Leksiarchika Vivlia Genneseon*) have not yet been transcribed but only counted, and therefore, sex-specific rates have not been produced (the annual number of births can be seen in Figure A1 in the Appendix).

Table 2 *Number of infant deaths and live births and mean per annum in Hermoupolis, 1861–1930*

Period	1861–1930
Total number of infant deaths	9,296
Mean per annum	133
Total number of live births	45,378
Mean per annum	648
Cause of death available in civil registration	1916–1930
Cause of death available in draft death registers	1876–1879 1892–1898 1902–1903 1912–1913
Total number of infant deaths for which COD is available	3,500

Source: Hermoupolis Mortality Database

In a nutshell, all infant deaths and annual birth sums have been employed to calculate annual and quinquennial infant, neonatal and post-neonatal mortality rates for the period 1861–1930. In the absence of cause-of-death information in the civil registration prior to 1916, such information was retrieved from the draft death registers for all the available years (see also blue and pink lines in Figure 2).

2 OVERVIEW OF INFANT MORTALITY RATES

Infant mortality in Hermoupolis was relatively high throughout the study period, and it was also among the highest in the country. A major reason for the high infant death rate is attributed to, among other reasons, the existence of a public hospital in the city which accepted foundlings and placed them with hired wet-nurses (Arfanes, 1900; Loukos, 1994; Raftakis, 2021). The sharp spikes in annual IMR shown in Figure 2 most likely reflect the unhealthy profile of the city as a result of high population density and the lack of adequate public health infrastructure.[1] This led to almost annual occurrences of epidemics and a high prevalence of diarrhoeal diseases among infants (Fragkides, 1894). However, the quinquennial IMRs, plotted in Figure 3, are extremely smooth.

Overall levels of infant mortality (as shown in Figure 3) remained remarkably stable, but still at relatively high levels, which did not exceed 200 per 1,000, throughout the first 20-year period. Subsequently, infant mortality followed an increasing trend, which lasted up to the turn of the 20th century. Such an increase is assumed to have been the product of Hermoupolis' economic decline, the worsening of working conditions and the very low living standards among the lower strata (Kolodny, 1969). The situation was further deteriorated by the unstable financial and political circumstances of the country at the time (i.e., 1893 public insolvency). The worsening of economic conditions in the late 19th century also led to an increase in child abandonment and the swelling of the foundling population, that had also driven up infant deaths (Loukos, 1994, Fig. 1; Raftakis, 2021, Fig. 2). Another reason may have been the gradual improvement in registration coverage (for infant death registration in Hermoupolis, see Raftakis, 2021). In particular, age-reporting was supposed to had improved by then, given that rounding the age of infants to one year was rather common. Perhaps, the decline in early childhood mortality in the 1890s[2] had also somehow contributed to a more accurate age-reporting, so some infant deaths who had previously shifted to the group of child deaths, they begun to be reported as dying at the age less than zero (Raftakis, 2019, Fig. 5.2). IMR peaked in 1890–1891 most likely as a result of the Russian flu epidemic, which afflicted a significant part of the population (Fragkides, 1894). Unfortunately, the lack of cause-of-death information in the years prior to 1892 does not allow this peak to be investigated further. Subsequently, IMR followed an almost continuous decline, which was only interrupted in 1918–1919 as a result of the great influenza pandemic and in 1923 because of the arrival of the Asia Minor refugees and its aftermath.[3] Stillbirths were only reported in the Hermoupolis civil registers from 1912 onwards. Although stillbirths have been excluded from the calculation of all rates, it has been suggested that the decline in infant mortality (particularly that of neonates) in the first decades of the 20th century may have been an artefact of such change in the registration process rather than an actual decline. More specifically, some stillbirths occurring prior to 1912 may have been reported as neonatal deaths, while their higher levels prior to that may be artificially inflated due to the possible inclusion of some stillbirths (Raftakis, 2019, 2021). The timing of infant mortality decline in Hermoupolis coincided with the national trend as estimated by Valaoras (1960, p. 132). The main factors that have been associated with the decline include improvements in living standards and nutrition among lower strata initiated by local philanthropic organizations[4], improvements in maternal literacy and wider access to water due to the introduction of an underground supply system in the mid-1920s (Raftakis, 2021).

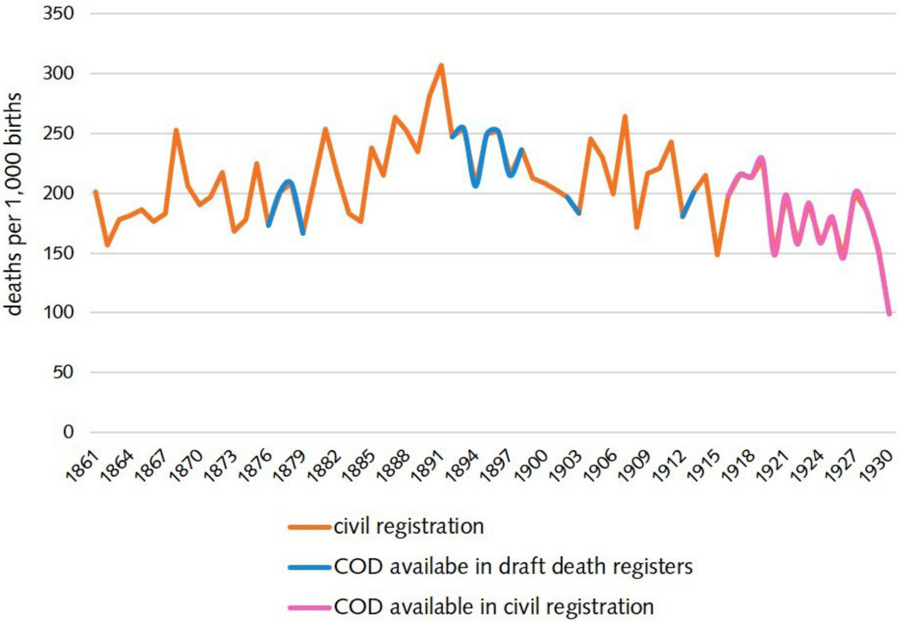
1 The annual variations in infant mortality may also be due to relatively small numbers.

2 The timing of the early-childhood mortality decline coincided with the introduction of vaccination practices; yet, further research is required to draw more secure links.

3 For the 1918–1919 influenza pandemic in Hermoupolis, see Raftakis (2022).

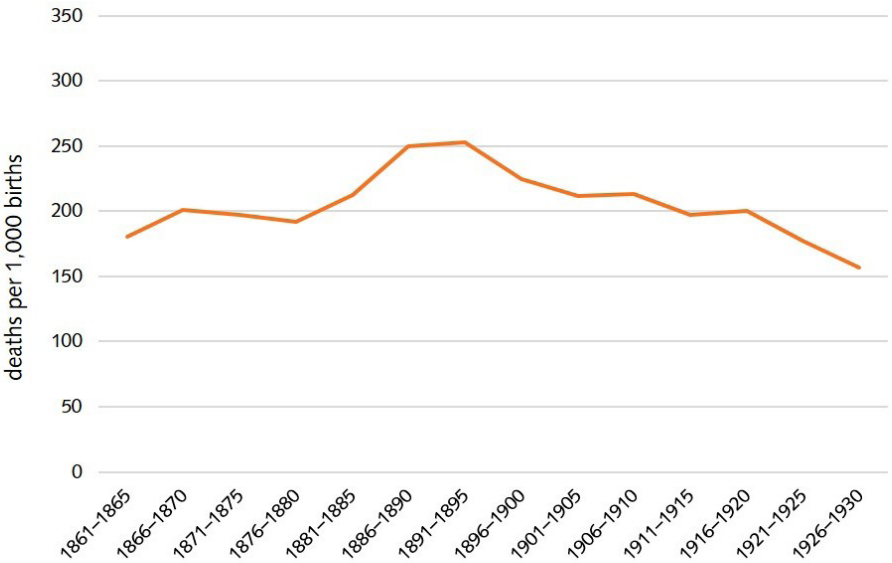
4 The inability of the state to enact legislation to establish a welfare system caused the bourgeois inhabitants of the city, often in association with the local authorities, to take action for those in need. Based on this practice, an organisation for the Welfare of Children (*Perithalpse tou Paidos*) was established in Hermoupolis in 1914 with the intention of helping mothers with the care of their children while they were working. Under this initiative, a group of women, using financial aid from the state, the city council or philanthropists, contributed to the daily provision of childcare for those infants and young children whose mothers worked mainly in the city's industries. Another important philanthropic association was the Foundling Hospital (*Asylo ektheton vrefon*), which was established in 1920 and provided childcare, medical care, nourishment and protection of foundlings and infants of the lower social classes. As a result, it has been found that foundling mortality declined significantly during the first decades of the 20th century (Loukos, 2015; Raftakis 2019, 2021).

Figure 2 *Annual IMR (1861–1930)*



Source: Hermoupolis Mortality Database

Figure 3 *Quinquennial IMR (1861–1930)*



Source: Hermoupolis Mortality Database

3 CAUSES OF DEATH

Using individual level causes of death for the years when such information is available in the civil registration and draft death registers, cause-specific mortality rates during infancy have been calculated and presented in Figure 4 (see also Table A1 in the Appendix). Water-food borne diseases was the most prevalent causal group throughout the study period, followed by weakness, congenital-birth disorders[5], airborne diseases and convulsions. Certainly, the first period, Sep. 1876–Aug. 1879, requires special attention, as it displays different patterns to the rest of the study period. The majority of deaths in this period were attributed to unknown causes and vague terms. A typical example is that of the term

5 Congenital-birth disorders group consists of mainly vague terms such as 'ateles anaptykse' (ατελής ανάπτυξη), 'ateleia' (ατέλεια), 'ateles anaplase' (ατελής ανάπλαση) and 'ateles diaplase' (ατελής διάπλαση), which are all related to 'congenital weakness' and 'imperfect development'.

'drakos'/'drakonti' [dragon][6], which was reported as the sole cause of death in a significant fraction of death certificates during this period. Given that no reference could be traced in contemporary sources, it is still unclear as to what this may refer to. Therefore, a unique special code (R99.999) was assigned and classified as "COD difficult to ascertain/not recognised", until the term is firmly understood. Several hypotheses have been put forward. The first hypothesis refers to a severe acute cough, as a symptomatic cause for pneumonia or laryngitis. However, the seasonality analysis shows that deaths from drakos exhibited a clear summer peak, similar to that of water-food borne diseases (see also section 6).[7] Hence, it is highly unlikely that drakos is associated with pneumonia or is a condition of the respiratory tract. On the other hand, according to a 1929 medical dictionary ('Drakontiasis' in Manos & Oikonomides, 1929b), the term 'drakos' may refer to 'Guinea worm infection' (infection due to Dracunculus medinensis; B72 according to ICD10).[8] A large number of infants dying from an unknown disease such as this is likely to have attracted the interest of both local physicians and press. However examination of the available contemporary local press and the proceedings of the Syros medical association (Iatrike Etaireia Syrou, 1895) yielded no reference to drakos or another rare disease. Therefore, it is suggested here that the term was used to represent an already known/existing symptom or term at the time or perhaps was simply a favourite term of one particular doctor or the local medical community at the time. Furthermore, while the term 'teething' was reported as a cause of death, this happened only during the first period investigated here (Sept. 1876–Aug. 1879), and even then, refers to a very small fraction of deaths. Moreover, although the term 'convulsions' was present throughout the study period, it exhibited relatively low levels.[9]

From 1893 onwards, cause-specific mortality exhibited a more homogeneous trend. More specifically, water-borne diseases became more important over time, which perhaps signifies a change in the attribution of causes of death. Certainly, more standardized terms (i.e., 'gastroenteritis', 'enteritis') began to be used by local physicians which led gradually to the disappearance of unknown and ill-defined causes of death (i.e., 'diarroia' [diarrhoea], 'enterikos katarrous' [enteric catarrh]). Another reason for this trend could be the worsening of environmental conditions which, in combination with the contaminated water supply in the city, contributed to the transmission of gastrointestinal diseases amongst infants. According to oral evidence, breastfeeding was almost universal in the city and therefore it would be expected that infants were protected against diarrhoeal-related diseases, at least for some months.[10] Although breastfeeding in Hermoupolis was said to be widespread and for long durations, it is possible that there were some women who were forced to give up breastfeeding earlier, and therefore it is likely that some infant deaths happened disproportionately among these deaths. However, early initiation of supplementary food (before the sixth month of life), and the use of impure water for its preparation, may explain the very high levels of water-food borne diseases in the city (Raftakis, 2021). Weakness captures another group of diseases which comprised a relatively important part of infant deaths, with 'atrophy' (*atrophia*) and 'athrepsy' (*athrepsia*) being the main terms used within this group. Although they are somewhat vague terms, they were associated with gastrointestinal infections by contemporary physicians.[11] On the other hand, airborne diseases were a relatively small cause of death compared to the water-food part of the picture, possibly reflecting the decreasing population density

6 According to folklore evidence, the term 'drakos' (or 'drakoula' for female infants) was used as a diminutive for unbaptised infants (Paradelles, 1995, p. 145). Baptism usually took place within the first week of infant's birth (Bent, 1885, p. 109; Rodd, 1892, p. 108). However, given that the majority of infant deaths due to drakos refer to infants older than three months, it is very unlikely that the term was used as a cause of death for those infants, who died and were unbaptized.

7 It should be noted that drakos was reported along with diarrhoea only for one case.

8 (Centers for Disease Control and Prevention. (n.d.))

9 The terms 'eclampsia' (εκλαμψία) and 'spams' (σπασμοί) were used in the first and second period, while the term 'eklamptikoi spasmoi' [convulsions] (εκλαμπτικοί σπασμοί) was introduced in the 20th century.

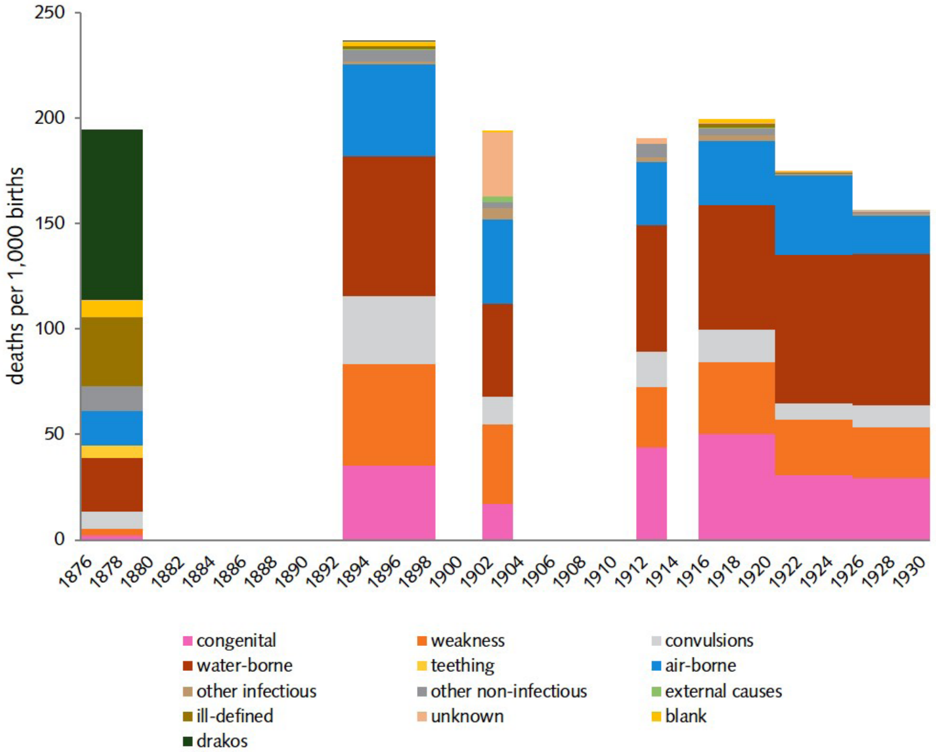
10 For the Syros interviews, see Hionidou (2006, pp. 29–30) and Raftakis (2019, p. 38).

11 According to a local contemporary physician, both atrophy and athrepsy resulted from inadequate nutrition and/or contaminated food (Arfanes, 1900, p. 14). Contemporary studies on the Athenian infant mortality linked also both terms to gastrointestinal infections, while often were included in the calculation of infant gastrointestinal mortality (Kanellakes, 1955, p. 17; Papagiannis, 1900, p. 343). Athrepsia, in particular, according to a contemporary medical dictionary was associated with a) inadequate nutrition, b) gastrointestinal infections, c) infectious and chronic diseases (i.e., pneumonia, whooping cough, bronchopneumonia, hereditary syphilis, tuberculosis), and d) prematurity, because premature infants were more prone to athrepsia, since they could not be fed properly (Manos & Oikonomides, 1929a, pp. 76–77).

of the city as a result of the decline in industrial activity in the last decades of the 19th century. Finally, convulsions had a sizeable presence in Hermoupolis mainly during the second period investigated here (1893–1898), while subsequently were responsible only for a relatively small fraction of infant deaths.

It is expected that the quality of the cause of death data in Hermoupolis improved from 1916 onwards, given that a physician had to certify the cause of death from this date. This is supported by the gradual disappearance of unknown and vague terms by the end of the study period. During the period 1916–1930, for which cause of death is continuously available, water-food borne diseases increased over time, while the rest of the causal groups declined, apart from weakness which remained relatively stable. The persistence of water-food borne diseases after the introduction of an underground piped water supply in the mid-1920s may indicate the limited improvement of water quality in the city. Evidence from Hermoupolis sources indicated that the expansion of the underground water supply was delayed significantly (indeed it was only expanded to the working-class areas and the refugee settlements in the mid-1930s), while water chlorination was not introduced in the city until 1940 (prior to that, and despite the initiatives of the local authorities, it was repeatedly rejected by the Water Supply Company due to its high cost). Therefore, according to oral accounts, clean water was said to be a 'luxury commodity' even until the late 1930s (Raftakis, 2019, pp. 65–69).

Figure 4 *IMRs by causal group*



Note: Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood. The first four periods (Sep. 1876–Aug. 1879; 1893–1898; 1902–1903; 1912–1913) are averaged over each period. The last period (1916–1930) is divided into three sub-periods, each averaged over five years. Note that empty periods correspond to an absence of cause of death data, not because there were no deaths.

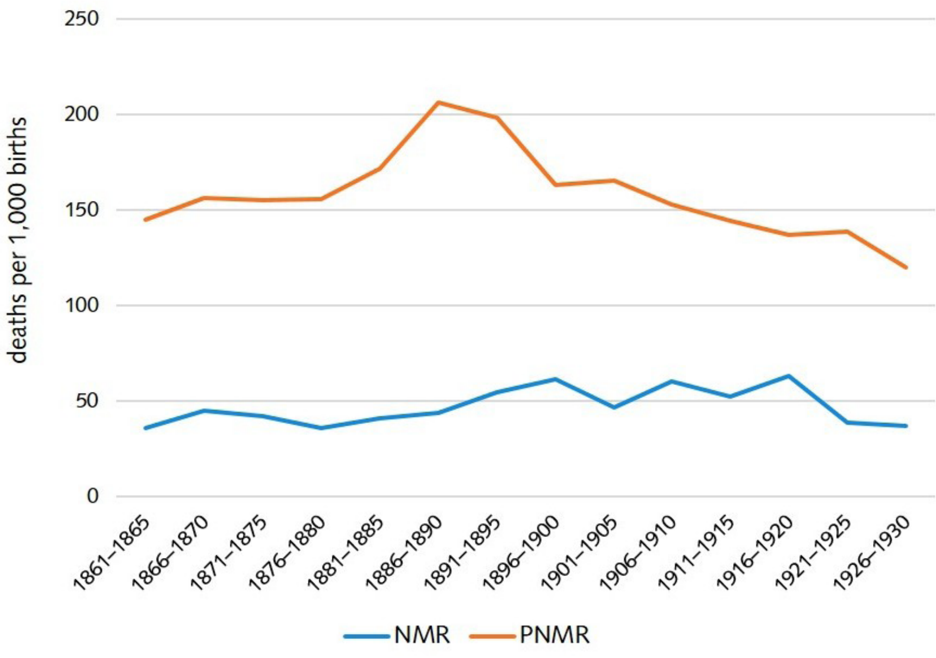
Source: Hermoupolis Mortality Database

4 NEONATAL AND POST-NEONATAL OVERVIEW

Fluctuations in post-neonatal mortality were responsible for the variations in the levels of infant mortality throughout the study period, reflecting the centrality of exogenous causes (Figure 5 and Table A2 in the Appendix). Post-neonatal mortality increased significantly in the last quarter of the 19th century, which may have been the result of the decline of the economy and its aftermaths and/or due to improvements in registration coverage (i.e., age misreporting), as discussed above. It started to decline in the late 1890s, returning quickly to the pre-1880s levels, and then following an almost continuous fall until the end of the study period. The decline was only interrupted in the period 1916–1924 as a result of the naval blockade of part of the country in 1917 which led to a food crisis, the 1918–1919 influenza pandemic, and the arrival of the Asia Minor refugees in 1923 (Raftakis, 2019, 2021, 2022; Valaoras, 1960).

Although neonatal mortality comprised a smaller fraction of overall infant mortality, its slight increase at the turn of the century and the first decades of the 20th century contributed to the course of infant mortality. The rise of neonatal mortality in the 1890s should be partly attributed to the gradual improvement in the registration coverage[12], while it is also expected that increases in food prices as a result of the declining economy may have affected the nutrition of mothers and consequently that of infants. The availability of causes of death during that time will shed light on explaining this rising trend. On the other hand, the brief reduction of neonatal mortality in the early 1910s must be associated with the onset of stillbirth registration in 1912. As discussed also earlier, the possible inclusion of some stillbirths prior to 1912 might have artificially inflated neonatal mortality and therefore this decline is possible to be the result of such change in the registration (Raftakis, 2021). Certainly, the noteworthy increase in neonatal mortality in 1916–1920 is likely to be a result of the 1918 pandemic peak possibly as an effect of the increase in prematurity rate, given the extremely high levels of congenital birth disorders,[13] as will be discussed in the next section. Subsequently, neonatal mortality declined to relatively low levels.

Figure 5 *Quinquennial NMRs and PNMRs (1861–1930)*



Source: Hermoupolis Mortality Database

12 Death registration in Hermoupolis but also in Greece as a whole was found to be more complete than that of births, since a burial could not be conducted without a death certificate (Stephanos, 1884). However, under-registration of deaths of infants who died shortly (within hours or even days) after birth was more likely, as often parents may have seen no reason to report their deaths (Hionidou, 1993). To detect the extent of under-registration in Hermoupolis civil registration, a series of IMRs was recently calculated by linking also infant deaths to births around the census years. Results of such exercise showed that registration coverage had certainly improved by the beginning of the 20th century (Raftakis, 2021).

13 Evidence from Derbyshire, England showed that infants born in the early months of 1919 were at great risk of dying from prematurity, wasting and congenital malformations, most likely because of earlier exposure to influenza or infections to mothers in the first or the second trimesters of pregnancy (Reid, 2005).

5 NMRs AND PNMRs BY CAUSE OF DEATH

Examination of cause-specific mortality during the neonatal and post-neonatal periods will yield a better understanding of the cause of death structure and whether the terminology used to assign causes of death by contemporaries differed between the two age-groups or over time. Congenital birth disorders were found to be the most dominant causal group among neonatal deaths (especially high in 1912–1913 and 1916–1920), followed by weakness, convulsions and, for certain periods, water-food borne and airborne diseases (Figure 6 and Table A3 in the Appendix). Again, the first period (Sep. 1876–Aug. 1879) is characterised by a noteworthy share of deaths attributed to either ill-defined causes or blank fields. Although the trend of cause-specific mortality for neonates seems to be relatively consistent, the third period (1902–1903) contains a rather larger fraction of neonatal deaths attributed to unknown causes. These vague terms, however, seem to disappear later in the study period, especially after 1916. Overall, it seems that the observed changes in cause of death registration express the changing terminology/reporting of causes of death rather than actual changes. The seasonal patterns of those deaths to these vague terms or unknown causes, as will be analysed in the next section, will enable us to identify what causal groups they might really be representing.

For post-neonates, the most common causal groups were water-food borne diseases, weakness and airborne diseases, while for the first period (Sept. 1876–Aug. 1879) drakos was by far the most prevalent cause of death (Figure 7 and Table A4 in the Appendix). The high levels of mortality due to water-food borne and perhaps weakness may be attributed to the use of contaminated water, when supplementary food was given. According to oral evidence from Hermoupolis, breastfeeding was a widespread practice among all social classes, with minimum average duration of 8 months (Raftakis, 2019; 2021); however, mothers were advised to start supplementary food as early as the third or fourth month of an infant's life (Melissinos, 1904; Ministry of Hygiene, 1930). When the age-pattern of infant deaths due to water-food borne diseases is examined, it becomes evident that a large proportion of those infants died while still being breastfed or while they were supposed to be breastfed. In particular, an earlier study has shown that half of all infant deaths due to water-food borne diseases in Hermoupolis for the period 1916–1940 occurred among those in the first semester of life, one-third of them between the sixth and the eight month and one-quarter during the last trimester.[14] Residents of Hermoupolis acquired water from artesian wells and private water tanks that collected rainwater. Many inhabitants also relied on public springs for potable water. In addition, an underground water supply system was constructed in the city in the mid-1920s. Although according to contemporary evidence all types of water were found to be contaminated in the 1930s, Fragkides suggested that water from public springs was the safest of these forms of water supply (Fragkides, 1894).[15] However, during annual droughts during the summer months less water was available on the island and therefore most inhabitants were forced to use the contaminated underground water or water stored in cisterns. Restricted access to clean water in the city, therefore, is considered to be the crucial factor for the high prevalence of water-food borne diseases, because when supplementary food or formula milk was given to infants it was mixed with water, especially during the summer months (Raftakis, 2019; 2021).

While it is very plausible that weaning with unsafe water led to high levels of faecal-oral diseases, it is also the case that infant diarrhoeal diseases can be caused by poor domestic hygiene and by faecal transmission by flies, both mechanisms that are also very temperature-dependent. More specifically, evidence from other populations has shown that the very hot summers in combination with the multiplication of the fly population resulted in higher risk of infection from accumulated human faeces in filthy middens and ash-pits (Alsan & Goldin, 2019; Cheney, 1984; Mooney, 1994; see also Levine & Levine, 1991). Given that the advent of piped water did not reduce summer peaks in infant mortality (see also next section), it seems plausible that other transmission pathways were also involved.[16]

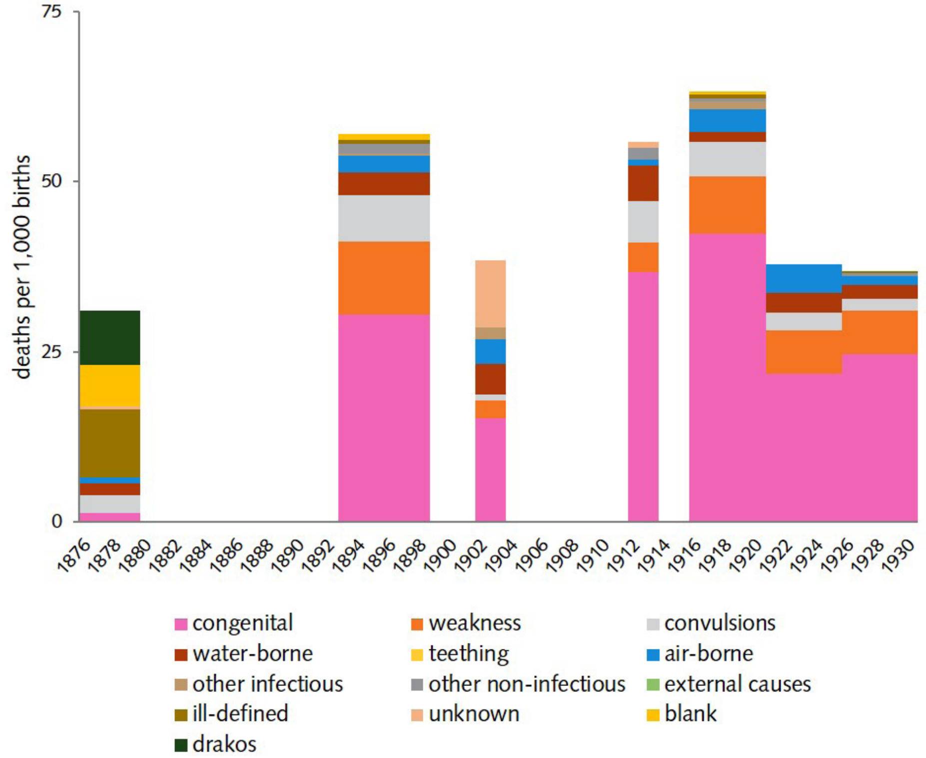
---

14 While three-quarters of all infant deaths due to atrophy and athrepsy occurred in the first semester. A previous study on the patterns of infant mortality has also employed cause-of-death information, though analysed using ICD-3 and ICD-4 (Raftakis, 2021).

15 In contrast with evidence from Tartu, Estonia, which showed a clear disadvantage for infants in households that acquired river water over households that drew water from artesian wells (Jaadla & Puur, 2016).

16 A possible way to look at this would be to look at trends in causes of death at other ages. For example, if typhoid had declined as a cause of death amongst adults while faecal-oral deaths continued to predominate amongst infants, then this might suggest that improvements in water supply were not sufficient to address the causes of faecal-oral diseases in infants. As this issue is beyond the scope of this special issue, this is not examined further here.

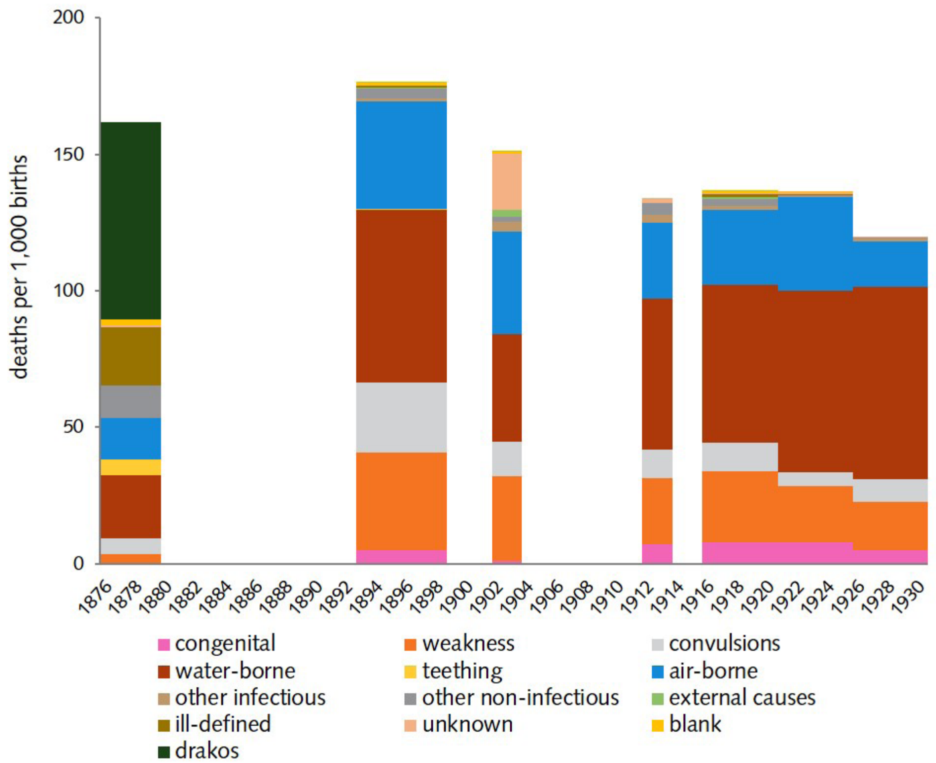
Figure 6 *NMRs by causal group*



Note: See note Figure 4.

Source: Hermoupolis Mortality Database

Figure 7 *PNMRs by causal group*



Note: See note Figure 4.

Source: Hermoupolis Mortality Database

6 SEASONALITY

Seasonality indexes have been estimated and presented in Figure 8. Given that Greece adopted the Gregorian calendar in 1924, all seasonality indexes prior to 1924 have been adjusted by taking into account the 13-day discrepancy between the two calendars. The results indicate a general picture of higher mortality risks during the summer months with much lower rates prevailing in the rest of the year. It is also evident that the seasonal fluctuations in infant mortality are driven mainly by seasonal fluctuations in post-neonatal mortality. Post-neonates had a greater risk of dying during the hottest months of the year when the prevalence of water-food borne diseases was particularly high. On the other hand, neonates were remarkably sensitive to the winter period, November to March. Various studies have established the high risk of dying for neonates during the cold winter months, especially in Mediterranean Europe (Breschi, Derosas, & Manfredini, 2004; Derosas, 2009; Reher & Sanz Gimeno, 2006; Scalone & Samoggia, 2018).[17] The seasonality pattern of births could also partially explain the observed peak in the winter months, since it is likely that more than the average number of births occurred in those months (Raftakis, 2019; 2021). Figure A2 in the Appendix displays the seasonality index of neonatal deaths along with that of births and conceptions, given that monthly variations in births may have affected the monthly variations in early neonatal period. Although neonatal deaths include all those events which occurred throughout the study period, the births (n = 881) include all those births for every census year and the following year (see also the note in Figure A2) of deceased infants and young children with a reported age at death 0 to 15 months, which were linked to a death certificate.[18] The limited availability and use of births for the calculation of the seasonality indexes is an important limitation and therefore the results of birth (and conception) seasonality should be treated with caution. Nevertheless, these calculations involve almost 2% of all births and "random" years. Even though the seasonal pattern of births has only been calculated for certain historical periods, a high occurrence of births during the winter months was observed by contemporary physicians in Hermoupolis (Fragkides, 1894), in mostly rural neighbouring island populations (Dekigalas, 1850; Gavalas, 2001; Hionidou, 1993), but also in Greece as a whole (Paradelles, 1995).

The pattern of seasonality of conceptions was estimated in order to gain a deeper understanding of birth seasonality patterns (see Figure A2 in the Appendix).[19] According to such estimations, a pattern of relatively low conceptions from March to June and rather high during the autumn and winter months (October to January) in Hermoupolis is observed. Various explanations have been put forward (Raftakis, 2019). The very low levels of conceptions in March must be connected to the Lent period, when fasting — including sexual abstinence — was prescribed by the Orthodox Church.[20] The prohibition of marriages during Lent (usually March) and Advent was responsible for the concentration of marriages on the months following the prohibited periods and therefore might have reduced the risk of conception during those periods and that of births nine months later (Hionidou, 1993, p. 49).[21] The trend of lower conceptions over the warmest months is very likely associated with the possible effects of the temperature on coital frequency.[22] In addition, the working pattern of fishermen and sailors, a noteworthy proportion

17 January and February were certainly the coldest months in Hermoupolis in the late 19th century, according to contemporary evidence (Fragkides, 1894, pp. 33–34). Although temperature data are not available in Hermoupolis, data from Athens in the early 20th century (given the geographical proximity) indicated that December, January and February were the coldest months of the year (Exner et al., 1929, pp. 530–531, 1934, p. 220).

18 See also footnote 12.

19 Seasonality of conceptions was estimated by simply changing each month to the one that preceded the birth by nine months. For the purposes of this current study, I assumed that all conceptions took place nine months before the corresponding births. I am nevertheless aware of the fact that only two thirds of conceptions result in a birth nine months later.

20 Stefanos explicitly indicated that sexual abstinence was observed for religious reasons during the Lent period and this resulted in low number of conceptions during March in Greece (Stefanos, 1884, p. 454 as cited by Hionidou, 1993, p. 46). Oral evidence from neighbouring Mykonos confirms that this continued in the first half of the 20th century (Hionidou, 1998, p. 76), while a very similar pattern of declining conceptions after the beginning of the Lent was also found in the pre-industrial Spanish town of Cuenca (Reher, 1990, pp. 103–105).

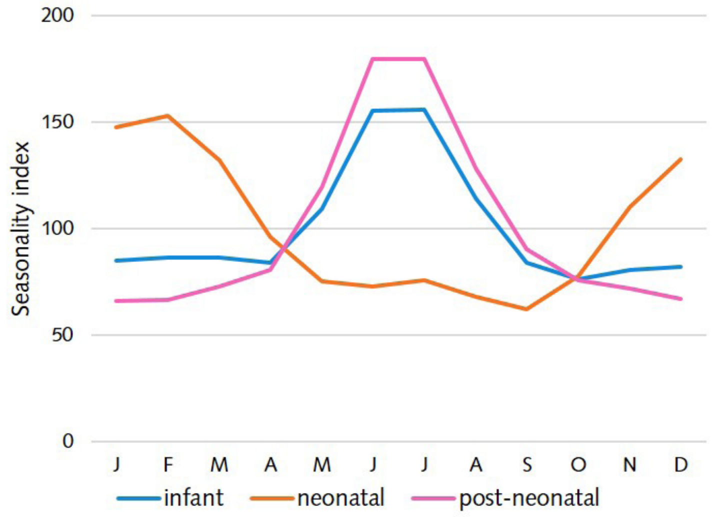
21 See also Eliopoulos, 2011, p. 64; Gavalas, 2001, pp. 143–144; Paradelles, 1995, p. 183.

22 For a review on how extreme temperatures (both cold and hot) affected seasonality of births and conceptions in Italy see Ruiu and Breschi (2017).

of the male population of Hermoupolis,[23] meant that they were away for most of the summer starting from Easter time but they stayed around the island during the winter (Hionidou, 1993). Finally, the peak summer months of infant mortality were also the months of relatively low number of conceptions.

A division into three periods was adopted in Figure 9 in order to detect any changes in seasonal patterns over time. Overall, the seasonality pattern displays remarkable stability over time but also across the components of infant mortality, although the third period (1911–1930) presents some discrepancies in the form of a reduction of the summer peak for post-neonates and the increase of the winter peak, especially during the first months of the year, among neonates. A possible explanation for the former is that by the 1910s the decline of post-neonatal mortality was well under way, while the latter may have been particularly influenced by the increase in neonatal mortality in the period around the 1918 influenza pandemic.

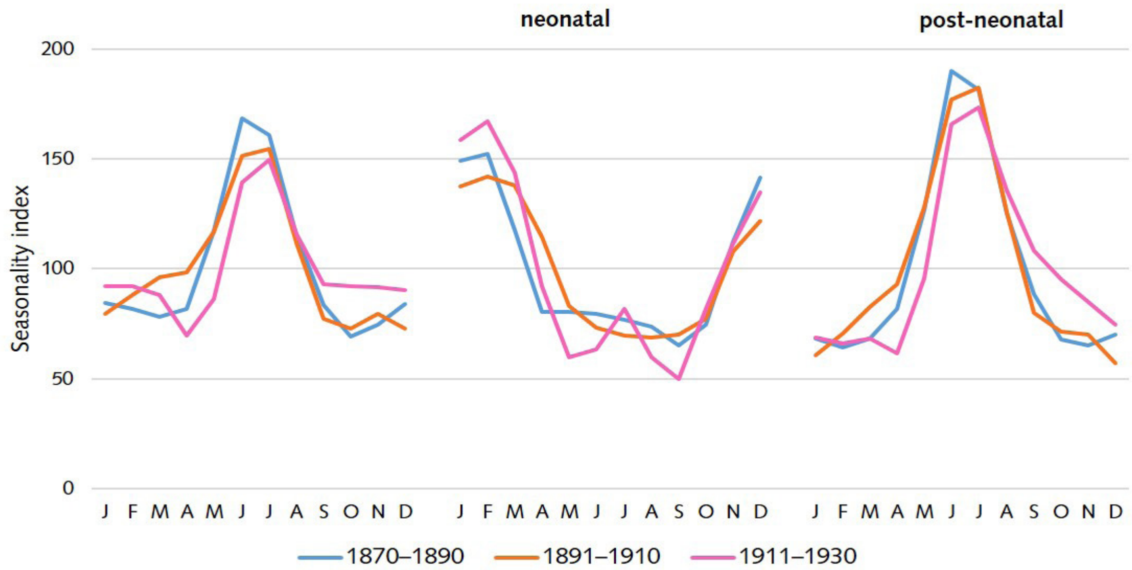
Figure 8 *Seasonality of infant deaths, neonatal deaths, and post-neonatal deaths, for all years combined (1870–1930)*



Note: All rates prior to 1924 have been adjusted to the Gregorian calendar.

Source: Hermoupolis Mortality Database

Figure 9 *Seasonality of infant deaths, neonatal deaths and post-neonatal deaths (1870–1930)*



Note: All rates prior to 1924 have been adjusted to the Gregorian calendar.

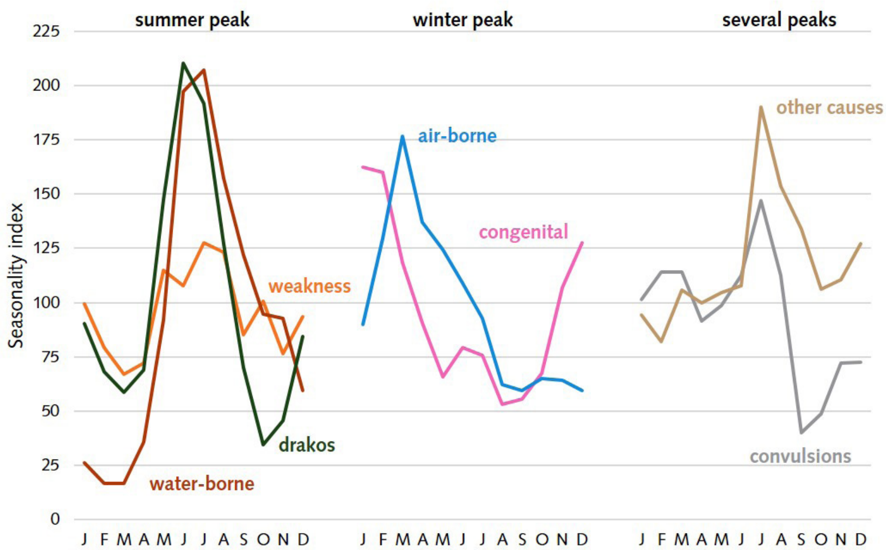
Source: Hermoupolis Mortality Database

23 According to evidence from the Hermoupolis municipal rolls, a quarter of the male population were registered as sailors for most of the 19th century (Anagnostake, 2007).

Figure 10 has grouped the cause of death groups according to their seasonal patterns. This clearly shows that mortality from water-food borne diseases presents an extreme summer peak and the very similar seasonal pattern of drakos, in combination with the fact that the vast majority of infant deaths to drakos occurred within the first eight months of life, may be suggestive of a close link to the water-food borne causal group. In addition, although weakness presents a less pronounced peak over the summer months, it may also be somehow related to water-food borne mortality. However, given the ambiguity of the terms included in this group (atrophia and athrepsia), and that they may differ across the different ages of infancy, it is important to examine the seasonal pattern for each component of infant mortality separately. Considering the extreme winter peak of neonatal deaths throughout the study period, it is not surprising that mortality from congenital diseases peaked during the winter months. Airborne diseases exhibited also a clear winter/early spring peak. In contrast, there are also certain causal groups which experienced several seasonal peaks. Both convulsions and other causes, for instance, showed an above average rate for March, with a second but higher peak during the summer months, which may indicate that these diseases were perhaps also associated with gastrointestinal infections or even served as containers for different and unrelated vague terms.

Given that the underlying causes of death for infants dying in the neonatal and post-neonatal periods may differ, it is worth examining seasonal patterns of infant mortality for deaths prior to one month of age separately to deaths during the next 11 months (Knodel, 1984). Indices of the seasonal fluctuations of death for the predominant causal groups are shown in Figures 11 and 12. The seasonal pattern of post-neonatal deaths for certain causal groups exhibits an almost identical pattern to that of all infants. However, the most notable feature of the results is the considerably more pronounced summer mortality peak due to weakness or other causes, which seems to provide additional evidence regarding their close association with gastrointestinal infections, when used for this age group. Moreover, the winter peak for deaths to congenital birth disorders was lower for post neonates than for all infants. In contrast to the results referring to the post-neonatal period, in the neonatal period all causal groups exhibited higher mortality risks in the late fall and winter with more moderate rates prevailing during the summer months. It is also clear that convulsions presented a more distinct seasonal pattern for neonates rather than post-neonates. Moreover, neonatal deaths attributed to unknown causes are most likely associated with congenital birth disorders or at least driven by birth seasonality. The causal group 'other causes' includes water-food borne diseases, among others, and therefore the secondary summer peak shown in Figure 12 might be driven by a summer peak associated to gastrointestinal disorders. The same may apply also to deaths due to weakness and convulsions, although both also exhibited a more pronounced peak during the late fall/winter similar to that of congenital birth disorders. Therefore, certain terms used to describe deaths among neonates might have reflected symptoms rather than actual diseases and may therefore not necessarily be connected to specific causal groups or infections.

Figure 10 *Seasonality of infant deaths, for each causal group, all years combined*

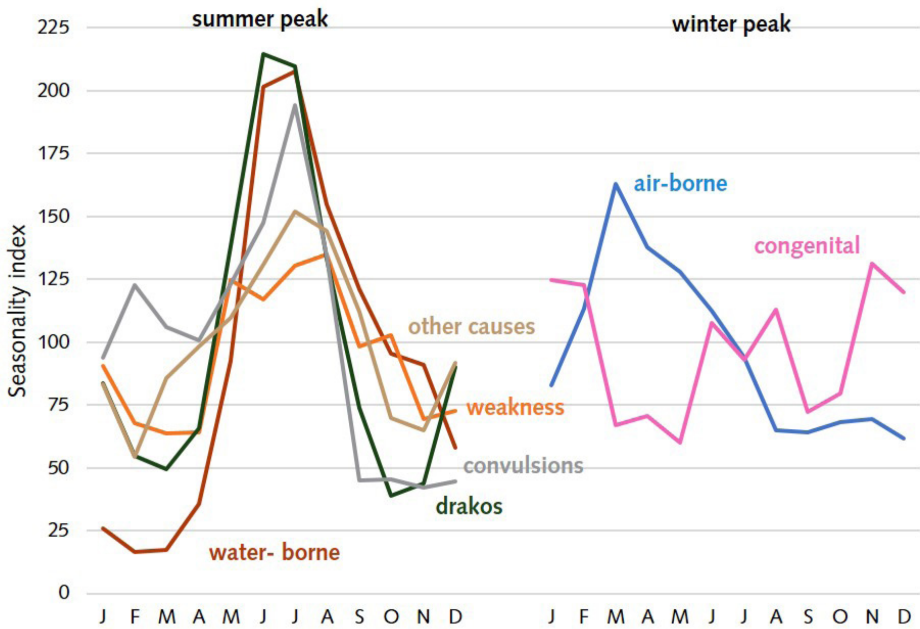


For the years: Sep. 1876–Aug. 1879, 1893–1898, 1902–1903, 19012–1913, 1916–1930.

Note: All rates prior to 1924 have been adjusted to the Gregorian calendar. Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood.

Source: Hermoupolis Mortality Database

Figure 11 *Seasonality of post-neonatal deaths, for each causal group, all years combined*

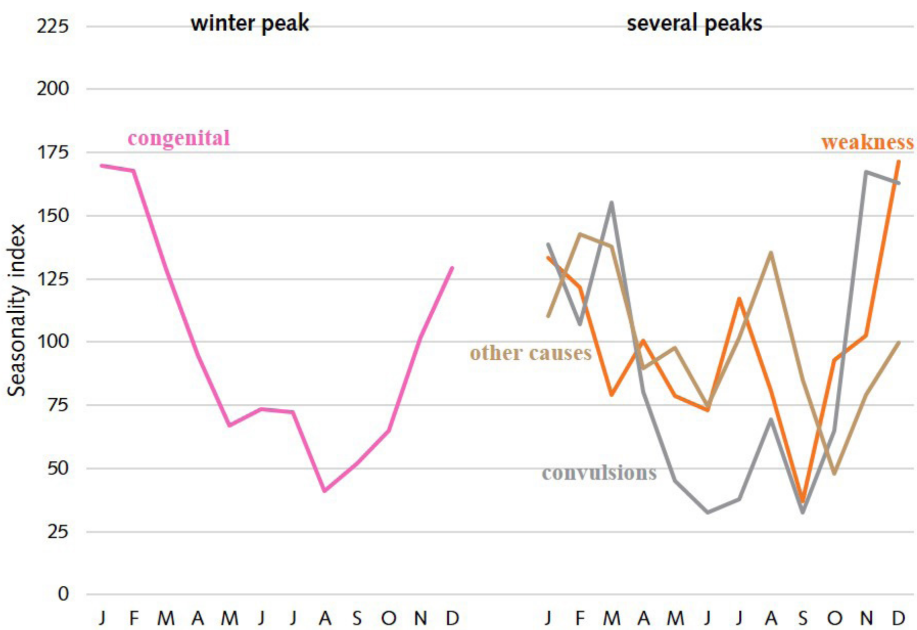


For the years: Sep. 1876–Aug. 1879, 1893–1898, 1902–1903, 19012–1913, 1916–1930.

Note: All rates prior to 1924 have been adjusted to the Gregorian calendar. Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood.

Source: Hermoupolis Mortality Database

Figure 12 *Seasonality of neonatal deaths, for each causal group, all years combined*



For the years: Sep. 1876–Aug.1879, 1893–1898, 1902–1903, 19012–1913, 1916–1930.

Note: All rates prior to 1924 have been adjusted to the Gregorian calendar.

Source: Hermoupolis Mortality Database

7 CONCLUSIONS

This paper has examined cause-specific mortality during infancy using individual level data (draft death registers and civil registration) from the Greek port city of Hermoupolis and employing the newly-constructed ICD10h coding system. A significant limitation of this study is the absence of sex-specific rates due to limited access to sex-specific information in birth registers. Overall, the analysis indicates that both the coding system and cause of death groupings work reasonably well for Hermoupolis data. Nonetheless, there are certain terms that require further investigation before they are firmly understood, e.g., the terms 'atrophy' and 'athrepsia' (both classified in weakness causal group) and most importantly 'drakos' (during the period 1876–1879), which was attributed a unique special code while it was classified as "COD difficult to ascertain/not recognised". In addition, this study has shown that unknown causes and vague terms disappeared in the early 20th century, especially after 1916 when cause-specific information is considered to be of better quality. A limited number of disease terms were also found to dominate certain causal groups, for instance 'bronchopneumonia' (airborne), 'gastroenteritis' and 'enteric catarrh' ('*enterikos katarrous*') mainly during the second period, 1893–1898) (water-food borne), 'imperfect development' ('*ateles anaptykse*' and '*ateleia*') (congenital disorders), 'atrophy' (weakness) and 'eclampsia' (convulsions).

Some important outcomes of this study are that convulsions comprise a relatively small fraction of infant deaths in Hermoupolis over the study period, although they are more important amongst post-neonates. Water-food borne diseases account for the highest number of infant deaths throughout the study period, but especially during the hot and dry summer months. Moreover, the high levels of water-food borne diseases in post-neonates less than eight months old, while the majority of infants were still being breastfed or they were supposed to be breastfed, is suggestive of the early initiation of supplementary food and the use of contaminated water for its preparation. The prominent winter peak of neonatal mortality but also congenital-birth disorders could be partially associated with birth seasonality (or even that of conceptions) or low temperatures over the winter months. Finally, it seems that drakos displayed a seasonal and age pattern much more similar to that of water-food borne diseases than to that of airborne diseases, despite being interpreted as a symptomatic cause of pneumonia or laryngitis.

ACKNOWLEDGEMENTS

I wish to thank Professors Angélique Janssens and Alice Reid who provided extensive feedback in earlier version of this paper, and the two anonymous referees for their insightful comments and suggestions. I would also like to thank the staff of the General State Archives of Syros and especially Taina Hietala for her help in the transcription of the draft death registers.

REFERENCES

Alsan, M., & Goldin, C. (2019). Watersheds in child mortality: The role of effective water and sewerage infrastructure, 1880 to 1920. *Journal of Political Economy*, *127*(2), 586–638. https://doi.org/10.1086/700766

Alter, G. C., & Carmichael, A. G. (1999). Classifying the dead: Toward a history of the registration of causes of death. *Journal of the History of Medicine and Allied Sciences*, *54*(2), 114–132. https://doi.org/10.1093/jhmas/54.2.114

Anagnostake, K. (2007). *Demiourgia, anaptykse, akme kai parakme tes Ermoupoles mesa apo ten epeksergasia ton epaggelmaton ton demotologion* [Creation, growth, prosperity and decline of Hermoupolis through the elaboration of professions in the municipal rolls]. The City in Modern Times. Retrieved November 2, 2021, from http://cities.ims.forth.gr/uploads/docs/Municipal.Hermoupolis.Anagnostaki.pdf

Arfanes, E. (1900). *Ypomnema peri ton ektheton* [Statement concerning the foundlings]. Typolithografeio N. Frere.

Bent, J. T. (1885). *The Cyclades, or life among the insular Greeks*. Longmans, Green, and co.

Breschi, M., Derosas, R., & Manfredini, M. (2004). Mortality and environment in three Emilian, Tuscan, and Venetian communities, 1800–1883. In T. Bengtsson, C. Campbell & J. Lee (Eds.), *Life under pressure: Mortality and living standards in Europe and Asia, 1700-1900* (pp. 209–251). The MIT Press.

Centers for Disease Control and Prevention. (n.d.). *Parasites — Guinea Worm*. Retrieved October 30, 2021, from https://www.cdc.gov/parasites/guineaworm/

Cheney, R. A. (1984). Seasonal aspects of infant and childhood mortality: Philadelphia, 1865–1920. *The Journal of Interdisciplinary History*, *14*(3), 561–585.

Dekigalas, I. (1850). *Genike statistike tes nesou Theras* [General statistics of the island of Thera]. Typographeio G. Melistagous Makedonos.

Delis, A. (2015a). A Mediterranean insular port-city in transition: Economic transformations, spatial antagonism and the metamorphosis of landscape in nineteenth-century Hermoupolis on the island of Syros. *Urban History*, *42*(2), 225–245. https://doi.org/10.1017/S0963926814000558

Delis, A. (2015b). Modern Greece's first industry? The shipbuilding center of sailing merchant marine of Syros, 1830–70. *European Review of Economic History*, *19*(3), 255–274. https://doi.org/10.1093/ereh/hev004

Derosas, R. (2009). The joint effect of maternal malnutrition and cold weather on neonatal mortality in nineteenth-century Venice: An assessment of the hypothermia hypothesis. *Population Studies*, *63*(3), 233–251. https://doi.org/10.1080/00324720903165449

Eliopoulos, P. G. (2011). *Oikonomikes kai koinonikes domes mias periphereiakes metropoles: Patra sto 1o miso tou 20ou aiona* [Economic and social structures of a peripheral metropolis: Patras in the second part of the 20th century.]. National and Kapodistrian University of Athens.

Exner, F., Walker, G., Simpson, G. C., Clayton, H. H., & Mossman, R. C. (1929). *World weather records, errata. Smithsonian miscellaneous collection* (Vol. 79). Smithsonian Institution.

Exner, F., Walker, G., Simpson, G. C., Clayton, H. H., & Mossman, R. C. (1934). *World weather records, errata. Smithsonian miscellaneous collections* (Vol. 90). Smithsonian Institution.

Fragkides, A. (1894). *Nesos Syros ypo topographiken, klimatologiken kai iatriken epopsin* [The island of Syros through topographic, climatological, and medical perspective]. Vellopoulou.

Gavalas, V. (2001). *Demographic reconstruction of a Greek island community: Naoussa and Kostos, on Paros, 1894–1998* [PhD thesis, London School of Economics and Political Science]. http://etheses.lse.ac.uk/id/eprint/899

Hietala, T. (n.d.). *Proheira vivlia apovioseon* [Draft death registers]. The City in Modern Times. Retrieved November 2, 2021, from http://cities.ims.forth.gr/uploads/docs/Death.Hermoupolis.pdf

Hionidou, V. (1993). *The demography of a Greek island, Mykonos, 1859–1959: A family reconstitution study* [PhD thesis, University of Liverpool]. https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.357709

Hionidou, V. (1998). The adoption of fertility control on Mykonos, 1879–1959: Stopping, spacing or both? *Population Studies*, *52*(1), 67–83. https://doi.org/10.1080/0032472031000150186

Hionidou, V. (2006). *Famine and death in occupied Greece, 1941–1944*. Cambridge University Press.

Iatrike Etaireia Syrou. (1895). *Praktika Iatrikes Etaireias Syrou* [Proceedings of the Syros Medical Association]. Patris.

Jaadla, H., & Puur, A. (2016). The impact of water supply and sanitation on infant mortality: Individual-level evidence from Tartu, Estonia, 1897–1900. *Population Studies*, *70*(2), 163–179. https://doi.org/10.1080/00324728.2016.1176237

Janssens, A. (2021). Constructing SHiP and an international historical coding system for causes of death. *Historical Life Course Studies*, *10*, 64–70. https://doi.org/10.51964/hlcs9569

Kanellakes, A. (1955). *Symvole eis te melete tes vrefikes thnesimotitos en Elladi* [A contribution to the study of infant mortality in Greece] [Unpublished PhD thesis]. University of Athens.

Kintner, H. J. (1986). Classifying causes of death during the late nineteenth and early twentieth centuries: The case of german infant mortality. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, *19*(2), 45–54. https://doi.org/10.1080/01615440.1986.10594168

Knodel, J. (1984). Seasonal variation in infant mortality: An approach with applications. *Annales de Démographie Historique,* 1983, 208–230. https://doi.org/10.3406/adh.1984.1577

Kolodny, E. Y. (1969). Hermoupolis-Syros: Gennesis kai ekselikses mias ellenikes nesiotikes poleos [Hermoupolis-Syros: The birth and evolution of a Greek insular city]. *Epeteris Etaireias Kykladikon Meleton*, *8*, 249–286.

Kolodny, E. Y. (1974). *Population des îles de la Grèce*. Edisud.

Leksiarcheio [Registry office], Demotiko acheio [Municipal archive], GSAS. (1859). *Leksiarchika vivlia genneseon* [Civil birth registration manuscript books]*, 1859–1924*.
Leksiarcheio [Registry office], Demotiko archeio [Municipal archive], GSAS (n.d.). *Proheira vivlia apovioseon* [Draft death registration manuscript books].
Leksiarcheio [Registry office], Municipality of Syros-Hermoupolis. (1925a). *Leksiarchika vivlia genneseon* [Civil birth registration manuscript books], *1925–1940*.
Leksiarcheio [Registry office], Municipality of Syros-Hermoupolis. (1925b). *Leksiarchika vivlia apovioseon* [Civil death registration manuscript books], *1925–1940.*
Levine, O. S., & Levine, M. M. (1991). Houseflies (*Musca domestica*) as mechanical vectors of shigellosis. *Clinical Infectious Diseases*, *13*(4), 688–696. https://doi.org/10.1093/clinids/13.4.688
The Library of Congress. (2010). *ALA-LC Romanization Tables: Greek*. Retrieved November 4, 2021, from https://www.loc.gov/catdir/cpso/romanization/greek.pdf
Loukos, C. (1994). Ta ektheta vrefe tes Ermoupoles: Ta prota thymata tes pathologias mias koinonias [Foundling infants of Hermoupolis: First victims of a society's pathology?]. In *Afieroma ston kathegete Vasileio Vl. Sfyroera* [A tribute to the Professor Vasileios Vl. Sfyroeras] (pp. 247–264). Lychnos Publishers.
Loukos, C. (2015). Ethelontikes syssomatoseis gia neous kai apo neous ste Syro kata to proto miso tou eikostou aiona [Voluntary organisations for the youth and from the youth on Syros during the first half of the twentieth century]. In E. Avdela, C. Eksertzoglou & C. Lyrintzes (Eds.), *Morphes demosias koinonikotetas sten astike Ellada tou eikostou aiona* [Forms of public sociality in twentieth century urban Greece] (pp. 62–81). Crete University Press.
Manos, Th., & Oikonomides, K. (Eds.). (1929a). Athrepsia [Athrepsy]. In *Mega leksikon tes Iatrikes* [Unabridged dictionary of Medicine] (pp. 76–78). Manos & Oikonomides.
Manos, Th., & Oikonomides, K. (Eds.). (1929b). Drakontiasis. In *Mega leksikon tes Iatrikes* [Unabridged dictionary of Medicine] (p. 733). Manos & Oikonomides.
Melissinos, M. (1904). *To vrefos: Praktikos odegos ton goneon* [The infant: Useful guidelines for parents]. Typographeio Raftane-Papageorgiou.
Ministry of Hygiene. (1930). *Meteres pos na threfete ta paidia os pou na ginoun dyo chronon* [Mothers, how to feed your babies until they reach the second year]. Ethniko Typographeio.
Mooney, G. (1994). Did London pass the 'sanitary test'? Seasonal infant mortality in London, 1870–1914. *Journal of Historical Geography*, *20*(2), 158-174. https://doi.org/10.1006/jhge.1994.1013
National Statistical Service of Greece (NSSG). (1925). *Statistike ton aition thanatou kata to 1921* [Statistics of causes of death in 1921]. Typographeio Nikolaidou.
Papagiannis, K. (1900). *Peri ton aition tes megales thnesimotetas en to vrefokomeio Athinon* [On the causes of high mortality in the Athens foundling hospital]. Iatrike Proodos.
Papastefanaki, L. (2008). To 'patriko endiaferon' ton viomechanon kai e diacheirise tes ergasias sten klostoufantourgia Karella' (Ermoupole, proto miso tou 20ou aiona) [The 'paternal interest' of industrialists and the management of labour in Karellas's textile mill (Hermoupolis, first half of the twentieth century)]. In C. Agriantoni & M. Dimitropoulos (Eds.), *Syros kai Ermoupolis: Symvoles sten istoria tou nesiou: 15os- 20os ai* [Syros and Hermoupolis: Contributions to the history of the island: 15th-20th c.] (pp. 155–186). INR/NHRF.
Paradelles, T. (1995). *Apo te viologike gennese sten koinonike: Politismikes kai teletourgikes diastaseis tes genneses ston elladiko choro tou 19ou aiona* [From biological birth to social birth: Cultural and ritual aspects of birth in 19th century Greece] [PhD thesis, Panteion University]. http://hdl.handle.net/10442/hedi/3503
Raftakis, M. (2019). *Mortality change in Hermoupolis, Greece (1859–1940)* [PhD thesis, Newcastle University]. http://theses.ncl.ac.uk/jspui/handle/10443/4770
Raftakis, M. (2021). Why were infants dying and what were they dying from? Infant mortality patterns in the Greek urban centre of Hermoupolis, Syros (1860–1940). *The History of the Family, 26*(3), 405–433. https://doi.org/10.1080/1081602X.2021.1921008
Raftakis, M. (2022). A 'silent' Pandemic? 1918–1919 influenza pandemic in Greece: Evidence from Hermoupolis, Syros. *Social History of Medicine*, hkac020. https://doi.org/10.1093/shm/hkac020
Reher, D. S. (1990). *Town and country in pre-industrial Spain. Cuenca, 1540–1870*. Cambridge University Press.
Reher, D. S., & Sanz Gimeno, A. (2006). Marked from the outset: Season of birth and health during early life in Spain during the demographic transition. *Continuity and Change*, *21*(1), 107–129. https://doi.org/10.1017/S0268416006005765
Reid, A. (2005). The effects of the 1918–1919 influenza pandemic on infant and child health in Derbyshire. *Medical History*, *49*(1), 29–54. https://doi.org/10.1017/s0025727300008279

Reid, A., & Garrett, E. (2012). Doctors and the causes of neonatal death in Scotland in the second half of the nineteenth century. *Annales de démographie historique*, *123*(1), 149–179. https://doi.org/10.3917/adh.123.0149

Rodd, R. (1892). *The customs and lore of modern Greece*. David Scott.

Ruiu, G., & Breschi, M. (2017). Seasonality of livebirths and climatic factors in Italian regions (1863–1933). *Historical Life Course Studies*, *4*, 145–164. https://doi.org/10.51964/hlcs9342

Scalone, F., & Samoggia, A. (2018). Neonatal mortality, cold weather, and socioeconomic status in two northern Italian rural parishes, 1820–1900. *Demographic Research*, *39*, 525–560. https://doi.org/10.4054/DemRes.2018.39.18

Stephanos, C. (1884). *Grèce, geographie médicale*. In A. Dechambre (Ed.), *Dictionnaire encyclopédique des sciences médicales* (Vol. 2, series 4). G. Masson and P. Asselin et Gie.

Travlos, I., & Kokkou, A. (1980). *Ermoupole, e demiourgia mias neas poles ste Syro stis arches tou 19ou aiona* [Hermoupolis, the creation of a new town on Syros at the beginning of the 19th century]. Emporike Trapeza tes Ellados.

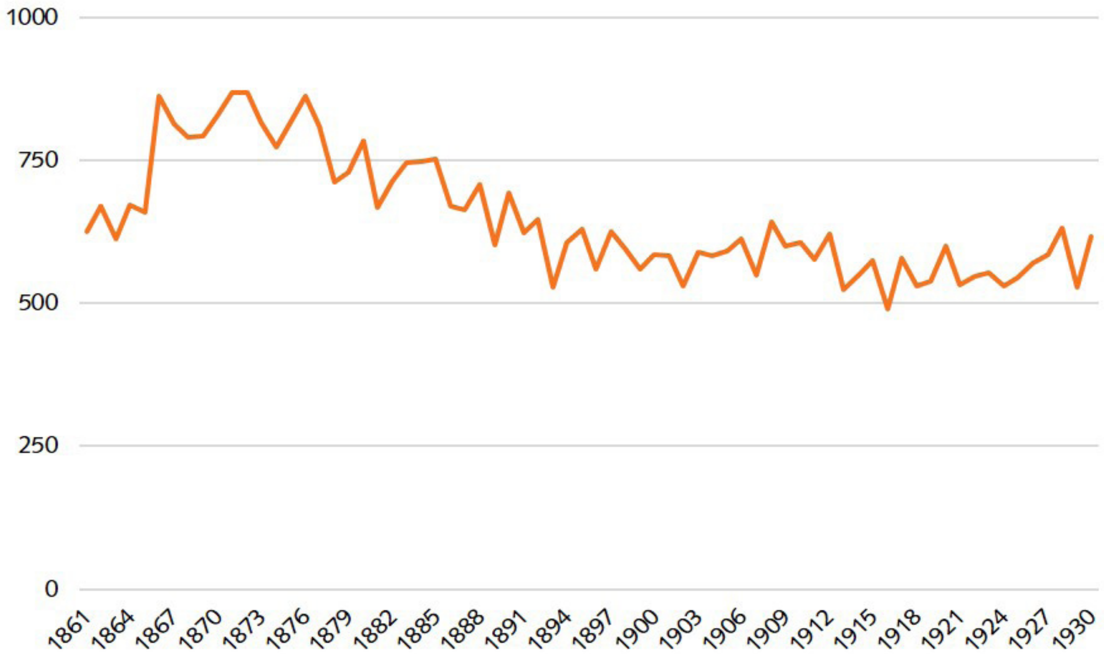
Tsakalotos, A. (1914). *Peri tes demosias ygeias kai idia tes fymatioseos en Syro* [Concerning the public health and especially the tuberculosis in Syros]. Ethniko Typographeio.

Valaoras, V. G. (1960). A reconstruction of the demographic history of modern Greece. *The Milbank Quarterly*, *38*(2), 115–139. https://www.milbank.org/quarterly/articles/a-reconstruction-of-the-demographic-history-of-modern-greece/

Williams, N. (1996). The reporting and classification of causes of death in mid-nineteenth-century England. The example of Sheffield. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, *29*(2), 58–71. https://doi.org/10.1080/01615440.1996.10112730

APPENDIX

Figure A1 *Annual number of births in Hermoupolis, 1861–1930*



Source: Hermoupolis Mortality Database

Table A1 *IMRs by causal group (the number of deaths on which it is based)*

	Sep. 1876–Aug. 1879	1893–1898	1902–1903	1912–1913	1916–1920	1921–1925	1926–1930
congenital	2.92 (5)	35.3 (125)	17 (19)	43.7 (50)	50.1 (137)	30.8 (85)	29.3 (86)
weakness	3.1 (7)	48.0 (170)	37.6 (42)	28.8 (33)	34.0 (93)	26.4 (73)	24.2 (71)
convulsions	8.3 (19)	32.2 (114)	13.4 (15)	16.6 (19)	15.7 (43)	7.6 (21)	10.2 (30)
water-food borne	25.4 (58)	66.6 (236)	43.8 (49)	60.3 (69)	58.8 (161)	70.2 (194)	72.0 (211)
teething	5.7 (13)	0.3 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
airborne	16.6 (38)	43.5 (154)	40.3 (45)	29.7 (34)	30.7 (84)	38.9 (105)	18.1 (53)
other infectious	0.0 (0)	1.4 (5)	5.4 (6)	2.6 (3)	2.9 (8)	0.4 (1)	1.0 (3)
other non-infectious	11.8 (27)	5.4 (19)	2.7 (3)	6.1 (7)	2.9 (8)	0.4 (1)	1.0 (3)
external causes	0.0 (0)	0.3 (1)	2.7 (3)	0.0 (0)	0.7 (2)	0.0 (0)	0.0 (0)
ill-defined	32.4 (74)	1.4 (5)	0.0 (0)	0.0 (0)	1.8 (5)	0.4 (1)	0.0 (0)
unknown	0.0 (0)	0.0 (0)	30.4 (34)	2.6 (3)	0.4 (1)	0.4 (1)	0.7 (2)
blank	8.3 (19)	2.5 (9)	0.9 (1)	0.0 (0)	1.5 (4)	0.4 (1)	0.0 (0)
drakos	80.9 (185)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)

Note: Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood.

Source: Hermoupolis Mortality Database

Table A2 *Quinquennial NMR, PNMR and the percentage of infant deaths in the neonatal period and post-neonatal period (1861–1930)*

	NMR	PNMR	(%) NMR	(%) PNMR
1861–1865	35.5	145.1	19.7	80.3
1866–1870	44.8	156.3	22.3	77.7
1871–1875	42.3	155.3	21.4	78.6
1876–1880	35.9	155.8	18.7	81.3
1881–1885	40.8	171.5	19.2	80.8
1886–1890	43.8	206.4	17.5	82.5
1891–1895	54.7	198.2	21.6	78.4
1896–1900	61.2	163.4	27.2	72.8
1901–1905	46.6	165.3	22.0	78.0
1906–1910	60.2	152.9	28.2	71.8
1911–1915	52.4	144.6	26.6	73.4
1916–1920	63.2	137.0	31.6	68.4
1921–1925	38.8	139.0	21.8	78.2
1926–1930	36.8	120.1	23.5	76.5

Source: Hermoupolis Mortality Database

Table A3 *NMRs by causal group (the number of deaths on which it is based)*

	Sep. 1876–Aug. 1879	1893–1898	1902–1903	1912–1913	1916–1920	1921–1925	1926–1930
congenital	1.3 (3)	30.5 (108)	15.2 (17)	36.7 (42)	42.4 (116)	21.7 (60)	24.6 (72)
weakness	0 (0)	10.7 (38)	2.7 (3)	4.4 (5)	8.4 (23)	6.5 (18)	6.5 (19)
convulsions	2.6 (6)	6.8 (24)	0.9 (1)	6.1 (7)	5.1 (14)	2.5 (7)	1.7 (5)
water-food borne	1.7 (4)	3.4 (12)	4.5 (5)	5.2 (6)	1.5 (4)	2.5 (8)	2.0 (6)
teething	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
airborne	0.9 (2)	2.5 (9)	3.6 (4)	0.9 (1)	3.3 (9)	4.3 (12)	1.4 (4)
other infectious	0.0 (0)	0.3 (1)	1.8 (2)	0.0 (0)	1.1 (3)	0.0 (0)	0.0 (0)
other non-infectious	0.0 (0)	1.4 (5)	0.0 (0)	1.7 (2)	0.4 (1)	0.0 (0)	0.3 (1)
external causes	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
ill-defined	10.1 (23)	0.6 (2)	0.0 (0)	0.0 (0)	0.7 (2)	0.0 (0)	0.3 (1)
unknown	0.4 (1)	0.0 (0)	9.8 (11)	0.9 (1)	0.0 (0)	0.0 (0)	0.0 (0)
blank	6.1 (14)	0.8 (3)	0.0 (0)	0.0 (0)	0.4 (1)	0.0 (0)	0.0 (0)
drakos	7.9 (18)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)

Note: Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood.

Source: Hermoupolis Mortality Database

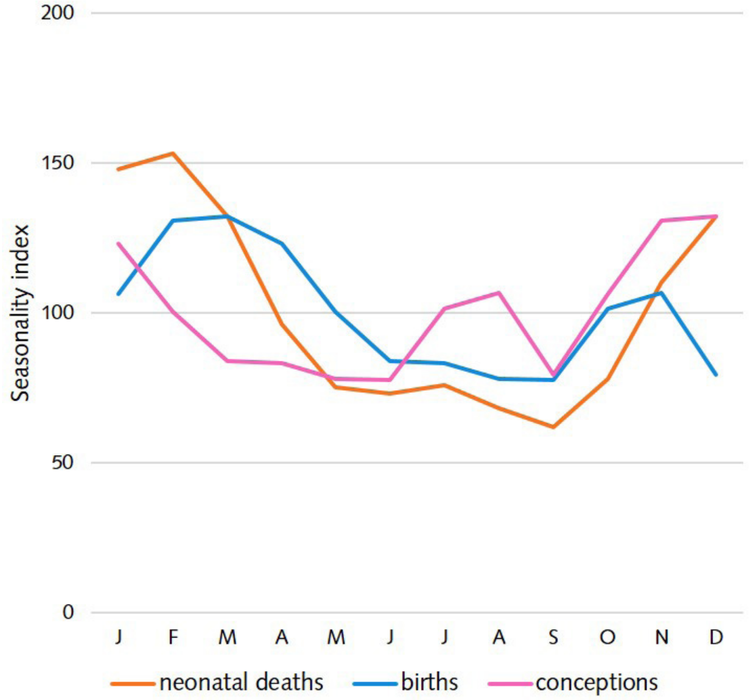
Table A4 *PNMRs by causal group (the number of deaths on which it is based)*

	Sep. 1876–Aug. 1879	1893–1898	1902–1903	1912–1913	1916–1920	1921–1925	1926–1930
congenital	0.0 (0)	4.8 (17)	0.9 (1)	7.0 (8)	8.0 (22)	8.0 (22)	4.8 (14)
weakness	2.3 (7)	36.1 (128)	31.3 (35)	24.5 (28)	25.9 (71)	20.3 (56)	17.7 (52)
convulsions	4.5 (14)	25.4 (90)	12.5 (14)	10.5 (12)	10.6 (29)	5.1 (14)	8.5(25)
water-food borne	16.4 (51)	63.2 (224)	39.4 (44)	55.1 (63)	57.7 (158)	66.6 (184)	70.3 (206)
teething	4.2 (13)	0.6 (2)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
airborne	9.6 (30)	39.2 (139)	37.6 (42)	28.0 (32)	27.4 (75)	34.4 (95)	16.7 (49)
other infectious	1.0 (3)	1.1 (4)	3.6 (4)	2.6 (3)	1.5 (4)	0.4 (1)	1.0 (3)
other non-infectious	10.3 (32)	3.7 (13)	1.8 (2)	4.4 (5)	2.6 (7)	0.4 (1)	0.7 (2)
external causes	0.0 (0)	0.3 (1)	2.7 (3)	0.0 (0)	0.7 (2)	0.0 (0)	0.0 (0)
ill-defined	16.7 (52)	0.6 (2)	0.0 (0)	0.0 (0)	1.1 (3)	0.4 (1)	0.0 (0)
unknown	0.0 (0)	0.0 (0)	20.6 (23)	1.7 (2)	0.4 (1)	0.4 (1)	0.3 (1)
blank	18.0 (56)	1.7 (6)	0.9 (1)	0.0 (0)	1.1 (3)	0.4 (1)	0.0 (0)
drakos	53.0 (136)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)

Note: Drakos has been classified in the causal group "COD difficult to ascertain/not recognised", until the term is firmly understood.

Source: Hermoupolis Mortality Database

Figure A2 *Seasonality of neonatal deaths, births and conceptions, for all years combined (1870–1930)*



Note: All rates prior to 1924 have been adjusted to the Gregorian calendar. The neonatal deaths contain all those events which occurred throughout the study period, whereas the births (n = 881) include all those births for every census and the following year (1861–1862, 1870–1871, 1879–1880, 1889–1890,1896–1897,1907–1908, 1920–1921, 1928–1929) of those deceased infants and young children with a reported age at death 0 to 15 months, which were linked to a death certificate (Raftakis, 2019). Seasonality of conceptions was estimated by simply changing each month to the one that preceded the birth by nine months.

Source: Hermoupolis Mortality Database

Table A5 *List of all individual standardised causes, causal groups, frequency and proportion of all infant deaths*

Cause of death	ICD10H 2020	Disease category	N	%
fymatiodes bronchitida	A16400	airborne	1	0,0
pneumonike fymatiose	A16904	airborne	4	0,1
fymatiosis	A16905	airborne	6	0,2
okseia fymatiodes meningitis	A17000	airborne	1	0,0
fymatiodes meningitis	A17000	airborne	38	1,1
fymatiodes osteitidos	A18000	airborne	1	0,0
enterike fymatiose	A18304	airborne	4	0,1
diftheritike laryggitida	A36200	airborne	5	0,1
diftheritis	A36900	airborne	12	0,3
kokkites	A37900	airborne	11	0,3
bronchopneumonia synepeia kokkite	A37901	airborne	1	0,0
paroksysmos kokkite	A37901	airborne	1	0,0
koncho ostrakia	A38000	airborne	1	0,0
ostrakia	A38000	airborne	9	0,3
ostrakodes amygdalitida	A38001	airborne	1	0,0
skarlatina	A38002	airborne	4	0,1
eulogia	B03000	airborne	1	0,0
ilarodes bronchopneumonia	B05200	airborne	1	0,0
ilarodes pneumonia	B05200	airborne	1	0,0
eklampsia apo ilara	B05900	airborne	1	0,0
ilara	B05900	airborne	12	0,3
ilara met' eklampsias	B05900	airborne	1	0,0
meningitida	G03900	airborne	28	0,8
egkefalitis	G04900	airborne	3	0,1
laryngitida	J04000	airborne	3	0,1
okseia laryngitida	J04000	airborne	1	0,0
laryngopneumonia	J04000	airborne	1	0,0
trachoeides	J04100	airborne	1	0,0
spasmodes laryngitis	J05000	airborne	1	0,0
tatania meta laryngospamo	J05000	airborne	1	0,0
grippodes bronchopneumonia	J11000	airborne	7	0,2
grippodes pneumonia	J11000	airborne	2	0,1
grippe	J11100	airborne	5	0,1
grippodes bronchitis	J11100	airborne	1	0,0
ispanike grippe	J11100	airborne	1	0,0
bronchoflemonia	J18000	airborne	1	0,0
diple bronchopneumonia	J18000	airborne	3	0,1
bronchopneumonia	J18000	airborne	211	6,0

pneumonikos katarrous	J18001	airborne	1	0,0
okseia bronchopneumonia	J18900	airborne	2	0,1
peripneumonia	J18900	airborne	7	0,2
pneumonia	J18900	airborne	17	0,5
faglopneumonia	J18900	airborne	1	0,0
okseia bronchitida	J20900	airborne	16	0,5
trichoeides bronchitida	J21901	airborne	12	0,3
bronchitida	J40009	airborne	75	2,1
pleuritis	R09100	airborne	2	0,1
no cause given	R99090	blank	202	5,8
drakos	R99999	COD difficult to ascertain/ not recognised	212	6,1
ateles anaptykse	P05900	congenital-birth disorders	207	5,9
marasmos synepeia proorou toketou	P07300	congenital-birth disorders	1	0,0
prooros toketos	P07300	congenital-birth disorders	11	0,3
dystokia	P15900	congenital-birth disorders	2	0,1
leuko oidema neognon	P15900	congenital-birth disorders	1	0,0
palmias apo tou toketou	P15900	congenital-birth disorders	1	0,0
sklero oidema ton nefron	P15900	congenital-birth disorders	1	0,0
aimorragia tou omfalou	P51900	congenital-birth disorders	1	0,0
ikteros	P59900	congenital-birth disorders	2	0,1
ikteros ton neognon	P59900	congenital-birth disorders	1	0,0
apopleksia	P90000	congenital-birth disorders	1	0,0
nekrogenneton	P95000	congenital-birth disorders	1	0,0
atrofia neognou	P96904	congenital-birth disorders	1	0,0
paidike atrofia	P96904	congenital-birth disorders	1	0,0
eksantlese anaptykseos	P96907	congenital-birth disorders	1	0,0
symfyous peri tes zotikes ateleias	P96907	congenital-birth disorders	1	0,0
kake diaplase	P96907	congenital-birth disorders	1	0,0
me artemeles	P96907	congenital-birth disorders	1	0,0
organike ateleia	P96907	congenital-birth disorders	1	0,0
diamartyria ths kardias	Q24900	congenital-birth disorders	1	0,0
kardiake pathese kai paralyse tou botaleiou tmematos	Q24901	congenital-birth disorders	1	0,0
ateleia	Q89900	congenital-birth disorders	173	4,9
ateles anaplase	Q89900	congenital-birth disorders	12	0,3
ateles diaplase	Q89900	congenital-birth disorders	97	2,8
eklampsia	R56801	convulsions	214	6,1
eklamptikoi spasmoi	R56801	convulsions	11	0,3
spasmoi	R56801	convulsions	25	0,7
eklampsia spasmodes	R56801	convulsions	1	0,0
eklamptikoi spasmoi	R56801	convulsions	16	0,5
paralerema ton neognon	R56801	convulsions	1	0,0

spasmoi glotidas	R56801	convulsions	2	0,1
egklema	Y09000	external	1	0,0
asfyksia	Y20002	external	2	0,1
egkauma	Y26001	external	2	0,1
egkaumaton ton akron	Y26001	external	1	0,0
esoterike thlase tou thorakos	Y34003	external	1	0,0
afaimakse	Y65801	external	1	0,0
pyretos	R50900	ill-defined	4	0,1
pyretos spasm.	R50900	ill-defined	1	0,0
aimorragia omfalou	R58000	ill-defined	1	0,0
aimorragia	R58000	ill-defined	1	0,0
ydrops	R60901	ill-defined	1	0,0
aifnidios thanatos	R96000	ill-defined	1	0,0
[f/tr/z]ro[e]bos	R99000	ill-defined	1	0,0
apxxxxxxx??	R99000	ill-defined	1	0,0
artigennes	R99000	ill-defined	16	0,5
artimeles	R99000	ill-defined	1	0,0
artimeles/ateles	R99000	ill-defined	1	0,0
bakillosis	R99000	ill-defined	1	0,0
brefos	R99000	ill-defined	21	0,6
embryo	R99000	ill-defined	1	0,0
nosos	R99000	ill-defined	1	0,0
okseia nosos	R99000	ill-defined	23	0,7
oksy	R99000	ill-defined	1	0,0
oksy nosema	R99000	ill-defined	7	0,2
psoro	R99000	ill-defined	1	0,0
siderokardites	R99000	ill-defined	1	0,0
spol[r]entza	R99000	ill-defined	1	0,0
akampsia	R99000	ill-defined	1	0,0
akrimentziras	R99000	ill-defined	1	0,0
ateles diakoraseos	R99000	ill-defined	1	0,0
nome	R99000	ill-defined	1	0,0
thalassinos	R99000	ill-defined	1	0,0
xx	R99000	ill-defined	1	0,0
karkinos epatos	C22901	other	1	0,0
syngenes kakoethhs ogkos tes xxxxxx	C80905	other	1	0,0
ydrokefalos	G91900	other	1	0,0
okseia ydrokefalia	G91900	other	1	0,0
engkefalike malakynse	G93803	other	1	0,0
blabe spondylikes steles	G95900	other	1	0,0
ateles kardiake diaplase	I50901	other	1	0,0
kardia	I51900	other	1	0,0

ateles apofrakse tou parabitaleiou	I51900	other	1	0,0
laimos	J39200	other	20	0,6
bronchikos katarrous	J40000	other	5	0,1
asthma	J45900	other	1	0,0
symforesis pneumonon	J81001	other	1	0,0
empyema	J86901	other	1	0,0
chronios katarrous	J98801	other	1	0,0
katarrous	J98901	other	2	0,1
oksys katarrous	J98901	other	4	0,1
malakynse tou stomachou	K31901	other	1	0,0
periesfegmene kele	K46000	other	1	0,0
enterokele	K46900	other	1	0,0
eileos	K56700	other	1	0,0
athrepsia enteron	K63801	other	2	0,1
enterike emfraksis	K63901	other	1	0,0
flogosis enterqn	K63901	other	1	0,0
enterike pyodermitida	K63901	other	1	0,0
apostema	L02900	other	1	0,0
apostoma	L02900	other	1	0,0
oksy ekzema	L30901	other	1	0,0
chronio enzema	L30901	other	1	0,0
ekzema	L30901	other	1	0,0
atrofia synepeia ektheseos eis psyksin	M63800	other	1	0,0
psyksis	M63800	other	1	0,0
nefritis	N05901	other	1	0,0
okseia nefritis	N05901	other	1	0,0
flegmone tes trachilikes choras	N72000	other	1	0,0
flegmone tou trachelou	N72000	other	1	0,0
ektetamene flegmone tou pyelou	N73901	other	1	0,0
gangraina	R00200	other	1	0,0
symforese	R09801	other	1	0,0
ponos koilias	R10101	other	1	0,0
kolikos	R10402	other	1	0,0
kolikos enteron	R10402	other	1	0,0
kyanose	R23000	other	1	0,0
sygkope kardias	R55000	other	1	0,0
tetanos	A33000	other infectious	2	0,1
tetanos ton neognon	A33000	other infectious	1	0,0
tetanou pneumonon	A33000	other infectious	1	0,0
sepsaimia	A41905	other infectious	3	0,1
sepse tes maschales	A41905	other infectious	1	0,0

erysipelas	A46000	other infectious	4	0,1
genikos erysipelas	A46000	other infectious	1	0,0
kleronomike syfilidike kacheksia	A50900	other infectious	2	0,1
kleronomike syfilis	A50900	other infectious	6	0,2
syfilis	A53900	other infectious	3	0,1
symfilidike renitis	A53900	other infectious	1	0,0
syneches pyretos	B54001	other infectious	1	0,0
flegmone tou stomatos	K12100	other infectious	1	0,0
stomatitida	K12100	other infectious	1	0,0
odontes	K00700	teething	11	0,3
odontofyia	K00700	teething	7	0,2
adelos	R99001	uknown	1	0,0
aqnostos	R99001	uknown	3	0,1
agnostou aitias	R99001	uknown	41	1,2
koiliakos tyfos	A01000	water-food borne	1	0,0
tyfoeides pyretos	A01000	water-food borne	5	0,1
gastrikos pyretos	A01003	water-food borne	2	0,1
enterike diarroia	A09002	water-food borne	1	0,0
dysenteria	A09003	water-food borne	12	0,3
dysenterikos	A09003	water-food borne	1	0,0
dysenterikos katarrous	A09003	water-food borne	6	0,2
oksys dysenterioeides katarrous	A09003	water-food borne	1	0,0
enterikos katarrous	A09004	water-food borne	165	4,7
gastroenterikos katarrous	A09004	water-food borne	5	0,1
spasmoi synepeia gastroenterikou katarrou	A09004	water-food borne	1	0,0
enterokolitis	A09008	water-food borne	8	0,2
gastroenteritis	A09008	water-food borne	551	15,7
okseia enterokolitis	A09008	water-food borne	3	0,1
athrepsia synepeia gastroenteritidas	A09008	water-food borne	1	0,0
eklamptikoi spasmoi met' okseia gastroenteritida	A09008	water-food borne	1	0,0
enteritis	A09009	water-food borne	87	2,5
katarrous enteron	A09009	water-food borne	3	0,1
okseia enteritis	A09009	water-food borne	26	0,7
okseia gastranteritida	A09009	water-food borne	43	1,2
oksys enterikos katarrous	A09009	water-food borne	5	0,1
chronia enteritis	A09009	water-food borne	5	0,1
chronia gastrenteritis	A09009	water-food borne	3	0,1
chronios enterikos katarrous	A09009	water-food borne	1	0,0
atrofia synepeia enteritidos	A09009	water-food borne	2	0,1
chronios dysenterikos katarrous	A09300	water-food borne	1	0,0
atrofia ek diarroias	A09900	water-food borne	1	0,0

diarroia	A09900	water-food borne	60	1,7
chronia diarroia	A09900	water-food borne	1	0,0
diarroia/drakos	A09902	water-food borne	1	0,0
gastritis	K29700	water-food borne	8	0,2
atresia tou daktyliou	K29800	water-food borne	1	0,0
kolitis	K52300	water-food borne	1	0,0
marasmos	E41000	weakness	3	0,1
ateles athrepsia	E41001	weakness	1	0,0
athrepsia	E41001	weakness	124	3,5
athrepsia- eksantlese	E41001	weakness	1	0,0
fysike adynamia	R53002	weakness	1	0,0
eksantlese	R53007	weakness	1	0,0
genike kacheksia	R64000	weakness	1	0,0
atrofia	R64003	weakness	367	10,5

Note: For the transliteration of Greek characters the ALA-LC Romanization Table was used (The Library of Congress, 2010).

Source: Hermoupolis Mortality Database