



An investigation into nature and extent of errors within the Irish Vital Statistics mortality database

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Timely, accessible, appropriate, and accurate health and demographic data is a vital resource in health service planning [1]. Such information is also crucial in epidemiological studies exploring incidence and prevalence of illness as well as trend and intervention data [2]. In many jurisdictions such as Ireland, limited information on health status, illness, and disease results in an increased reliance on mortality data, or “vital statistics” as it is often called [3].

Significant deficits in Ireland’s health information systems have been noted [4–6] as well as in allied information systems including the Irish census [7] and vital statistics publications [8, 9]. Given the dearth of adequate, appropriate, and timely health information systems, Ireland often still relies heavily on mortality/vital statistics data. Recent research on Irish mortality data using records from 2006 and 2011 noted the requirement for “data cleaning” of vital statistics mortality records in order to remove duplicate records in the official dataset [10]. Death certification is notoriously inaccurate [11, 12]. There appears to have been relatively little examination of this issue in Ireland compared to other countries [12–14], particularly in relation to the accuracy in the vital statistics records [15, 16].

The primary goal of this research was to identify the absolute rate of duplicate errors in Irish Vital Statistics mortality micro-data for the years 2007–2014. The second aim was to identify factors associated with errors in Irish Vital

Statistics mortality micro-data for the years 2007–2014 [3, 17]. This was designed to help improve the accuracy of health service planning and epidemiological analysis and contribute to reducing such errors in the future [18].

As a result of concerns over confidentiality access to vital statistics, mortality micro-data is restricted to onsite examination in either of the Irish Central Statistics Offices (CSO) in Dublin or Cork. In total, 7 years of mortality data were examined. Relevant data prior to 2007 was not accessible. The most recent mortality data available by July 2017 related to 2014. A faulty dataset was provided for the year 2013, so this year was excluded from the analysis. Thus a total of 199,944 death records were examined. Potential duplicates were identified on the basis of name and date of death identified via Microsoft Excel and then other data relating to factors such as date of birth, address, and cause of death was examined on a case-by-case basis to determine if they appeared to be duplicates. Relative risk (RR) analysis was then used to identify factors that potentially contribute to the duplicate errors [17, 18]. This research had Eastern Washington University Institutional Review Board.

As can be seen from Table 1, the overall incidence of duplicates was very low, and with the exception of 2008, clearly demonstrated a declining trend. It is notable that evidence from 2012 and 2014 would appear to indicate that the formerly identified issue of case duplication in the Irish mortality dataset has largely been “solved.”

Although no evidence of geographical factors emerged in this research, there was slight evidence of a gender dimension. Between 2007 and 2011, duplicates among males exceeded duplicates among females. However, an analysis of relative risk (RR) examining gender noted that this finding was only significant for the year 2007.

The incidence of duplicates in the Irish mortality dataset was very low throughout the period 2007 to 2011. With the exception of 2008, it declined from 2007 to 2011. Examination of the datasets from 2012 and 2014 identified no duplicates. The data appears to show an end to this issue

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Table 1 Number of duplicate death records by year 2007–2014

Year	Number of death records	Duplicates identified	Incidence per 1000	Relative risk of male over-representation among duplicates
2007	28,117	15 (13 males; 2 females)	0.533	RR = 6.1996, 95% CI = 1.3993–27.4683, <i>P</i> = 0.0163
2008	28,274	19 (13 males; 6 females)	0.672	RR = 2.0708, 95% CI = 0.7873–5.4466, <i>P</i> = 0.1401
2009	28,380	14 (9 males; 5 females)	0.493	RR = 1.6687, 95% CI = 0.5594–4.9781, <i>P</i> = 0.3585
2010	27,961	13 (9 males; 4 females)	0.465	RR = 2.1390, 95% CI = 0.6589–6.9444, <i>P</i> = 0.2057
2011	28,456	7 (6 males; 1 female)	0.246	RR = 5.7814, 95% CI = 0.6961–48.0172, <i>P</i> = 0.1043
2012	29,186	0	0.000	
2013	29,504	*	*	
2014	29,252	0	0.000	

*Due to an incorrect dataset 2013 was not examined

in 2011. Having examined the issue of duplicates, further research is still required to determine the proportion of deaths that are not recorded on the Irish mortality dataset. In addition, further research is still required to explore the accuracy of cause of death in mortality data. The findings of this study lend support to the accuracy of the Irish mortality dataset, which appears to have improved in quality in recent years.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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