

**Title:** Improving Cause of Death Reporting in Marin County: 2020-2023-Examination of Ill-Defined ICD-10 Codes

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**BACKGROUND:** Marin County is a largely affluent Bay Area County with substantial disparities in life expectancy and causes of premature mortality between subpopulations. Identifying and addressing causes of premature death is a public health priority. Death certificates are the primary source of data on mortality patterns across populations. However, the cause of death listed on death certificates often lacks specificity, which limits visibility into the drivers of preventable mortality. We analyzed the frequency and characteristics of ill-defined codes on death certificates to guide outreach to clinicians who declare the cause of death and improve the utility of local mortality analyses.

**METHODS:** The World Health Organization death certificate data quality manual was used to define 19 ICD-10 codes as “ill-defined” causes of death. R statistical software was used to examine the frequency of these 19 codes in the final cause of death field on death certificates of Marin County residents with deaths occurring between January 1, 2020, and September 9, 2023. Deaths with an ICD-10 code of R99 (pending investigation) occurring less than one year ago were excluded. Differences between valid and ill-defined causes of death were examined by age, gender, race/ethnicity, marital status, place of death and census tract health condition index score (Healthy Places Index, HPI) using Fisher’s Exact Test with simulated p-value.

**RESULTS:** From 2020-2023, ill-defined ICD-10 codes were used on 350 out of a total of 8,976 (3.9%) death certificates. The three most common ill-defined codes recorded were Generalized and Unspecified Atherosclerosis (I70.9, 64.9%), Malignant Neoplasm Without Specification of Site (C80, 21.4%) and Malignant Neoplasms of Independent (primary) Multiple Sites (C97, 3.7%). The frequency of ill-defined codes varied significantly by age, gender, marital status, and place of death. No significant differences in the frequency of ill-defined ICD-10 codes were found by race/ethnicity or HPI score ( $p>0.05$ ).

**CONCLUSIONS:** Approximately 4% of Marin County decedents received an ill-defined cause of death. Efforts to improve the utility of death certificate data should focus on educating clinicians to utilize all clinically available information to document the type or location of fatal atherosclerotic and malignant diseases, which together made up nearly all ill-defined codes. Subgroup disparities in the frequency of ill-defined codes reinforces that an appropriate level of specificity should be used for all residents to enable targeted public health interventions.