

Death Certification. Defining the Error Rate and Considering the Effect on Mortality Statistics

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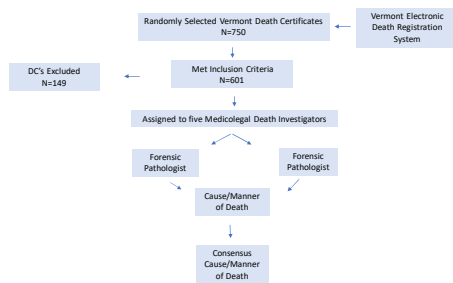
- Medical Examiner Office within Vermont Department of Health
- Statewide Jurisdiction
- Central Office Staffing and Investigative Field Staffing
- Population of 600,412
- Investigate approximately 1,700 cases/year
- Review every death certificate
 - Completeness
 - Accuracy
 - Red Flags

- Request for Task Order Proposal through CDC/NCHS/DVS for a pilot evaluation of the Quality of the Cause of Death on Mortality Records in August 2015.
- Contract awarded and supported through the Vital Statistics Cooperative Program contract between the Centers for Disease Control and Prevention and the Vermont Department of Health
- Study period September 2015 through August 2016 with an extension through November 2016

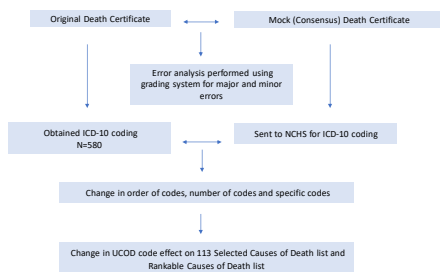
Objective

- Primary objective was to characterize inaccuracies in cause and manner of death data among non-medical examiners
- ICD-10 coding was compared to analyze the effect on 113 Selected Causes of Death and Rankable Causes of Death lists to determine impact on national statistics

Methods



Methods continued



Scale for Grading Errors on Death Certificates

Class I. Minor Error (limited impact on interpretation)
Ia. Inappropriate information included
Ib. Abbreviations
Class II. Minor Error (potential impact on interpretation)
IIa. Errors of sequencing (regardless of whether or not an underlying cause is provided)
IIb. Multiple underlying causes in Part I
Class III. Major Error (impact on interpretation of contributing causes)
IIIa. Major comorbidities/contributing cause(s) absent or wrong
Class IV. Major Error (impact on interpretation of cause and manner)
IVa. Underlying cause listed as contributory cause (<i>in Part 2</i>)
IVb. No underlying cause in Part I
IVc. Wrong underlying cause or underlying cause not on last line of Part I
IVd. Wrong manner of death

Results – Error Analysis

Specific Error	N with error	% with error	95% CI	
Any errors	319	53%	49%	57%
Major error ¹	305	51%	47%	55%
Minor error ²	59	10%	7%	12%
Inappropriate information included (Ia)	21	3%	2%	5%
Abbreviations used (Ib)	5	1%	0%	2%
Sequencing error (IIa)	33	5%	4%	7%
Multiple UCOD in Part I (IIb)	22	4%	2%	5%
Major comorbidities error (IIIa)	232	39%	35%	42%
Correct UCOD not in Part I (IVa)	158	26%	23%	30%
No UCOD in Part I (IVb)	92	15%	12%	18%
Correct UCOD not on DC (IVc)	107	18%	15%	21%
Correct UCOD not on last line of Part I (IVc)	174	29%	25%	33%
Wrong manner (IVd)	22	4%	2%	5%

ICD-10 Coding Comparison

- Coding for original certificates was compared to coding for mock certificates in 580 of 601 cases
- Change in order of codes, number of codes and specific codes were analyzed
- Change in underlying cause code (UCOD) effect on 113 Selected Causes of Death list and Rankable Causes of Death list

Code Comparison

- 113 Selected Causes of Death – used for the general analysis of mortality and for ranking leading causes of death
- Rankable Causes of Death List – used by the National Center of Health Statistics for tabulation and dissemination of mortality statistics

Results – Coding Comparison

Change in Underlying Cause of Death Code (UCOD) Between Original and Mock Death Certificate

Type of Change in Underlying Cause of Death Code	N with change	Total N	% with change
Any Underlying Cause of Death Code Change	348	580	60%
Underlying Cause of Death Code Change that Affects 113 Cause	289	348	83%
Underlying Cause of Death Code Change that Affects Rankable Cause	169	348	49%

Results – Coding Comparison

Effect of Death Certificate Error Class on Cause Classification Lists

	Total with Error	113 cause change		Rankable cause change	
		Change	No change	Change	No change
Correct UCOD not in Part I	141	115 (82%)	26	90 (64%)	51
Correct UCOD not on DC	91	79 (87%)	12	57 (63%)	34
Correct UCOD not on last line	156	128 (82%)	28	99 (63%)	57

Limitations

- Results may not generalize to other counties/states or ME/C systems
- Cause and manner of death determination was limited to the quality of medical records
- Differences in medical opinion
 - Mock certification by consensus in this study limited this type of error (Medical Examiners were discordant for underlying cause of death in **12%** of cases)

Strengths

- All reviewers in the study have clinical/medical backgrounds with ability to understand and summarize medical records to determine cause/manner of death
- The use of medical records (vs coded data or problem lists) and physician reviewers with specific expertise in death certification are unique aspects of this study providing optimal retrospective evaluation
- Study is reproducible with a clearly defined scale for grading errors

Closing Remarks

- Error rates in death certification are high, extending to ICD-10 coding which may impact national mortality statistics
- Accurate certification is the foundation for good epidemiologic data, but certification error rate is not directly proportional to the error of mortality statistics. ICD-10 coding may increase or mitigate errors
- Despite active interventions to improve quality of death certification, Vermont's error rate is high. Jurisdictions with less active efforts may be even higher
- Certifiers goal is to accurately explain why the person died not how that literal text will fit into ICD-10 coding

Next Steps?

- **Research needs:**

- Limited research on death certification errors outside an academic setting or hospital
- Similar studies in other regions of the country are needed
- Evaluate contributions of death certification and coding on national mortality statistics

- **Possible solutions:**

- Implementation of hospital comprehensive reviews of death certificates with internal feedback to certifiers
- Standardizing or simplifying underlying cause of death literal text on death certificate

Thank you

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