Selecting a Main Injury Diagnosis in the Multiple Cause-of-Death File, United States 1999
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Background
Why do we need to choose the main injury?
- Selecting a main injury is important because the number of injury diagnoses recorded on death certificates varies due to multiple factors.
- Multiple causes of death data contain all diagnoses on the death certificate, including injuries, external causes, and diseases associated with the deaths.
- In 1999, the number of injuries recorded on U.S. death certificates ranged from 9 to 10 and the average number of injury diagnoses per injury mortality was 2.7. Some of the differences may be related to:
  - Level of detail recorded by certifier
  - Diagnoses, such as age
  - Cause of death and intent
- The number of injuries recorded varies between countries. Some of the differences may be
  - Space available on the death certificate to list the causes of death.
  - Artifacts of coding – particularly coding multiple injuries.

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<tr>
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</thead>
<tbody>
<tr>
<td>Mean number of injuries diagnosed</td>
<td>50.8</td>
<td>61.7</td>
<td>74.7</td>
<td>74.5</td>
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<tr>
<td>Percent of deaths with more than one injury</td>
<td>51.9</td>
<td>72.9</td>
<td>21.0</td>
<td>19.3</td>
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Number of diagnoses by country

Methods
Three methods tested for selecting a main injury

First Listed Diagnosis
- Select the first listed diagnosis within the ICD-10 range of 800-999, T80-T89, T90-T98.
- ICD-9 Procedure List
- Select the first listed diagnosis in the top ranking category of the ICD-9 Procedure List.
- First Listed Diagnosis
- Select the first listed diagnosis as the main injury diagnosis.

ICD-10 Injury Selection Guidelines
- Select using the recommendations of ICD-10 Volume II, Section 6.2.1.

Analytic methods
- From the 1999 multiple cause-of-death data, 124,281 deaths with an external cause of injury (V01-T89/V91-T99) were selected.
- A sample of 500 deaths with more than one unique ICD-10 code within 800-999/T80-T89/T90-T98 was randomly selected.
- ICD-9 code not on Procedure List were excluded.

Selection methods:
- For each death, three methods were used to select a main injury.
- 1. First Listed Diagnosis
- 2. ICD-9 Procedure List
- 3. ICD-10 Injury Selection Guidelines

Results

<table>
<thead>
<tr>
<th>Percent agreement and kappa among selection methods</th>
<th>Total</th>
<th>ICD-9 Procedure List</th>
<th>ICD-10 Injury Selection Guidelines</th>
<th>ICD-9 Procedure List and ICD-10 Injury Selection Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent agreement (rows)</td>
<td>71.2</td>
<td>63.5</td>
<td>64.5</td>
<td>77.7</td>
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<td>Kappa (columns)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
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Conclusions

- There was agreement among the three methods, but some is expected by chance.
- First Listed Diagnosis has the largest percentage agreement with ICD-9 and ICD-10.
- The three methods tend to select the same injury and are not independent.

Discussion

First Listed Diagnosis
19% agree in exact categories.
Reasons:
- Misdiagnoses of deaths were filled in correctly and the first listed cause of death is usually the intended cause of death.
- The death certificates are known to be filled in consistently, which results in inconsistency in the selection of the main injury.

ICD-9 Procedure List
20% agree in exact categories.
Reasons:
- Comparability rates between ICD-9 and ICD-10 are not available yet.
- A plausible explanation for the lack of agreement is the higher degree of clinical judgment in coding for ICD-9.

ICD-10 Injury Selection Guidelines
20% agree in exact categories.
Reasons:
- The order of injury approach on the death certificate plays a major role in the injury diagnosis selection. Approximately 20% of the sample deaths had more than one injury listed in the up-ranking category and the first listed diagnosis of these was selected.

ICD-10 Injury Selection Guidelines
20% agree in exact categories.
Reasons:
- While the injury approach on the death certificate plays a major role in the injury diagnosis selection.