Are You Really Dead? Validation of Death and Date of Death in Patients With COPD in the CPRD

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DISCLOSURES
ERF, JK (retiree), JA, EP, NS, SPG, and CR are full-time employees of RTI Health Solutions. The contract between RTI Health Solutions and the sponsor, AstraZeneca, includes independent publication rights. RTI-HS conducts work for government, public, and private organizations, including pharmaceutical companies. As an RTI-HS employee, SPG has also participated in scientific advisory boards that are funded by pharmaceutical companies. EGG is an employee of AstraZeneca.

BACKGROUND
• The current Clinical Practice Research Datalink (CPRD) death algorithm identifies a large number of deaths. CPRD provides a derived date of death (DoD). However, data on the algorithm performance are limited.

OBJECTIVE
• To evaluate a process for identifying and verifying cases of death and the DoD in the CPRD.

METHODS
• Deaths in a nested case-control study of all-cause mortality in a cohort of new users of selected chronic obstructive pulmonary disease (COPD) medications (September 2012–June 2016) were identified in the Hospital Episode Statistics (HES), the Office for National Statistics (ONS), and the CPRD General Practitioner Online Database (GOLD) through an electronic algorithm and classified as confirmed (CONF) or potential (for clinical review) (Figure 1).

RESULTS
• In CPRD-GOLD, HES, and ONS, 3,822 deaths were identified in 39,788 users of selected COPD medications. Of these, 3,610 (94.5%) were CONF deaths through the electronic algorithm, and 212 (5.5%) were potential deaths (Table 1).

Table 1. Number of Deaths Identified, Confirmed, and Validated

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths identified</td>
<td>3,822</td>
<td>100</td>
</tr>
<tr>
<td>Deaths confirmed</td>
<td>3,610</td>
<td>94.5</td>
</tr>
<tr>
<td>Potential deaths</td>
<td>212</td>
<td>5.5</td>
</tr>
</tbody>
</table>

• We recommend:

  • In NLP, validation of death and DoD for those patients with clinical codes beyond 15 days after the DoD or with transfer-out date missing.

  • In LP, validation of cases with 3 days difference between the DoD in HES and ONS, irrespective of GOLD, or those for which the DoD is missing in ONS.

CONCLUSIONS
• The electronic algorithm we used confirmed most deaths and DoD as derived by CPRD.

• Patient profile review confirmed most deaths identified as potential by the electronic algorithm.

• In LP, HES/ONS DoDs are usually correct, and most CPRD GOLD DoDs were confirmed.

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• Figure 2 shows the distribution of deaths in LP by the number of days of difference between DoD recorded in two data sources, and Table 3 shows the median number of days of difference between the DoD in two sources of data.

Table 2. Reasons for and Results of the Patient Profile Review of Potential Deaths

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>212</td>
<td>100</td>
</tr>
<tr>
<td>Patients with nonmatching DoD</td>
<td>191</td>
<td>90.1</td>
</tr>
<tr>
<td>DoD in ONS &gt; 3 days before</td>
<td>59</td>
<td>29.0</td>
</tr>
<tr>
<td>DoD in ONS ≤ 3 days after</td>
<td>132</td>
<td>67.0</td>
</tr>
<tr>
<td>DoD in ONS ≤ 3 days before</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td>DoD in ONS &gt; 3 days after</td>
<td>12</td>
<td>6.1</td>
</tr>
</tbody>
</table>

• In CPRD-GOLD and HES, compliant deaths were those with matching DoD in ONS, HES, and CPRD GOLD and, if not matching, those with nonmatching DoD in ONS, HES, and CPRD GOLD and, if not matching, those with matching DoD in ONS, HES, and CPRD GOLD.

• Potential deaths were those with recorded clinical information beyond 15 days after the DoD or with missing transfer-out date.

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• Patients in practices linkable to HES/ONS (linkable practices [LP]), CONF deaths were those with matching DoD in ONS, HES, and CPRD GOLD and, if not matching, those with nonmatching DoD in ONS, HES, and CPRD GOLD, and classified as confirmed (CONF) or potential (for clinical review) (Figure 1).  

• In practices linkable to HES/ONS (linkable practices [LP]), CONF deaths were those with matching DoD in ONS, HES, and CPRD GOLD and, if not matching, those with nonmatching DoD in ONS, HES, and CPRD GOLD and, if not matching, those with matching DoD in ONS, HES, and CPRD GOLD.

• In NLP, the DoD changed for 13 cases (56.5%, 6 cases with an error in the year).

• Patients in practices not linkable to HES/ONS (non-linkable practices [NLP]), potential deaths were those with recorded clinical information beyond 15 days after the DoD or with missing transfer-out date, and CONF deaths were all others.

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• In NLP, the DoD changed for 13 cases (56.5%, 6 cases with an error in the year).

• In LP, the DoD changed for 5 cases (< 5%, 6 cases with DoD missing in ONS were not confirmed.

• Patients in practices not linkable to HES/ONS

Table 3. Differences Between Dates of Death in Linkable Practices

<table>
<thead>
<tr>
<th>Category</th>
<th>Median (Q1–Q3)</th>
<th>1 Day</th>
<th>2 Days</th>
<th>3 Days</th>
<th>4 Days</th>
<th>5 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRD-GOLD and HES</td>
<td>5 (2–15)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CPRD-GOLD and ONS</td>
<td>3.5 (1–14)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

• Patients with nonmatching dates between data sources

Figure 2. Distribution of Deaths by Days Elapsed Between Recorded DoD in Different Data Sources in Linkable Practices

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REFERENCES

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