Existing Evidence in Published Literature for Drug-Condition Pairs

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Objectives

• To quantify using an automated search strategy the extent to which literature is readily available to explore evidence about potential drug-outcome associations

Methods

SEARCHING FOR EVIDENCE
Evidence was assessed by 3 search strategies with varying degrees of sensitivity:
1. Broad PubMed Search – leveraging Search Method 1 to identify all publications returned by searching for a given drug-condition pair
2. Co-occurrence of MeSH Terms – leveraging Search Method 2 selection of all publications in which both the drug and condition MeSH tags were found
3. Co-occurrence of MeSH Terms with Adverse Event Qualifiers – same as above but drug qualified with “adverse effects” and conditions “chemically induced” (Avillach et al.)

SEARCH EXAMPLE
Using PMID 26948245 in Abstract 1 as an example of an article that meets both search strategies for D000069283 “Rituximab” & D0009503 “Neutropenia”

Results

TABLE 1 - Reliability of Entrez (PubMed) Search Strategies

<table>
<thead>
<tr>
<th>Evidence Type</th>
<th>All Drugs &amp; All Conditions (721 conditions &amp; 998 drugs)</th>
<th>All Drugs &amp; 23 Conditions (23 conditions &amp; 998 drugs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug and Condition Pairs</td>
<td>719,558 (100%)</td>
<td>22,954 (100%)</td>
</tr>
<tr>
<td>Broad PubMed Search</td>
<td>216,241 (30%)</td>
<td>10,772 (47%)</td>
</tr>
<tr>
<td>Co-occurrence of MeSH Terms</td>
<td>132,108 (18%)</td>
<td>6,673 (29%)</td>
</tr>
<tr>
<td>Co-occurrence of MeSH Terms</td>
<td>37,179 (5%)</td>
<td>2,681 (12%)</td>
</tr>
</tbody>
</table>

| Graph 1 shows when using the 3 search strategies for the 23 conditions of pharmacovigilance for every drug how many have 1+ articles
| The strategies are subsets of one another; co-occurrence with qualifiers is within co-occurrence, which is within the broad search
| The greatest proportions of drug covered for each search strategy:
  - Broad: 83% Depression
  - Co-occurrence: 51% Drug Eruptions
  - Co-occurrence with Qualifiers: 25% for thrombocytopenia
  - Suicide and Confusion get associated with many more drugs using the broad search but much less when using the MeSH tags

Conclusions

• For >50% of drug-condition pairs of potential pharmacovigilance interest, our automated literature approach could not identify any published evidence (either supporting or refuting a potential association) – meaning <50% of the time can a patient/physician find any publication associated to a pair
• A limitation is equal weight was given to all drug-condition pairs as well as no judgement of the quality of the evidence is made
• Understanding where evidence is currently unavailable can support researchers in prioritizing future research

Conflict of Interest Statement

All authors declare no conflict of interest.

Citations


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