An Analysis of the Use of Animals in Predicting Human Toxicology and Drug Safety

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Drug testing – evidence to date

1999

FRAME / RSPCA

Drug testing – our study

Safety Intelligence Programme

Publicly Available Data

>80,000 Compounds

>2,300 Drugs
## Drug testing – our study

<table>
<thead>
<tr>
<th></th>
<th>Toxic</th>
<th>Not toxic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toxic</strong></td>
<td>a: True Positives (TPs)</td>
<td>b: False Positives (FPs)</td>
</tr>
<tr>
<td><strong>Not Toxic</strong></td>
<td>c: False Negatives (FNs)</td>
<td>d: True Negatives (TNs)</td>
</tr>
</tbody>
</table>

- **Sensitivity** (TP rate): \( \frac{a}{a+c} \)
- **Specificity** (TN rate): \( \frac{d}{d+b} \)
- **PPV** (Conditional Evidential Weight): \( \frac{a}{a+b} \)

Drug testing – our study
Drug testing – our study

Likelihood Ratios

<p>| | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PLR</td>
<td>Sensitivity / [1-Specificity]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iNLR</td>
<td>Specificity / [1-Sensitivity]</td>
<td></td>
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</tr>
</tbody>
</table>

Evidential Weight

PLR

iNLR

>1.0

Independent

Drug testing – our study
Drug testing – our study

Results

PLR
- Median 28
- ✔️
- Range 4.7-548.7
  - No pattern

iNLR
- Median 1.11
- ✔️
- ✔️
- Range 1.01-1.92

No Evidential Weight
Drug testing – our study

Prior Data
70%

Our Data

72%

↑ 2%
Drug testing – our study

Little/No Evidential Weight

<table>
<thead>
<tr>
<th>Group</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>iNLR</td>
<td>1.39</td>
<td>1.03-50</td>
</tr>
<tr>
<td>Mouse</td>
<td>1.12</td>
<td>1.01-2.33</td>
</tr>
<tr>
<td>Rat</td>
<td>1.82</td>
<td>1.02-100</td>
</tr>
<tr>
<td>Monkey</td>
<td>1.02</td>
<td>1.00-1.08</td>
</tr>
</tbody>
</table>
Evidence – & call for action


Transparent investigation by regulators & industry with independent oversight

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