Bias in clinical studies

- **Bias** - systematic error in a clinical study which is not reduced by increasing the study sample size (as opposed to random variation)
- **Classification** - (type) of bias is based on the source of bias

- **Types of bias**
  - **Selection bias**
    - Systematic differences between baseline characteristics of the groups that are compared
  - **Performance bias**
    - Systematic differences between care given to groups/exposure to factors other than that being studied
  - **Attrition bias**
    - Systematic differences between groups in withdrawals from a study
  - **Detection bias**
    - Systematic differences between groups in how outcomes are measured
  - **Reporting bias**
    - Systematic differences between reported/unreported findings

- **Confounding bias**
  - 3rd variable exists which isn't accounted for
    - It is associated with the cause
    - It is also associated with the effect
    - It is not distributed the same between the groups being studied
  - The supposed cause-effect relation will be confounded by the third variable

  e.g.

```
Alcohol and lung cancer

<table>
<thead>
<tr>
<th>The confounded association</th>
<th>One possible explanation</th>
<th>The confounded factor</th>
<th>The confounding (causal) factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who drink/alcohol have a raised risk of lung cancer</td>
<td>Alcohol drinking and smoking are behaviours which go together</td>
<td>Alcohol, which is a marker for, on average, smoking more cigarettes</td>
<td>Tobacco, which is associated with both alcohol and with the disease</td>
</tr>
</tbody>
</table>
```

**What do you do next to check the assumption of smoking being a confounder?**

See if the association between alcohol and lung cancer still holds in people not exposed to tobacco.