Choose 1 student at random from 106:

unconditional: \[ P(Y) = \frac{81}{106} \approx 76\% \]

conditional: \[ P(Y|E) = \frac{29}{49} \approx 59\% \]

\[ P(Y|M) = \frac{52}{57} \approx 91\% \]

Q: Are gender & help independent of each other in this data set?

A: No, they're dependent; they are associated with each other; an association exists between them.

Q2: Is assoc. strong/weak/none?

Because 91% is quite different from 59%
In reality, all probabilities are conditional, at least as the assumptions made in calculating them.

\[ P(Y) = P(Y \mid 1 \text{ student chosen at random from 106}) \]

Dr. Schram

Pr inf on any single cut \( \Rightarrow p = \frac{1}{500} \)

Pr inf (int.)

\[
\begin{array}{c|c|c}
\text{# cuts} & \text{Pr (int.)} & \text{200% bullsh*t} \\
100 & 0.20 & \text{200% bullsh*t} \\
500 & 0.10 & \text{100% bullsh*t} \\
1000 & 0.05 & \text{50% bullsh*t} \\
\end{array}
\]

Surprising fact about HIV: it's possible to be infected with HIV more than once.
Math: All math can ever give us is conclusions.

If A then C

2 ways to measure quality:
1. Process: how we solve problems
2. Outcome: whether we succeeded in solving or not

Useful process tip:

When faced with a new problem, try to find an old problem with:
1. It's similar to how you approach the problem.
2. You already know about.
A: Is Dr. Schrau similar to any problem we've already solved?

A: Our only success so far is T-f disease.

\[ P(1 \text{ or more T-f kids in family of 5}) \]

1. \[ P(\text{inf. is 100 acts?}) = P(1 \text{ or more inf. in 100 unprotected acts}) \]

\[ P(\text{inf. on 1 act}) = \frac{1}{500} = p \]

A: \[ P(1 \text{ or more inf. in 100 acts}) \]
\[ 1 - P(\text{not } A) \]
\[ 1 - P(\text{not } B \lor \text{not } C \lor \text{not } D \lor \text{not } E) \]

\[ P(A \text{ and } B) = P(A) \cdot P(B \mid A) \]
\[ = P(B) \cdot P(A \mid B) \]

Special case: if \( A, B \) \text{ independent},

then \( P(A \text{ and } B) = P(A) \cdot P(B) \)
\[ = P(B) \cdot P(A \mid B) \]

\[ 1 - P(\text{not } \inf_{i \in \mathbb{N}} P(i)) \cdot P(\text{not } \inf_{i \in \mathbb{N}} P(i)) \ldots P(\text{not } \inf_{i \in \mathbb{N}} P(i)) \]
\[
\text{constant risk}
\]
\[
1 - \left(1 - \frac{1}{500}\right) \left(1 - \frac{1}{500}\right) \cdots \left(1 - \frac{1}{500}\right)
\]
\[
= 1 - \left(1 - \frac{1}{500}\right)^{100} = 1 - \left(1 - p\right)^5
\]

<table>
<thead>
<tr>
<th>n</th>
<th>V (1 or more hits)</th>
<th>Schwan</th>
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<tbody>
<tr>
<td>100</td>
<td>18%</td>
<td>20%</td>
</tr>
<tr>
<td>500</td>
<td>62% (?)</td>
<td>100%</td>
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