uncertainty is not a property of the world; it's a description of your information about the world.

Soon we will be able to write things like $p(\theta | B)$ where $B = \{ B_1, \ldots, B_n \}$ all the by context & data-gathering process.

ex. $B_i = \{ \text{572 people were like a random sample from P} \}$
I. random variable

\[ F(x) = P(\xi \leq x) \]

cumulative distribution function (CDF)

\[ \theta = F \]

you may be uncertain about \( F \)

uncertainty about functions

\[ \mathcal{P} = (\mathcal{A}, \mathcal{C}) \]

natural language

context

problem

question(s)

(\( \mathcal{O}, \mathcal{I} \)) \( \mathcal{B} = \{ B_1, \ldots, B_l \} \)

unknown(s)

data

Bayesian nonparametric methods

background information
P = IHGA case study
Q: How much better is IHGA than no IHGA in reducing mean # of hospitalizations?

\[ \Theta = \frac{\mu_T - \mu_C}{\sigma_C} \]

\[ J = \begin{bmatrix} T & 1 \\ 10 & 0.3 \end{bmatrix} \]

\[ n_T = 285 \]

\[ n_C = 287 \]
we will need a way to quantify how much info we have, both internal & external to $I$.

$\begin{pmatrix}
1 \\
2 \\
3
\end{pmatrix}$ at random

relevant outcomes (E0)
equ: possible

$P_k(A)$ is primitive

$P(A) \leq \text{prop.}$

$P(\text{E0 is odd}) = \frac{n_A}{n}$

$P(A) = \frac{2}{3}$
\[ \Pr(E | A \land B) \leq \text{primitive} \]
\[ \text{T/F propositions} \]

\[ \Pr(A \land B) \leq \text{primitive} \]
\[ \text{T/F propositions} \]

\[ \Pr(\text{this guy is HIV+}) = ? \]

\[ \Pr(\text{all relevant people} \land \text{my guy is similar to all relevant people}) \]

\[ \text{at random} \]
\[ \text{IID} \]

\[ \begin{pmatrix} 1 \\ \vdots \end{pmatrix} \]

\[ \text{rel. freq. of HIV+ people} \]
\[ P(A) = p \]

\[ \text{odds in favor of } A \]

\[ \text{is/are } o = \frac{p}{1-p} \]

\[ p = \frac{o}{1+o} \]

"We need in science, with our methods for separating signal from noise, a way of finding out how often our methods get the right answer."