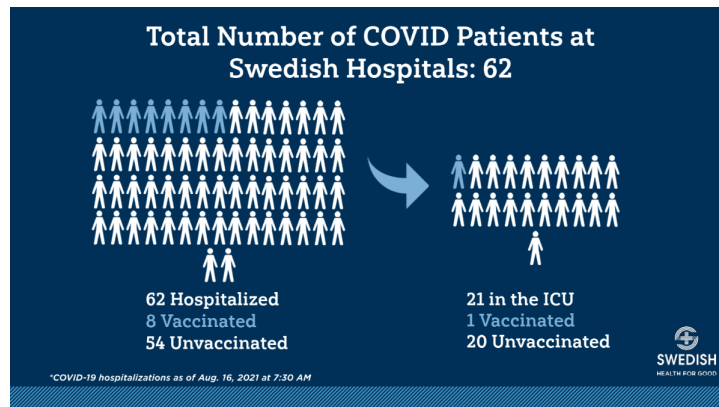


Prosecuter's Fallacy

- In the fall of 2021, early in the U.S. vaccination campaign, a series of infographics spread on social and news media, comparing the number of vaccinated and unvaccinated COVID-19 patients in area hospitals. For example, one graphic (shown below) depicts 62 COVID patients at Swedish Hospitals in Seattle, WA on August 16th, 2021. Of those hospitalized, 8 were vaccinated and 54 were unvaccinated. The graphic was also accompanied by the text "The COVID19 vaccine has never been more important."



- What is the argument that the infographic and text are making?
- Use Bayes' Rule to explain the flaw in this argument. That is, what critical information is also needed in order to justify the claim being made?
- What are some ramifications of this error? Consider both the cases where a viewer is unaware of the error, as well as when the viewer is aware of the error.
- Consider data from Israeli hospitals from August 15th, 2021: Of the 515 patients currently hospitalized with severe cases of COVID-19, 301 were fully vaccinated. For context, a COVID-19 vaccine was introduced and widely adopted earlier in Israel than in U.S., so a higher proportion of the Israeli population was vaccinated by August 15th. Does the data here suggest that the vaccine is ineffective? Does it suggest that it loses effectiveness over time?

Monty Hall

- Consider the Monty Hall problem, except that there are 5 doors (4 contain goats and 1 contains a car). After the contestant has selected a door, Monty reveals goats behind 2 other doors and offers you the chance to switch to any of the 2 other doors.

Assume that Monty knows which door has the car, will always open 3 goat doors, and that Monty chooses with equal probabilities from all choices of which goat doors to open. Should you switch doors? What is the probability of success if you switch to one of the 3 other doors?