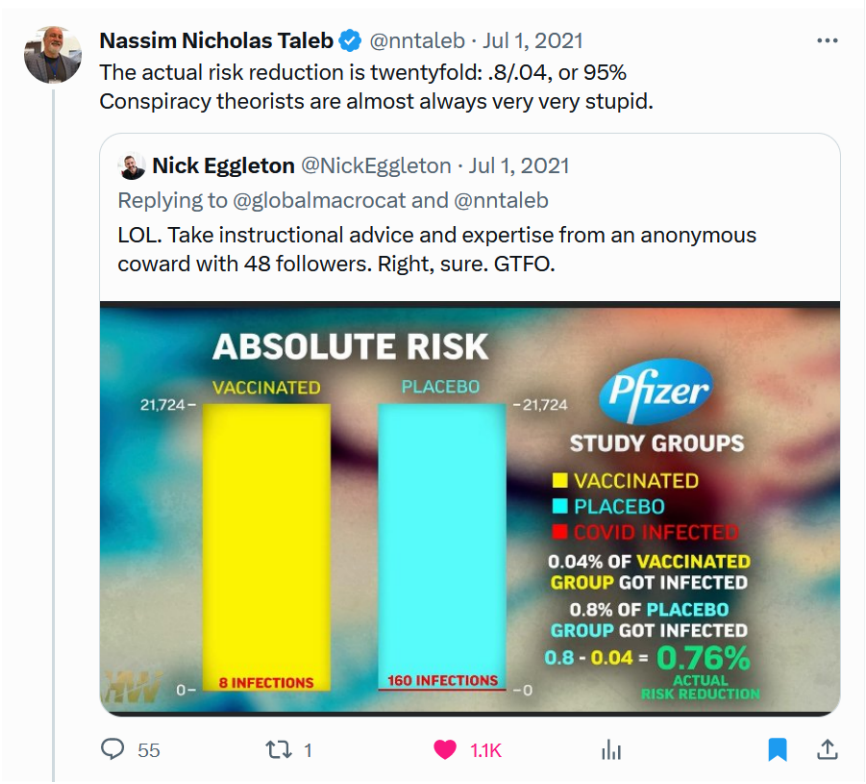
Risk Reduction

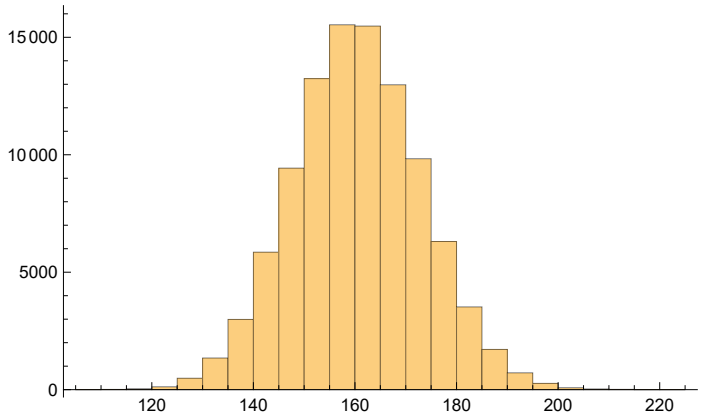


Monte Carlo of Sampling Error of Placebo

I did not know you can use the Bernoulli's distribution and run a Monte Carlo of how sampling error.

```
In[•]:= Table[RandomVariate[BernoulliDistribution[160 / 27000], 27000] // Total, {10^5}] //
         Histogram
```

Out[•]=



Odds Ratio of Sampling Error

One can compute the odds ratio to compare with the vaccine versus without the vaccine with consideration of the sampling error.

```
In[•]:= ta = Table[1 / (RandomVariate[BernoulliDistribution[160 / 27000], 27000] // Total) / (RandomVariate[BernoulliDistribution[8 / 27000], 27000] // Total), {10^5}];
```

Power: Infinite expression $\frac{1}{0}$ encountered.

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General: Further output of Power::infy will be suppressed during this calculation.

```
In[•]:= ta // StandardDeviation // N
Out[•]=
0.0183241
```

```
In[•]:= value = ta // Mean // N
Out[•]=
0.0503112
```

Odds ratio, you are 20 times more likely to be correct by taking the vaccine based on this study.

```
In[•]:= 1 / value
Out[•]=
19.8763
```

The error is the following, in worse case of two standard deviations, it is about 3 times more likely to be correct by taking the vaccine within 2 s.d. assuming this is normally distributed.
I think, not sure if this interpretation is okay.

```
In[•]:= 1 / (0.183241 + (0.0503112 * 2))
Out[•]=
3.52282
```

We can plot the histogram of the odds ratio, how many times we are likely to be wrong.

In[•]:= **ta // Histogram**

Out[•]=