Response rate incentive increase power calculation

To perform a power calculation to estimate the required sample size to detect a change in the exam response rate (among persons who were interviewed), we need to determine:

    1) what the expected number of interviewed persons will be in each stand. We used the average number of interviewed participants age 16+ years from the first 4 stands in 2021. This was approximately 250 people interviewed per stand (1,014, divided by 4).

    2) the expected change in response rate. For an increase from $85 to $125, it is reasonable to expect that we could observe a 5% increase in response rate. As we discussed last week, we wouldn't expect an increase in incentive to be the sole intervention needed. The overall exam response rate for the first four stands in 2021 was 75%. We can reasonably expect the higher incentive to increase the exam response rate to 80%.

Sample sizes and response rate for ages 16 years and above for the first 4 stands in 2021

Adults 16+ years	Total	Stand 428	Stand 429	Stand 430	Stand 431
Interviewed	**1,014**	227	278	282	228
Examined	757	179	207	212	159
Exam response rate	**75%**	79%	75%	75%	70%

In the table below, the statistical power for each additional stand completed is shown in the right column. For the first stand in which the exam incentive is raised to $125 and the expected 250 adults age 16+ are interviewed, the statistical power to detect a 5% difference in the exam response rate (an increase from 75% to 80%) is only 37%. In the last row, after five stands are visited (a cumulative total of 1,250 interviewed people), the statistical power reaches 81%. A statistical power of 80% is the conventional target. **In sum, for the assumptions used, NHANES would need to visit five stands to detect a 5% increase in the exam response rate.**

Statistical power calculation

Cumulative # of stands	Response rate first 4 stands	Expected Response rate	Cumulative sample size	Statistical Power
1	75%	80%	250	37%
2	75%	80%	500	58%
3	75%	80%	750	70%
4	75%	80%	1000	77%
5	75%	80%	1250	**81%**

However, field experience could vary:
-- If a greater number of people are interviewed (e.g., higher interview response rates), fewer number of stands will be needed to detect a 5% increase in response rates.
-- Conversely, if interview response rates are lower and fewer adults per stand are interviewed, a greater number of stands will be needed.
-- If the impact of the incentive is greater (higher than a 5% increase) it will take fewer stands to detect a change in exam response rates.