Asabere KWABENA ASANTE

PROBLEM ST 1

Q1a)

status			
trt	Alive	Died	Sum
Placebo	7880	239	8119
Vit A	8218	206	8424
Sum	16098	445	16543

Q1b)

If there is no information,

For p=0.5 and q= 0.5

$$n = \frac{1.96^2 \times 0.50 \times 0.50}{0.005^2}$$

=38,416

For p=0.3 and q= 0.7

$$n = \frac{1.96^2 \times 0.10 \times 0.90}{0.005^2}$$

=32,270

For p=0.2 and q= 0.8

$$n = \frac{1.96^2 \times 0.20 \times 0.80}{0.005^2}$$

=24,587

For p=0.1 and q= 0.9

$$n = \frac{1.96^2 \times 0.10 \times 0.90}{0.005^2}$$

=13,830

For p=0.05 and q= 0.95

n= $\frac{1.96^2 \times 0.05 \times 0.95}{0.005^2}$

=7,300

Q2a) Two-sample comparison of proportions power calculation

```
              n = 17143.9
             p1 = 0.0294
             p2 = 0.0245
      sig.level = 0.05
          power = 0.8
    alternative = two.sided
```

NOTE: n is number in *each* group

2b) n = (1.96 x sqrt(2) x 0.02695 x 0.97305 + 0.84 x sqrt(0.0294) x 0.9706 + 0.0245 x 0.9755)^2 /(2.401 x 10^-5)

= 17,124.5 children per group

Q3)

Q4)

RR	P = 0.0244	P = 0.0294	P= 0.0344
1.2	41778	35100	30222
1.5	10026	8214	6948
1.75	6264	4774	4090

Q5)

RR	P= 0.0244	P = 0.0294	P = 0.0344
1.2	55600	46714	40222
1.5	13256	10860	9186
1.75	8388	6284	5384

As the relative risk for each mortality rate in the control group rises, so does the mortality rate difference between the control group and the Vitamin A group. This increase in delta corresponds to a decrease in the sample size required to detect a significant difference between the two groups. This relationship holds regardless of power. Conversely, higher power necessitates a larger sample size.

Q6

Based on the tables provided, achieving a statistical power of 90% with a relative risk of 1.2 requires a larger sample size per group compared to achieving the same relative risk with a power of 80%. However, resource constraints may limit the recruitment of a large number of participants for the study, potentially prolonging the study unnecessarily. Given these factors, opting for a smaller sample size per group, which still provides 80% power to detect differences in mortality between the control and treatment groups, may be essential.