1

Denote S_n as the sensitivity, S_p as the specificity, p as the prevalence rate, n as the sample size; The precision can be calculated as

$$\begin{aligned}\text{Precision } &= \frac{TP}{TP+FP} \\ &= \frac{np \times S_n}{np \times S_n + n(1-p) \times (1-S_p)} \\ &= \frac{p \times S_n}{p \times S_n + (1-p) \times (1-S_p)}\end{aligned}$$

Plug in $p = 9/100000, S_n = S_p = 0.8$, we have $\text{Precision } = 0.036\%$

2

With the equation we derived for question 1, solve for the equation that plugs in $\text{Precision } = 0.5, p = 9/100000, S_n = S_p$, we have $S_n = 99.991\%$

3

In the table2 of Wang et al., there are 1829 cases and 7665 controls. Their reported $S_n = 83.1\%, S_p = 82.3\%$and $\text{Precision } = 0.571$. Given the NMSC prevalence is 2.3 to 9.2 per 100,000 population. As shown in the calcualtio for question 1, the precision should be very low. Thus, there might be some problems with their conclusion.