a) $P(GH \mid S) = \dfrac{P(S \mid GH) P(GH)}{P(S)}$

GH = good hygiene
BH = bad hygiene
S = sick
NS = not sick

$P(S) = P(S \mid GH) \cdot P(GH) + P(S \mid BH) \cdot P(BH)$

$P(GH) = 0.99$
$P(S \mid GH) = 0.01$
$P(BH) = 0.01$
$P(S \mid BH) = 0.5$

$ = 0.01 \cdot 0.99 + 0.5 \cdot 0.01$

$ = 0.0149$

$\therefore P(GH \mid S) = \dfrac{P(S \mid GH) P(GH)}{P(S)} = \dfrac{0.01 \cdot 0.99}{0.0149}$

$ = \dfrac{99}{149} \approx 0.66^{46}$

b) $P(\text{S twice}) = P(S)^2 = \cancel{0.0149} \; 0.0149^2 = 2.2201 \times 10^{-4}$

$\cancel{P(\text{S twice} \mid GH) = P(GH}$

$P(GH \mid \text{S twice}) = \dfrac{P(\text{S twice} \mid GH) \cdot P(GH)}{P(\text{S twice})}$

$\qquad\qquad\qquad = \dfrac{P(S \mid GH)^2 \cdot P(GH)}{P(\text{S twice})}$

$\qquad\qquad\qquad = \cancel{\dfrac{\left(\frac{0.49}{2.149}\right)^2 \cdot 0.99}{2.2201 \times 10^{-4}}}$

$\qquad\qquad\qquad = \dfrac{(0.01 \times 0.99)^2 \cdot 0.99}{2.2201 \times 10^{-4}}$

$\qquad\qquad\qquad = 0.43268\ldots$

$\qquad\qquad\qquad \approx 0.433$