1. The physician has written an order for albuterol 12 mg/hr to be administered for six hours. You have a large volume nebulizer that has an output 30 mL/hr. How medication and diluent (saline) do you need?

\[
\text{AMOUNT OF DRUG} = \text{DOSAGE DESIRED} \times \text{DURATION} = \frac{12 \text{mg}}{\text{hr}} \times 6 \text{ hours} = 72 \text{mg}
\]

\[
\text{TOTAL VOLUME} = \text{THERAPY DURATION} \times \text{OUTPUT} = 6 \text{ hr} \times \frac{30 \text{mL}}{\text{hr}} = 180 \text{ mL}
\]

\[
\text{DRUG DOSAGE} = \text{DRUG CONCENTRATION vs. AMOUNT OF DRUG} =
\]

\[
0.5\% = \frac{0.5 \times 500 \text{mg}}{100 \text{ mL}} = \frac{5 \text{mg}}{1 \text{ mL}}
\]

\[
\frac{5 \text{mg}}{1 \text{ mL}} = \frac{72 \text{ mg}}{\chi}
\]

\[
\chi = \frac{72 \text{ mg} \times 1 \text{ mL}}{5 \text{ mg}} = 14.4 \text{ mL}
\]

\[
\text{DILUENT VOLUME} = \text{TOTAL VOLUME} - \text{DRUG VOLUME} = 180 \text{ mL} - 14.4 \text{ mL} = 165.6 \text{ mL} = 166 \text{ mL}
\]

2. The physician has written an order for terbutaline 8 mg/hr to be administered over the next eight hours. Terbutaline is available as a 0.1 % solution. You have a large volume nebulizer that has an output of 40 mL/hr. How much medication and diluent do you need?

\[
\text{AMOUNT OF DRUG} = \text{DOSAGE DESIRED} \times \text{DURATION} = \frac{8 \text{mg}}{\text{hr}} \times 8 \text{ hours} = 64 \text{mg}
\]

\[
\text{TOTAL VOLUME} = \text{THERAPY DURATION} \times \text{OUTPUT} = 8 \text{ hr} \times \frac{40 \text{mL}}{\text{hr}} = 320 \text{ mL}
\]

\[
\text{DRUG DOSAGE} = \text{DRUG CONCENTRATION vs. AMOUNT OF DRUG} =
\]

\[
0.1\% = \frac{0.1 \times 100 \text{mg}}{100 \text{ mL}} = \frac{1 \text{mg}}{1 \text{ mL}}
\]

\[
\frac{1 \text{mg}}{1 \text{ mL}} = \frac{64 \text{ mg}}{\chi}
\]

\[
\chi = \frac{64 \text{ mg} \times 1 \text{ mL}}{1 \text{ mg}} = 64 \text{ mL}
\]

\[
\text{DILUENT VOLUME} = \text{TOTAL VOLUME} - \text{DRUG VOLUME} = 320 \text{ mL} - 64 \text{ mL} = 256 \text{ mL}
\]

3. The physician has written an order for albuterol 4 mg/hr to be administered for four hours. You have a large volume nebulizer that has an output 30 mL/hr. How medication and diluent (saline) do you need?

\[
\text{AMOUNT OF DRUG} = \text{DOSAGE DESIRED} \times \text{DURATION} = \frac{4 \text{mg}}{\text{hr}} \times 4 \text{ hours} = 16 \text{mg}
\]

\[
\text{TOTAL VOLUME} = \text{THERAPY DURATION} \times \text{OUTPUT} = 4 \text{ hr} \times \frac{30 \text{mL}}{\text{hr}} = 120 \text{ mL}
\]

\[
\text{DRUG DOSAGE} = \text{DRUG CONCENTRATION vs. AMOUNT OF DRUG} =
\]

\[
0.5\% = \frac{0.5 \times 500 \text{mg}}{100 \text{ mL}} = \frac{5 \text{mg}}{1 \text{ mL}}
\]

\[
\frac{5 \text{mg}}{1 \text{ mL}} = \frac{16 \text{ mg}}{\chi}
\]

\[
\chi = \frac{16 \text{ mg} \times 1 \text{ mL}}{5 \text{ mg}} = 3.2 \text{ mL}
\]

\[
\text{DILUENT VOLUME} = \text{TOTAL VOLUME} - \text{DRUG VOLUME} = 120 \text{ mL} - 3.2 \text{ mL} = 116.8 \text{ mL} = 117 \text{ mL}
\]