

George Washington, cause of death? 1 pt (003) Due at start of lecture on 1/26/12

*You must **show calculations** throughout and pay attention to sig. fig. to receive full credit!*

After exposure (12/12/1799) to bad weather George Washington got sick. He was rather ill the next day, and at about 3 AM on the 14th indicated his state of discomfort to his wife. His symptoms included difficulty breathing, speaking, and swallowing (see <http://gwpapers.virginia.edu/articles/wallenborn.html>). One of the treatments administered was bleeding. Wallenborn indicates the total blood loss by medical treatment was 5 pints. Vadakan gives a different estimate (7.93 pints) (<http://xnet.kp.org/permanentejournal/spring04/time.html>).

conversion factors: 0.9464 L = 1 qt 2 pint = 1 qt (exact) 1 lb = 0.4536 kg 1 in = 2.54 cm (exact) 4 qt = 1 gal (exact)

1. Calculate the liters of blood Washington lost by this treatment using both values from above using the unit conversion method discussed in lecture. Show calculations.

2. Assume that the average male has a total blood volume of 5.42 L and weighs 185.6 lb. If Washington weighed 233lb and had the same blood volume to weight ratio as that for the average male, calculate Washington's total blood volume. Show calculations.

3. Using the total blood volume determined in question 2, calculate the percent of blood that Washington lost using both Wallenborn's and Vadakan's estimate of blood loss. (**Show a formula for % and all calculations!**)

4. a) Use the nursing **calculator** at http://www.manuelsweb.com/blood_loss.htm (not the formulas) to calculate the total blood volume and allowable blood loss for Washington, assuming his hematocrit was 48%. Write the values below. Show calculation for conversion of Washington's weight from lb to kg using unit conversion method.

b) Use the same nursing calculator to determine **your** allowable blood loss. Show calculation for conversion of your weight from lb to kg. (Use hematocrit values: adult female = 40.3% adult male = 47.4%)

5. Show conversion of mL to L for Washington's allowable blood loss found in 4a. Do you think the bleeding treatment administered to Washington helped or hurt him? (I realize you are not a board certified hematologist.) Referring to information provided and the calculations in this assignment, very briefly indicate why you answered as you did. You can use the back of this page to answer.

6. Using only the relationships between units given above and the metric to metric relationships that you have memorized, (i) show calculations for the conversion of 4.29×10^{-2} gal to L *and* (ii) the conversion of 0.0650 m to in. (on back of page?) You must use the unit conversion method shown in lecture.