**#1** THE HOSPITAL LABOR NEEDS CASE

(Table 1) presents data concerning the need for labor in 16 U.S. Navy hospitals. Here, *y* = monthly labor hours required; *x*1 = monthly *X*-ray exposures; *x*2 = monthly occupied bed days (a hospital has one occupied bed day if one bed is occupied for an entire day); and *x*3 = average length of patients stay (in days). (Fig 1) gives the Excel output of a regression analysis of the data using the model

Table 1 **Hospital Labor Needs Data**



(Fig 1)**Excel Output of a Regression Analysis of the Hospital Labor Needs Data Using the Model** *y* = *β*0 + *β*1 *x*1 + *β*2 *x*2 + *β*3 *x*3 + *ε*



days (a hospital has one occupied bed day if one bed is occupied for an entire day); and *x*3 = average length of patients’ stay (in days (Fig 1) gives the Excel output of a regression analysis of the data using the model



Note that the variables *x*1, *x*2, and *x*3 are denoted as XRay, BedDays, and LengthStay on the output.

**a**. Find (on the output) and report the values of *b*1, *b*2, and *b*3, the least squares point estimates of *β*1, *β*2, and *β*3. Interpret *b*1, *b*2, and *b*3 .

**b.** Consider a questionable hospital for which XRay = 56,194, BedDays = 14,077.88, and LengthStay = 6.89. A point prediction of the labor hours corresponding to this combination of values of the independent variables is given on the Excel add-in output.

Report this point prediction and show (within rounding) how it has been calculated.

**c.** If the actual number of labor hours used by the questionable hospital was *y* = 17,207.31, how does this *y* value compare with the point prediction?