PubH 7465: Biostatistical Consulting

Chromium Case Study: Introduction

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Chromium infusion in hospitalized patients with severe insulin resistance

- Most hospitalized patients with hyperglycemia respond well to insulin therapy
  - maximal effect of insulin at a rate of 2.0 – 5.0 mU/(kg*min)
    - 8.4 to 21 units/hr for 70 kg adult
- some do not because of severe insulin resistance
  - will have persistent hyperglycemia
- Cr infusion may help
  - prescribed to complete in 10-12 hours

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- To investigate the effects of intravenous chromium on serum glucose and insulin infusion rates in hospitalized patients with severe insulin resistance.

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How can we formulate this into a statistical framework?

- How to summarize “effect?”
- What is a corresponding hypothesis to test?

Data available from hospital records over a period of three years

- 14 patients meeting inclusion criteria
  - inability to achieve a blood glucose value $<$200 mg/dl despite administration of continuous insulin infusion at a rate $>$20 units/hr
- continuous infusion of chromium chloride at 20 mcg/hr for 10-15 hours for total dose of 200-240 mcg to each patient

For R users, you may find package “chron” rather helpful (along with function by same name within).

- Number of measurements on a given patient range from 26 to 61 over a period of approximately 36 hours.
- check the help page: you may need to manipulate the date:time slightly to get into the expected format...
  - e.g., append “:00” with call to ‘paste()’

Assignment this week

- create a “Table 1” descriptive table
- create an analysis plan to address the stated objective
  - include specifics of what results you would present, e.g.,:
    - what summary measure(s)
    - what method for estimating summary measure
    - what would be the interpretation
- create plots for glucose and insulin (separately)
  - (plans for analysis likely influenced by the data available)
  - “looking at your data” – some types are appropriate
- What variables are available?
  - What type of variable are they?
    [outcome(s)/response(s), predictor(s) of interest, groups of interest; potential confounders; potential precision variables, (extraneous)]
  - E.g., what is A1C?