OUTCOMES:

Statistically literate adults should be able to: (1) read and interpret the use of statistics in everyday life; (2) communicate their analysis of news reports, press releases and magazine articles that use statistics as evidence; and, in their writing, (3) use statistics found in tables and graphs. This involves:

Critical thinking:

- Identify whether or not a story involves an argument
- If a story does involve an argument, identify the point and the evidence
- Identify whether claims assert association, causation, or in between

Statistical literacy:

Understand and apply your knowledge of the four influences on a statistic and how it is perceived as represented in the "Take CARE" acronym explained below. These four influences are *Context, Assembly, Randomness* and *Error* (bias). Here are specific outcomes for each of these.

Context: *Influence of factors that were or were not controlled for*

Chapter 1:

- Understand how an association can have alternate explanations
- Distinguish a *confounder* from a common cause
- Distinguish alternate explanations from mechanisms

Chapter 2:

- Distinguish study designs: experiment vs. observational study, longitudinal vs. cross-sectional, controlled and random assignment
- Read and communicate numeric comparisons: difference, ratio or relative difference; distinguish percent and percentage points
- Understand how different study designs and comparisons block or control for different kinds of related factors
- Identify plausible confounders that could affect an association

Chapter 3:

- Understand distributions, frequency, ranks and percentiles.
- Understand means, medians and modes and their relationships
- Calculate influence of a *confounder* on an average
- Understand best-fit model, range, interquartile range, standard deviation, Z-scores, coefficient of variation and effect size

Chapter 4:

- Understand how ratios control for factors such as size of group
- Identify part and whole for ratios in tables and graphs.
- Read and write descriptions of ratios using percent, percentage, rate and chance grammars, and convert among different grammars

Chapter 5:

- Calculate percentage attributed and cases attributed
- Read and write comparisons of ratios using percentage, rate, chance and likely/prevalent grammar

Chapter 6:

- Understand the confusion of the inverse, the base-rate fallacy (prosecutor's fallacy) and accuracy and error in medical tests
- Calculate the influence of a *confounder* on a ratio.

Assembly: *Influence of choices in defining, measuring or presenting*

- All chapters: Understand how the size of a statistic and a comparison of two statistics can be influenced by choices in definition, grouping, measurement and presentation

Randomness: *Influence of chance*

- Ch 1: Understand Law of Very Large Numbers and Margin of Error
- Ch 7: Distinguish empirical, analytical and subjective measures of probability; understand importance of independence
- Ch 7: Understand practical applications of chance in sensitive surveys, in adjusting for guessing and in estimating population sizes
- Ch 7: Understand confidence levels, margin of error, confidence intervals, statistical significance and the impact of sample size
- Ch 7: Distinguish statistical significance and practical importance
- Ch 7: Understand how statistical significance can be changed by taking into account the influence of a confounder

Error: *Influence of bias*

- Ch 1: Distinguish respondent , measurement and sampling bias
- Ch 2: Understand Hawthorne, halo, pessimism and safety effect
- Ch 2: Understand benefits of single blind and double blind studies