Chapter 4 Epidemiology Cheat Sheet

by Nvstewart via cheatography.com/194496/cs/40578/

Study Design

A program able to lead the researcher on a guided path of analyzing, interpreting, and systematically collecting data

There are both analytical and descriptive study design forms

Descriptive Epidemiology

Descriptive studies are normally followed up with analytical studies, this way one can exam associations that may permit cause-effect relationships.

Involves observation, definitions, measurements, interpretations, and dissemination of health-related states or events by using person,place and time.

Descriptive Study Designs

Casre reports: A profile of a single individual. Includes qualitative descriptive research of facts in chronological order

Case reports and case series can also suggest the emergence of a new epidemic if disease exceed its expectations.

Cross Sectional Surveys: conducted ovver a short period of time [usually a few days or weeks.]

Case series: A small group with similar diagnoses

Exploratory ecologic designs: making comparisons between variables using aggregated data on the population level vs the individual level

Ecologic fallacy: an error that results when association between two variables when the association does not actually exist.

Excerpt From Introduction to Epidemiology Ray M. Merrill;

Multiple ways to Classify Data Examples

Table 1.1 Examples of types of data

Quantitative	
Continuous	**Discrete**
Blood pressure, height, weight, age	Number of children Number of attacks of asthma per week
Categorical	
Ordinal (Ordered categories)	**Nominal (Unordered categories)**
Grade of breast cancer Better, same, worse Disagree, neutral, agree	Sex (male/female) Alive or dead Blood group O, A, B, AB

https://www.healthknowledge.org.uk/public-health-textbook/health-information/3b-sickness-health/rates-ratios-measure-health

Multiple ways to classify Data

Types of data

Nominal Data: unordered categories.

Dichotomous is *nominal* data that have two **distinct** values

Ordinal Data: information provided by the order among categories.

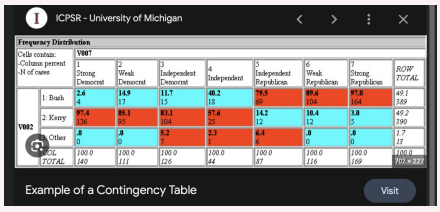
Common in health behavior research

Discrete Data: intergers or counts that differ by fixed amounts, with no intermediate values possible

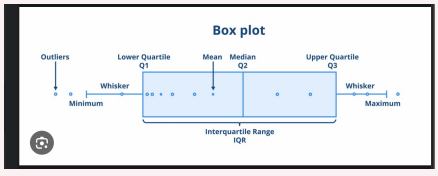
Continous Data: measurable quantities not restricted to taking on integer values.

Measuremnts of Data

Contigency Example:



Interquartile Data + Box Plot example.



Age Adjusted Rates

Give an example of ratio?
1 in 6 unintentional deaths are suicides.

How is proportion normally expressed?
As a percentage

Give an example of proportion
123 people were infected, 44 died. Proportion: 44/123= 0.36 or 36%

What is Rate?
A Frequency measure that involves nominal data

What is attack rate ?
New cases that start to occur rapidly overtime in a defined population

What is Person-Time rate also known as?
Incidence Density Rate

What is the difference between mortality rate and incidence rate ?
Mortality rate is **deaths occurring during a given time period**.
Incidence rate is *New cases occurring during a given time period*

What is the formula for SAR ?
(new cases among contacts of known cases)/((population at beginning of time period)-(primary cases)(*100)

What is SAR?
Secondary Attack Rate: New rate of cases occurring among known cases

What is point prevalence?
Existing cases of a disease at a point in time

https://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH717-QuantCore/-PH717_BasicQuantitativeConcepts/PH717_BasicQuantitativeConcepts4.html

Other forms of Measurements cont'd

Numerical Methods	Measures of dispersion
Arithmetic Mean, geometric mean, Median, Mode	Range, Interquartile range, Variance, Standard deviation, coefficient of variation
Measures of Association When measuring the association between two nominal or ordinal variables data is entered into a *contingency table*	When using a *contingency table* all entries are classified by each variable in the table.

Crude Rate: An outcome Calculated without any restriction (i.e gender or age). Crude rates can be calculated for entire populations or in a subgroup
Example: *Crude Rate of Motor Vehicle Traffic Fatalities in California, Years 2008–2014*
Total Motor Vehicle Traffic Deaths in California from 2008 through 2014 = 21,854
Total Population in California from 2008 through 2014 (summed across years) = 263,818,096 Crude Rate = (21,854 ÷ 263,818,096) × 100,000 = 8.28 per 100,000 population

Age- adjusted rate: Summary measures adjusted for differences in age distributions
Age-adjusted rates may be preferred for injuries that occur more often among certain age groups than others.
Example: "fall-related deaths are more common among the elderly than any other age group."

Direct Method = deaths in age group ÷ estimated population of that age group × 100,000.
a given areas age-specific rate

Indirect Method: a common set of age-specific rates is applied to the populations whose rates are to be standardized.

Standard Morbidity/Mortality Rate Ratio= SMR
Used less frequently than direct method. **SMR**=Observed/Expected. useful when age-specific numbers of deaths in the study population are either unavailable or small in number (less than 25 events across all age groups, as per Curtin & Klein, 1995).

https://www.cdc.gov/injury/wisqars/mapping_help/crude_rate.html

https://www.cdc.gov/injury/wisqars/mapping_help/age_adjusted.html

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3406211/#:~:text=In%20indirect%20age%2Dadjustment%2C%20a,(SMR)%20(5).

https://www-doh.state.nj.us/doh-shad/view/sharedstatic/StandardizedMortalityRatio.pdf

Other Forms of Measuremnts used in Public Health

Frequency Distribution: complete summary of the frequencies, or number of times each value appears.	**Other ways to measure data**: Bar Charts, steam and leaf plots, box plot, two way scatter plot, line graph, a spot map or area map.
Relative Frequency: dividing the number of people in each group by total number of people. May normally used for presenting the frequency of nominal, ordinal, discrete, or continuous data.	A **histogram** shows distribution for discrete or continous data An *epidemic curve* is a **histogram** that shows the course of an epidemic by plotting *number of cases X time of onset*

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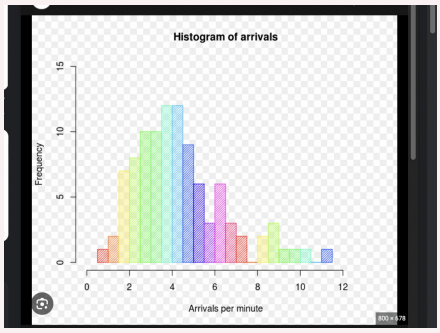
Histogram



Spot/Area Map