Understanding Advanced Data Applications in the IVP Setting

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Learning Objectives

- Inform participants on the various data applications for use in Hospital based IVP programs
- Participants will be informed on the basic components needed for program evaluation
- List the purpose of Program Evaluation
- Participants will understand basic concepts of data management and how it impacts the Hospital Based Injury Prevention Program and the datasets used.
Disclosure
What Is data?

- Numbers
- Symbols
- Sound
- Visual

- Facts or bits of information about the world, environment, person, place or things that exist around us

- “Data is both an Interpretation of the objects it represents and object that must be interpreted”

- “We need context for data to be meaningful”

Health Information Today

- Evidence Based Practice
- More effective interventions
- Stronger prevention programs
- Driven by demands for greater quality and cost efficiency and affordable care
Metrics

- One of the most fundamental aspects of measurement

- **Variable:** a single measure that, by definition, can take on more than one value

**Types of Metrics:**

- Nominal
- ordinal
- interval
- ratio
Nominal and Ordinal Metrics

**Nominal**: data are based on categories that cannot be placed into an order based on preference or any other criteria

- Examples include: race or ethnicity, sex (male or female), and religion

**Ordinal**: data are based on categories that be placed into an order of preference

- Distance between ranks is not known to be equal
- Example includes Likert scale responses (Likert Scales): “Agree, Neither Agree nor Disagree, Disagree

Interval and Ratio Metrics

- **Interval**: data are continuous, not based on categories, and the separation between points on the continuum is always equal
  - Don’t have true zero points
  - Example: temperature (i.e. degrees Fahrenheit and Celsius)

- **Ratio**: have an absolute zero point, a feature not described by interval data
  - Allows for statements about proportions
  - Example: number of cigarettes smoked per day

Data Categories

- **Raw Data**: Data which has not been analyzed is called *raw data*

- **Measurement data**: quantitative data -- the result of using some instrument to measure something (e.g., test score, weight)

- **Categorical data** also referred to as frequency or qualitative data. Things are grouped according to some common property(ies) and the number of members of the group are recorded (e.g., males/females, vehicle type).

Data Categories

- **Qualitative data** result in categorical responses (*categorical data*)
  - Example: Sex: MALE / FEMALE
  - Ethnicity: Hispanic / Non-Hispanic

- **Quantitative data**: numerical; discrete or continuous.
  - **Discrete data** arise from a counting process.
    - Example: How many Car vs Pedestrian crashes have there been in the past quarter?
  - **Continuous data** arise from a measuring process.
    - Example: How Tall are you?
Variables and Values

- **Variable**
  - An observation that can take different values.

- **Value (Attribute)**
  - All variables have values.
  - Values are the levels or variations of a variable.
  - A characteristic of a person or thing.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Attributes (Values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male and Female</td>
</tr>
<tr>
<td>Race</td>
<td>White, Black, Asian, Hispanic, etc.</td>
</tr>
<tr>
<td>Age</td>
<td>1, 14, 23, 34, 56, …</td>
</tr>
<tr>
<td>Drug Use</td>
<td>Yes/No</td>
</tr>
<tr>
<td>The intervention was effective</td>
<td>Strongly Agree; Agree; Disagree; …</td>
</tr>
</tbody>
</table>
Types of Variables

**Independent variable:** the variable that is changed or controlled in a scientific experiment

**Dependent variable:** what is being measured or evaluated in a mathematical equation. The *dependent variable* is also called "the outcome" *variable*.

**Example:**

A scientist studies the impact of a violence prevention program. *The independent variable* is the intervention- the frequency and the timing.

*The dependent variable* is the impact in the reduction of violence in a community.

Types of Variables

- **Qualitative Variable** - a variable based on categorical data

- **Quantitative Variable** - a variable based on quantitative data.
Why Analyze Data?

- The process of **Scientific Inquiry**
- Explains phenomena with **Theory**
- **Discovery** requires evidence to support an argument
- **Statistical Analysis** is all about discovery

Embrace the Statistics!
It’s all about the data baby!

Statistics - The methods used to examine data collected in the process of scientific inquiry; a set of concepts, rules, and procedures that help us to:

- **Organize** numerical information in the form of tables, graphs, and charts

- **Understand** statistical techniques underlying decisions that affect our lives and well-being

- **Make informed decisions.**
Sleeping Patterns During Statistics

- Open eyes w/ GCS of 3: 10
- Snoring: 2
- Head down and snoring: 5
- Drooling/eyes closed: 3
Uses of Statistics

Descriptive Statistics:
- Allows researchers to come to meaningful conclusions about the data
- Describes and explains characteristics of defined groups
- Mean
- Spread (Range of scores)
- Standard deviation
- Median
- Frequency distributions

Inferential Statistics: Determines or infer characteristics of large groups based on the data collected on small parts
- Determine probability

Statistics Are Used Everyday

WHOOOPS!
WHY DO POLLSTERS GET IT WRONG?

DAILY 15 Days

<table>
<thead>
<tr>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
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<tr>
<td>🔥</td>
<td>☀️</td>
<td>☀️</td>
<td>☁️</td>
<td>⛈️</td>
</tr>
<tr>
<td>39°</td>
<td>42°</td>
<td>31°</td>
<td>33°</td>
<td>39°</td>
</tr>
<tr>
<td>36°</td>
<td>25°</td>
<td>21°</td>
<td>29°</td>
<td>34°</td>
</tr>
<tr>
<td>/30%</td>
<td>/10%</td>
<td>/10%</td>
<td>/10%</td>
<td>/60%</td>
</tr>
</tbody>
</table>

Dec 18 - Dec 22
Probability

The laws of **probability** dictate how typical a sample dataset is of the population from which it is drawn. **The probability that an event is likely to occur.**

\[
P(\text{event}) = \frac{\text{Number of Desired Outcomes}}{\text{Total Possible Outcomes}}
\]
“p” Values

- Helps determine the significance of your results
- Hypothesis tests are used to test the validity of a claim that is made about a population (the null hypothesis)
- The alternative hypothesis is the one you would believe if the null hypothesis is concluded to be untrue
- All hypothesis tests ultimately use a p-value to weigh the strength of the evidence (what the data are telling you about the population)
- The p-value is a number between 0 and 1
- A small p-value (typically ≤ 0.05) indicates strong evidence against the null hypothesis, so you reject the null hypothesis.

"All I want is a chance to prove money can't make me happy."
Qualitative Data vs. Quantitative Data

- Both types of data analysis can cause anxiety
- Both types of data analysis are open to interpretation
- Both involve procedures and processes to increase validity of findings
- Both are not free of bias


Coffin, Pierre, Renaud, Chris (directors). *Despicable Me*. Universal Pictures, United States
Mixed Methods

qualitative methods

quantitative methods
Statistical Power

- The ability of a statistical test to detect true associations (effects) between variables

- Power is influenced by:
  - Sample size
  - Effect size
  - Dispersion or variance
Sample

- Sampling is about “representativeness”
- Each population made up of elements
- Elements are units that define the population and can be, for example, at different levels:
  - People
  - Schools
  - Hospitals
  - Homeless shelters
- Sampling elements will correspond to the research question
Effect Size

- Statistical concept that measures the strength of the relationship between two variables on a numeric scale.

![Figure 6.9 Effect Size in Two Similar Studies](image)

May your effect size be large & your p value tiny.
Measures of Variability

- Also known as dispersion and spread
- Range
- Interquartile Range (IQR)
- Variance
- Standard of Deviation of

Standard of Deviation

- It is the measure the difference between the average and the outliers within a given dataset. Difference between each data point and the mean
- Square root of the variance

Interquartile Range

- Middle half of the data
- Divides the into quarters (quartiles)
- Data that is in between the upper and lower quartiles.
- The interquartile range includes the 50% of data points that fall between Q1 and Q3.

Measures of Central Tendency

- A measure of central tendency is a single value to describe a set of data by identifying the central position within that set of data.
- The **mean**, **median** and **mode** are all valid measures of central tendency.
- Under different conditions, some measures of central tendency become more appropriate to use than others.

Measures of Central Tendency: The Shape of the Distribution

- When a distribution is symmetrical, the mode, median and mean are all in the middle of the distribution.
Normal Distribution

- Occurs naturally in many cases and in most actual datasets
- Values are distributed in many ways
- There can be many shapes in normal distribution curves

https://statisticsbyjim.com/basics/measures-central-tendency-mean-median-mode/
NORMAL DISTRIBUTION

PARANORMAL DISTRIBUTION
The Mean

- Also known as the “average”. Calculated by **adding** all the data points and **dividing** by the number of the data points.

The sum of: 20, 21, 22, 24, 24, 26, 26, 27, 28, 28, 36, 42, 43, 50, 62 = 479

\[
\frac{479}{15} = 31.93
\]
The Mode

- The number that appears most frequently

(4, 4, 8, 7, 8, 8, 6, 8, 2, 3)

Not be confused with:

(Just checking that you are still awake!)
The Median

- The middle number

20, 21, 22, 24, 24, 26, 26, 27, 28, 28, 36, 42, 43, 50, 62,
Range

- The difference between the lowest and highest value
  - Find the highest and lowest values
  - Subtract the lowest value from the highest value

Example:

Data set: 4, 4, 6, 7, 7, 9, 9, 12
12 – 4 = 8 therefore the range = 8
Variance

- Variance is the average squared difference of the values from the mean.
- Simply summing the deviations will result in a value of 0.
- The variance is based on squared deviations of scores about the mean.
- When the deviations are squared, the rank order and relative distance of scores in the distribution is preserved while negative values are eliminated.

…..In other words…… Variance is the difference between our results and our expectations…..

Measures of Variation

Variation

Variance

Range

Population Variance

Sample Variance

Interquartile Range

Or

Standard Deviation

Population Standard Deviation

Sample Standard Deviation

Coefficient of Variation

Princyp
Statistical Tests

- **chi-square test**: can be used to test if the variance of a population is equal to a specified value. Compares categorical variables. 2 types:
  - Goodness of Fit
  - A chi-square fit test for two independent variables is used to compare two variables in a contingency table to check if the data fits.

- **Z-Test**: In a z-test, the sample is assumed to be normally distributed. A z-score is calculated with population parameters such as “population mean” and “population standard deviation” and is used to validate a hypothesis that the sample drawn belongs to the same population.

- **T-Test**: used to compare the mean of two given samples.

- **Anova**: also known as analysis of variance, is used to compare multiple (three or more) samples with a single test.

https://towardsdatascience.com/statistical-tests-when-to-use-which-704557554740
Risk Ratios

- A measure of risk of an event occurring in an individual or population compared to the risk of the same event happening to another individual or population.

- A risk Ratio of 1 means there is no difference between two groups.

- A risk ratio >1 or < 1 usually means that being exposed to a factor either increases (risk ratio greater than one) or decreases (risk ratio less than one) the risk of the event, or that the treatments or interventions being compared do not have the same effects.
A measure of the odds of an event happening in one group compared to the odds of the same event happening in another group.

Table 3. Hypothetical Cohort Study of Seat Belt Use and Death in a Traffic Crash

<table>
<thead>
<tr>
<th>Vehicle Crash Speed</th>
<th>Seat Belt Used</th>
<th>Outcome, No.</th>
<th>Risk</th>
<th>Risk Ratio</th>
<th>Odds</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Died</td>
<td>Survived</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Yes</td>
<td>25</td>
<td>4975</td>
<td>.005</td>
<td>0.50</td>
<td>0.005</td>
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<td></td>
<td>No</td>
<td>50</td>
<td>4950</td>
<td>.010</td>
<td>0.50</td>
<td>0.010</td>
</tr>
<tr>
<td>High</td>
<td>Yes</td>
<td>125</td>
<td>375</td>
<td>.250</td>
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<td>0.333</td>
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<td>No</td>
<td>250</td>
<td>250</td>
<td>.500</td>
<td>0.50</td>
<td>1.000</td>
</tr>
<tr>
<td>Total</td>
<td>450</td>
<td>10 550</td>
<td></td>
<td>.041</td>
<td></td>
<td>0.043</td>
</tr>
</tbody>
</table>
WELCOME TO Fabulous LAS VEGAS NEVADA

HIGHER ODDS

Less Chance of Winning / Higher Payouts

EVEN MONEY

Win Your Stake & has 50/50 chance of winning

LOWER ODDS

Greater Chance of Winning / Lower Payouts
What are the odds?

- Odds of being audited by the IRS — 1 in 160
- Odds of being involved in a drunk driving crash — 2 out of 3
- Odds of finding a pearl in an oyster — 1 in 12,000
- Odds of being injured by a toilet — 1 in 10,000
- Odds of dying in an airplane crash — 1 in 205,552
- Odds of getting killed by fireworks — 1 in 340,733
- Odds of being struck by lightning — 1 in 114,195
- Odds of becoming a billionaire — pretty much none
- Odds falling to your death — 1 in 119
- Odds of getting attacked by a shark — 1 in 3,748,067
- Odds of winning the Powerball jackpot — 1 in 292,000,000

https://www.sheknows.com/living/articles/1023453/what-are-the-odds-21-statistics-that-will-surprise-you/
What Are the ODDS......

That someone has a question?
Program Planning and Evaluation
Overview of Program Evaluation

- Evaluation differs from research
- Primary purpose is to provide information to decision makers and stakeholders
- Helps to make judgments about the effectiveness of a program and to improve it

Reason To Evaluate

- Are plans **actually** working before they are put into use?
- Is the program being delivered the way in which it was intended? (Fidelity)
- Getting desired results?
- Identify issues before they jeopardize the program?
- Can we identify unexpected benefits, problems, Unintended consequences?
- Keeping track of progress / are meeting our standards and indicators?
- Can we produce data to show the program’s effectiveness to the target population?

Considerations

- **Evaluation Planning**
  - Should never be an after thought, but should begin before program is ever implemented
  - Evaluation should be integrated into the operation of the program
  - Budgeting for the evaluation should be part of program planning stage

- **Stakeholders**
  - Must identify and engage stakeholders at beginning
  - All persons who have interest in the program
First Steps

- Logic Model
  - Activities
  - Inputs
  - Outputs
  - Outcomes
  - Impact

WHAT IS A LOGIC MODEL?

Source: University of Wisconsin Extension, Program Development and Evaluation
Types of Evaluation

- **Formative**
  - Is the program feasible?

- **Process**
  - How is the program being delivered?

- **Outcome**
  - What are the short term effects?

- **Economic**
  - Are the effects worth the cost?
Formative Evaluation

- Aims to improve the project’s design and performance
- Should be conducted when program materials, messages, and procedures are being developed, before the program begins

Process Evaluation

- Assesses program context, *reach of the program*, dose delivered and received, fidelity to the original program plan, implementation, and recruitment.
Outcome Evaluation

- Provides evidence of the degree to which a program is meeting its short-term or intermediate goals
- Almost always uses experimental or quasi-experimental study
- Did the program increase participants’ awareness of the hazards of radon gas, or changing their knowledge, attitudes, and beliefs about radon gas?

“A Matter of Balance”
Tufts Medical Center, Boston, MA

Beth Wolfe, CAGS, ATC
Sandra Strack Arabian, MBA, NREMT CSTR, CAISS
Purpose - Overview

Provide the A Matter of Balance (MOB) program to the underserved, at risk population within the greater Boston area.
Data Use

Trauma Registry / ED and State Data

- Most common Mechanism of Injury
  - >60% of trauma patients were falls
  - Falls from Standing Vs. falls from height (ECode)
  - Demographics: Age, ethnicity, race, region, county, zip code, socio-economic status (SES)
Partnerships

Collaboration is a key component for the success of the program. Instructors (coaches) needed to be culturally and ethnically diverse and part of the targeted community.

**Outside Partners**
- Boston Elderly Commission / Affairs
- Multicultural VNA Home Health Provider
- Joint collaboration with local area Level 1 and 2 Trauma Centers
- Affiliated Hospital’s ED Manager

**Institutional Collaborators**
- PT / OT Services
- IP Coordinator
- Trauma Research Manager
Implementation and Training

Initial Investment / Budget

- $1550/pp person for a 2 day Master Training course. Course includes educational materials for participants, trainers and coaches and license agreement.
- $300 for each coach training session (*lay leader model)
- Funding for courses

Implementation

- Identify Collaborators
- Identify and train coaches
- Identify and schedule locations for classes

Requirements

- All coaches must teach 2 courses per year
- Attend Quarterly Conference calls
- Complete annual review of coaches
Evidence-Informed Strategies

The MOB program is an evidence-based (EB) program originating in early 2000s.

MOB Aims (partial list):
- Reduce fear of falling in participants at risk for a fall
- Increase physical activity in latter years of life
- Increase awareness of fall hazards and home safety
Evaluation Metrics

MOB Program Evaluation and Class Surveys

Tools
- Falls Efficacy Scale-International (FES-I)
  - 16 question, 16-64 point scale: First class pre-survey, last class post survey and post 6-month

Additional Measures / Research
- Coach evaluations
- Participant evaluations
- Qualitative and demographic surveys
  - First class and 6-month follow-up
### Evaluation Metrics: Coaches

#### Coach Training

<table>
<thead>
<tr>
<th>Year</th>
<th>Organization</th>
<th>Location</th>
<th>Coaches Enrolled</th>
<th>Coaches Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Boston VNA</td>
<td>Back Bay</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>2015</td>
<td>Local Hospital</td>
<td>South Boston</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2016</td>
<td>TBA</td>
<td>TBA</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

#### Coach Courses Taught

<table>
<thead>
<tr>
<th>Year</th>
<th>Organization</th>
<th>Location of Course</th>
<th>Participants Enrolled</th>
<th>Participants Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Boston VNA</td>
<td>Back Bay</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Boston VNA</td>
<td>Beacon Hill</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2015</td>
<td>Local Hospital</td>
<td>South Boston</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>
## Evaluation Metrics: Participants

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Site</th>
<th>Org. Teaching</th>
<th>1st Class FES-I Average (SD)</th>
<th>Last Class FES-I Average (SD)</th>
<th>6 Month Follow-up FES-I Average (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Back Bay</td>
<td>Boston VNA</td>
<td>33.2 (8.6)</td>
<td>28.4 (5.7)</td>
<td>30.6 (6.2)</td>
</tr>
<tr>
<td>2014</td>
<td>Beacon Hill</td>
<td>Boston VNA</td>
<td>42.8 (10.5)</td>
<td>35.9 (6.4)</td>
<td>32.7 (5.3)</td>
</tr>
<tr>
<td>2015</td>
<td>South Boston</td>
<td>Local Hospital</td>
<td>45.3 (3.3)</td>
<td>43.5 (4.2)</td>
<td>44.8 (4.5)</td>
</tr>
</tbody>
</table>
Needs, Obstacles and Take-Aways

**Needs**
- Funding to cover on-going expenses
- Time
- Dedicated staff

**Difficulties / Obstacles**
- Larger grants limited to state / government agencies
- **Commitment from coaches**
- Commitment from participants / trust building / attendance

**Take-Aways**
- On going research and evaluation of translated MOB materials
- Evaluate differences, challenges and success within YOUR targeted population
- **NOT ALL EB PROGRAMS ARE A ONE SIZE FITS ALL!!**
Evaluating the Effectiveness of the Translated “A Matter of Balance” Fall Prevention Program Materials for Non-English-Speaking Participants

Wolfe, Elizabeth Suzanne, DHS, ATC; Arabian, Sandra Strack, MBA, NREMT; Breeze, Janis L., MPH; Bugaev, Nikolay, MD, FACS

Journal of Trauma Nursing; September/October 2018 - Volume 25 - Issue 5 - p 311-317
doi:10.1097/JTN.0000000000000394

A Matter of Balance (MOB) is an evidence-based fall prevention program shown to reduce fear of falling (FOF) in English-speaking participants. The effectiveness of translated (Chinese and Spanish) MOB materials in reducing FOF is unknown. The objective of this study was to evaluate whether MOB was associated with reduced FOF in Chinese- and Spanish-speaking participants and included an English-speaking comparison group. Participants were recruited from MOB classes in Massachusetts and Illinois. Investigators used the Falls Efficacy Scale–International (FES-I) and a demographic questionnaire to survey the participants at the first class (baseline), the last class, and 6 months after the MOB course. Of the 96 participants who enrolled, 77 (80%) completed the course (Chinese: n = 27, Spanish: n = 46, and English: n = 24), and 72 of these participants were included in the analysis.
Table 1: Demographic Characteristics by Language among Matter of Balance (MOB) Participants

<table>
<thead>
<tr>
<th>Language of MOB Class (n)</th>
<th>Chinese (37)</th>
<th>Spanish (25)</th>
<th>English (28)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Gender (n, %)</td>
<td>28 (78)</td>
<td>22 (88)</td>
<td>27 (96)</td>
<td>0.057</td>
</tr>
<tr>
<td>Age Category (n, %)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;75</td>
<td>9 (25.0)</td>
<td>12 (42.9)</td>
<td>15 (65.2)</td>
<td>0.042</td>
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<td>75-79</td>
<td>14 (38.9)</td>
<td>10 (35.7)</td>
<td>4 (17.4)</td>
<td></td>
</tr>
<tr>
<td>&gt;79</td>
<td>13 (36.1)</td>
<td>6 (21.4)</td>
<td>4 (17.4)</td>
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<tr>
<td>Countries of Origin (n)</td>
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<tr>
<td>China (34)</td>
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<td>Hong Kong (1)</td>
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<td>Taiwan (1)</td>
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<tr>
<td>Bolivia (1)</td>
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<td>Cuba (4)</td>
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<td>Dominican Republic (11)</td>
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<td>Puerto Rico (3)</td>
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<tr>
<td>No Answer (5)</td>
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<td></td>
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<tr>
<td>United States (27)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuba (1)</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Mean Years in the US (SD)</td>
<td>27.5 (12.3)</td>
<td>22.3 (17.8)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*missing n=3

Table 2: Survey Answers by Language for Participants Who Completed the MOB Course

<table>
<thead>
<tr>
<th></th>
<th>Chinese (37)</th>
<th>Spanish (25)*</th>
<th>English (28)</th>
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<tr>
<td><strong>Education (n, %)</strong></td>
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<td>Less than high school</td>
<td>23 (64)</td>
<td>14 (67)</td>
<td>3 (12)</td>
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<td>High school</td>
<td>4 (11)</td>
<td>7 (33)</td>
<td>18 (69)</td>
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<td>College and higher</td>
<td>9 (25)</td>
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<td>5 (19)</td>
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<tr>
<td><strong>Mean number of health problems (SD)</strong></td>
<td>1.5 (0.9)</td>
<td>1.3 (0.9)</td>
<td>1.5 (1.2)</td>
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<tr>
<td><strong>Use of an assistive device (n, %)</strong></td>
<td>13/33 (39)</td>
<td>13/20 (65)</td>
<td>11/23 (48)</td>
<td>0.1942</td>
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<tr>
<td>Baseline: Had ≥ 1 fall in past 6 months (n, %)</td>
<td>6/36 (17)</td>
<td>3/22 (14)</td>
<td>5/26 (19)</td>
<td>0.8744</td>
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<tr>
<td>Completed final class FES-I (n, %)</td>
<td>37 (100)</td>
<td>19 (76)</td>
<td>21 (75)</td>
<td>0.0009</td>
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<td>Baseline FES-I Mean (SD)</td>
<td>40.9 (12.6)</td>
<td>32.0 (10.8)</td>
<td>28.9 (10.0)</td>
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<td>Final Class FES-I Mean (SD)</td>
<td>48.0 (12.3)</td>
<td>27.5 (8.3)</td>
<td>25.0 (7.2)</td>
<td>&lt;0.0001</td>
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<tr>
<td>Mean change from baseline (paired t-tests)</td>
<td>7.1 (15.6)</td>
<td>-6.6 (10.9)</td>
<td>-2.7 (7.9)</td>
<td>&lt;0.0001</td>
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<tr>
<td>Completed 6-month follow-up FES-I (n, %)</td>
<td>33 (89)</td>
<td>-</td>
<td>21 (75)</td>
<td>0.18</td>
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<td>6 month FES-I Mean (SD)</td>
<td>47.2 (14.3)</td>
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<td>27.0 (9.6)</td>
<td>&lt;0.0001</td>
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<td>Mean change from baseline to 6 month (paired t-tests)</td>
<td>6.7 (13.8)</td>
<td>-</td>
<td>-0.4 (5.8)</td>
<td>-</td>
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<tr>
<td>6 month f/u: Had ≥ 1 fall in past 6 months (n, %)</td>
<td>10/33 (30.3)</td>
<td>-</td>
<td>3/21 (14.3)</td>
<td>0.18</td>
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</tbody>
</table>

*Six-month follow-up surveys were not available from Spanish-speaking MOB group
**Diabetes, hyper- and hypotension, heart condition, neuropathy, lung condition, stroke, other
***Walker, cane, hearing device, vision device, other

Chinese group had higher fear of falling than the English and Spanish groups at baseline.

The Chinese group’s fear of falling continued to increase after participation in the MOB program.

Baseline FES-I scores were significantly different among all groups (p=<0.0001) which suggests that one’s language and culture could be a pre-disposing factor in how they perceive their risk and fear of falling.

FES-I scores were significantly higher (p=0.008) from the first class to the 6 month follow up in the Chinese group than the English group, and the reason(s) for this increase in fear of falling were not identified in this study.
Unexpected Findings and Barriers

- The low literacy of the participants and their ability to comprehend the content of the questions on the surveys.
- Across all language groups, and especially within the Chinese group, many of the participants could not read or write.
- The results of this study could have been impacted by the low literacy of the participants.
- This study elucidated that some participants who do not speak English as a first language may need to have program materials written and tailored to their current literacy and comprehension ability which may be below a 6th grade level.
- Participant Trust

Basic First Steps

- Be familiar with the standards and indicators for hospital based injury prevention program
- Using institutional, local, state and national data, Identify a population in need
- Are there evidence based programs for either prevention or intervention opportunities
- Are there organizations you can partner with?
- Create or choose a program for your identified population
- For “evidence based programs” do your homework, drill into the evidence. **Know the evidence!**
- Not all programs are a one size fits all!
- Create an evaluation plan first, including which metrics to use
- Start small
# 10 Leading Causes of Death by Age Group, United States - 2017

<table>
<thead>
<tr>
<th>Rank</th>
<th>Age Group</th>
<th>&lt;1</th>
<th>1-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65+</th>
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<tbody>
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<td>1,267</td>
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<td>860</td>
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<td>25,659</td>
<td>22,828</td>
<td>39,266</td>
<td>114,810</td>
<td>519,052</td>
<td>647,457</td>
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<td>2</td>
<td>Short Gestation</td>
<td>3,749</td>
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<td>418</td>
<td>317</td>
<td>822</td>
<td>7,948</td>
<td>10,900</td>
<td>32,658</td>
<td>80,102</td>
<td>547,890</td>
<td>599,108</td>
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<tr>
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<td>Maternal Pregnancy Comp.</td>
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<td>183</td>
<td>437</td>
<td>4,905</td>
<td>5,448</td>
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<td>24,048</td>
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<td>SIDS</td>
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<td>51</td>
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<td>Neonatal Hemorrhage</td>
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Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.  
Produced by: National Center for Injury Prevention and Control, CDC using VITALSTATS™.
<table>
<thead>
<tr>
<th>Rank</th>
<th>&lt;1</th>
<th>1-4</th>
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<th>10-14</th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65+</th>
<th>Total</th>
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<td>3</td>
<td>Unintentional Other Bite/Sting</td>
<td>13,505</td>
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<td>Unintentional Stab By/Against</td>
<td>170,577</td>
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<td>Other Assault*</td>
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<td>Other Assault*</td>
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*The "Other Assault" category includes all assaults that are not classified as sexual assault. It represents the majority of assaults.

Data Source: NIS/ISS All Injury Program operated by the Consumer Product Safety Commission (CPSC).
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

## Trauma Registry

<table>
<thead>
<tr>
<th>Cause Code</th>
<th>Total</th>
<th>Percent</th>
<th>AvAge</th>
<th>AvgISS</th>
<th>%Multi</th>
<th>%ISS_0-15</th>
<th>%ISS_&gt;16</th>
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<td>9.99</td>
<td>46.03</td>
<td>74.008</td>
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Non-fatal injuries of MA residents

- In 2014, unintentional injuries accounted for 3 out of 4 (74%) of the 72,581 injury-related hospital stays.
- A majority of the unintentional injury hospital stays were due to falls (59%). Over two-thirds (71%) of these falls involved MA adults ages 65 and older.
Evidence Based Programs

Falls
► A Matter of Balance
► Tai Chi
► Stepping On
► Bingocize
► Fit & Strong
► Healthy Steps for Older Adults

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>POPULATION</th>
<th>SETTING</th>
</tr>
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<tr>
<td>Buckle Up, Stay Safe</td>
<td>Seniors</td>
<td>Community</td>
</tr>
<tr>
<td>Buckle Up University of San Diego</td>
<td>Young adults, adults</td>
<td>All</td>
</tr>
<tr>
<td>Checkpoint Strikeforce</td>
<td>Teens, Young adults, Adults, Seniors</td>
<td>All</td>
</tr>
<tr>
<td>Feedback Signs on Seat Belt Use on Campus</td>
<td>Young adults</td>
<td>All</td>
</tr>
<tr>
<td>The Harvard Alcohol Project</td>
<td>Adults, Seniors</td>
<td>All</td>
</tr>
<tr>
<td>Motivating safety belt use at a community hospital</td>
<td>Adults</td>
<td>All</td>
</tr>
<tr>
<td>A pilot program in rural schools to increase bicycle and motor vehicle safety</td>
<td>Children, Adults</td>
<td>All</td>
</tr>
<tr>
<td>Promoting safety belt use with traffic signs and prompters</td>
<td>Young adults, adults, Seniors</td>
<td>All</td>
</tr>
<tr>
<td>The Vehicle Injury Prevention Program (VIP)</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>The Driving and Dementia Toolkit</td>
<td>Adults, Seniors</td>
<td>All</td>
</tr>
<tr>
<td>Buckie Bear</td>
<td>Children</td>
<td>All</td>
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<tr>
<td>Bucklebear</td>
<td>Infants/Toddlers</td>
<td>All</td>
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<td>A “Driving Under the Influence” class</td>
<td>Teens</td>
<td>All</td>
</tr>
<tr>
<td>Impaired Minds Produced by Alcohol Cause Trauma (IMPACT) Program</td>
<td>Teens</td>
<td>All</td>
</tr>
<tr>
<td>Integration of injury control information into a high school physics course</td>
<td>Teens</td>
<td>All</td>
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<tr>
<td>Plan a Safe Strategy (P.A.S.S.) Program</td>
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<td>Progressive Agriculture Safety Day program</td>
<td>Children</td>
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<td>Promoting automobile safety belt use by young children</td>
<td>Children</td>
<td>All</td>
</tr>
<tr>
<td>Resisting Pressures to Drink and Drive</td>
<td>Teens</td>
<td>All</td>
</tr>
</tbody>
</table>

https://health.mo.gov/data/InterventionMICA/MotorVehicleInjuries/index_5.html
Partner Organizations

- National Council on Aging (NCOA) (State and Local Chapters)
- Safekids Worldwide (State and Local Chapters)
- National Organizations for Youth Safety (NOYS)
- Mother’s Against Drunk Driving (MADD)
- Cure Violence
- Local and state Health Departments
EB: “E” is for evidence!

- Falls Prevention Program:
- Original research: Published in 1998

Example:

- English Speaking
- Sample Size: N= 434 (216 to Intervention, 218 to control group)
- Of the 216 intervention subjects, 137 (63.4%) attended 5-8 sessions, 44 (20.4%) attended 1-4 sessions, and 35 (16.2%) subjects attended no sessions.

Lets Talk Samples and Evidence

- Sampling is about “representativeness”
- Goal is to reduce bias in your sample and ensure research results can be generalized to the larger **population**
- It is a mistake to equate sample size with representativeness
- Sample size does influence p-value

So, In conclusion......

- Embrace the statistics!
- Use statistics for program evaluation
- Know the “evidence” in EB programs
- Define your population
- Watch your sample size
- Decide what metrics are pertinent for your program. Don’t get too complex

Coffin, Pierre, Renaud, Chris (directors), *Despicable Me*. Universal Pictures, United States
If you torture statistics long enough, they’ll eventually confess the truth.

Alan Simpson
THANK YOU!

Any Questions?
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