Data in the ASC

Health Care Data Literacy

Joseph Engel, MPS
Gastroenterology Associates of Fairfield County, PC
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"If you torture the data long enough, it will confess to anything.“

-Tim O’Reilly–

What is Data?

- Data is the result of measurement
- Data is the result of counting
- Data is increasing everyday
- Data is an important resource
- “If you can’t measure it, you can’t manage it”

In the ASC we measure, count, interact with and generally create data everyday!

Sources of data in the ASC

- Patient Care
- Quality
- Business Intelligence
- Compliance
- Profit
- Market position
- Patient Satisfaction
- Etc.

BUT…

Without the skills to use it , data is useless!

The solution: “Data Literacy”

ASC managers and staff need to become “Data Literate”

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- Practically speaking data literacy is being able to answer questions and tell a story with your data.

Data Literacy is similar to Word Literacy

▪ Words are assembled in sentences and paragraphs	▪ Data is assembled in Data Frames
▪ Words are used to describe reality	▪ Data is used to describe reality
▪ Words reflect a perception of reality	▪ Data is used to reflect a count or measurement of reality
▪ Words relate to each other functionally	▪ Data in one data set can be a factor in another data set

Don’t forget to include all staff members

- **Data literacy is important for everyone.**

Basic Elements of ASC Data Literacy

- The ASC Data Plan

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- A Personal Data Analytical Process

The ASC “Data Plan”

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- Should be part of the daily routine of the center

The "Data Plan" should include…

- What the data will be used for
- How and what data will be collected
- Who will collect it
- Who will analyze it
- How results will be presented
- How data will be stored and accessed
- How results will lead to action
- A consideration of Data Ethics and security

Your Personal Process for Data Analysis

- Work to develop your own data analytical process

Elements of a Data Analytical Process

- Start with a question
- Obtain and know your data
- Analyze the data for the answer to your question
- Present the results – use appropriate graphs

Start with a question

- How does “on time” relate to patient satisfaction?
- What is our ADR?
- What is the cost of a case?
- How many staff members will we need?
- What are our quality measures?
- How do we compare to benchmarks?

Obtain and know your data

- Your data plan should be your primary source
- Look for patterns, relationships and outliers
- Can the data you have answer your question?
- Prepare (clean up) data for analysis
- Explore with quick graphs

Prepare (clean up) your data

- Most time consuming step in data analysis
- Put the time in up front
- Try to collect data in the format you will need for analysis

Explore with quick graphs

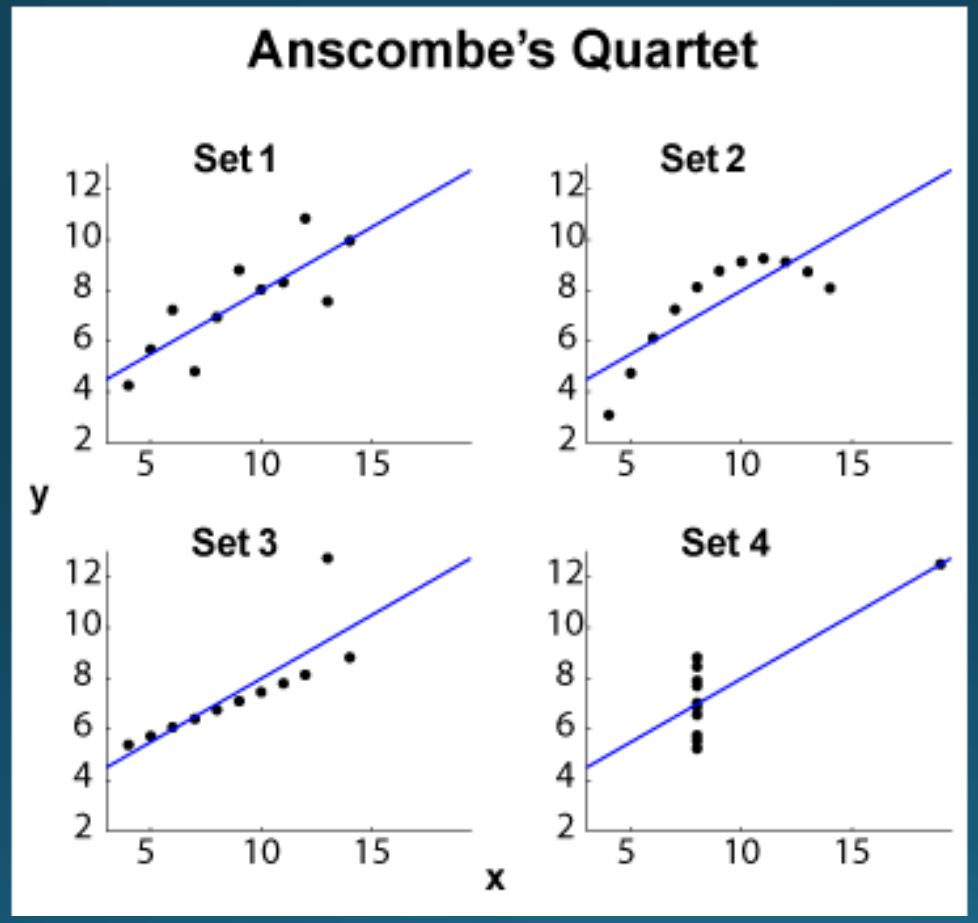
- Why?
  - Tabular data is hard for humans to understand
  - A quick graph makes it easy to explore data
  - Shows trends, range and outliers
- Start with Excel
- Consider Visual analytical programs like Tableau or QlikView

Results of "Spreadsheet Only" Analysis

	I		II		III		IV	
	x	y	x	y	x	y	x	y
	10	8,04	10	9,14	10	7,46	8	6,58
	8	6,95	8	8,14	8	6,77	8	5,76
	13	7,58	13	8,74	13	12,74	8	7,71
	9	8,81	9	8,77	9	7,11	8	8,84
	11	8,33	11	9,26	11	7,81	8	8,47
	14	9,96	14	8,1	14	8,84	8	7,04
	6	7,24	6	6,13	6	6,08	8	5,25
	4	4,26	4	3,1	4	5,39	19	12,5
	12	10,84	12	9,13	12	8,15	8	5,56
	7	4,82	7	7,26	7	6,42	8	7,91
	5	5,68	5	4,74	5	5,73	8	6,89
SUM	99,00	82,51	99,00	82,51	99,00	82,50	99,00	82,51
AVG	9,00	7,50	9,00	7,50	9,00	7,50	9,00	7,50
STDEV	3,32	2,03	3,32	2,03	3,32	2,03	3,32	2,03

Same Sum, Average & Standard Dev

Results of visual analysis



The actual data is very different in each case

Analyze your data

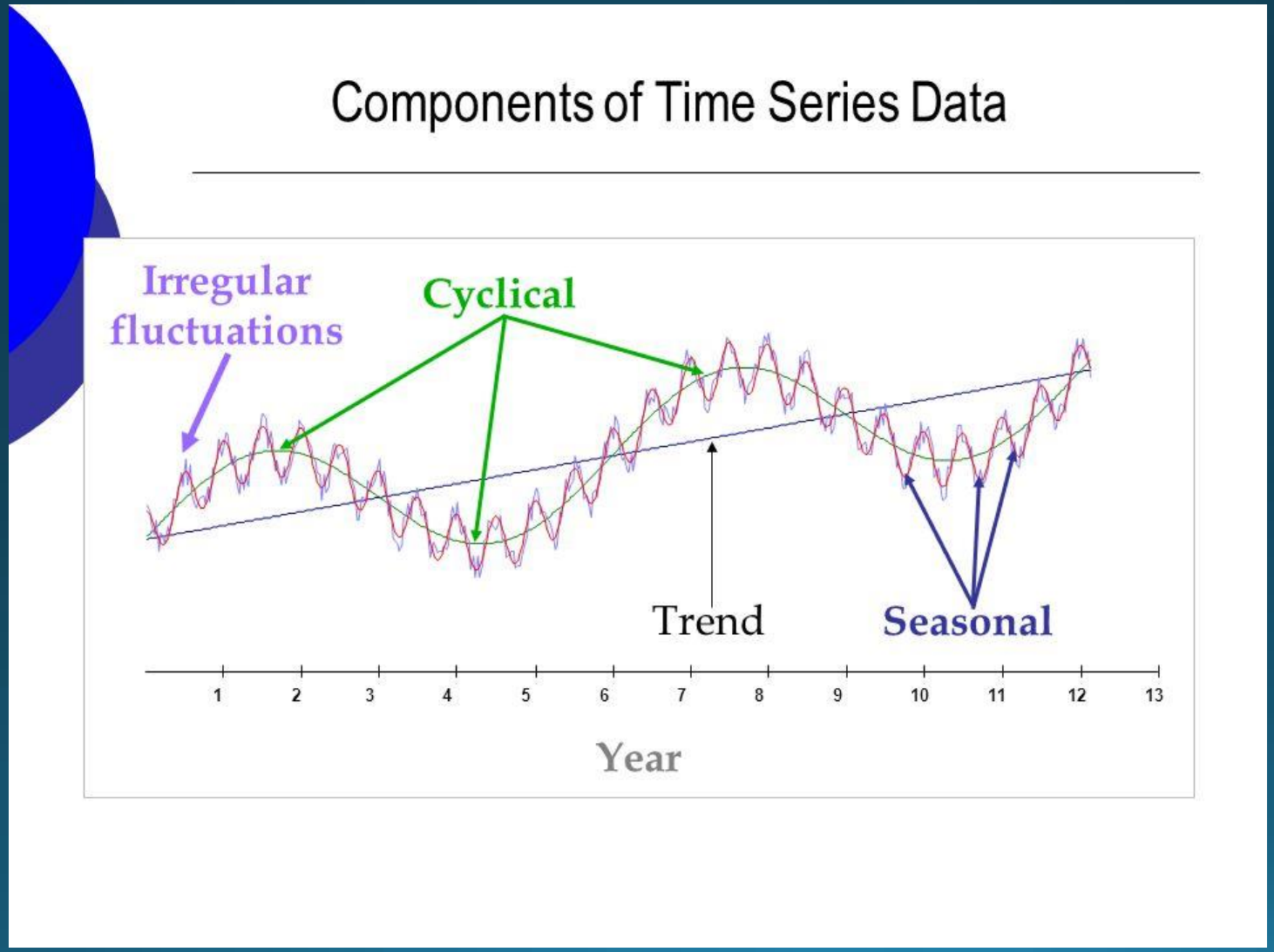
- Use time series analysis to identify trends, cycles, randomness
- Use Basic statistics to understand data characteristics
- Build “what if” models to show relationships

ASC Data is almost always a time series

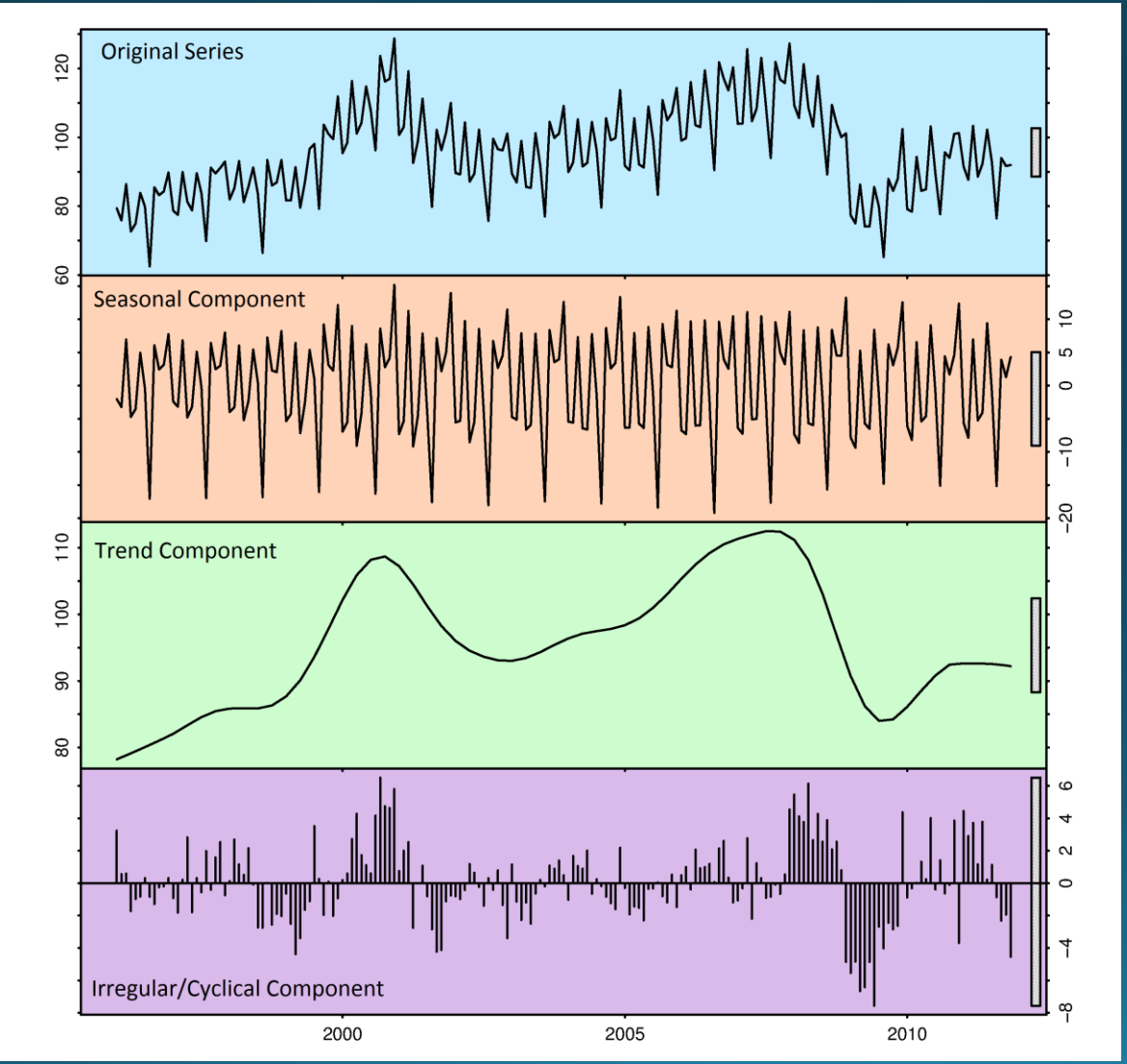
Time series data

- Points of data that change over time
- Composed of identifiable patterns
  - Trends
  - Cycles
  - Randomness

Identify components



Each component can be analyzed separately



Examples of time series

- ASC Examples
  - Cases per day
  - Staffing per day
  - Costs per month
  - Profit distributions by quarter
  - Patient recovery time by minutes

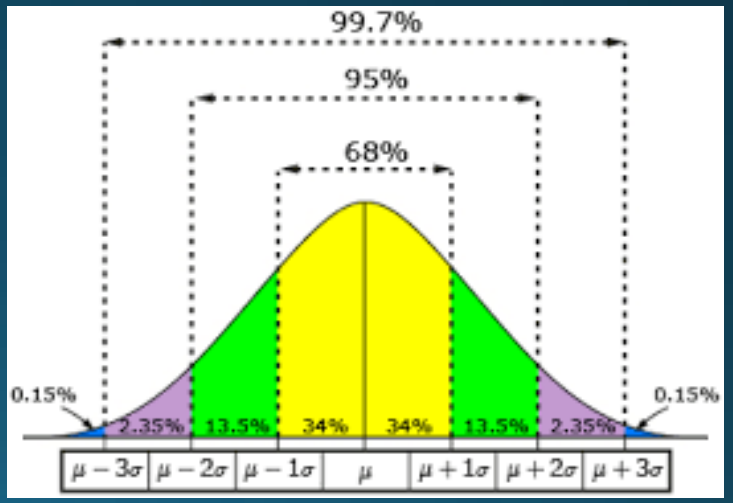
Basic Statistics

- Averages
  - Mean
    - The familiar average
  - Median
    - Half above – half below
    - Think highway – half the lanes on either side of the "median"
  - Mode
    - The most common value
    - Think fashion – what are most people wearing

Basic Statistics

- Standard Deviations
  - Almost all of the data is within plus or minus 2 Standard Deviations of the mean

- Example from salary survey data
  - Mean salary is $25,000
  - SD is $2,000
  - 2 X $2,000 = $4,000 Plus or Minus
  - 95% of the values are between $21,000 and $29,000



Examples of basic statistics

- Helps to explain your current position
  - Range of cases per day
  - Production YTD
  - Average cost per case
  - Median minutes per case
  - Benchmarks
  - Unused time slots

Build “what if” models

- Use Excel to build interactive models
- Show how changes in a single variable relate to other elements
- For example, “what if” cases done on time increased by 10%
  - Change in volume
  - Change in costs
  - Change in patient satisfaction
  - Change in profit

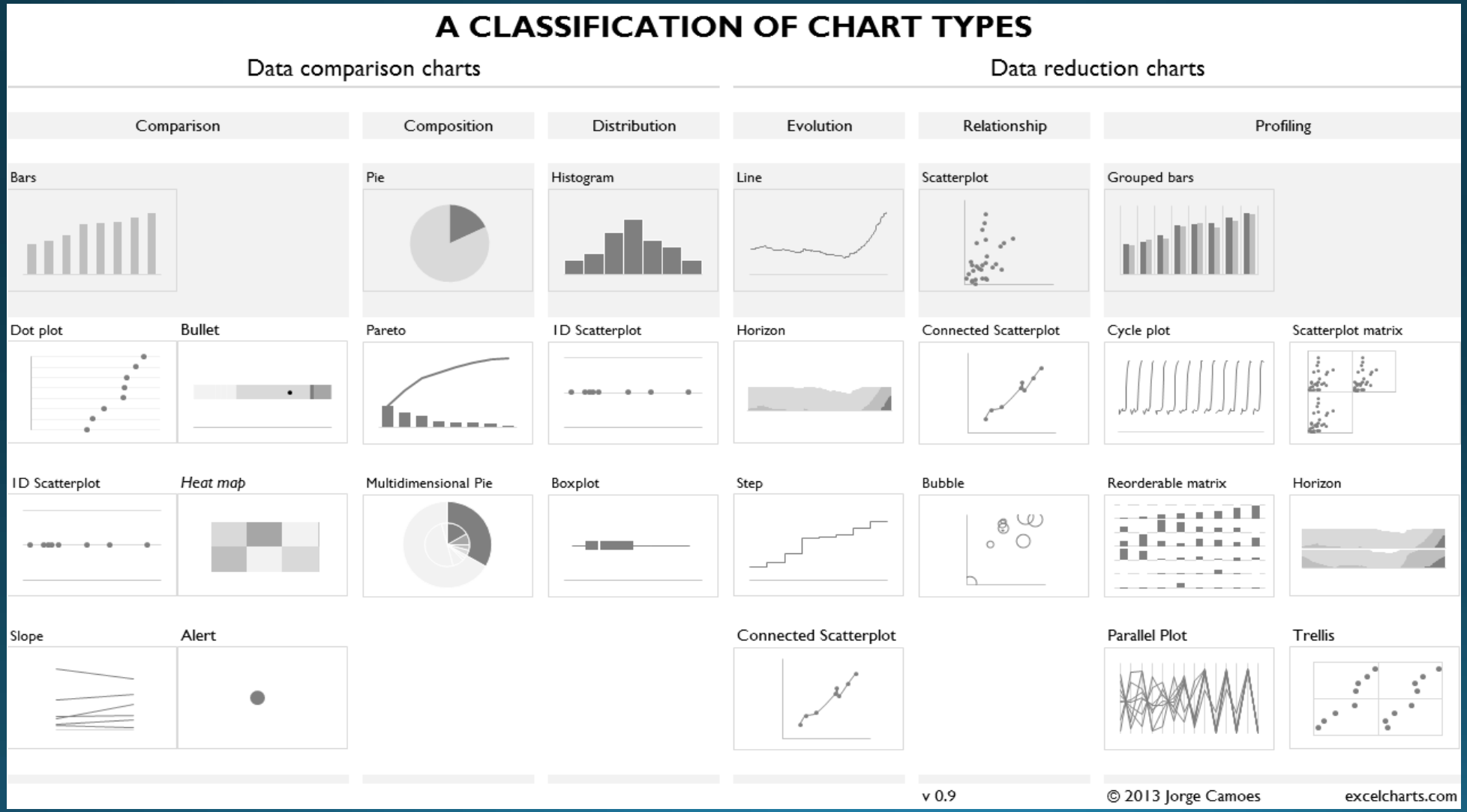
Know your tools – practice using them

- Basic Excel
- Pivot Tables
- Tableau
- QlikView
- Software Report Writers
- Statistical packages
- Quality programs

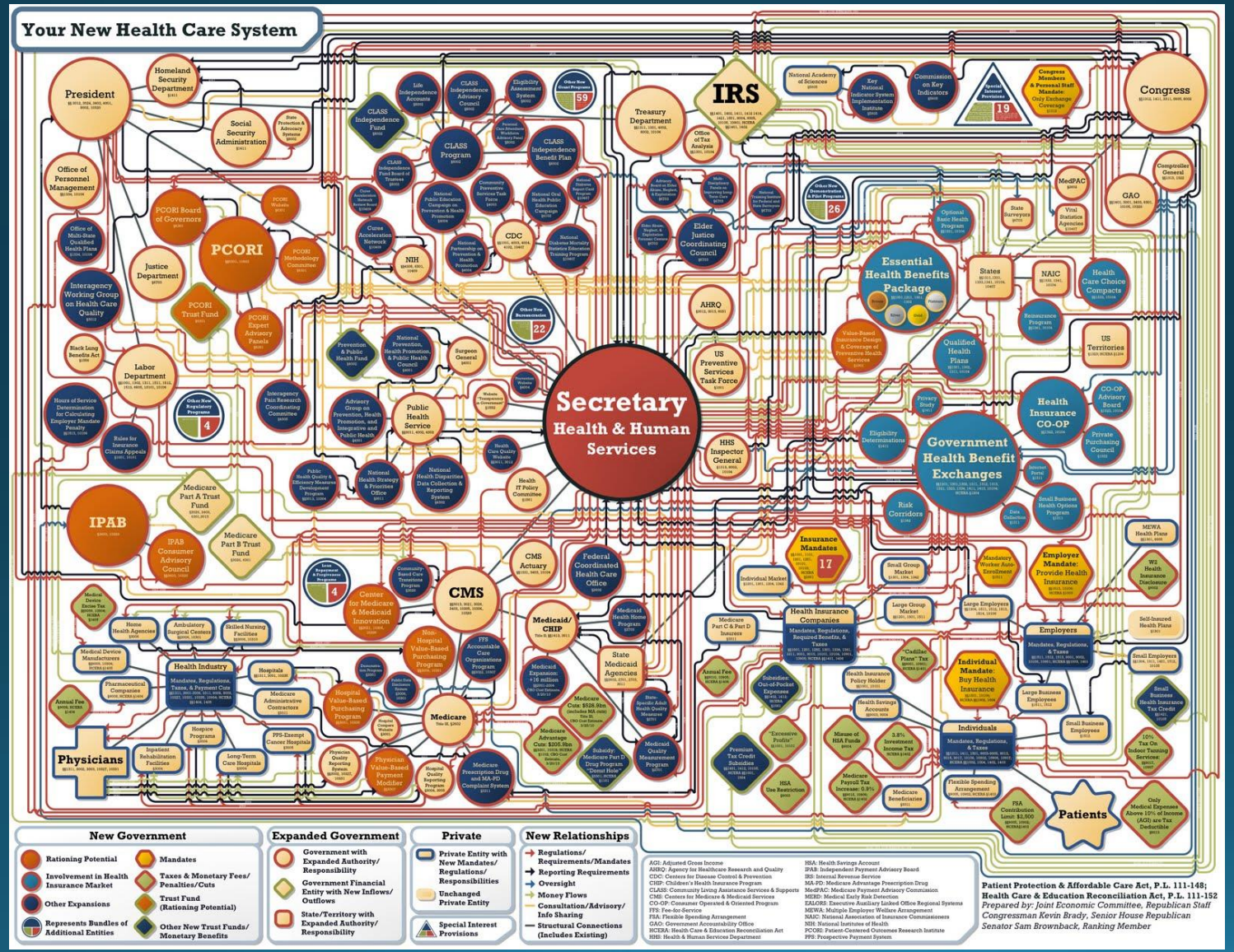
Present the results

- Use appropriate graphs
  - Pie charts for a few large relationships
  - Bar graphs for differences in characteristics
  - Lines for time series
  - Histograms bins
  - Boxplots
  - Scatter diagrams for relationships
  - Keep it simple

Use Appropriate graphs



Keep it simple



Applying data literacy

- Samples and Surveys
- Measuring Quality
- Predictive Statistics

Samples and Surveys

- Survey formats
  - Patient Questionnaire
- How large should a sample be?
- Survey pitfalls
  - Relevant questions are important
  - What do you intend to measure?
- Interpreting and presenting results
  - Marketing
  - Improve performance in target areas

Sample Size??

- It depends!!
- Using a sample size calculator is the best
- Rough rules of thumb
  - Minimum sample size is 100
  - Maximum is 10% of population but not over 1000

http://www.tools4dev.org/resources/how-to-choose-a-sample-size/

	Size of population					
Margin of error	>5000	5000	2500	1000	500	200
±10%	96	94	93	88	81	65
±7.5%	171	165	160	146	127	92
±5%	384	357	333	278	217	132
±3%	1067	880	748	516	341	169

Measuring Quality

- Determine a measure of quality
  - Cases on time
  - CMS quality data
  - Benchmarking
- Utilize a quality program
  - Lean
  - Six Sigma
- The run chart
  - Simple graph
- Statistical control charts
  - More complex graphing technique

Prediction

- Its hard to make predictions, especially about the future!
  - Danish Proverb

Prediction

- Consider learning advanced prediction techniques
  - Linear Regression
    - Predicts one variable from another
  - Logistic Regression
    - Predicts yes or no

Prediction examples

- From projected volume you can predict
  - Staffing schedules
  - Supply costs
- From an intervention you can predict a change
  - Example: Increases in hand washing after staff discussion
- From age, gender, referral source, Insurance
  - Predict likelihood of “no-shows”

Work on your data literacy

- Have and use an ASC data plan
- Develop a simple personal analytical process and use as a tool
- Always explore data visually as a first step
- Learn about time series
- Practice answering questions with data
- Take a course in the basics
  - YouTube
  - Podcasts
- Tell your story with your data

Practice !!!


Hard Work
H+A+R+D+W+O+R+K
8+1+18+4+23+15+18+11 = 98%
Knowledge
K+N+O+W+L+E+D+G+E
11+14+15+23+12+5+4+7+5 = 96%

“Not everything that can be counted counts, and not everything that counts can be counted”

- William Bruce Cameron
- http://quoteinvestigator.com/2010/05/26/everything-counts-einstein

You can have data without information, but you can't have information without data.

Daniel Keyes Moran