Analytics and Quality Improvement: A Key Connection

Matthew Murphy, Director of Performance, Analytics and Accountability

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Please be advised that we are currently in a controlled vendor environment for the

One Person One Record project.

Please refrain from questions or discussion related to the

One Person One Record project.

Informatics…

utilizes health information and health care technology to enable patients to receive best treatment and best outcome possible.

Clinical Informatics…

is the application of informatics and information technology to deliver health care.

AMIA. (2017, January 13). Retrieved from https://www.amia.org/applications-infomatics/clinical-informatics

Objectives

At the conclusion of this activity, participants will be able to…

- Identify what knowledge and skills health care providers will need to use information now and in the future.
- Prepare health care providers by introducing them to concepts and local experiences in Informatics.
- Acquire knowledge to remain current with new trends, terminology , studies, data and breaking news.
- Cooperate with a network of colleagues establishing connections and leaders that will provide assistance and advice for business issues, as well as for best-practice and knowledge sharing.

Conflict of Interest Declaration

- I do not have an affiliation (financial or otherwise) with a pharmaceutical, medical device, health care informatics organization, or other for-profit funder of this program.

Session Objectives

This session will make the case that quality improvement is essential for the Nova Scotia (any) Health System, and that analytics is essential to guiding this work

01 Make the case for quality improvement in health care

02 Make the case for analytics as a key driver of quality improvement

03 Provide insight into how to tie these two concepts together within your organization

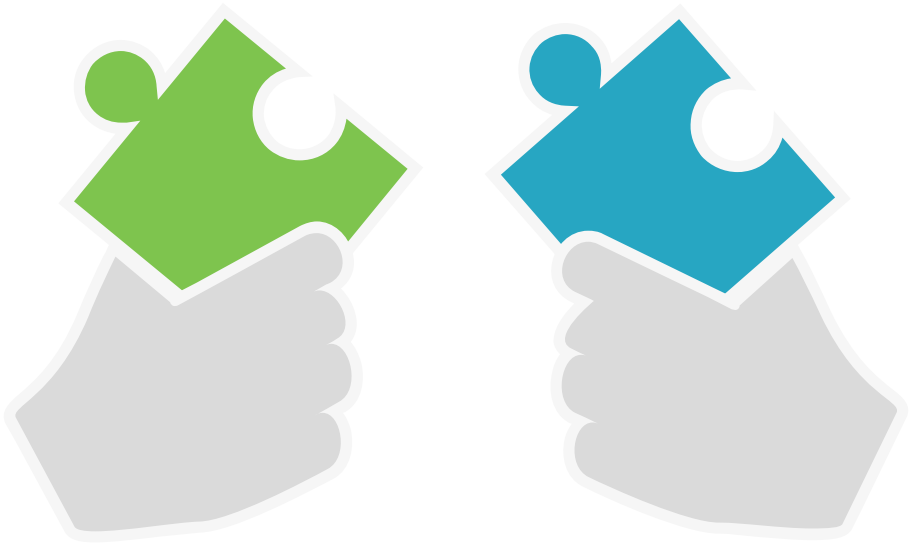
Analytics…

“is the discovery, interpretation, and communication of meaningful patterns in data.”

“relies on the simultaneous application of analysis, statistics, computer programming and operations research to quantify performance.”

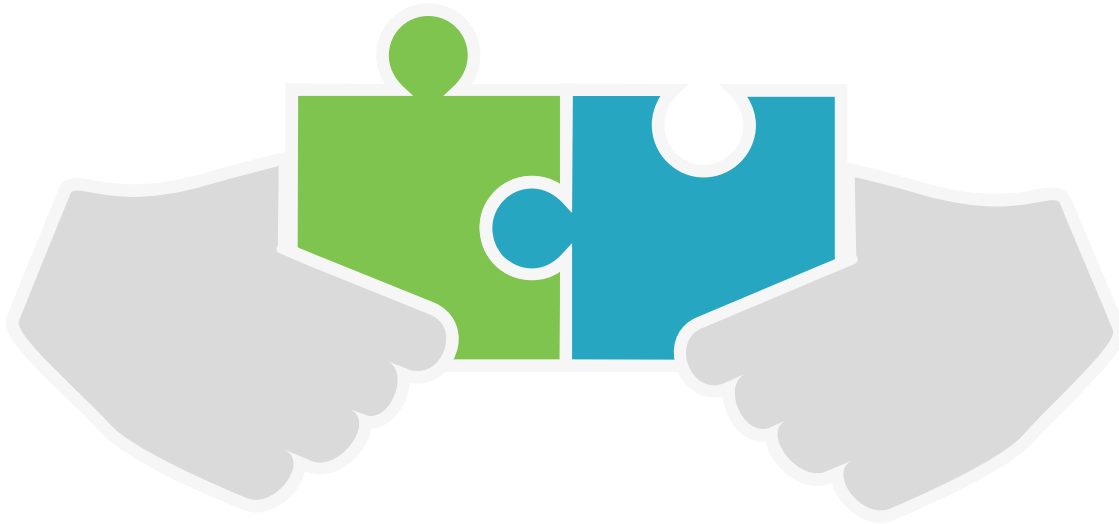
Objective of Analytics

From Data to Insight



Data

Data in different forms and formats held in disparate system across NSHA clinical and corporate domains



Insight

Data joined together to create metrics and insights for ongoing monitoring and improvement

Why do we need QI?

PHOTOS

Ambulance offload time limits to be set at 5 busiest ERs in Nova Scotia

Ambulance service, paramedics union relief'

The emergency department a
Re
be

Health · Second Opinion

Nova Scotia's health care 'crisis' is Canada's crisis too

It's a nationwide recruitment battleground as provinces try

39 cancer patients died while list for Halifax gastroenterolo

Premium content
The Chronicle Herald
Published: Apr 23 at 8:11 p.m.
Updated: Apr 25 at 9:51 a.m.

HEALTH June 15, 2019 4:36 pm Updated: June 15, 2019

Halifax residents rally against Nova Scotia's health care 'crisis'

By Aya Al-Hakim
Online producer/reporter Global News

Sick people wait days at Halifax ER before being admitted ...
https://www.cbc.ca/news/canada/nova-scotia/sick-people-backlog-emergency-hospital-1...
Many of the patients waiting in rooms and on stretchers in hallways of emergency rooms at QEII ... zone of the Nova Scotia Health Authority. ... her dying husband; Nova Scotia emergency rooms aren ...
Author: Shaina Luck

The awful death of Jack Webb: Wife says crowded Halifax ...
https://atlantic.ctvnews.ca/the-awful-death-of-jack-webb-wife-says-crowded-halifax...
The awful death of Jack Webb: Wife says crowded Halifax hospital failed her husband. ... and start shipping out patients to other floors. The Nova Scotia Government and General Employees Union ...
Author: Michael Tutton

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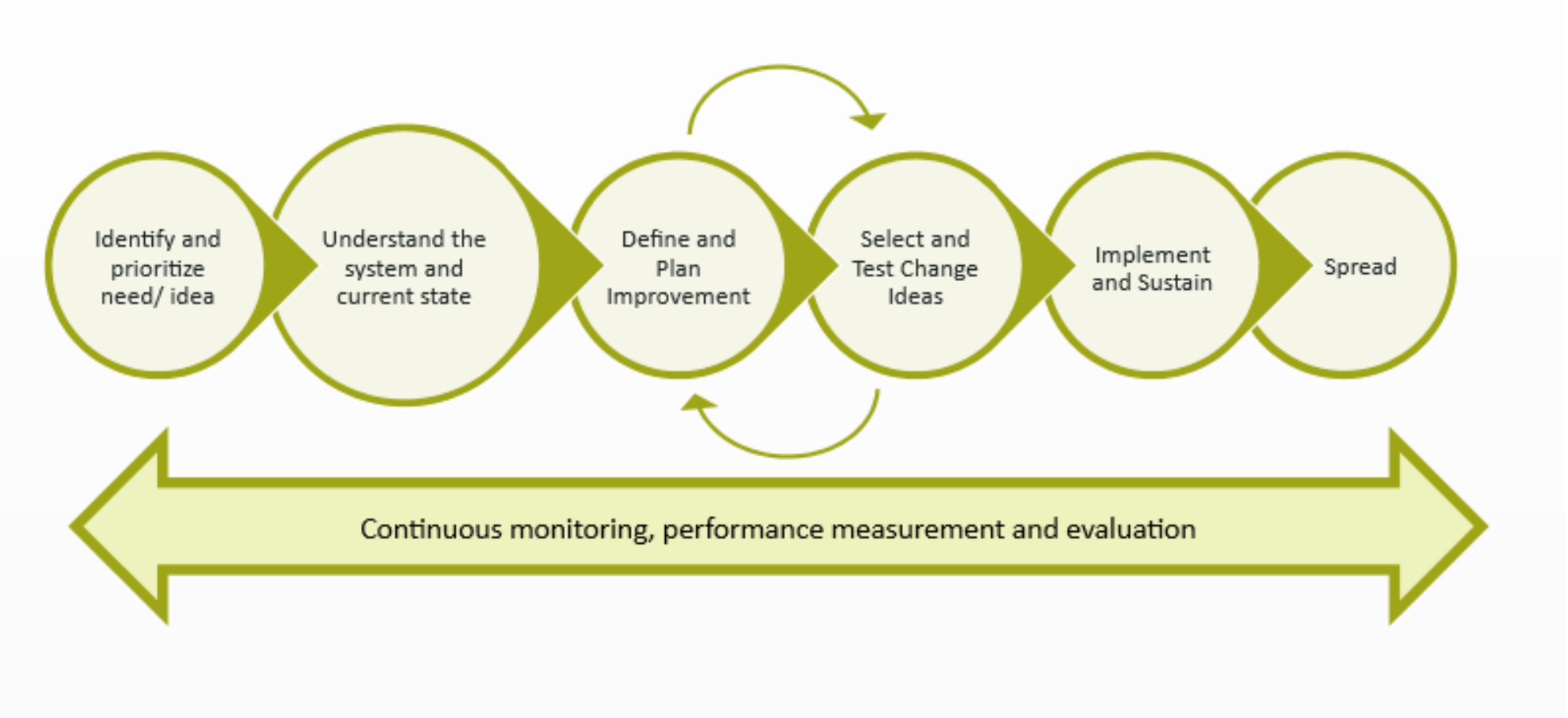
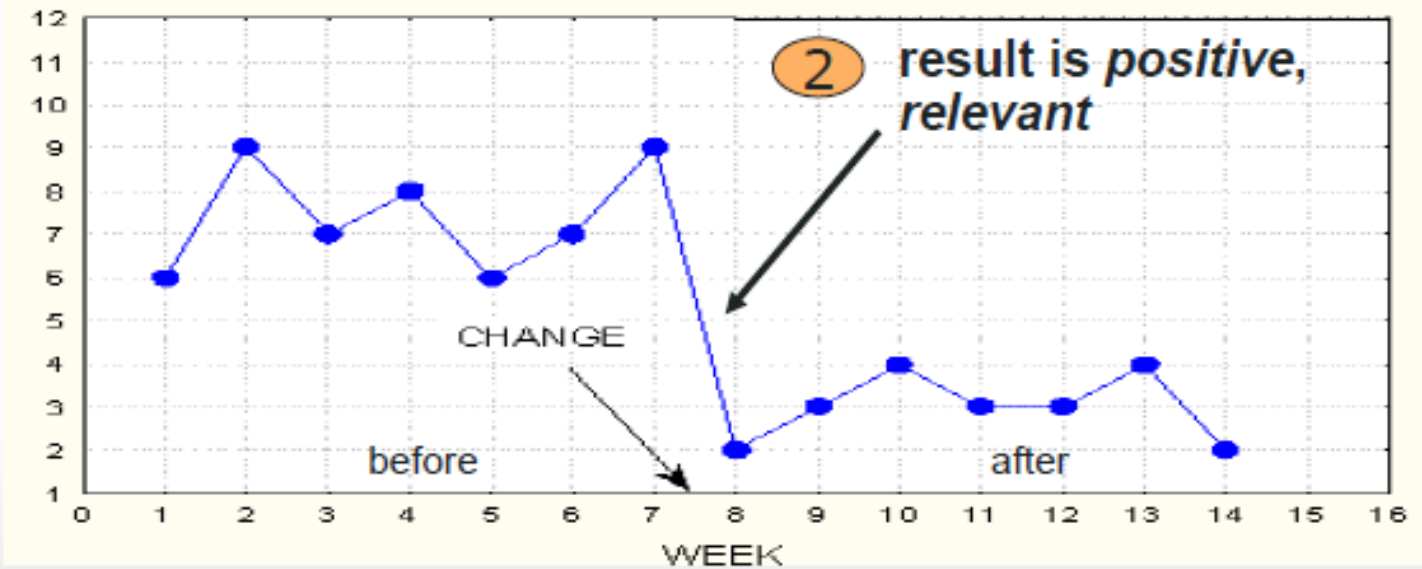
Quality Improvement 101

Quality Improvement



What is Improvement?

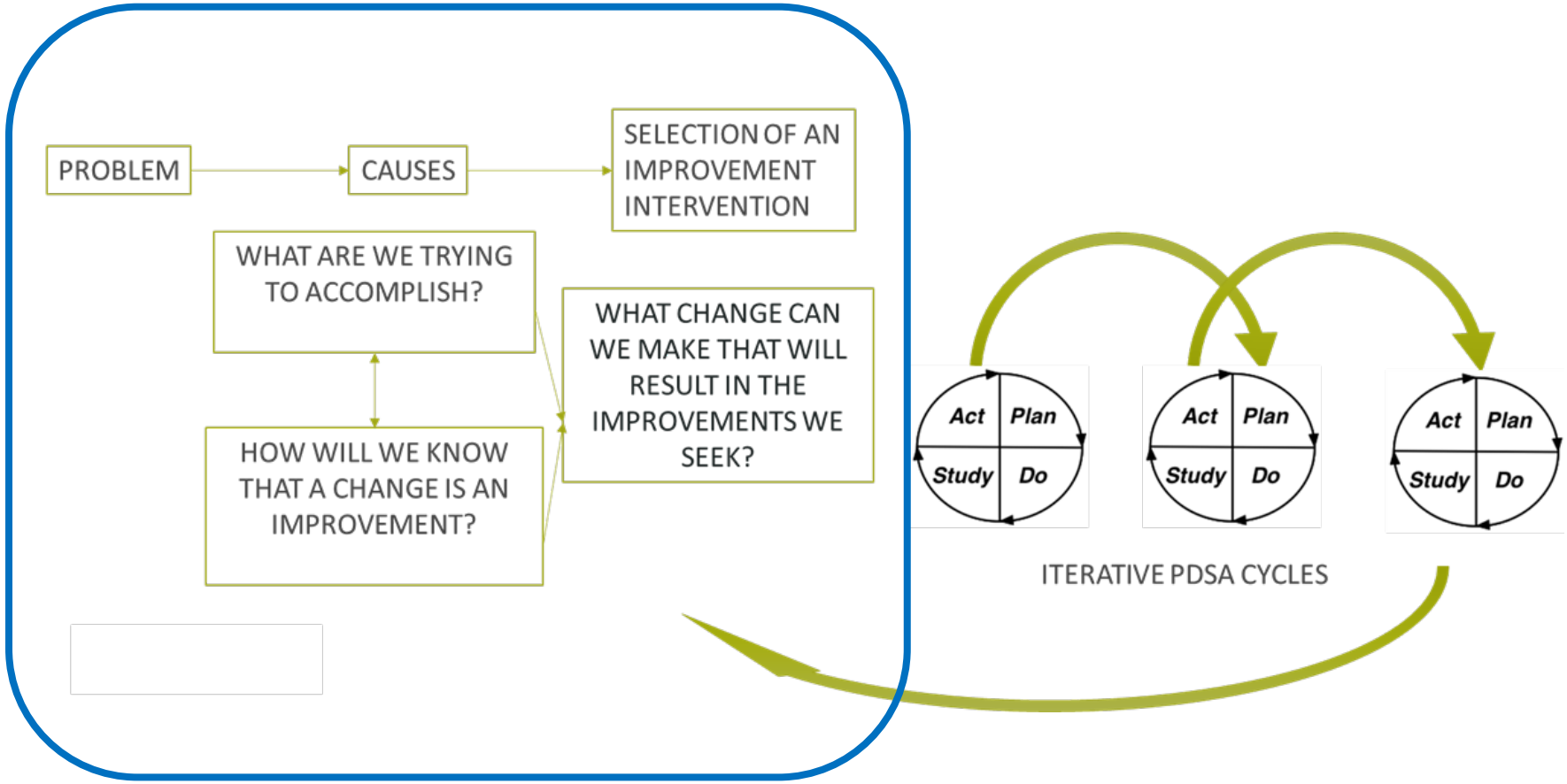
1 **Improvement is the result of some design or redesign of the work or activity**



3 **and *lasting* impact**

Reference: *The Improvement Guide*, 2nd ed. Langley, Moen, Nolan, Nolan, Norman & Provost, p. 16

Applying PDSA to Solve the Problem



Adopted from François Champagne

Gathering the Right Information

For any analysis you need data, but the data you need, and the process to get it, is not always clear and can vary based on the problem to be solved.

01 What Data Do You Need

02 How to Ask for Data and Analytics

03 Know the Difference Between Your Data and Your Metrics

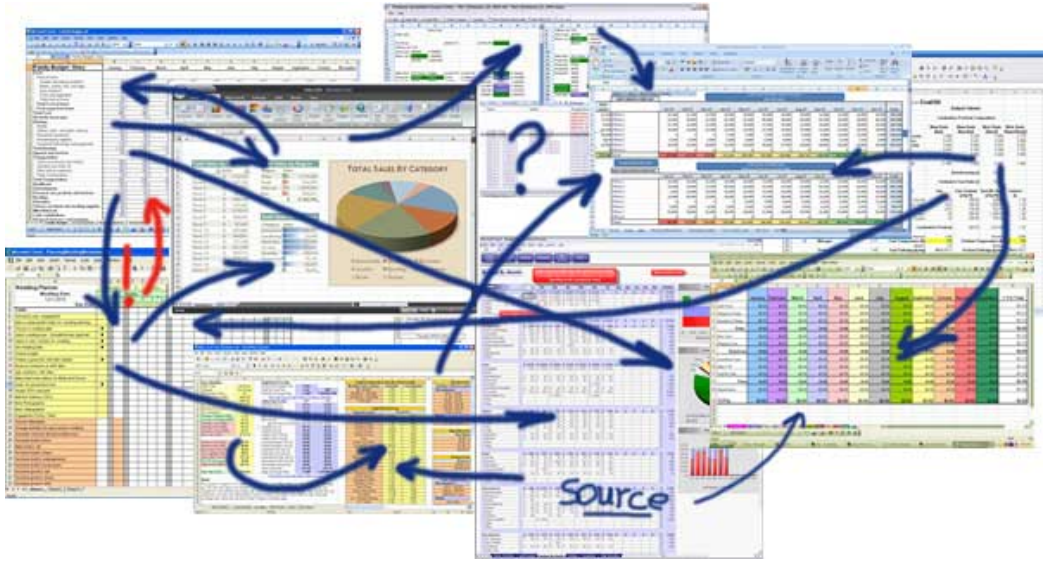
04 Can Your Data Be Trusted

What Data Do You Need

and, Do You Need All That Data?

As an organization we're constantly producing data; numbers, reports, trend lines, graphs, spreadsheets and more.

But, do we know if all this data leads to better decisions?



What Data Do You Need

and, Do You Need All That Data?

"After analyzing all your data, I think we can safely say that none of it is useful."

When conducting analysis whether it is a overview of past performance or a predictive model, we need to consider the following:

1. Are we asking the right questions?
2. Does our data tell a story?
3. Does our data help us look ahead, rather than behind?
4. Do we have a good mix of quantitative and qualitative data?

What Data Do You Need

Asking the right questions

Often we collect the and gather the data that is available rather than the information is needed to help make decisions and deliver services and care.

We need to be clear about the questions that we need the data to help us answer and focus analysis around those, rather than everything that is possible.

What Data Do You Need

Does our data tell a story?

Most data comes in fragments. To be useful, these individual bits of information need to be put together into a coherent explanation of the situation, which means integrating the data into a “story”.

Clinical and corporate information systems provide information, metrics and data. Analytics allows us to shape that into a story, the scope and structure of which we should consider in advance of gathering data.

What Data Do You Need

Does our data help us look ahead, rather than behind?

Most of the data we collect tells how we performed in a past period, but is less effective in predicting future performance.

Therefore, it is important to ask what data, in what time frames will help us get ahead of the curve instead of just reacting.

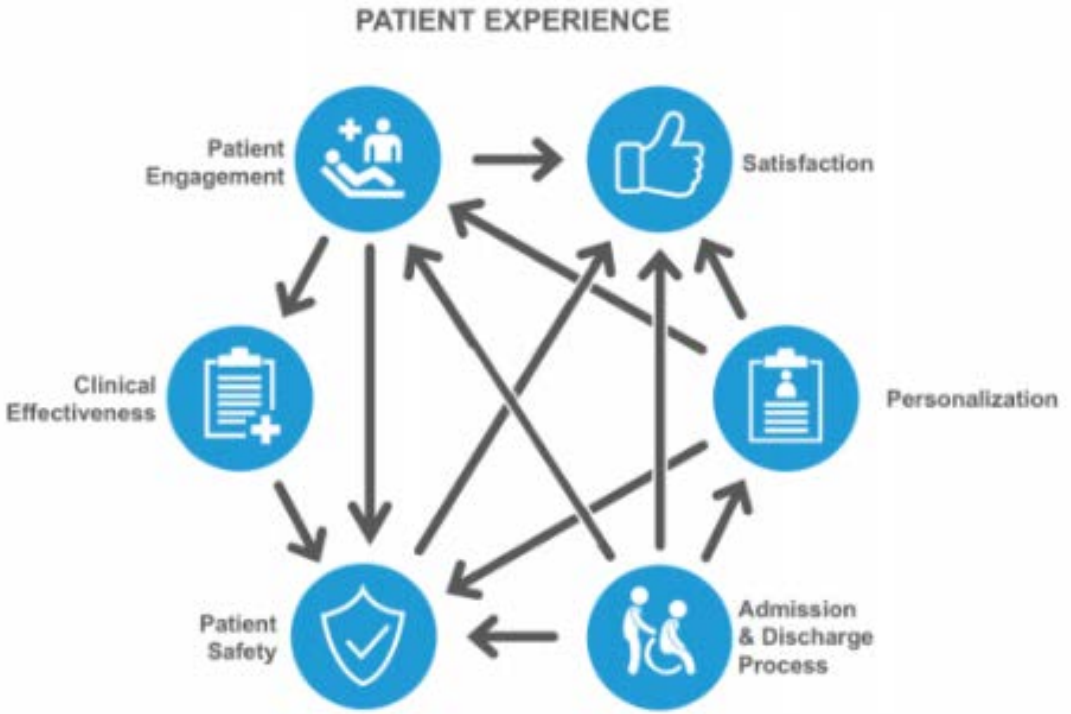
What Data Do You Need

Do we have a good mix of quantitative and qualitative data?

Neither quantitative or qualitative data tells the whole story.

For example, to ensure a positive patient experience we need to know not just why a patient was admitted, what procedures were performed, when that happened and how long it took.

Beyond the quantitative we need to know how the felt about their care, their involvement in decision making, and so much more.



How to Ask for Data and Analytics

It's often difficult for clinicians and administrators to articulate clear questions or identify the problem they're seeking to address. We lack a common vocabulary between programs, geographies and roles.

This results in analysts uncertain how to proceed, and frustrated requestors when the information they get isn't what they intended.

You should consider what you hope to achieve, the impact you want the data to have and your ability or the organization's ability to act on that information

How to Ask for Data and Analytics

Define Your Question

- Define your question(s) well
- Start out in general terms, then move to specifics
  - Timeframes
  - Data elements / types
  - Comparisons
- Refine the question as you gather more insight and information

Know the Difference Between Your Data and Your Metrics

Metrics contain a single type of data – patient days, admission rates.

A successful organization can only measure so many metrics well, and what we measure should be tied to our **definition of success**.

There is a difference between numbers and numbers that matter. This is what separates data from metrics.

Your Data and Your Metrics

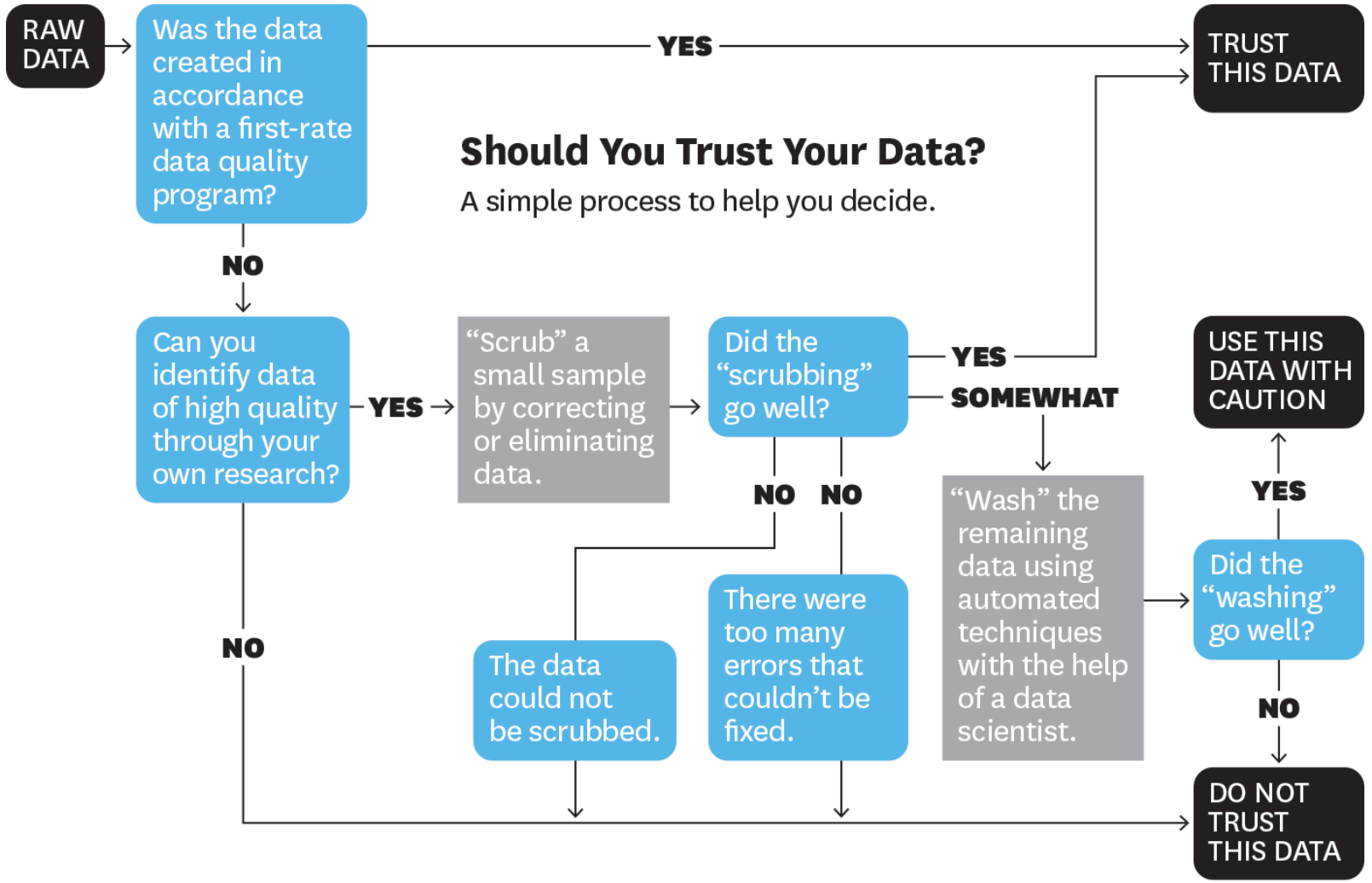
Organizations Become Their Metrics

Measurement changes/drives performance, “measurement bias”

Choosing Metrics:

1. Define Your Governing Objective
2. Develop a theory of cause and effect to assess presumed drivers of the objective
3. Identify specific activities that can drive achieving the governing objective
4. Measure
5. Regularly assess the metrics impact on objective

Can Your Data Be Trusted



SOURCE THOMAS C. REDMAN

Analyse the Data

Now that you have data, what do you do with it? We'll review the basics of analysis, statistical concepts, how to avoid common pitfalls and biases

01 Analytics Primer

02 When to Act

03 Pitfalls of Data-Driven Decisions

04 Signal to Noise

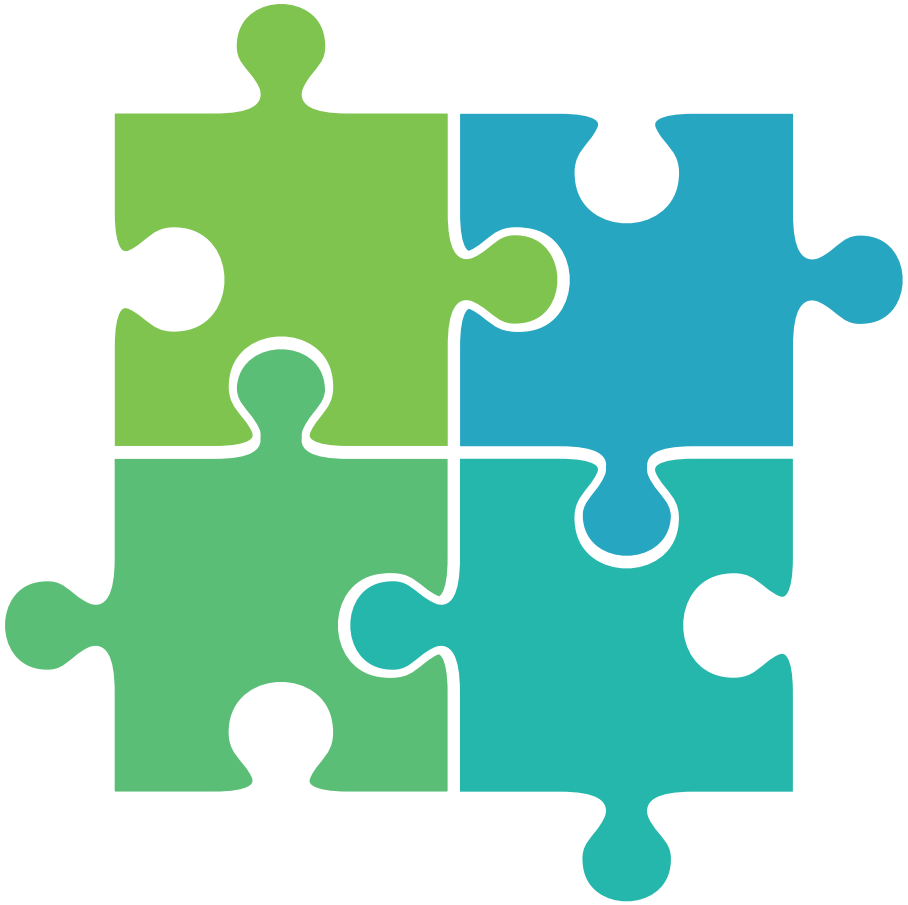
Analytics Primer

Descriptive Analytics

Summary of historical data to yield useful information and possibly prepare the data for further analysis. Reporting and data visualization may be applied to yield more insight.

Diagnostic Analytics

Examines data to answer the question “Why did it happen?”, using techniques such as drill-down, data discovery, data mining and correlations.



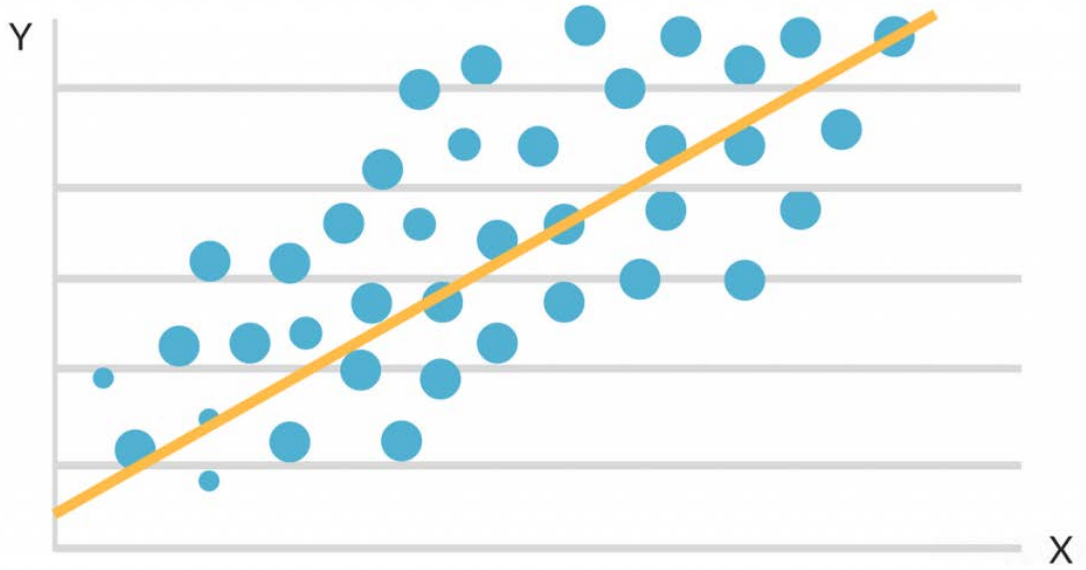
Inferential Analytics

Identifying relationships between variables, correlation, regression, ANOVA, developing hypotheses

Predictive Analytics

Extracting information from existing data sets in order to determine patterns and forecasts what might happen in the future with an acceptable level of reliability.

Predictive Analytics Primer



Predicting the future using data from the past, a little bit of statistics and some important assumptions.

To predict we need **good data** on what is happening now and happened in the past.

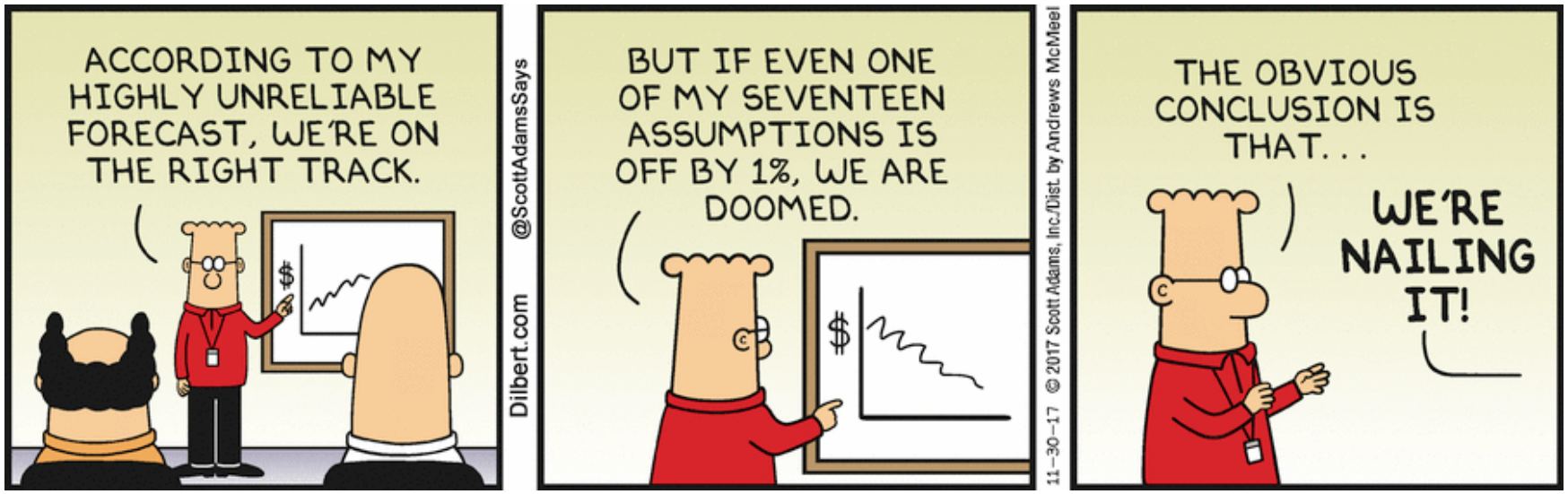
Regression Analysis is the primary tool – we hypothesis that a set of independent variables (diagnosis, acuity, co-morbidities) are statistically correlated with an outcome for a subset (sample of patients)

- Determine strength of correlation for each variable
- Iterative process
- The degree to which each variable effects the outcome (coefficient) lets us create a score predicting the likelihood of the outcome

Assumption – the future will continue to be like the past

Predictive Analytics Primer

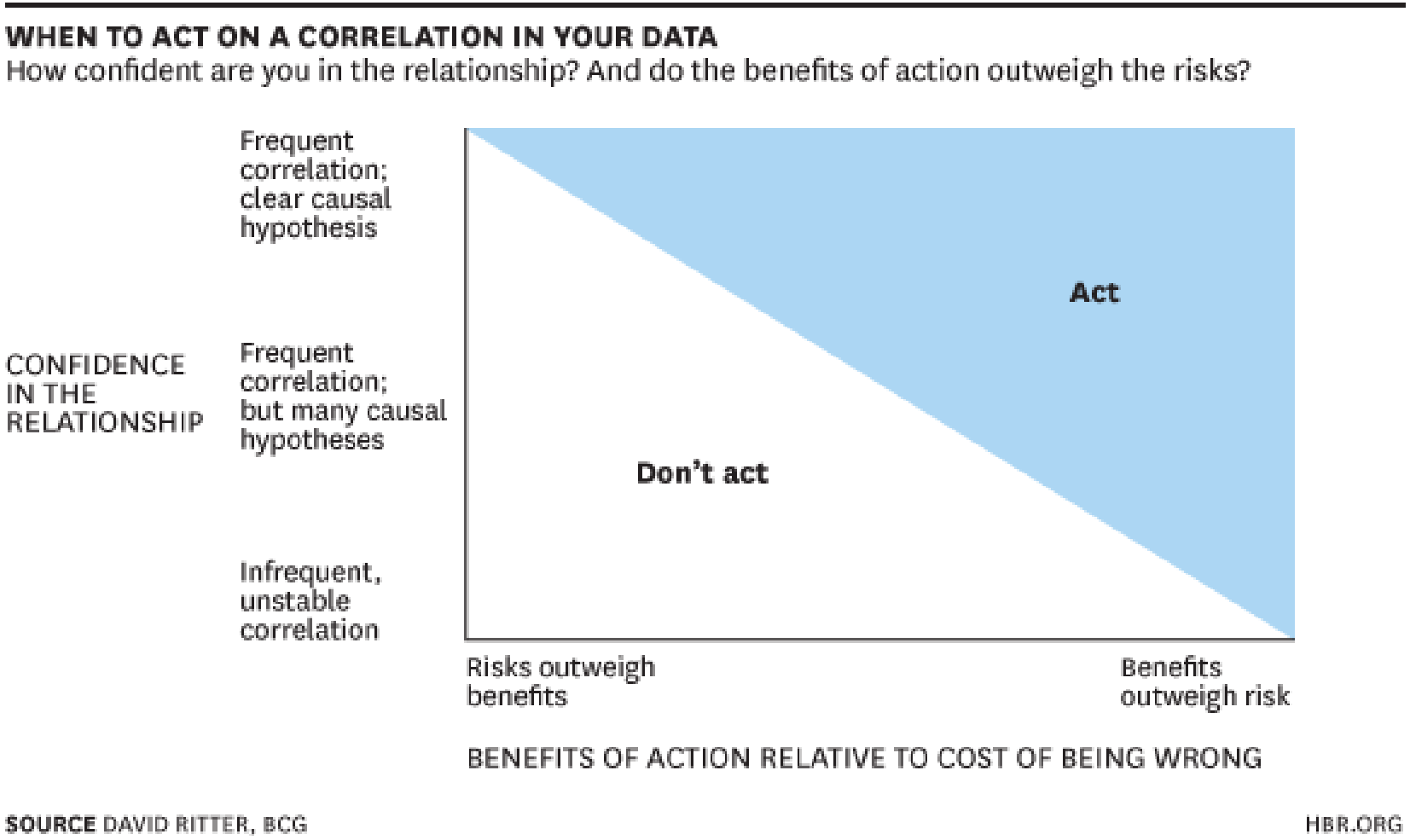
Assessing the Analysis



- Can you describe the sources of data in the analysis?
- Are you sure the data (sample data) is representative of the population?
- Are their outliers in the data distribution? How did they effect the results?
- What assumptions are behind your analysis?
- Are their conditions that would make your assumptions invalid?

When to Act

Correlation isn't Causation

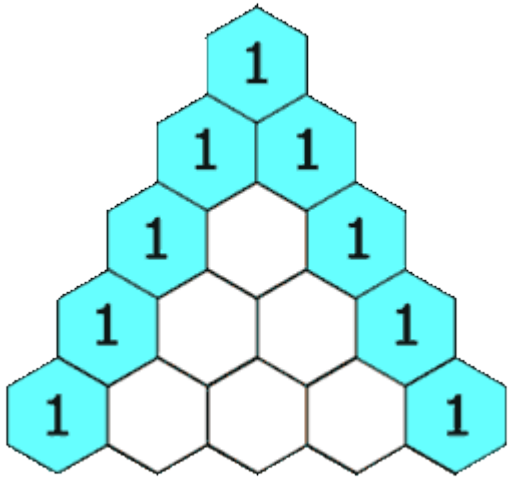


Pitfalls of Data-Driven Decisions

Common Decision Making Traps

- Confirmation Trap
  - Paying more attention to findings that align with our prior beliefs, and ignore other facts and findings
- Overconfidence Trap
  - Not questioning methods, motivations, and communication of findings, underinvest in data and analytics because when we're confident in our understanding
- Overfitting Trap
  - Signal to noise, model describes random noise, rather than underlying relationship

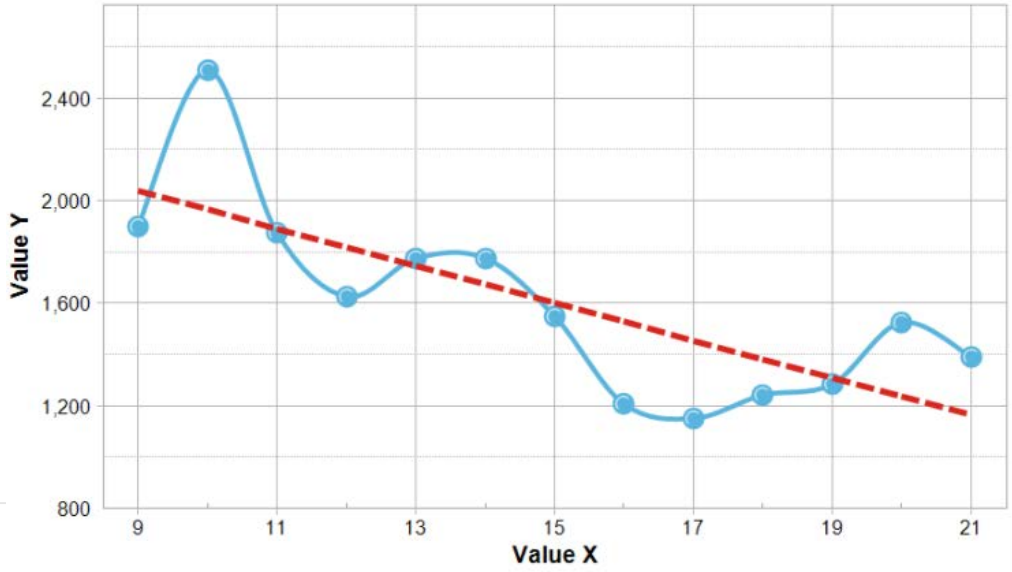
Signal to Noise



Understanding the patterns and relationships in our data.

Using these patterns to guide decisions and understand the past and predict the future

For a given dataset, we could fit a simple model to the data and have a decent chance of representing the overall trend. We could alternatively apply a very complex model to the data and "overfit" the data – rather than representing the trend, we'll fit the noise. The example below illustrates the difference between modelling the trend (the red straight line) and overfitting the data (the blue line). The red line has a better chance of predicting values outside of the dataset presented.



Communicate Your Findings

“Never make the mistake of assuming that the results speak for themselves”

We need to communicate our results and use that information to persuade and drive your decisions

01 Data Is Worthless If You Don’t Communicate It

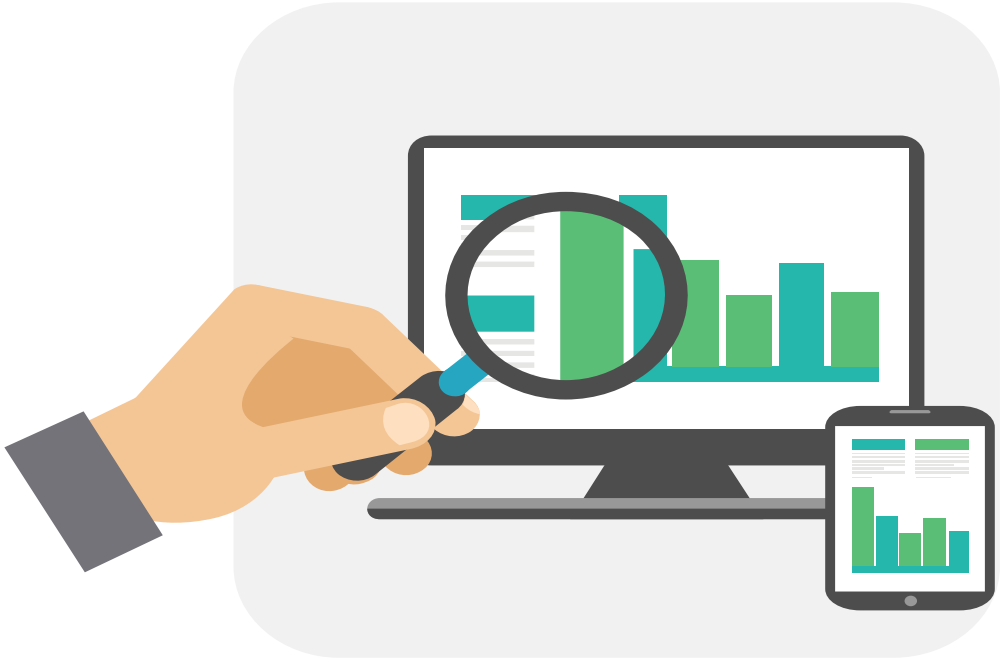
02 Visualization Do’s and Don’ts

03 Responding to Challenges

04 Decisions Don’t Start with Data

Data Is Worthless If You Don’t Communicate It

- To often we compile vast troves of data and analytical reports that never see the light of day.
- We need to communicate findings well, rather than assuming the results speak for themselves
- Simple communication model
  - Understanding of problem
  - Measurement of impact of problem
  - What data is available
  - Initial solution hypothesis
  - The Solution
  - The impact of the Solution



When Visualization Works and When it Doesn't

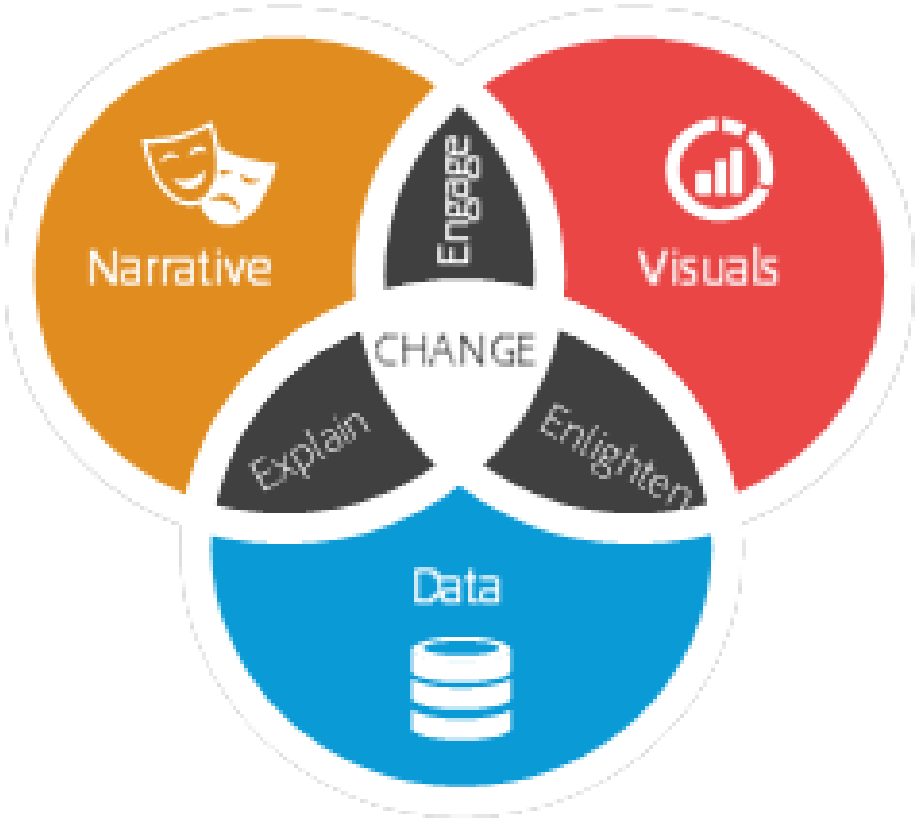
Visualizations and infographics hold the potential to distill a large volume of data and analytics to a series of actionable metrics and views, if they serve an informing purpose.

Visualizations of data should communicate an idea that will drive action and should be, interpretable, relevant and novel.

Visualizations are best suited to

- Confirmation of operational assumptions and deviations in performance
- Education through measurement, comparison and insight
- Exploration through exploratory data analysis to examine and investigate patterns in the data

Decisions Don’t End with Data



Data can provide new insights and evidence to inform our toughest decisions. But numbers alone won’t convince others. Good stories – with a few key facts woven in – are what attach emotions to your argument, prompt people into unconscious decision making, and ultimately moves them to action.

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- Digital Health Canada for 1CE hour for each presentation attended. Attendees can track their continuing education hours through the HIMSS online tracking certification application, which is linked to their HIMSS account.

Thank you for attending this event.

THANK YOU

Questions?