QI 101:
Introduction to Quality and The Model For Improvement

Patricia Hametz, MD, MPH
February 7, 2024

The Children's Hospital at Montefiore

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What to expect during your fellowship:

- **1st year** → intro to QI, how to use the model for improvement, intro to discovery tools
- **2nd year** → complete project worksheet, discuss ongoing progress/issues with your project
- **3rd year** → 10 minute presentation on your QI project
  - Work with QI expert in your division
  - Have a SMART aim statement
  - Use at least 1 discovery tool
  - Present data on a run chart

CHAM QI Project Worksheet

- Use this as we go along
- Will hit on several of the sections during this talk
- Helps outline your project

Does anyone have ideas yet?

What is Health Care Quality?

What is Health Care Quality?

According to the IOM, WHO, IHI:

*"…The degree to which health services for individuals and populations increase the likelihood of desired **health outcomes**"*

"…consistent with current professional knowledge"

"…safe, effective, timely, efficient, equitable and people-centered."

We don't always live up to our standards…

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

The Quality of Ambulatory Care
Delivered to Children in the United States

Rita Mangione-Smith, M.D., M.P.H., Alison H. DeCristofaro, M.P.H.,
Claude M. Setodji, Ph.D., Joan Keesey, B.A., David J. Klein, M.S., John L. Adams, Ph.D.,
Mark A. Schuster, M.D., Ph.D., and Elizabeth A. McGlynn, Ph.D.

ABSTRACT

BACKGROUND
Little is known about the magnitude of deficits in the quality of care delivered to children, since comprehensive studies have been lacking.

METHODS
We assessed the extent to which care processes recommended for pediatric outpatients are delivered. Quality indicators were developed with the use of the RAND–UCLA modified Delphi method. Parents of 1536 children who were randomly selected from 12 metropolitan areas provided written informed consent to obtain medical records from all providers who had seen the children during the 2-year period before the date of study recruitment. Trained nurses abstracted these medical records. Composite quality scores were calculated by dividing the number of times indicated care was documented as having been ordered or delivered by the number of times a care process was indicated.
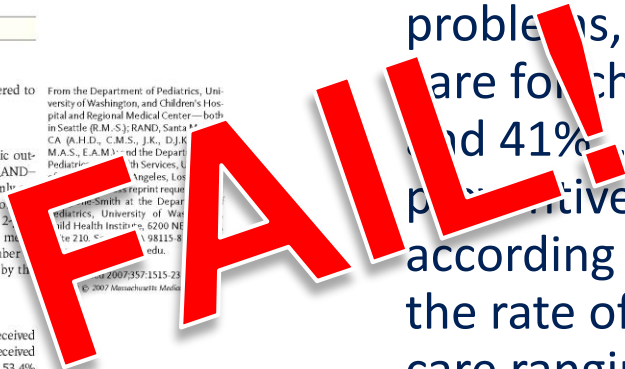
RESULTS
On average, according to data in the medical records, children in the study received 46.5% (95% confidence interval [CI], 44.5 to 48.4) of the indicated care. They received 67.6% (95% CI, 63.9 to 71.3) of the indicated care for acute medical problems, 53.4% (95% CI, 50.0 to 56.8) of the indicated care for chronic medical conditions, and 40.7% (95% CI, 38.1 to 43.4) of the indicated preventive care. Quality varied according to the clinical area, with the rate of adherence to indicated care ranging from 92.0% (95% CI, 89.9 to 94.1) for upper respiratory tract infections to 34.5% (95% CI, 31.0 to 37.9) for preventive services for adolescents.

CONCLUSIONS
Deficits in the quality of care provided to children appear to be similar in magnitude to those previously reported for adults. Strategies to reduce these apparent deficits are needed.

From the Department of Pediatrics, University of Washington, and Children's Hospital and Regional Medical Center—both in Seattle (R.M.-S.); RAND, Santa Monica, CA (A.H.D., C.M.S., J.K., D.J.K., J.L.A., E.A.M.) and the Department of Pediatrics, Health Services, …

N Engl J Med 2007;357:1515-23
© 2007 Massachusetts Medical …

FAIL!

On average, … children in the study received 46% … of the indicated care. They received 68% … of the indicated care for acute medical problems, 53% … of the indicated care for chronic medical conditions, and 41% … of the indicated preventive care. Quality varied according to the clinical area, with the rate of adherence to indicated care ranging from 92% … for upper respiratory tract infections to <u>34% … for preventive services for adolescents.</u>

Overestimating Performance
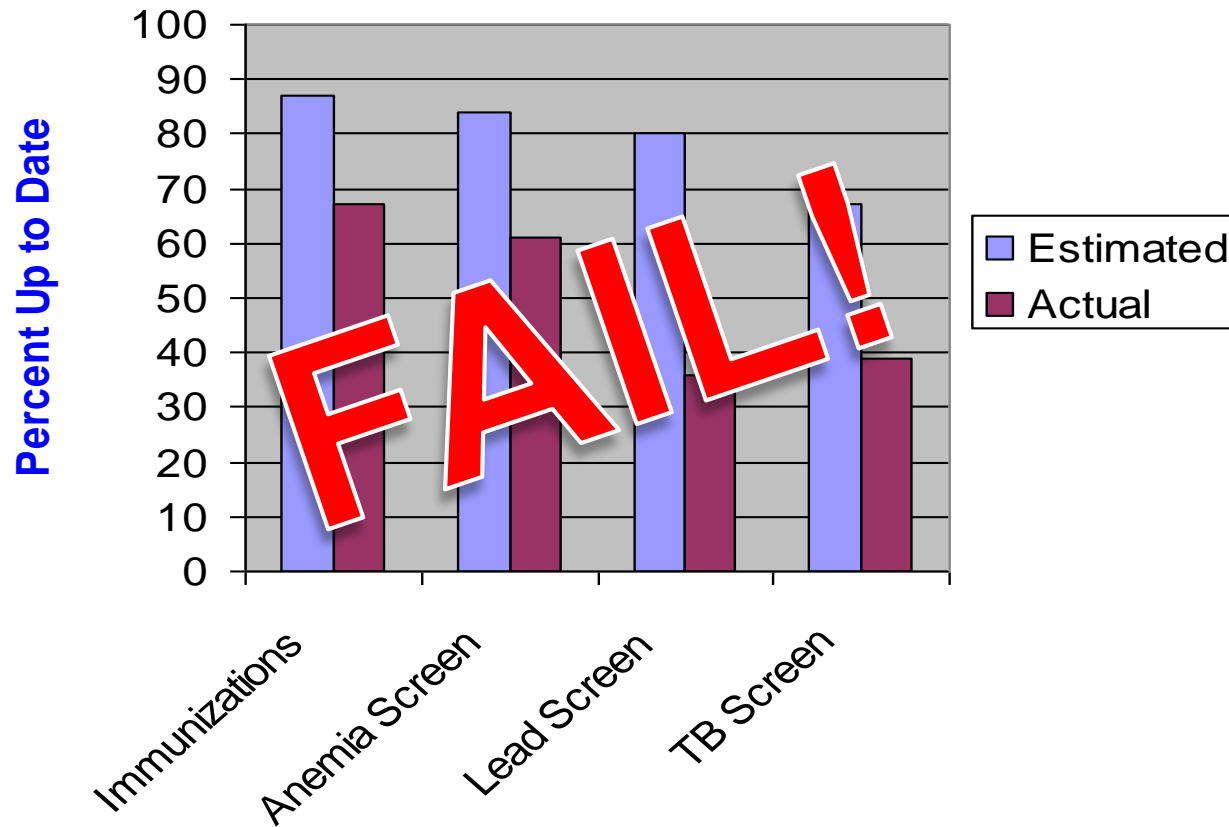
Randolph, Fried, Loeding, Margolis, Keyes, Lannon: *Pediatrics, 2005.*

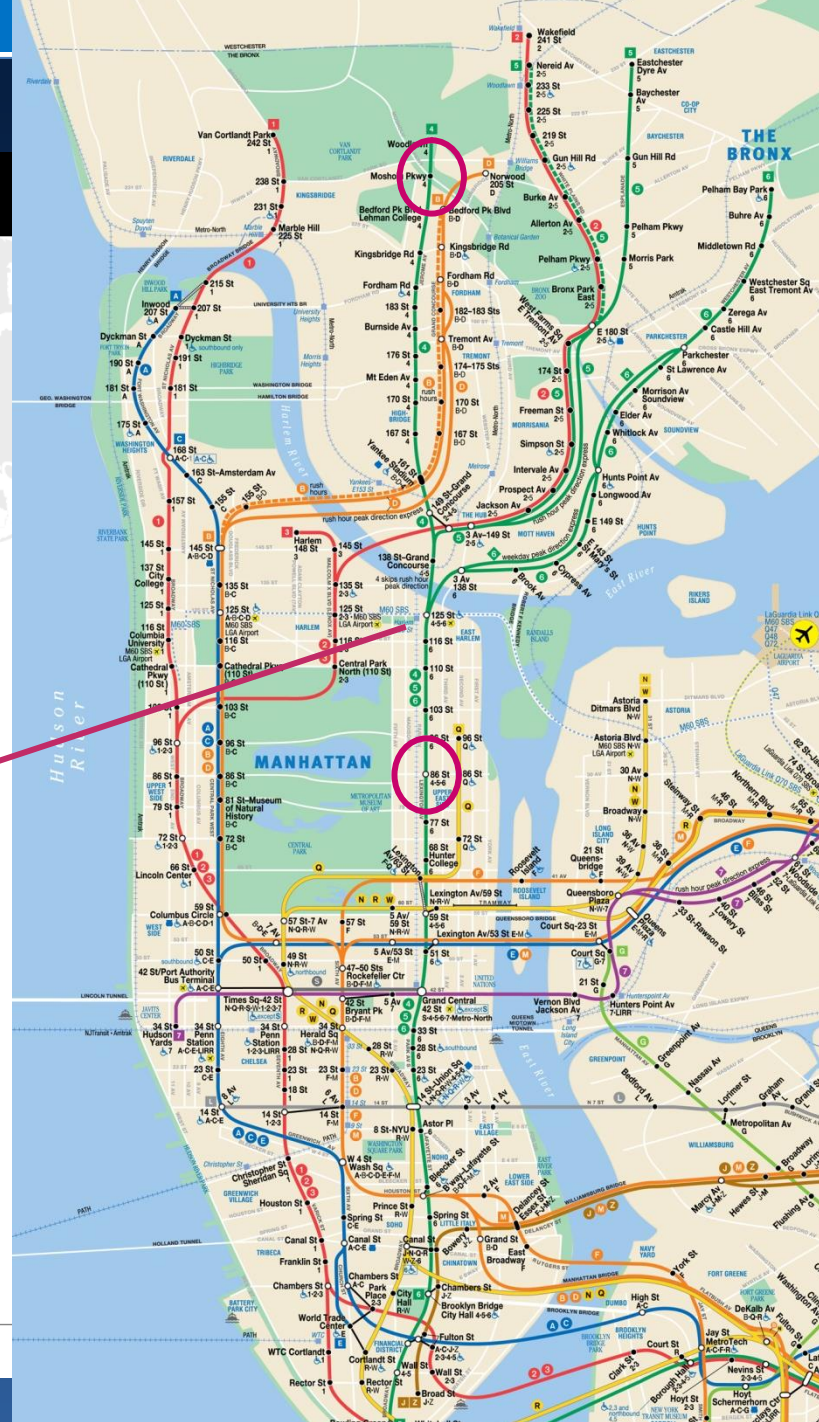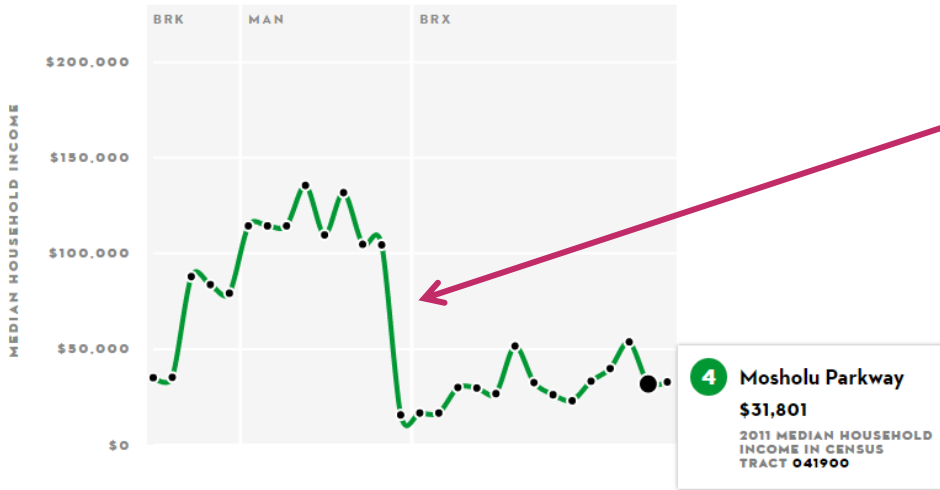Randolph, Fried, Loeding, Margolis, Keyes, Lannon. *Pediatrics, 2005.*

THE NEW YORKER
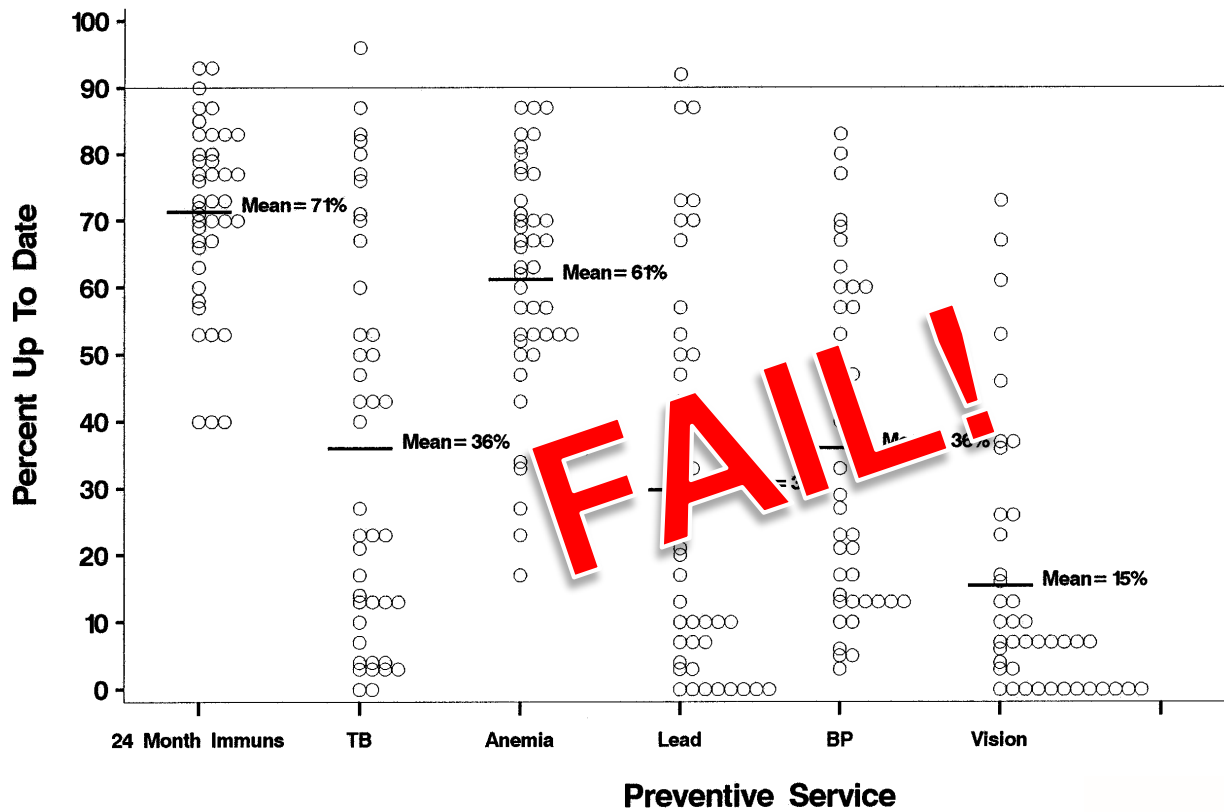
IDEA OF THE WEEK

INEQUALITY AND NEW YORK'S SUBWAY

New York City has a problem with income inequality. And it's getting worse—the top of the spectrum is gaining and the bottom is losing. Along individual subway lines, earnings range from poverty to considerable wealth. The interactive infographic here charts these shifts, using data on median household income, from the U.S. Census Bureau, for census tracts with subway stations.

CHOOSE A LINE, TAKE A RIDE

1 2 3 4 5 6 7 A C E B D F M N Q R J Z G L

4 **Mosholu Parkway**

$31,801

2011 MEDIAN HOUSEHOLD INCOME IN CENSUS TRACT 041900

By Larry Buchanan | Sources: NYC OpenData, U.S. Census Bureau

Why QI?
When we do what we shouldn't

"…a lower limit of 210,000 deaths per year was associated with preventable harm in hospitals. Given limitations in the [methodology], the true number of premature deaths associated with preventable harm to patients was estimated at more than 400,000 per year."

Harm associated with medical care, as a result, is the 3rd leading cause of death in the US.

James JT. A new, evidence-based estimate of patient harms associated with hospital care. J Patient Saf. 2013 Sep;9(3):122-8.

QI is about closing the gap between what is and what could, and should, be

Traditional QI Systems in Healthcare
(Most US Hospitals, Pre-2000)

- Retrospective (often random) review of voluntarily reported cases/events

- Majority of resources allocated to regulatory mandates and surveys

- Notion that there was always a single cause and effect relationship for every major event (culture of blame)

- Lack of focus on systems and processes

- *Lots of measurement but no real improvement*

Steven Choi, MD

Quality Improvement in 2024

- An applied science that emphasizes innovation, rapid-cycle testing in the field, and spread in order to generate learning about what changes, in which contexts, produce improvements.

- Multidisciplinary — drawing on clinical science, systems theory, psychology, statistics, and other fields.

Methods and tools to effectively address the issues that interfere with our ability to provide the best care we can every day

What is Quality Improvement?

Quality Improvement
is the
Science of Process Management

Health care delivery is a system made up of thousands of interlinked processes

Brent James, Intermountain Healthcare

Structure ➡ Process ➡ Outcome

Why change our process?

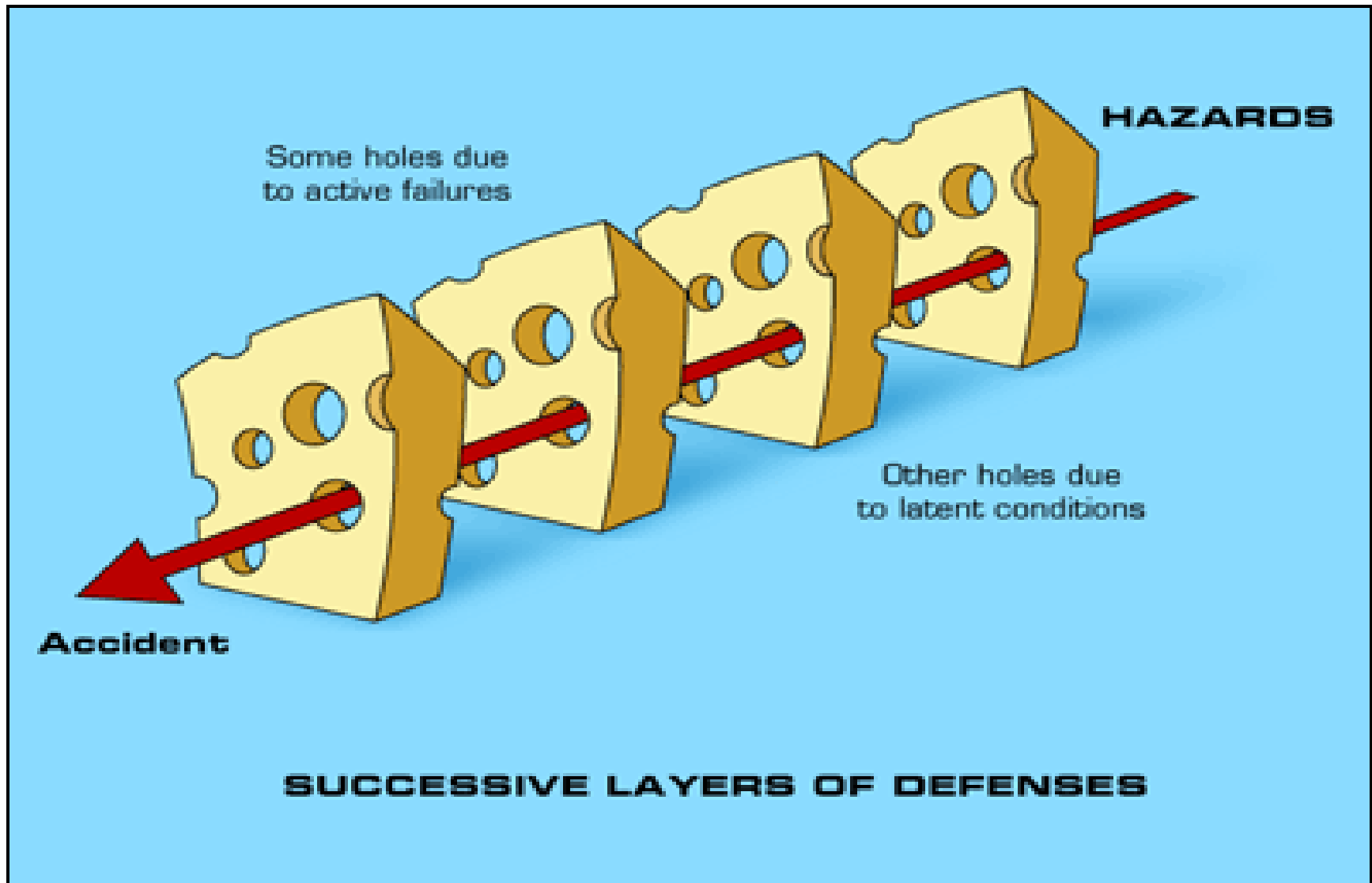**"Every system is perfectly designed to get the results it gets.“**

Don Berwick, MD

Paul Batalden, MD

Joseph Juran

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Systems Based Approach to QI

Some holes due to active failures

HAZARDS

Other holes due to latent conditions

Accident

SUCCESSIVE LAYERS OF DEFENSES

The Model for Improvement

- Why do we need a model for improvement?

  → Provides a roadmap for how to change our processes

The FRAMEWORK/METHOD/MODEL of QI.

Where Do I Begin? What Do I Change?

"What if we don't change at all ...
and something magical just happens."

How do you choose what to improve?

- Stories

- Data

- Dollars

Then, burn the platform!
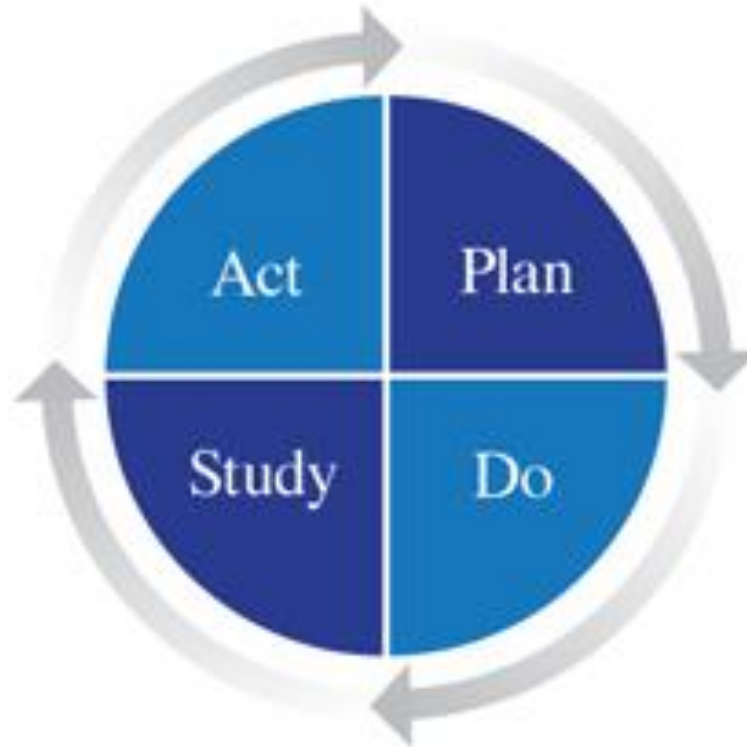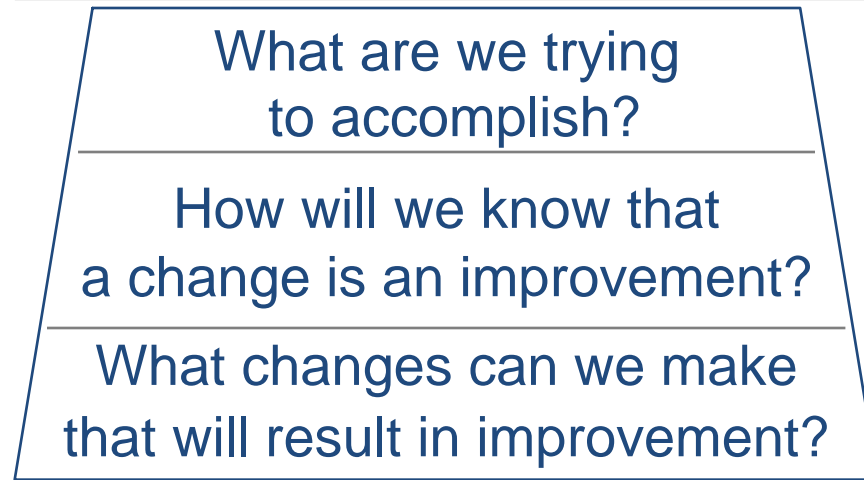
3 Major Models

The Model for Improvement

AIM
What are we trying to accomplish?

MEASURES
How will we know that a change is an improvement?

CHANGES
What changes can we make that will result in improvement?

Act | Plan
Study | Do

1. Identify Value
2. Map the Value Stream
3. Create Flow
4. Establish Pull
5. Seek Perfection

CONTROL DEFINE MEASURE ANALYZE IMPROVE

Model for Improvement

LEAN

SIX SIGMA

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Common Theme of all 3 Methods

- Continuous, cyclical, iterative

Steven Choi, MD

Model for Improvement

What are we trying
to accomplish?

Aim Statement

How will we know that
a change is an improvement?

Measures

What changes can we make
that will result in improvement?

Change
Concepts

Act   **Plan**

Study   **Do**

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Model for Improvement

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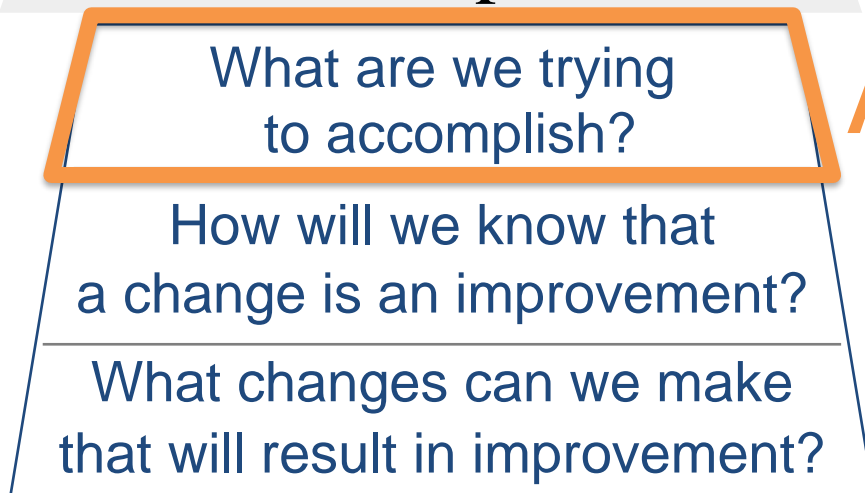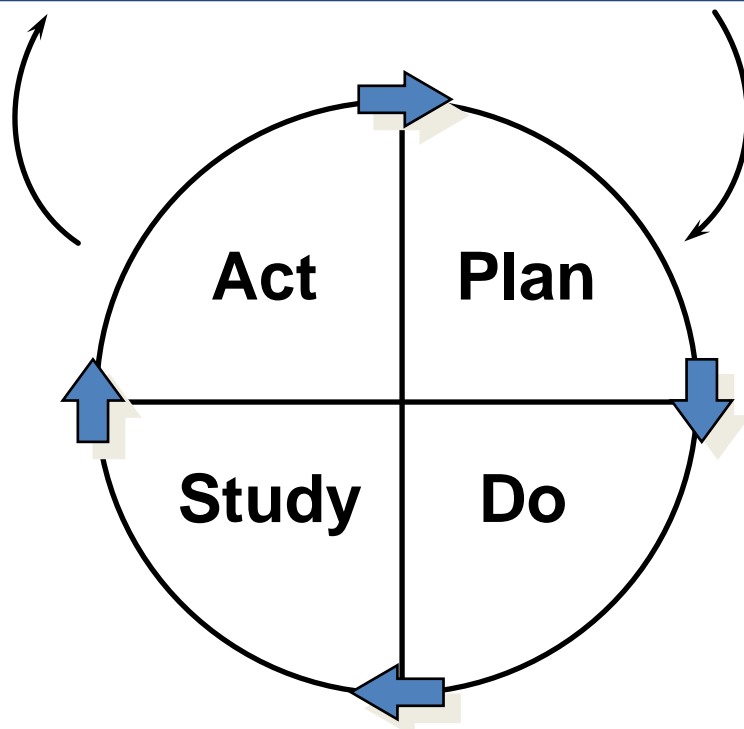
Change
Concepts

Act | **Plan**

Study | **Do**

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"AIM STATEMENT"

- A written statement of the accomplishments expected from team's improvement effort
- A communication tool to help maintain focus within the team and from external stakeholders

What are the characteristics of a good aim statement?

"AIM STATEMENT"

- A written statement of the accomplishments expected from team's improvement effort
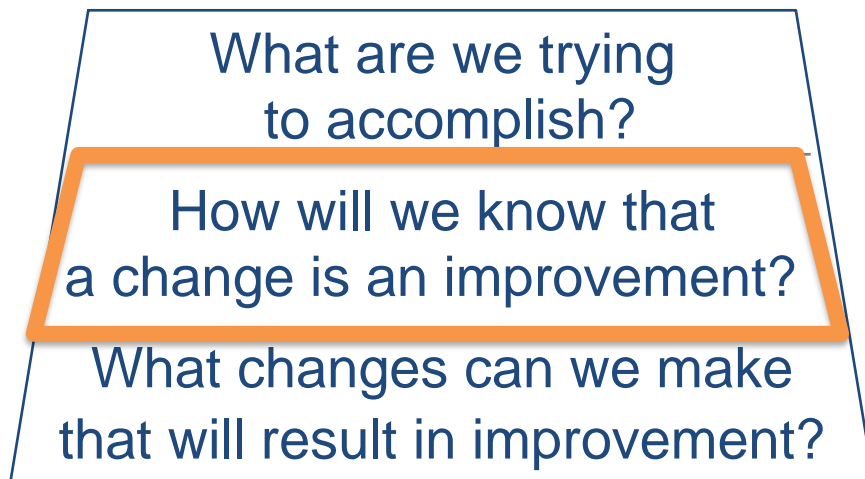
  - S - Specific
  - M - Measurable
  - A - Actionable
  - R - Relevant
  - T - Time bounded

Model aim statements

- By January 2025, at least 80% of patients who present to the CHAM ED with febrile neutropenia will receive IV antibiotics within 60 minutes.

- By December 2024, we will increase the percent of young children (birth – 5y) who have an age-appropriate structured developmental screening at their well-child care visit from 25% to 75%.
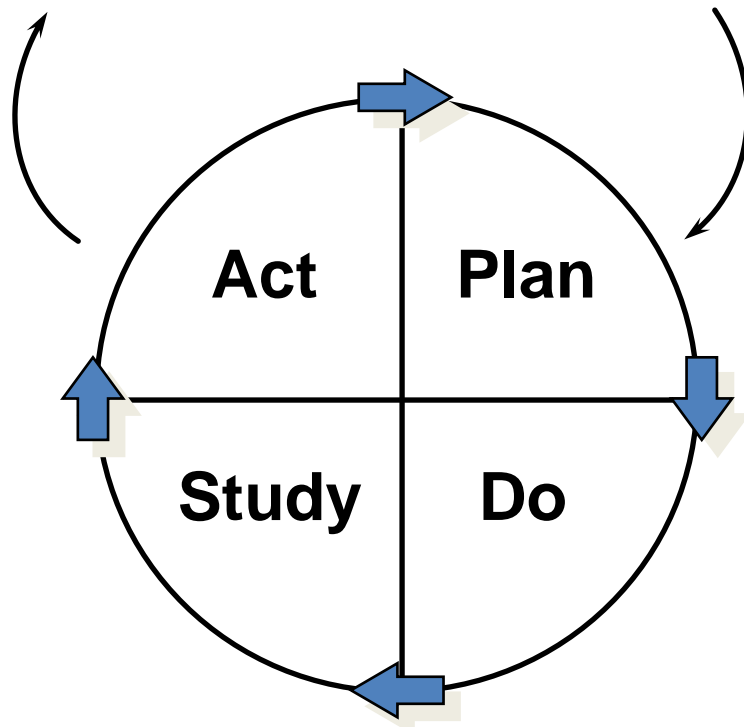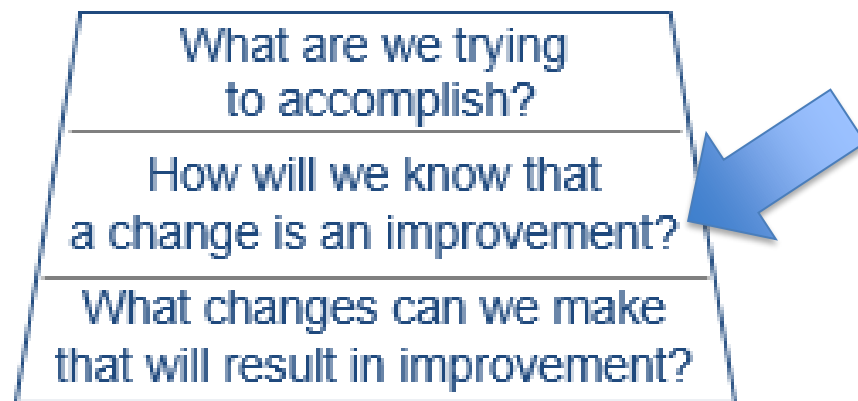
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Model for Improvement

What are we trying
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How will we know that
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What changes can we make
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Act **Plan**

Study **Do**

Aim Statement

Measures

Change
Concepts

The
**Children's
Hospital**
at **M**ontefiore

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Q2: How will we know if a change is an improvement?

"All improvement is change,

but <u>not</u> all change is an improvement"

What are we trying to accomplish?

How will we know that a change is an improvement?

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Importance of Measurement

- Measures are an indicator of how the system is working at any given time – important feedback

- It shows whether and how changes are working

- All measures have limitations, but the limitations do not negate their value

- The purpose of measurement in improvement work is for *learning* not judgment

What are the three types of measurements we use?

31

3 Types of QI Measures:

- **Outcome Measures**: patient focused, the harm we are trying to avoid or the care we are trying to deliver

- **Process Measures**: measuring the processes that lead to your outcomes

- **Balancing Measures**: unintended consequences of our work

What measurements could we use?

By January 2024, at least 80% of patients who present to the CHAM ED with febrile neutropenia will receive IV antibiotics within 60 minutes.

Outcome:

Process:

Balancing:

You've got a good measure when...

- Is related to the aim and linked to key changes
- Is easy to collect
  - Fits into clinical flow (e.g. the billing sheet)
  - Already being collected or electronic
- Is simple
- Shows improvement quickly
- **Can be collected regularly (weekly, monthly)**

How will you measure?

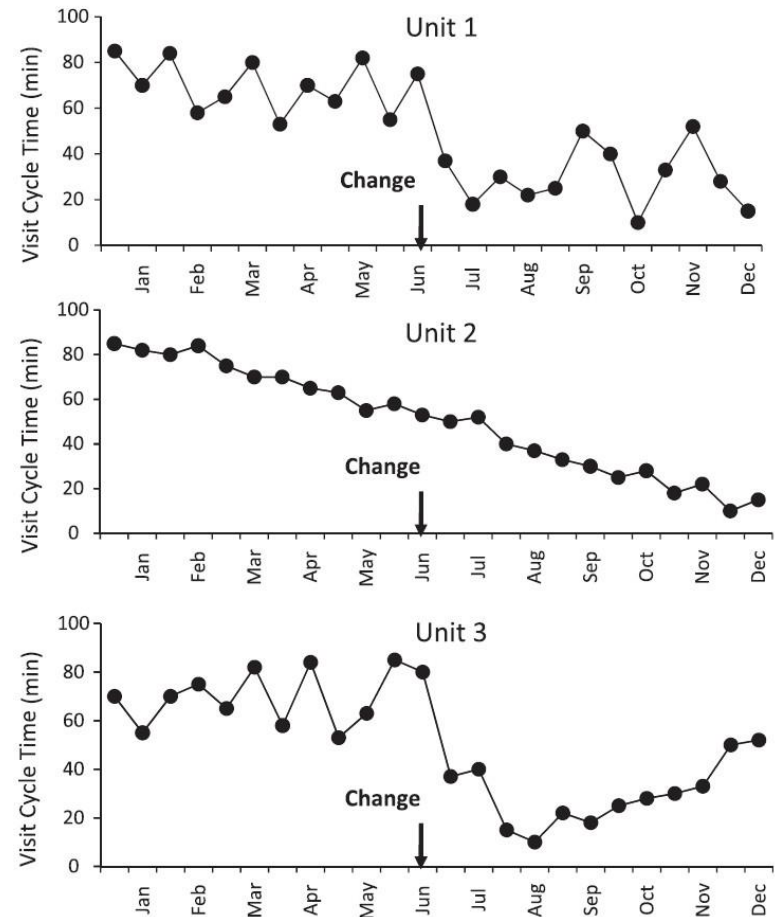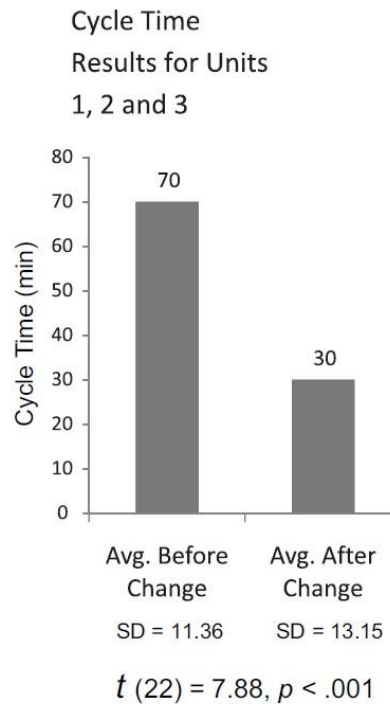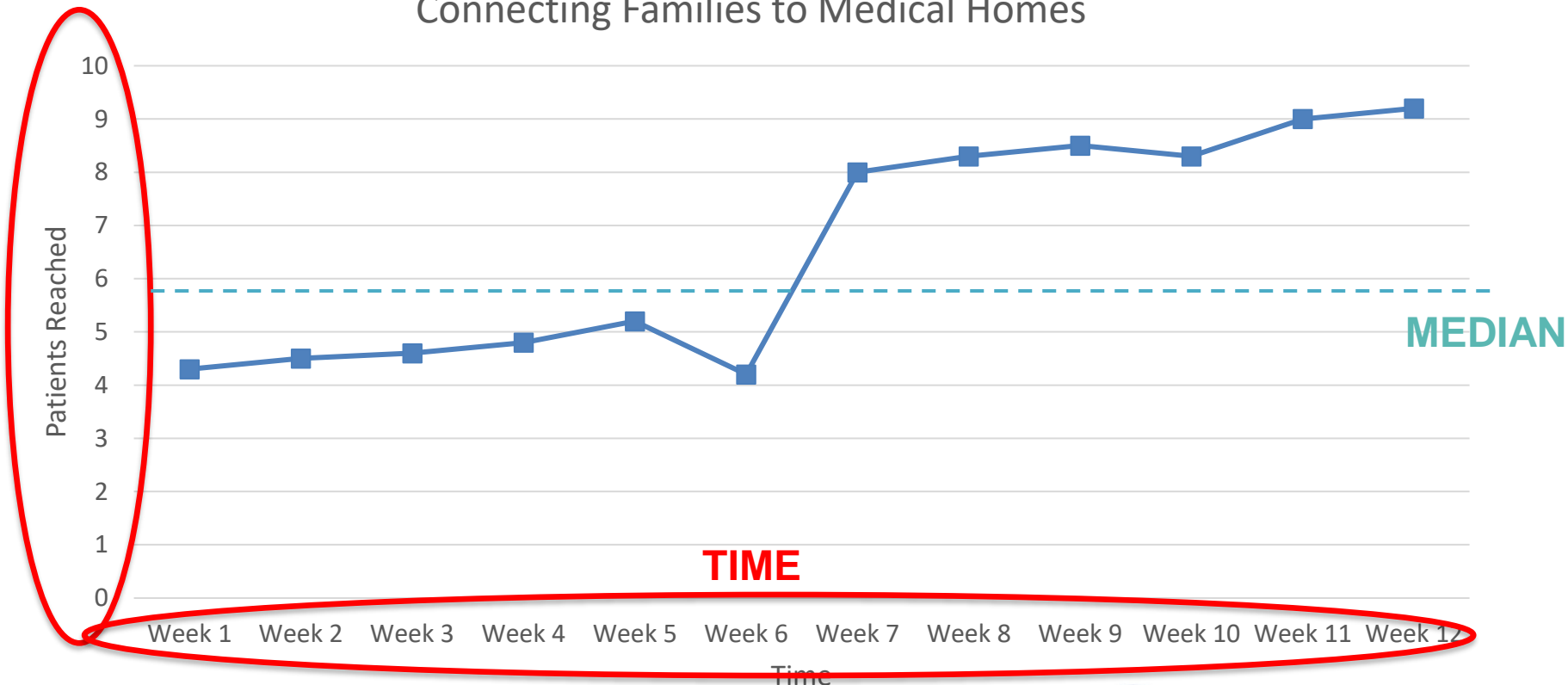# The problem with "before vs. after"

Figure 2 Summary statistics versus time-ordered data. (Each unit has the same 24 data values ordered differently over time.)

Cycle Time
Results for Units
1, 2 and 3

t (22) = 7.88, p < .001
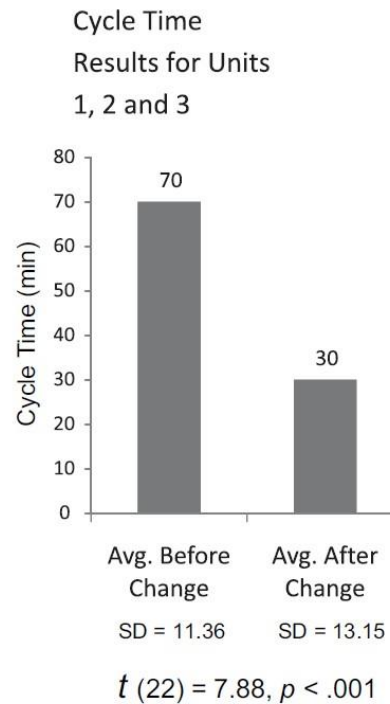
BMJ Qual Saf 2011;2

The problem with "before vs. after"

Figure 2 Summary statistics versus time-ordered data. (Each unit has the same 24 data values ordered differently over time.)

Cycle Time Results for Units 1, 2 and 3
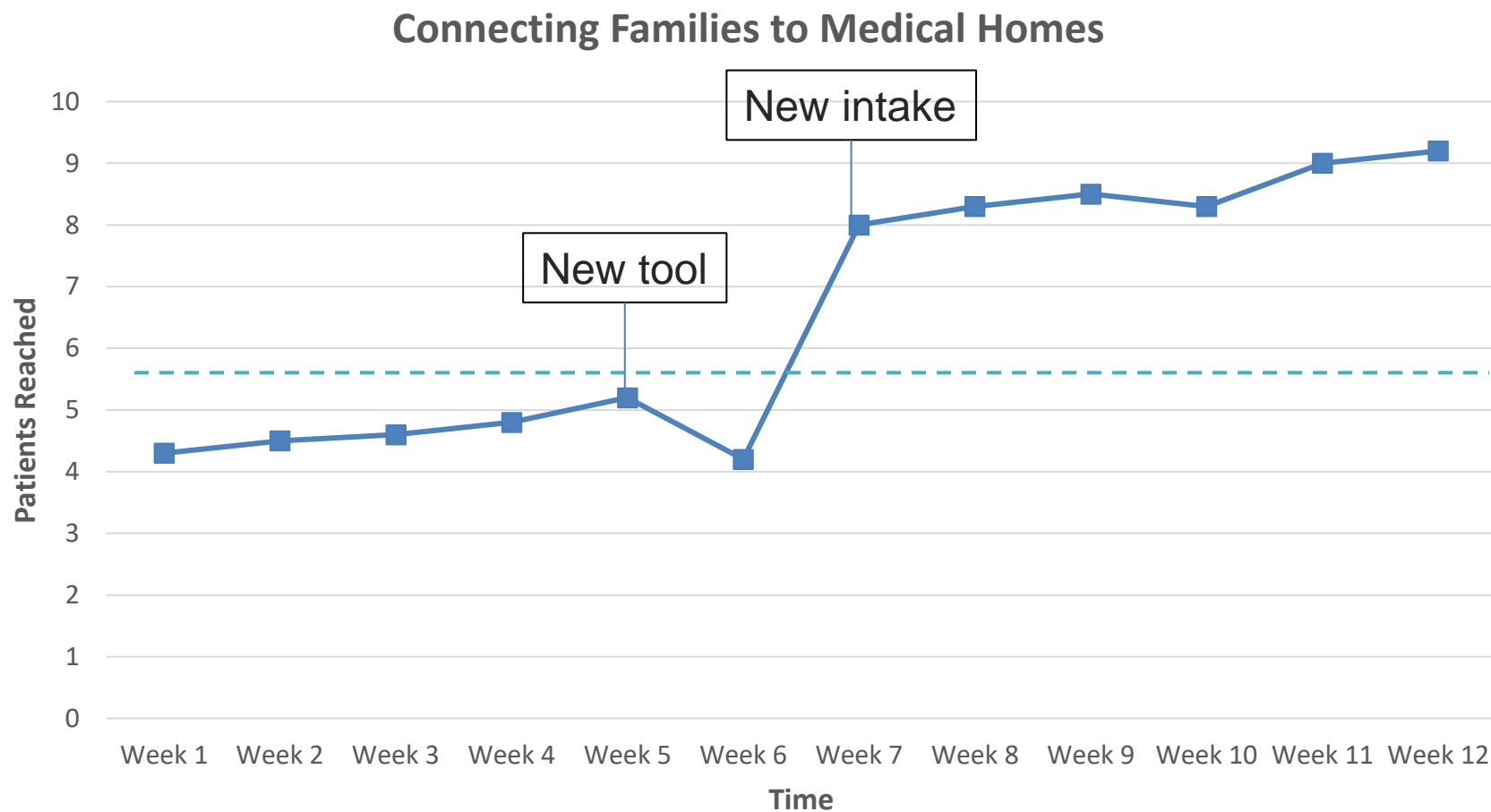
Avg. Before Change SD = 11.36
Avg. After Change SD = 13.15
t (22) = 7.88, p < .001

Unit 1
Unit 2
Unit 3

Run Chart: Displays data **over time**

DATA

Connecting Families to Medical Homes

Patients Reached (y-axis, 0–10)

Weeks 1–12 (x-axis), Time

MEDIAN

TIME

Project Data

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Annotate to tell your story

Connecting Families to Medical Homes

Model for Improvement

What are we trying
to accomplish?

How will we know that
a change is an improvement?

What changes can we make
that will result in improvement?

Act   **Plan**

Study   **Do**

Aim Statement

Measures

**Change
Concepts**

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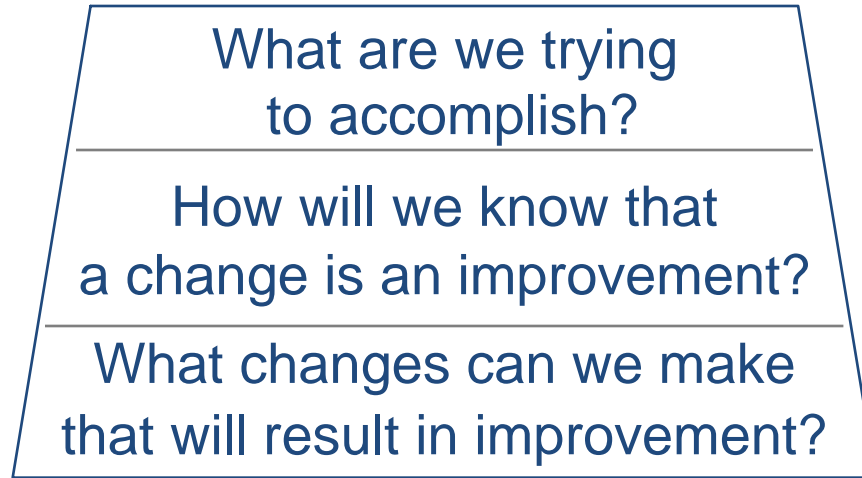Albert Einstein College of Medicine
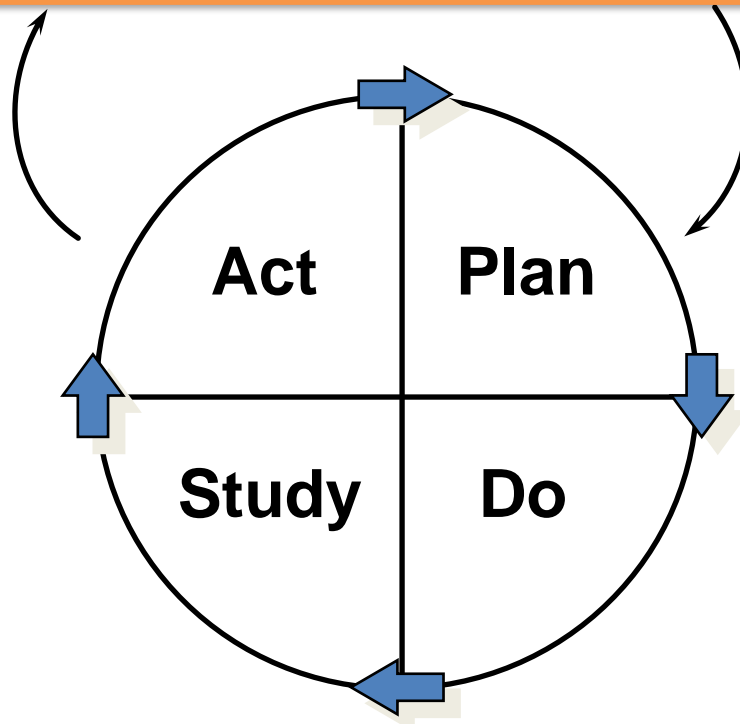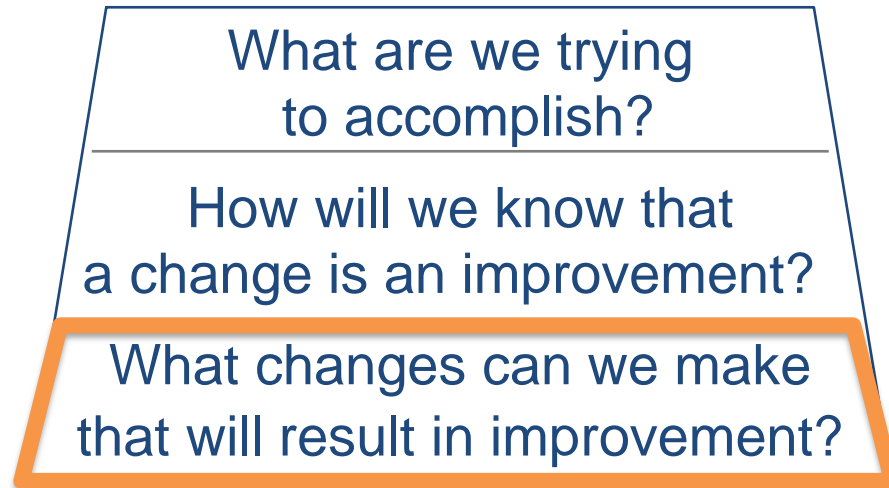
What changes can we make that will lead to improvement?

- Goal – Find and try out ideas!
- Ask, ask, ask
  - Use the literature: Evidenced Based QI
  - Use colleagues, & your own creativity
- Create your QI team
- Use your Discovery Tools
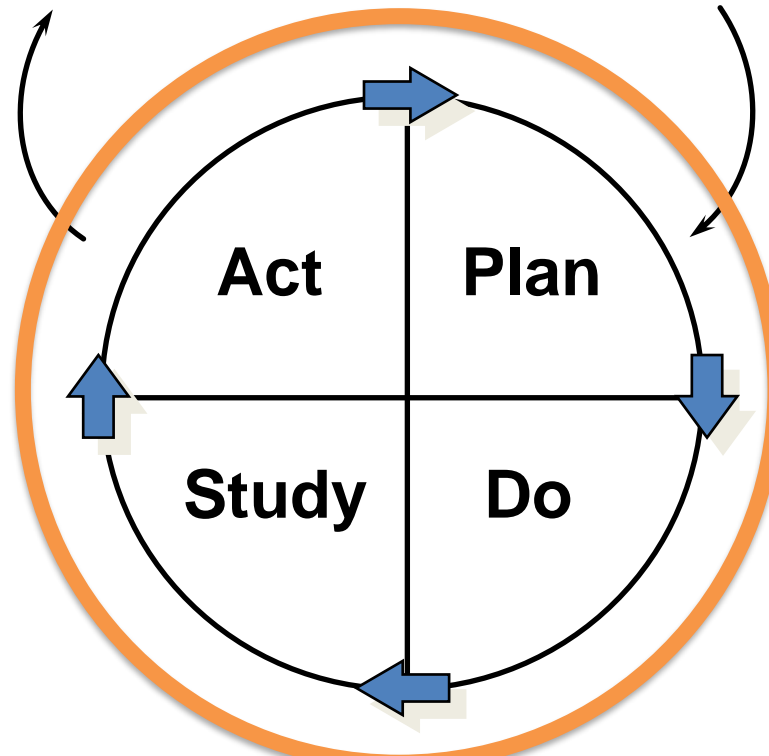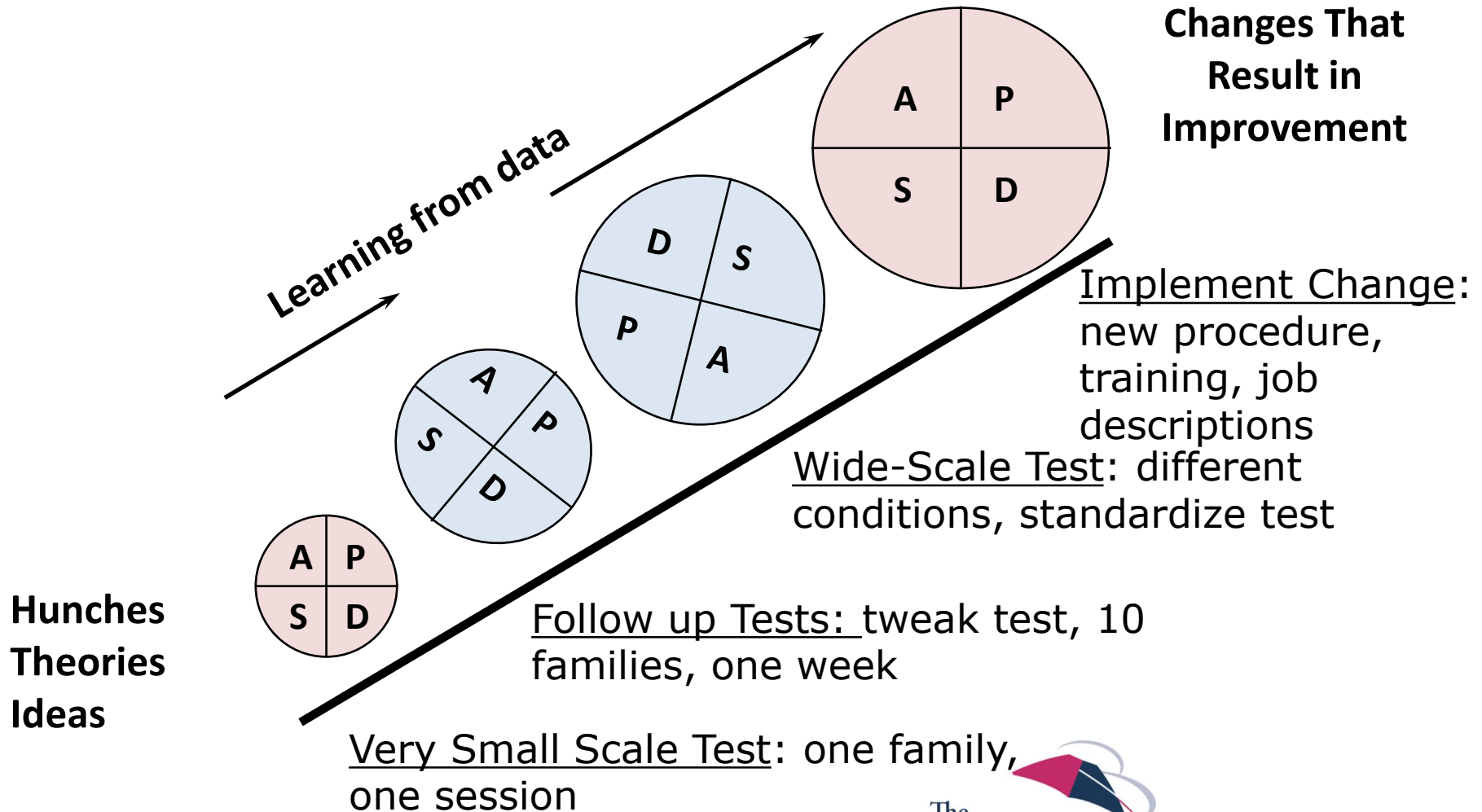
Have a beginner's mind!

> In the beginner's mind there are many possibilities, in the expert's mind there are few.
>
> —Shunryu Suzuki

Model for Improvement

What are we trying
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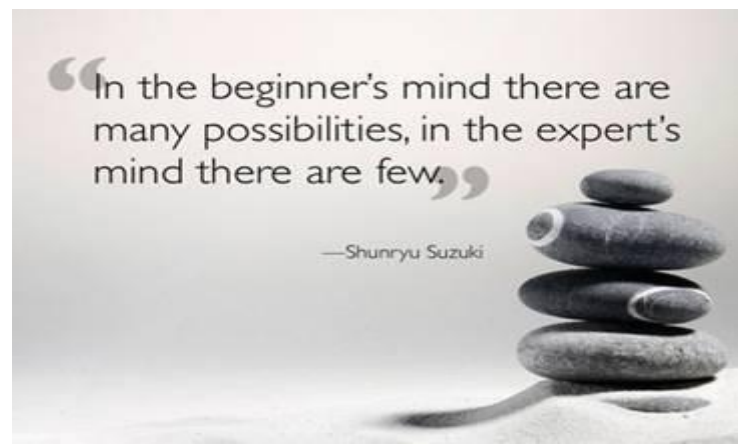
PDSA Ramp – Start small, spread fast

Changes That Result in Improvement

Learning from data

Implement Change: new procedure, training, job descriptions

Wide-Scale Test: different conditions, standardize test

Hunches Theories Ideas

Follow up Tests: tweak test, 10 families, one week

Very Small Scale Test: one family, one session

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The first idea is rarely the best idea

Understanding the Big Picture

Improvement Initiative

+

PDSA

Run charts
Pareto charts
Tally sheets
5 why's
Process mapping
7 wastes
FMEA
Value stream mapping
Fishbone diagrams
5S
Kaizen events
Project charters
SPC charts
Affinity diagrams
SIPOC
Brainstorming
Many many more…….

Tools that Generate Change Concepts

Achieve Your AIM
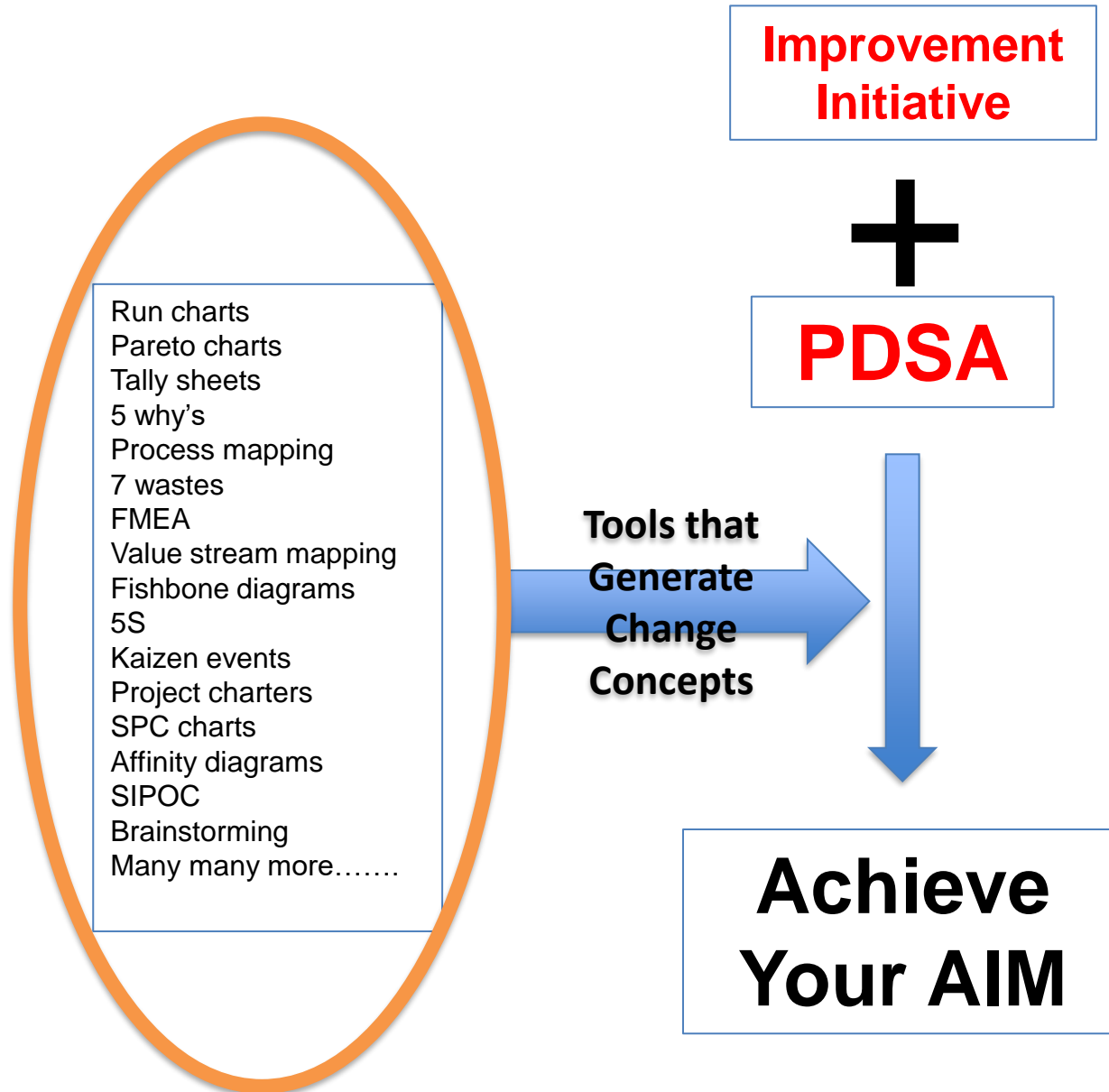
Discovery Tools

Discovery Tools

- Tools are intended to help: they are the means, not the ends

- Tools inform one another and are interrelated

- Not expected that you use all of them every time

Key Driver Diagrams

Key Driver Diagrams

- Organizes the Model for Improvement for a specific aim.

- Key Drivers: all the factors that contribute to desired outcome

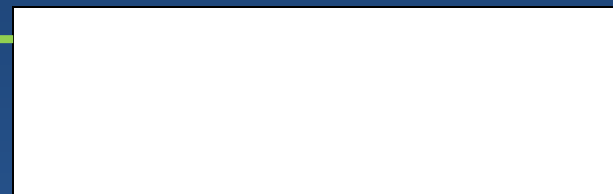- Identifying key drivers helps focus the selection of changes to be tested.
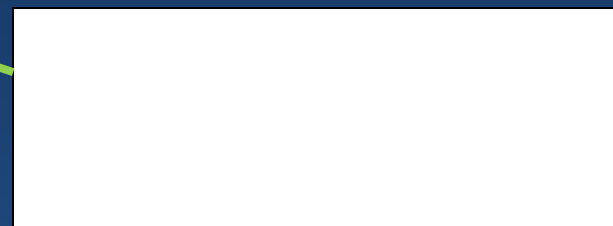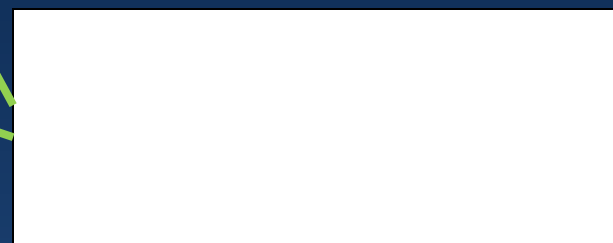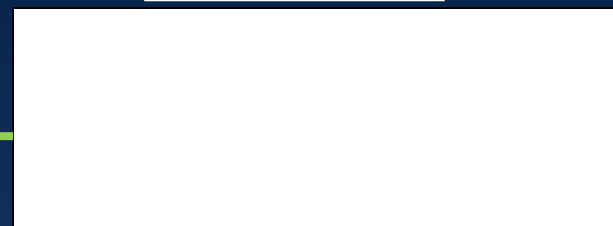
Key Driver Diagram

Interventions

Key Drivers

SMART Aim

**Overall Outcome/
Global Aim:**

Pizza!

Interventions

Key Drivers

SMART Aim

By December 31, 2024, 95% of pizzas will be delivered within 30 minutes of order being placed.

Overall Outcome/ Global Aim: We will run the most popular pizza shop in the Bronx

Pizza Delivery Example

Interventions

Key Drivers

Aim

By December 31, 2024, 95% of pizzas will be delivered within 30 minutes of order being placed.

Vehicles available and fully operational

Sufficient ingredients

Communication with customers

Timely prep of pizza

Defined Delivery Area

Pizza Delivery Example

Key Drivers

Interventions

Aim

By December 31, 2024, 95% of pizzas will be delivered within 30 minutes of order being placed.

Vehicles available & fully operational

sufficient ingredients

Communication

Timely prep of pizza

Appropriate Delivery Area

- Hire workers

- Buy cars

- Establish a schedule for ingredient delivery

Enough phone lines

Designate person to answer the phone

- Ovens in good working order

- Larger ovens

- Establish delivery area boundaries

GPS system to bypass traffic

Flow Charts (aka Process Maps)

Flow Charts (aka Process Maps)

- Explain whole process to key stakeholders
- Demonstrate complexity, find redundancy, note ill-defined steps
- Identify steps that you think are being done differently than they actually are
- Identify all people involved, so you know who to involve in change project

Identify areas for improvement:

- Waste

- Communication issues

- Areas of common errors or breakdown of process

- Downstream effects of problems at specific steps

# EXAMPLE 1: PATIENT WAIT TIME PROCESS FLOW
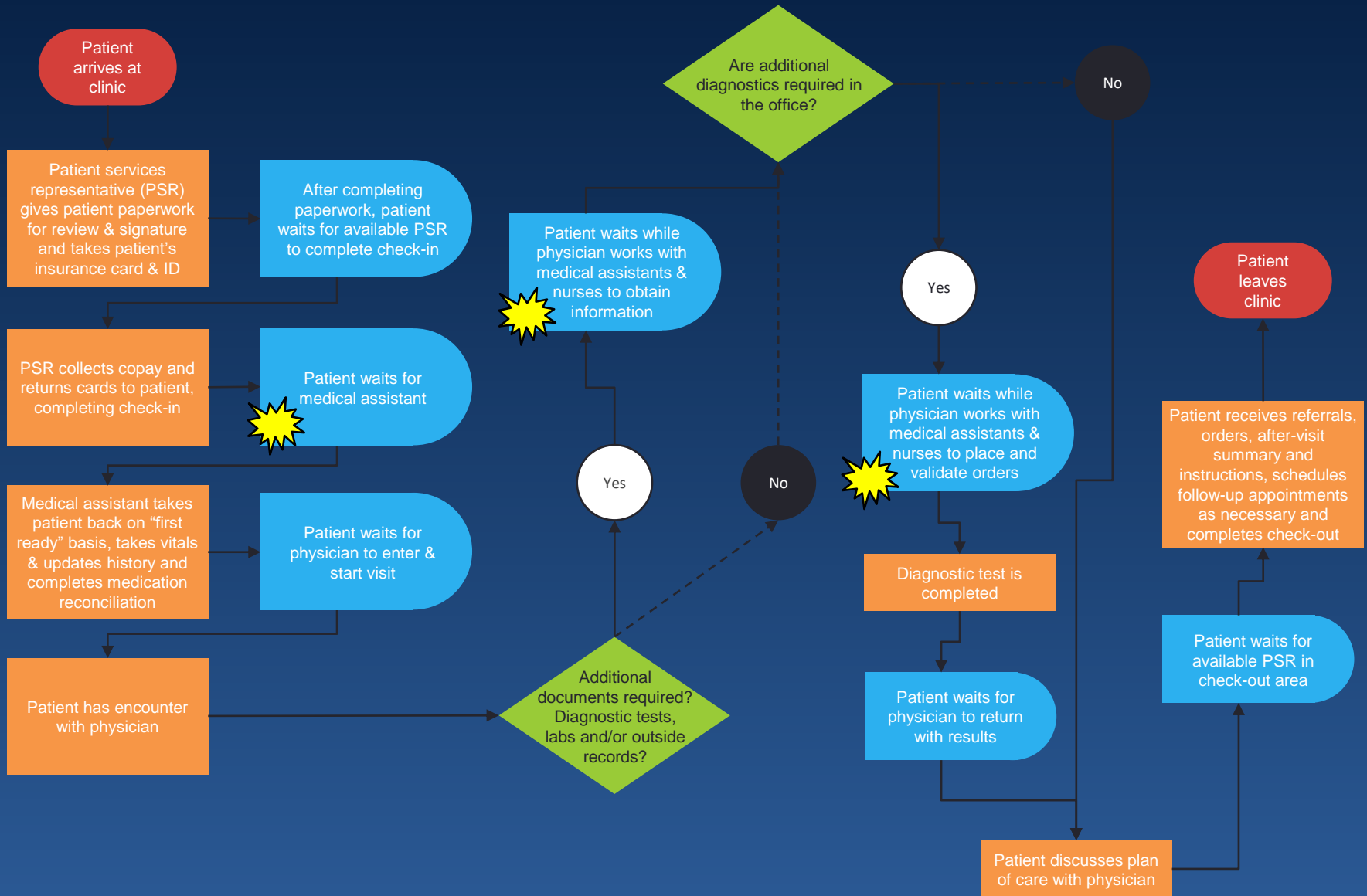
Fishbone Diagrams

Fishbone Diagrams

- Also known as an Ishikawa Diagram or a Cause and Effect Diagram
- Identifies all the challenges or barriers to achieving desired outcome
- Organizes into categories the multiple causes of an effect
- Encourages brainstorming

Ishikawa/Fishbone Diagram


Montefiore Center for Performance Improvement
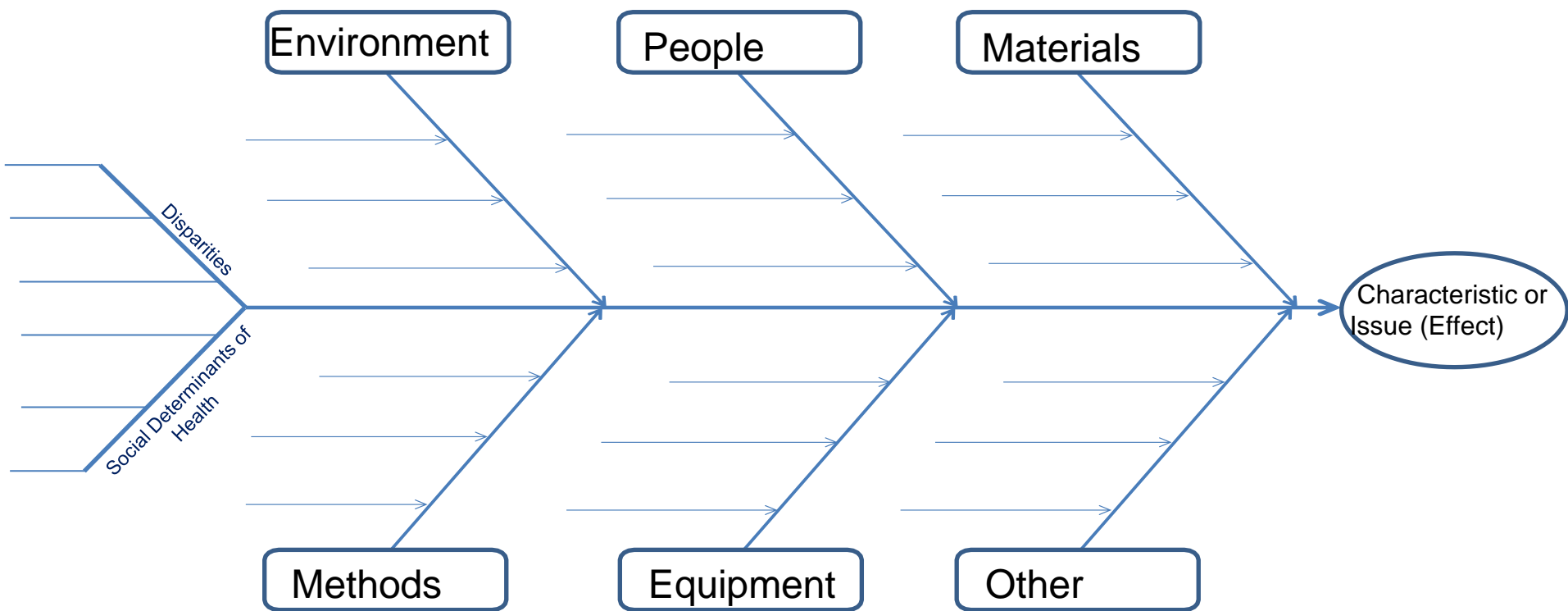
Pareto Charts

Pareto Charts

- Based on Pareto Principle: In any set of factors that contribute to a common effect, a relatively few contributors account for the majority of the effect (80/20).

- Visual depiction of this principle, identifies the 'vital few' versus the 'useful many'

What change will give the most 'bang for the buck?'

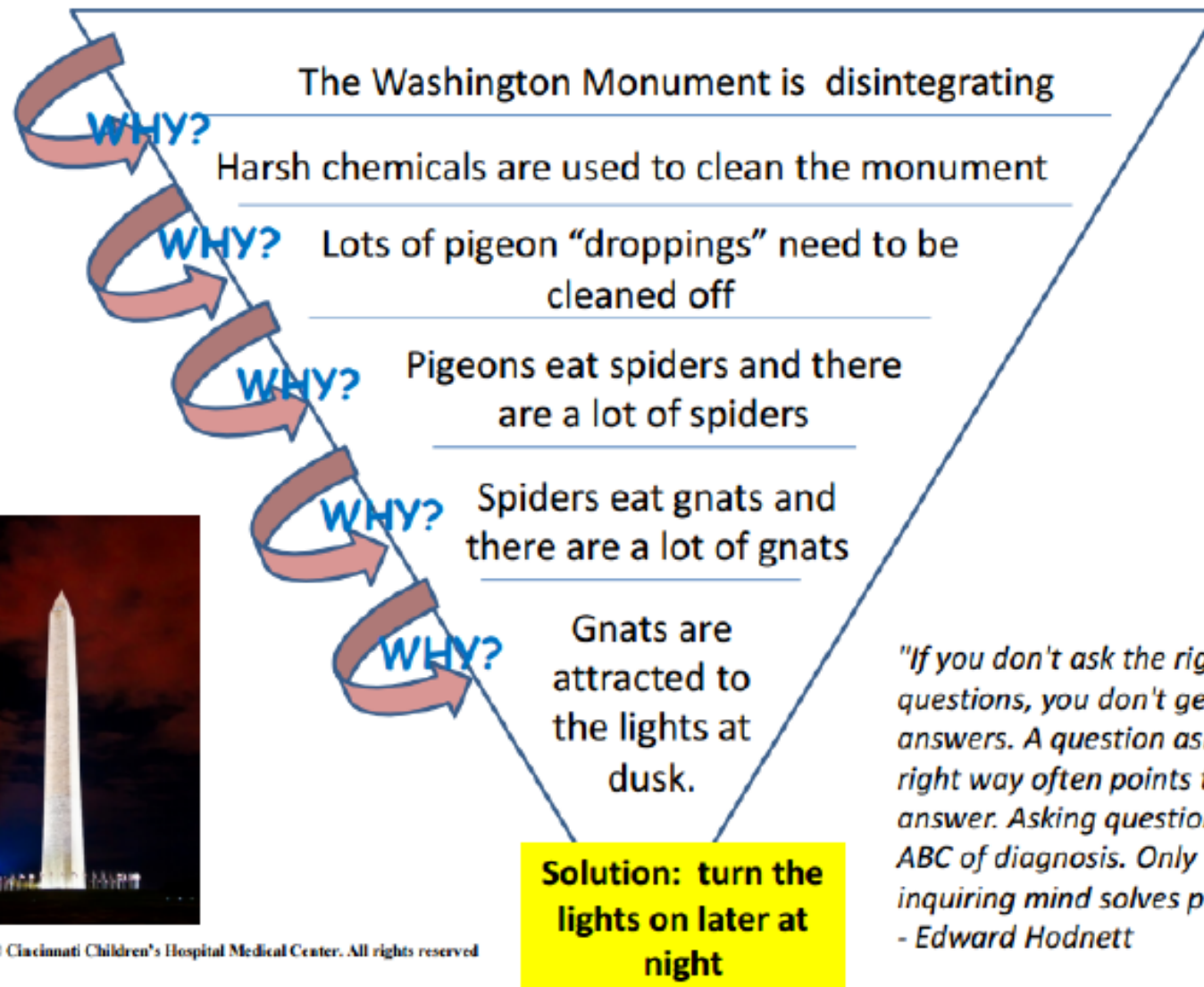**Reasons patients leave the hospital without a PCP appointment scheduled**
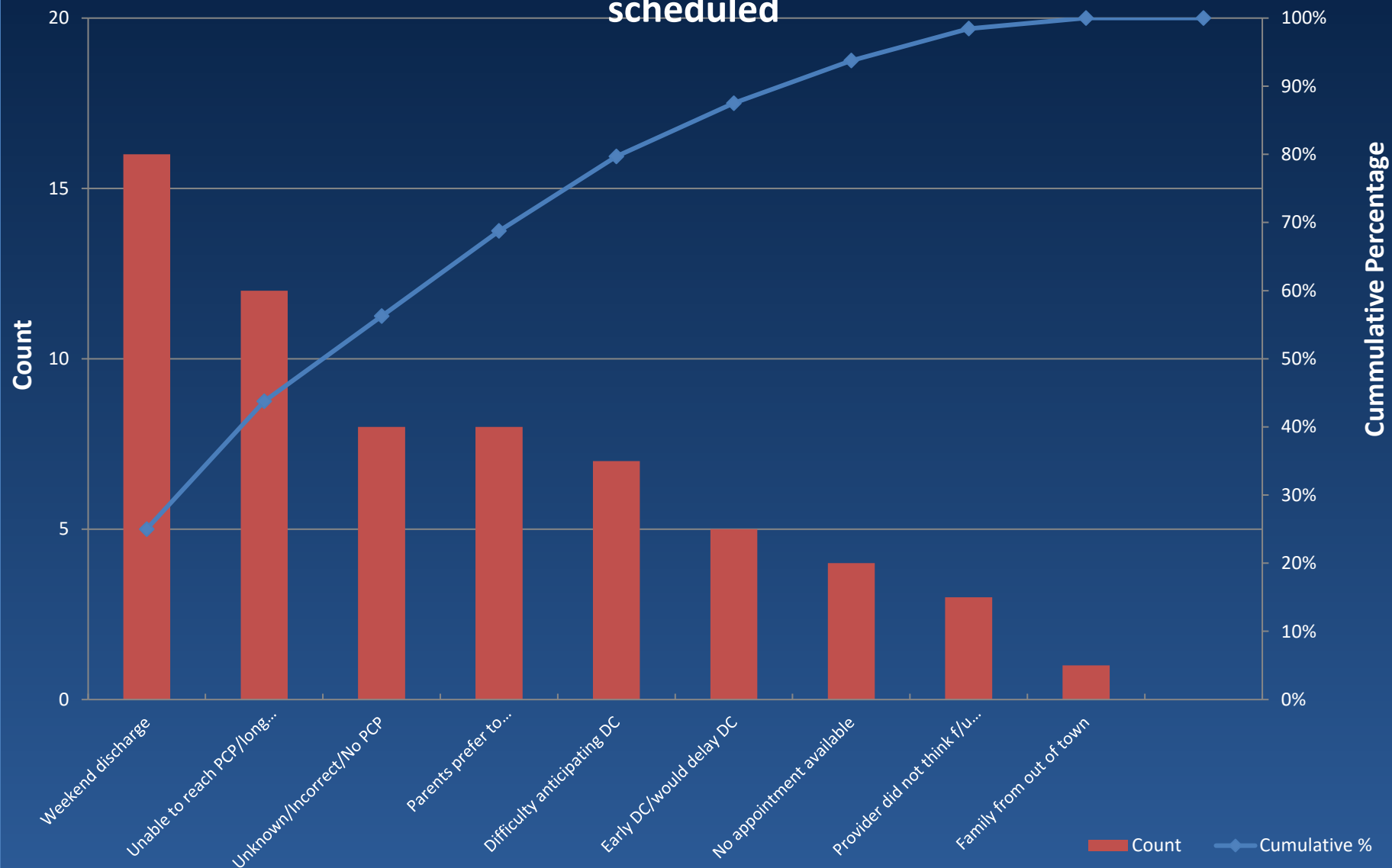
"5 Why's"

"5 Why's"

- By repeatedly asking the question "Why?", you can peel away the layers of symptoms which can lead to the root cause of a problem.

- Very often the proximate reason for a problem is not the underlying issue that needs to be fixed.

Ask Why At Least 5 Times

The Washington Monument is disintegrating

WHY?

Harsh chemicals are used to clean the monument

WHY?

Lots of pigeon "droppings" need to be cleaned off

WHY?

Pigeons eat spiders and there are a lot of spiders

WHY?

Spiders eat gnats and there are a lot of gnats

WHY?

Gnats are attracted to the lights at dusk.

Solution: turn the lights on later at night

"If you don't ask the right questions, you don't get the right answers. A question asked in the right way often points to its own answer. Asking questions is the ABC of diagnosis. Only the inquiring mind solves problems." - - Edward Hodnett
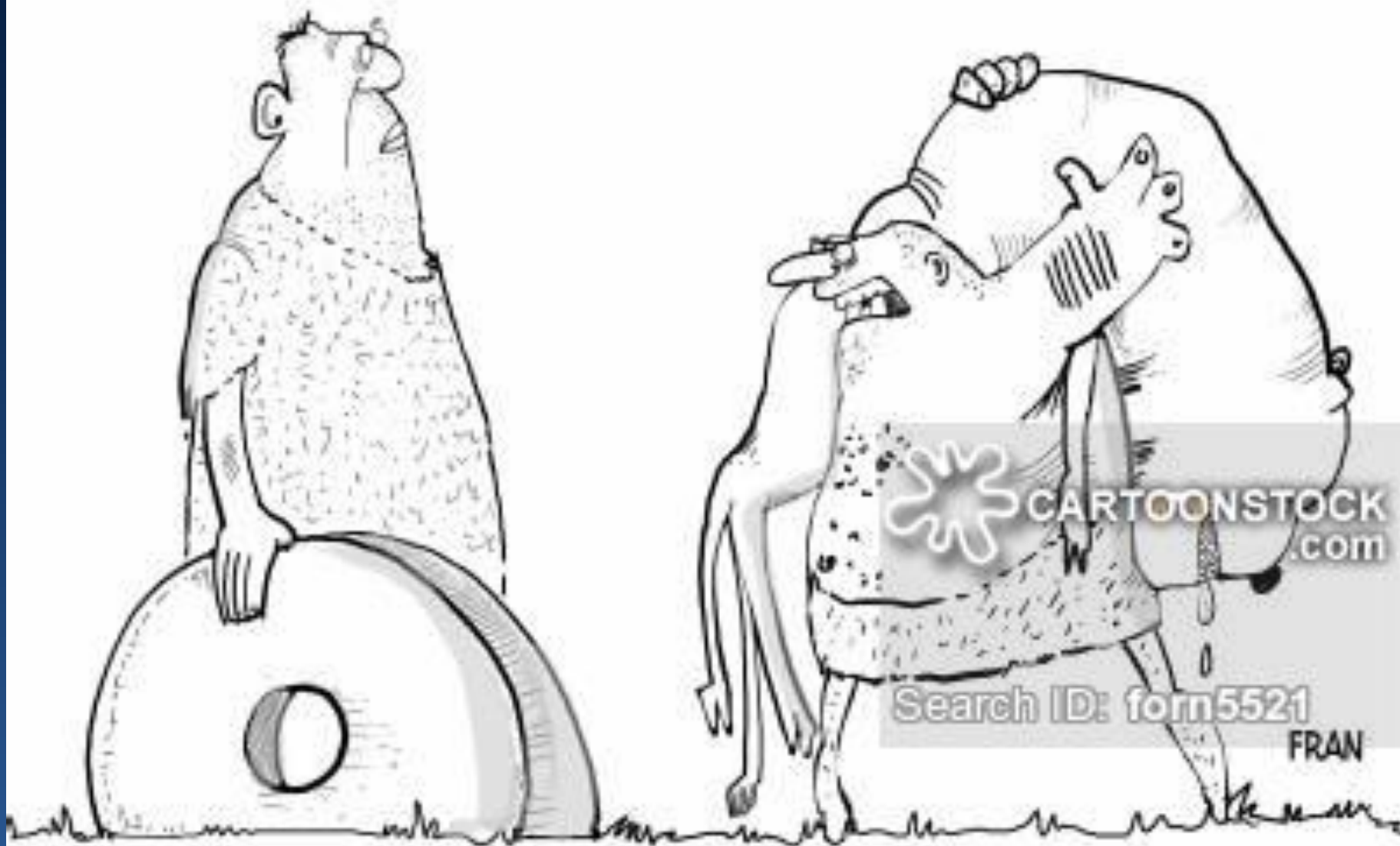
Damn change and newfangled ideas...if mindless back breaking work was good enough for my ancestors it's good enough for ME!

Conclusions:

1. Improving Patient Quality and Safety is one of your <u>central jobs</u> as a physician

    - Thousands of people die each year from lapses in Patient Quality and Safety

2. To improve Patient Quality and Safety you have to change <u>the system</u>

3. We must <u>study</u> changes to know if changes improve the system

    - Model for Improvement

What to expect during your fellowship:

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Questions?

Check out:

- Institute for Healthcare Improvement modules
- The Improvement Guide (Langley et al.)
- The Health Care Data Guide (Provost & Murray)

phametz@montefiore.org