Measurement for improvement. accelerating learning using Plan Do Study Act (PDSA) cycles

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Health Quality & Safety Commission New Zealand

Safe Use of Opioids National Collaborative

Learning Session Two

Hagley Oval, Christchurch (June 23rd and 24th, 2015)

Acknowledgements

- Many thanks to IHI and Mr. Robert Lloyd for some of the content in the following slides.

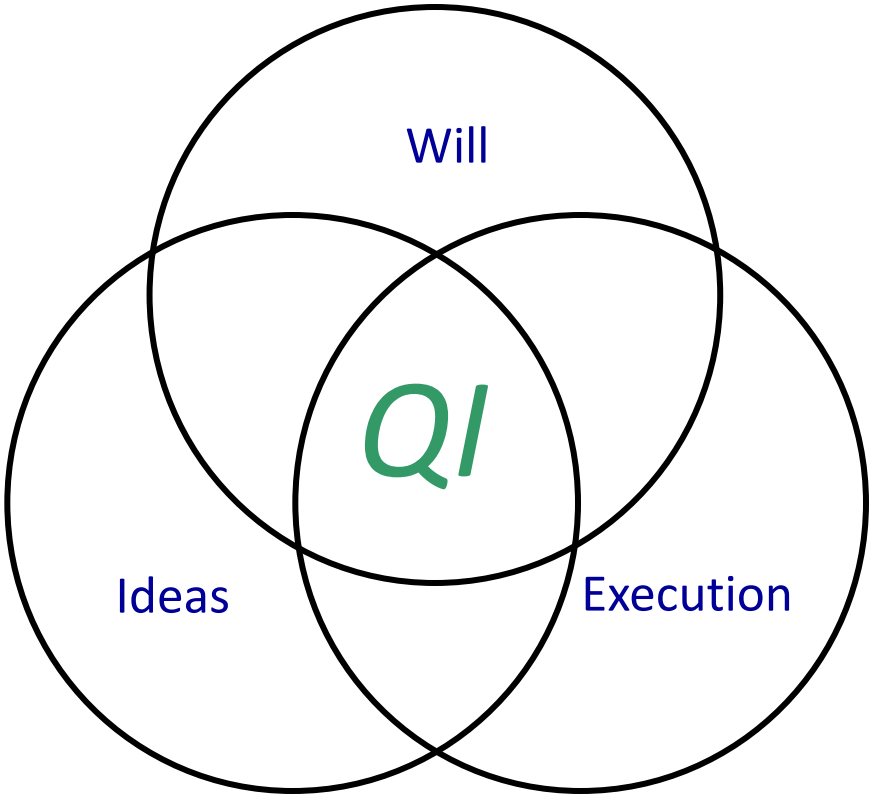
Discussion Topics

- Concept of the PDSA Cycle
- Change Concepts
- How to Perform a PDSA
- When to do PDSA
- Prioritizing Ideas
- Size of a Typical PDSA Test
- Moving to Scale

The Primary Drivers of Improvement

Having the *Will* (desire) to change the current state to one that is better

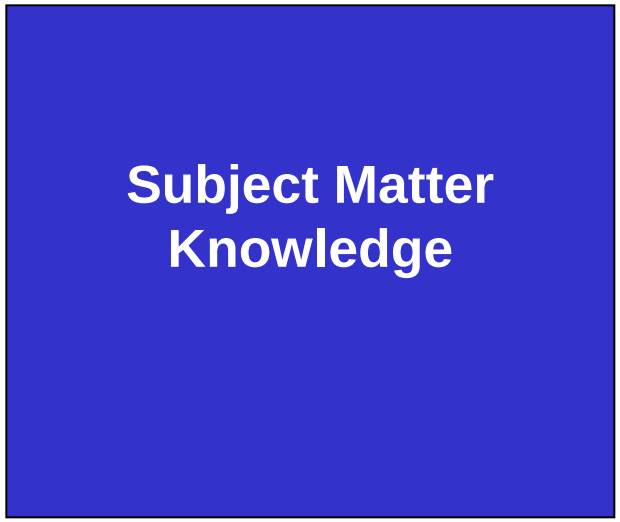
Developing *Ideas* that will contribute to making processes and outcome better

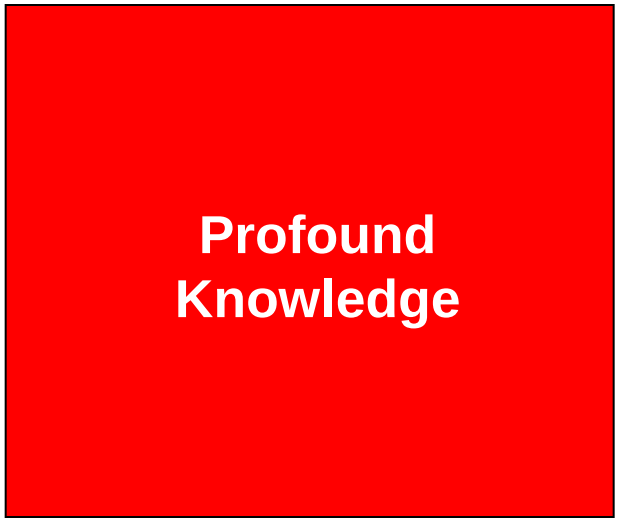


Having the capacity to apply CQI theories, tools and techniques that enable the *Execution* of the ideas

Two Types of Knowledge

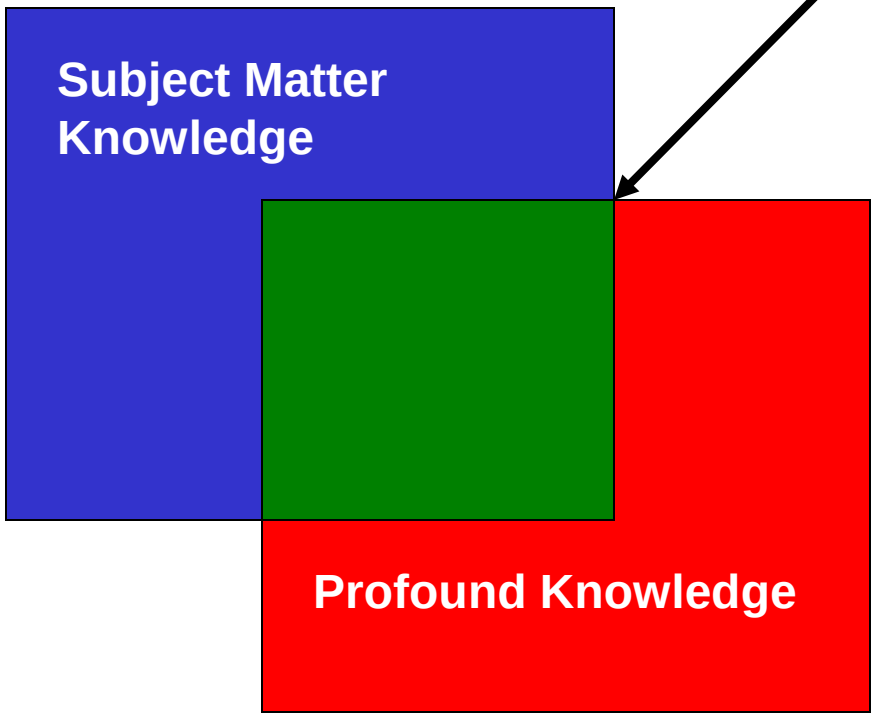
Subject Matter Knowledge: Knowledge basic to the things we do in life. Professional knowledge.





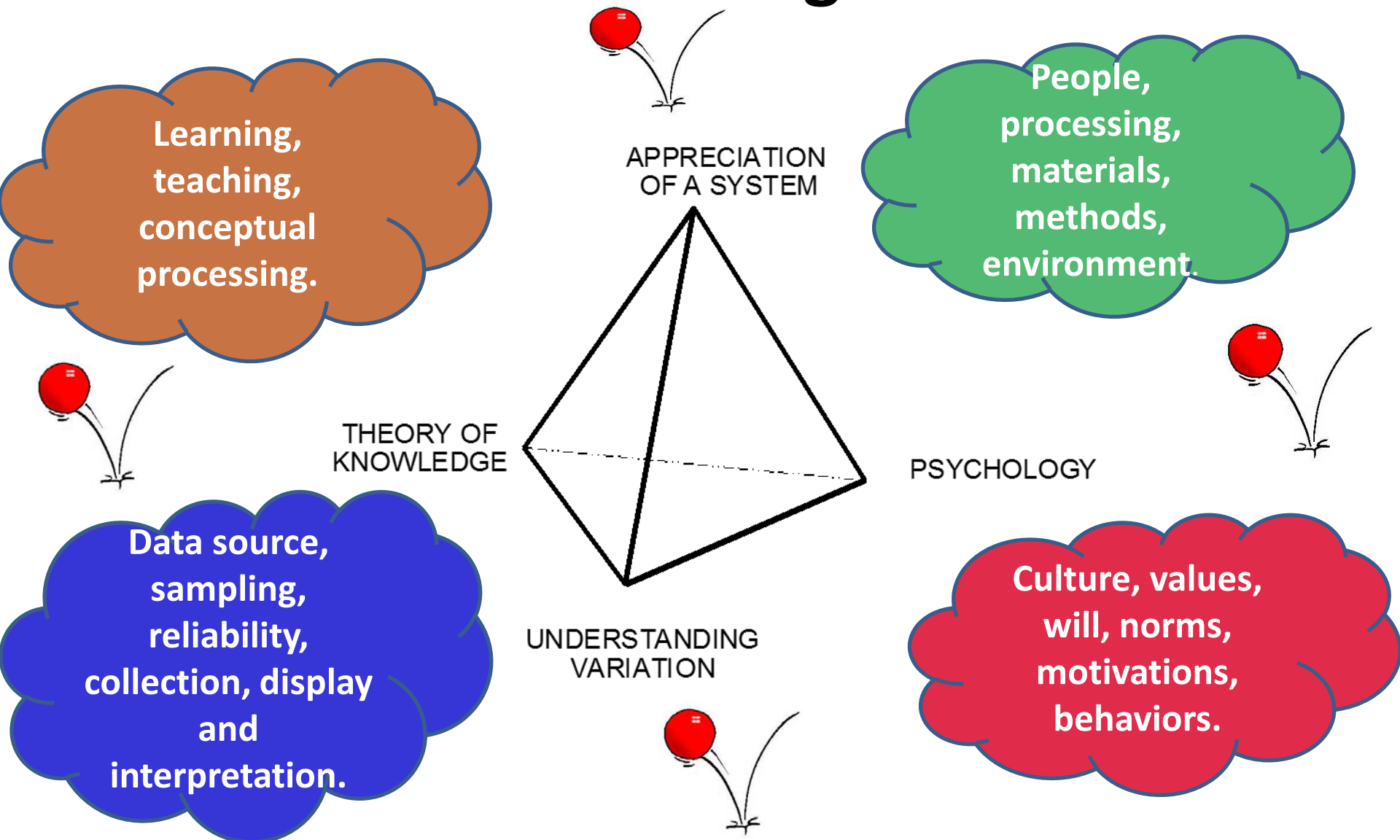
Profound Knowledge: The interaction of the theories of systems, variation, knowledge, and psychology.

Knowledge for Improvement



***Improvement*: Learn to combine subject matter knowledge and profound knowledge in creative ways to develop effective changes for improvement.**

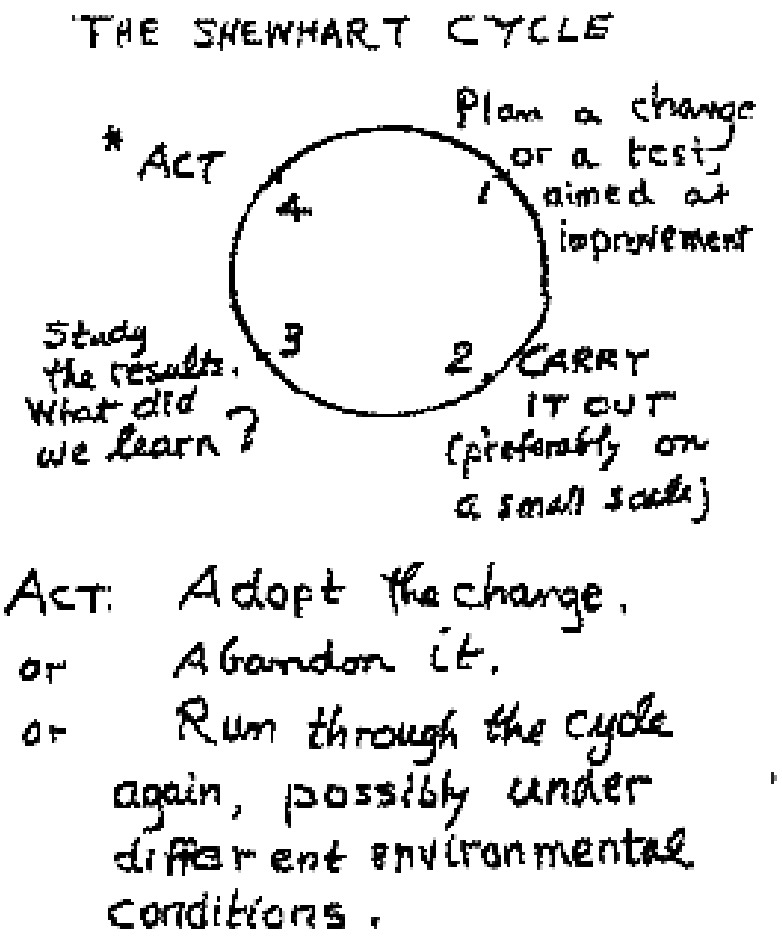
Dr. Deming's Lenses of Profound Knowledge



The Theory of Knowledge

- Importance of theory
- PDSA emphasizing prediction
- Operational definitions and no true value
- Judgment heuristics
- Double loop learning - importance of theory
- Different ways the people gain knowledge

Deming's Sketch of the Shewhart Cycle - 1985



Complete List of Change Concepts

Eliminate Waste

1. Eliminate things that are not used
2. Eliminate multiple entry
3. Reduce or eliminate overkill
4. Reduce controls on the system
5. Recycle or reuse
6. Use substitution
7. Reduce classifications
8. Remove intermediaries
9. Match the amount to the need
10. Use Sampling
11. Change targets or set points

Improve Work Flow

12. Synchronize
13. Schedule into multiple processes
14. Minimize handoffs
15. Move steps in the process close together
16. Find and remove bottlenecks
17. Use automation
18. Smooth workflow
19. Do tasks in parallel
20. Consider people as in the same system
21. Use multiple processing units
22. Adjust to peak demand

Optimize Inventory

23. Match inventory to predicted demand
24. Use pull systems
25. Reduce choice of features
26. Reduce multiple brands of the same item

Change the Work Environment

27. Give people access to information
28. Use Proper Measurements
29. Take Care of basics
30. Reduce de-motivating aspects of pay system
31. Conduct training
32. Implement cross-training
33. Invest more resources in improvement
34. Focus on core process and purpose
35. Share risks
36. Emphasize natural and logical consequences
37. Develop alliances/cooperative relationships

Enhance the Producer/customer relationship

38. Listen to customers
39. Coach customer to use product/service
40. Focus on the outcome to a customer
41. Use a coordinator
42. Reach agreement on expectations
43. Outsource for “Free”
44. Optimize level of inspection
45. Work with suppliers

Manage Time

46. Reduce setup or startup time
47. Set up timing to use discounts
48. Optimize maintenance
49. Extend specialist’s time
50. Reduce wait time

Manage Variation

51. Standardization (Create a Formal Process)
52. Stop tampering
53. Develop operation definitions
54. Improve predictions
55. Develop contingency plans
56. Sort product into grades
57. Desensitize
58. Exploit variation

Design Systems to avoid mistakes

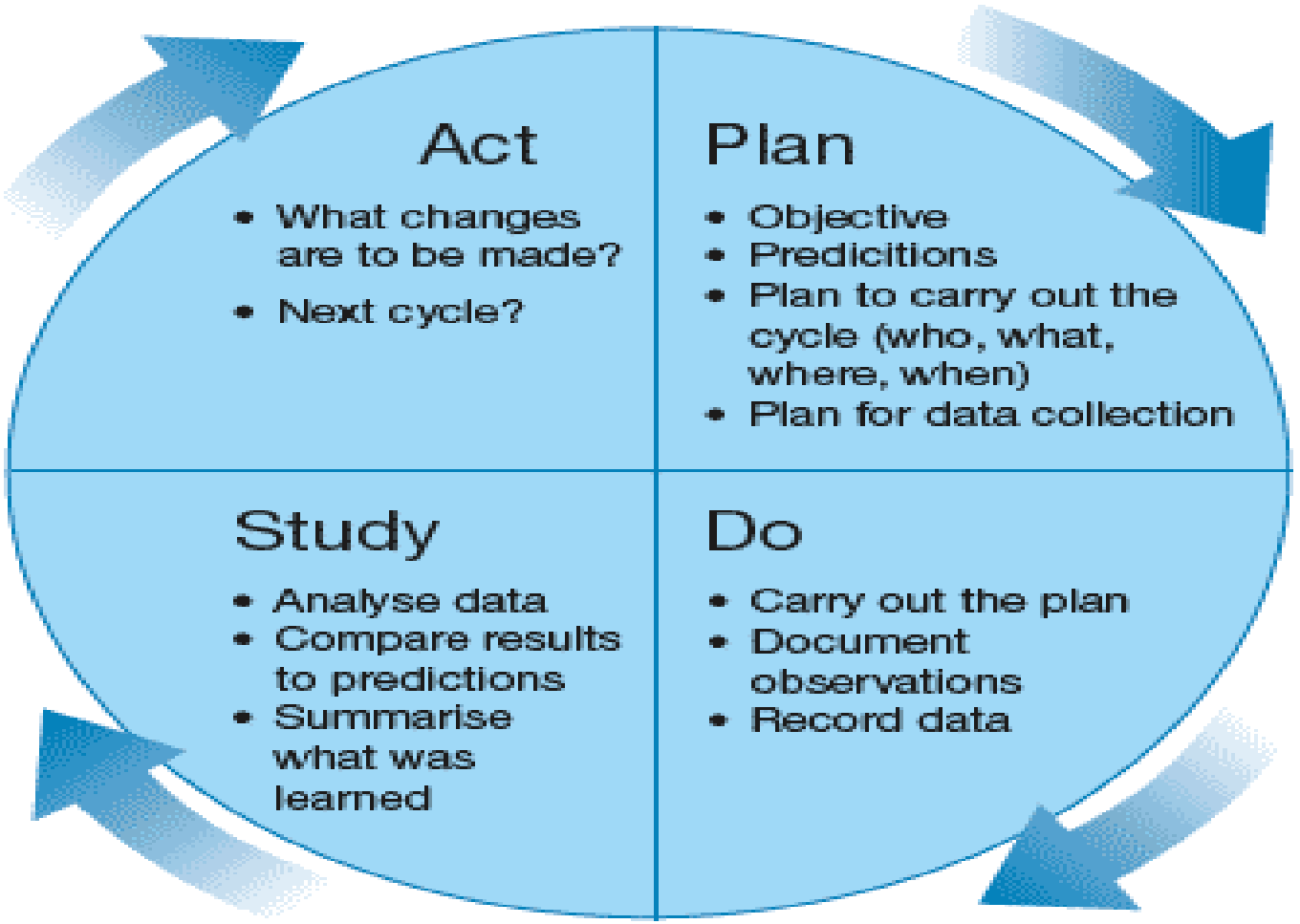
59. Use reminders
60. Use differentiation
61. Use constraints
62. Use affordances

Focus on the product or service

63. Mass customize
64. Offer product/service anytime
65. Offer product/service anyplace
66. Emphasize intangibles
67. Influence or take advantage of fashion trends
68. Reduce the number of components
69. Disguise defects or problems
70. Differentiate product using quality dimensions
71. Change the order of process steps (New)
72. Manage uncertainty, not tasks. (New)

Reference: The Improvement Guide, Langley, Nolan, Nolan, Norman and Provost, p.359

PDSA


Act
What changes are to be made?
Next cycle?
Plan
Objective
Predicitions
Plan to carry out the cycle (who, what, where, when)
Plan for data collection
Study
Analyse data
Compare results to predictions
Summarise what was learned
Do
Carry out the plan
Document observations
Record data

Components of a PDSA Cycle

PDSA Test #_____

Team:_____

Plan: Describe the Test:_____

Desired Outcome?_____

What Will It Improve?_____

What is Our Prediction on Impact?_____

Do: Collect Data and Analyze:

_____

_____

Study: What Did We Learn?

_____

_____

_____

Act: What Should We Do?

(Circle One): **ADD** **REVISE WITH ANOTHER PDSA** **SCRAP THE IDEA**

When To Do a PDSA

- To build belief in the change idea, that it will lead to an improvement.
- To help prioritize proposed changes.
- To evaluate the magnitude of improvement that a particular change might cause.
- To see if the proposed change will actually work in the environment in which it is being tested.
- To decide which combinations of changes will have the desired effects on the problem you are trying to solve.
- To evaluate costs, social impact and side effects from the proposed change.
- To minimize resistance if an when the change is implemented.

A Few Important Tips About PDSA Cycles

- Don't test what you already know to be true.
  - Example: Raincoats and umbrellas help to keep you dry when it's raining. It does not require a test.
  - Avoid elucidating the obvious.
- Test ideas out often and rapidly. Do not wait and test one PDSA after every monthly data collection cycle.
- Small is best. Try it on one patient. Better yet, simulate a patient experience.
- To succeed, fail fast, fail often and learn always.
- Use surrogate measures.
  - Example: if your outcome is a reduction in OIC cases, and your change is adoption of a particular treatment protocol, study in 1-2 persons the number of steps of the protocol that were successfully implemented in the next two patients using your idea of academic detailing of providers.
  - Did teaching work? Is it durable? What seemed to work and what did not? Use these questions to modify your approach.

Reaching Consensus on What to Test: Normative Group Process

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Helps group work in non-hierarchical informal way.

Allows freedom of ideas with the general concept being that there is “no bad idea”.

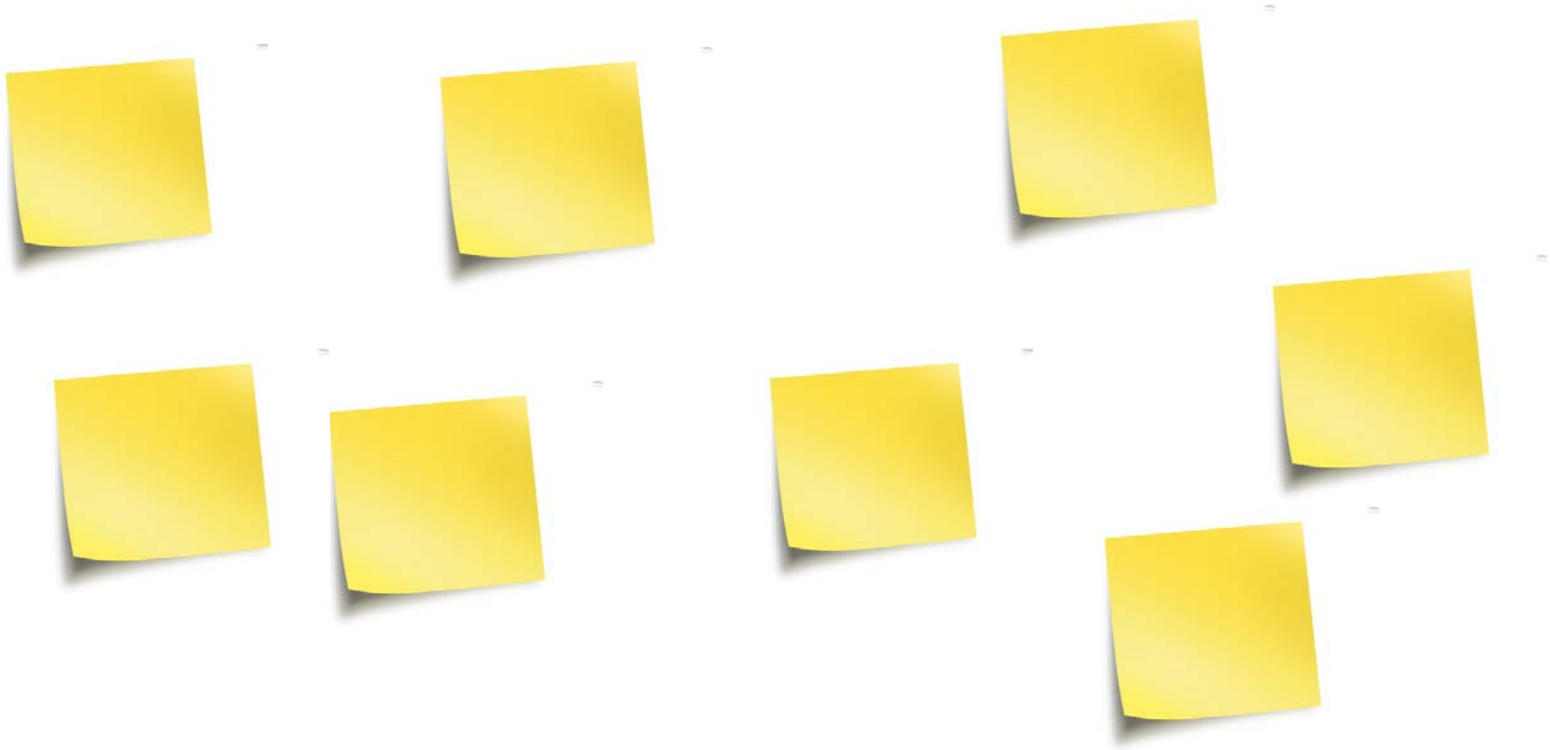
“Jazz Riffing” Concept

Allows group to expand ideas that might not have previously been expressed.

Balances the will of the group against pragmatic constraints and individual preference.

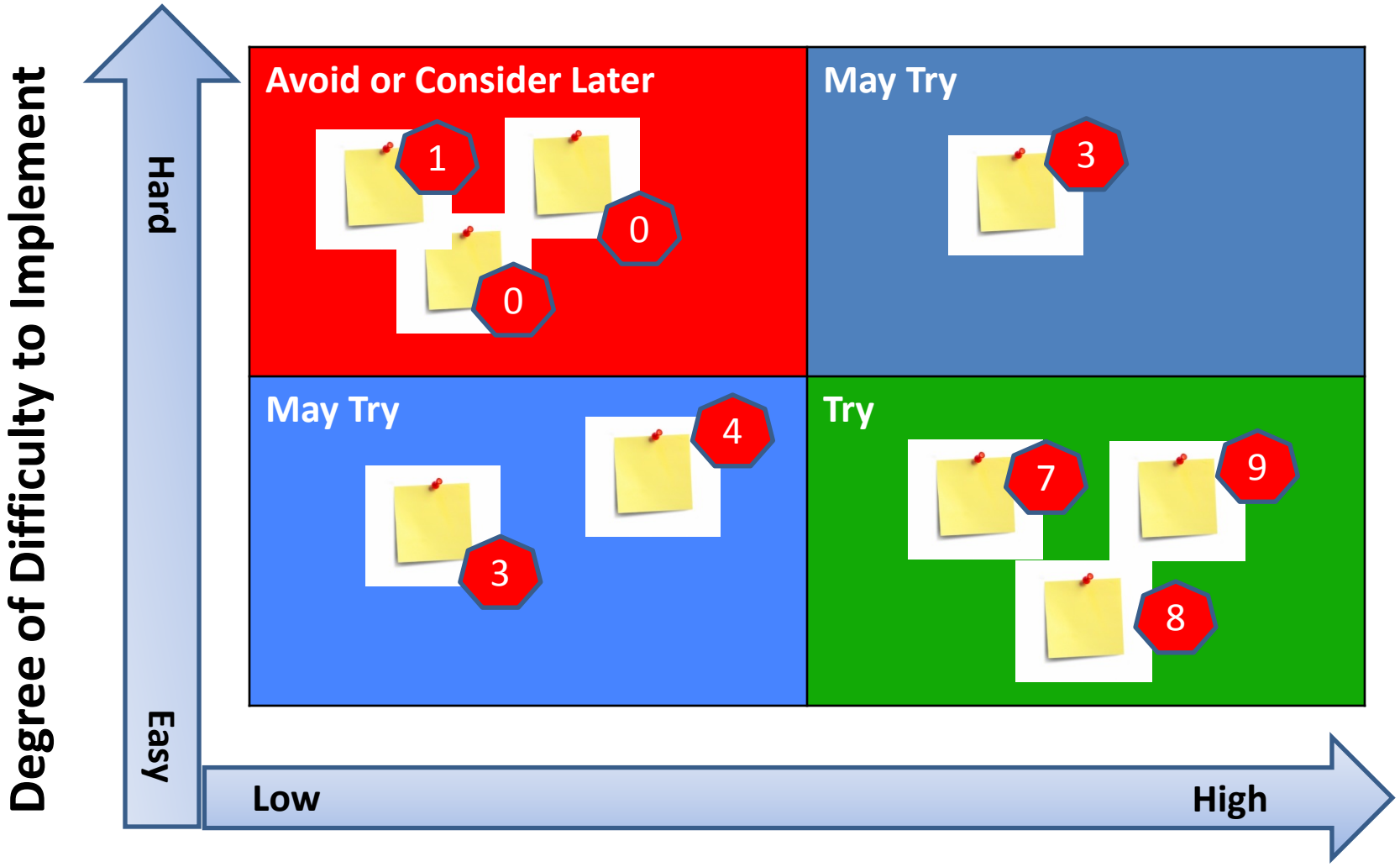
Group Idea Collection Board

Change Ideas

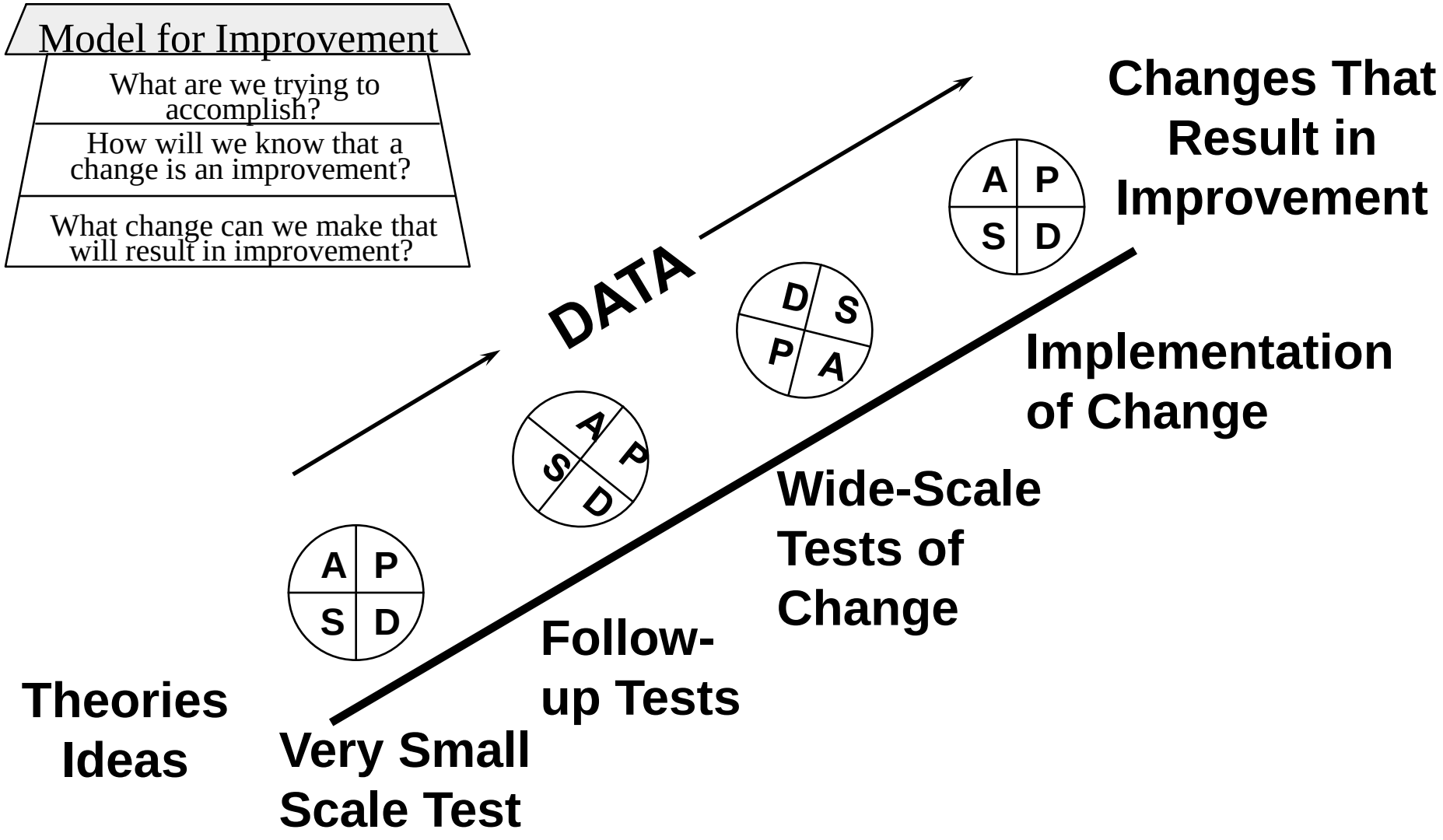


Team Information: Print and Hand to Team

Normative Group Process Grid



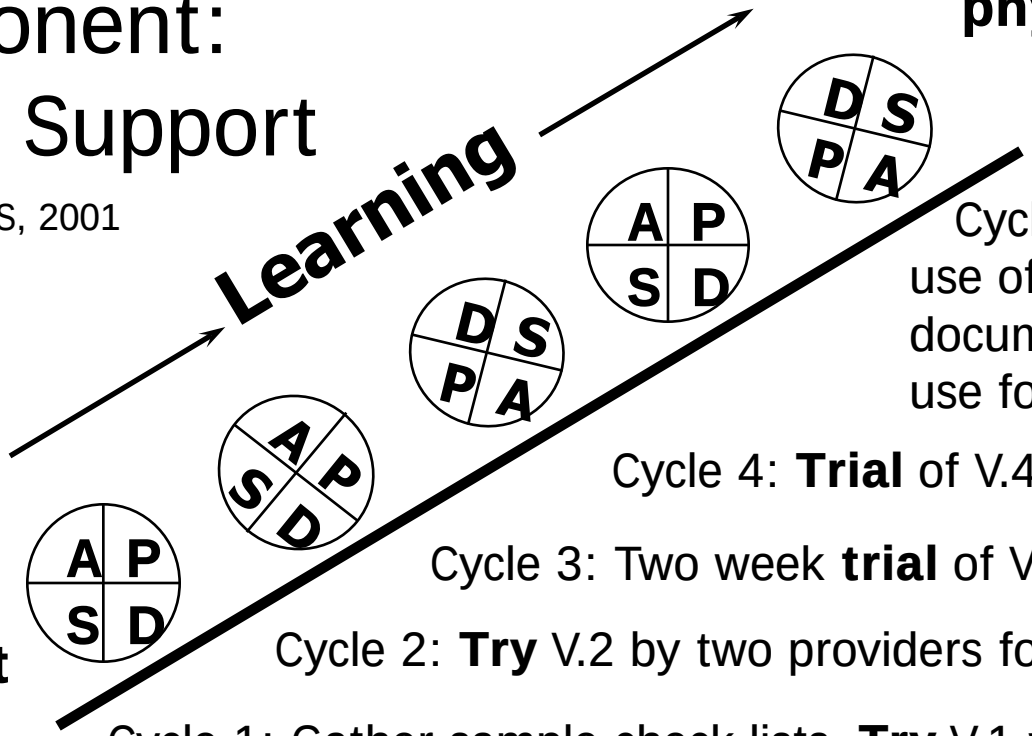
Repeated Use of the PDSA Cycle



Multiple Cycles to Implement Components of the Chronic Care Model

Component:
Decision Support

Chinatown, Asthma BTS, 2001



Use of Flow sheet V.4 by all physicians and nurses

Cycle 5: Implement use of V.4, do peer documentation and use for al visits

Cycle 4: **Trial** of V.4 by all providers

Cycle 3: Two week **trial** of V.3, review meetings

Cycle 2: **Try** V.2 by two providers for a few days

Cycle 1: Gather sample check lists. **Try** V.1 with two patients

Will a check list be useful for opioid patients?

Measurement for Improvement. The Red Ball Challenge

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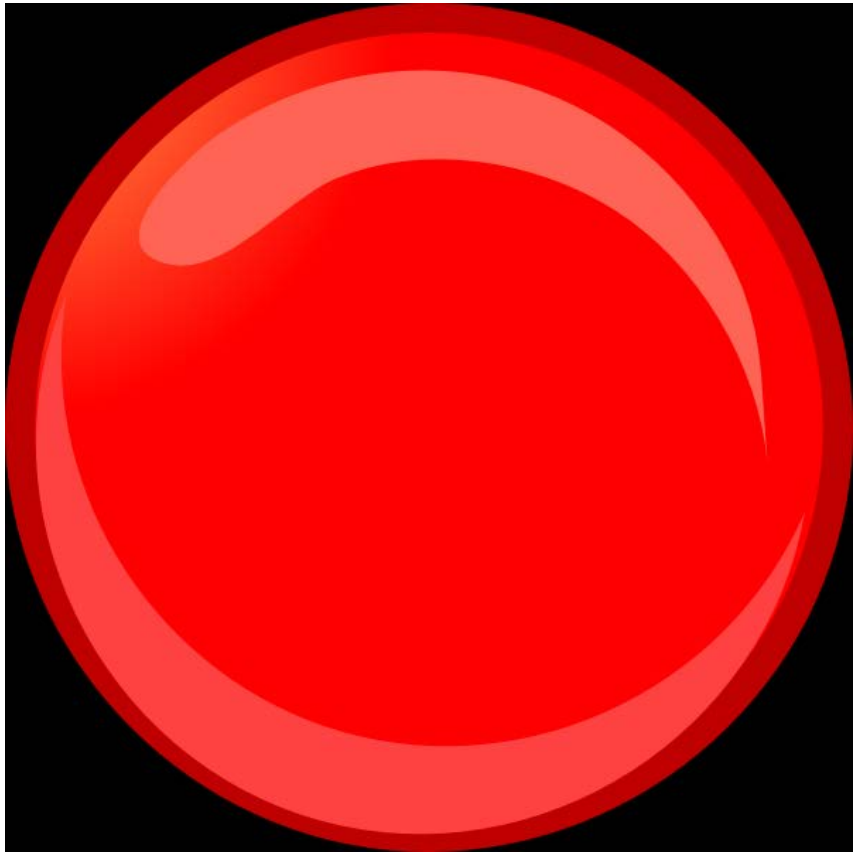
Format of the Group Exercise

- Describe the Challenge and Rules
- Show how the Model for Improvement is Tied to Various Tools and Methods Used in the Exercise
- Conduct the Exercise and Gather and Analyze Data
- Team Exercise Wrap Up Learning Discussion.

The Challenge

- You have been asked by your local health department to develop a highly reliable process for rapidly spreading contact of a new anti-septic which is administered person to person using a red ball.
  - Only casual contact of a person's hands with the ball is needed to assure antiseptic delivery.
- **The challenge is simple: Find the fastest way to have the ball contact as many people's hands in the shortest amount of time.**
- This challenge has been opened up to teams made up of an equal number of members.



The Rules

1. Ball much touch both hands of each participant.
    1) If a participant does not have one or both limbs, a portion of that participants body must be touched at least one time each cycle.
2. Fastest time to touch both hands of all group participants is the desired goal.
3. Must use group space allowed.
4. If ball comes into contact with the ground, prior to touching both hands of all participants the process must start over for all participants.
5. NO eavesdropping on other participant sessions.
6. Penalties and curveballs may occur
7. Time starts when called by referee.
8. You may not physically alter the shape, color or surface of the ball.
9. If a member of the team drops out, you must use another member twice to equal the number of members on the other team.
10. A PDSA must be completed in between each cycle or an extra 10 seconds is added to the groups time.

Team Information: Print and Hand to Team

Understanding How to Use the Model for Improvement

What Are We Trying to Accomplish?

- Aim Statement:
  - How much by when? (In this seconds to case cycles)
  - Example: We will develop a red ball process that can be accomplished successfully in XX seconds within XX cycles.

How Will We Know That a Change is an Improvement?

- Measurement over time with a Run or Control Chart:
  - Metric: Seconds to complete a cycle
  - Metric: Errors per cycle.
    - Error Types:
      - * Dropped Ball *Failure to document times and errors *Team member not touching ball.

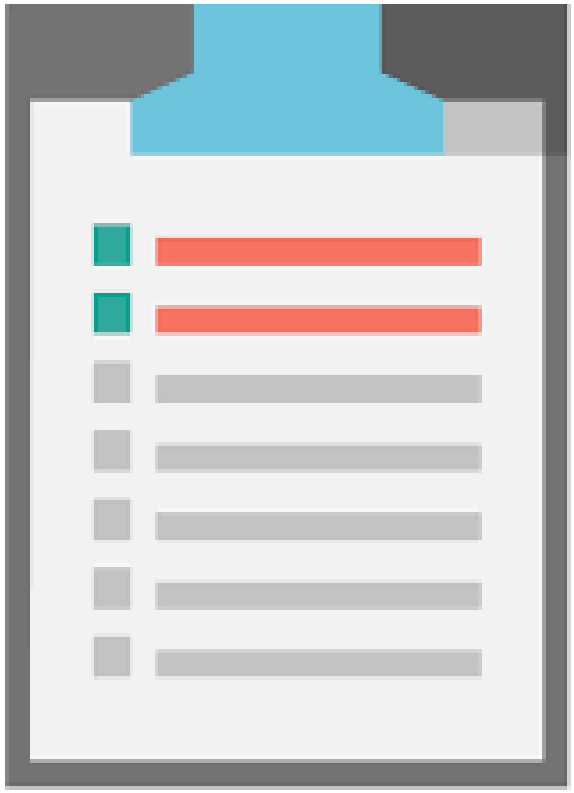
What Change Can We Make that Will Result in an Improvement?

- Normative Group Processing: Helps group reach consensus on what to test.
- Driver Diagram: Categorizes possible change concepts
- PDSA: Helps groups test ideas to gain confidence that a proposed change might work to improve cycle time.

Your Materials

Each Team Receives:

- 1 Red Ball per Team
- 5 Stacks of colored sticky notes (Green) Enough for 15 per member.
- 5 Red Sticky Dots Per Member
- A flip chart
- Stopwatch (Seconds)
- Pens
- Colored Markers
- Templates:
  - AIM Statement
  - Driver Diagram Template
  - Normative Group Process Grid
  - Data Collection Grid
  - Run Chart Templates
- Designated work zone



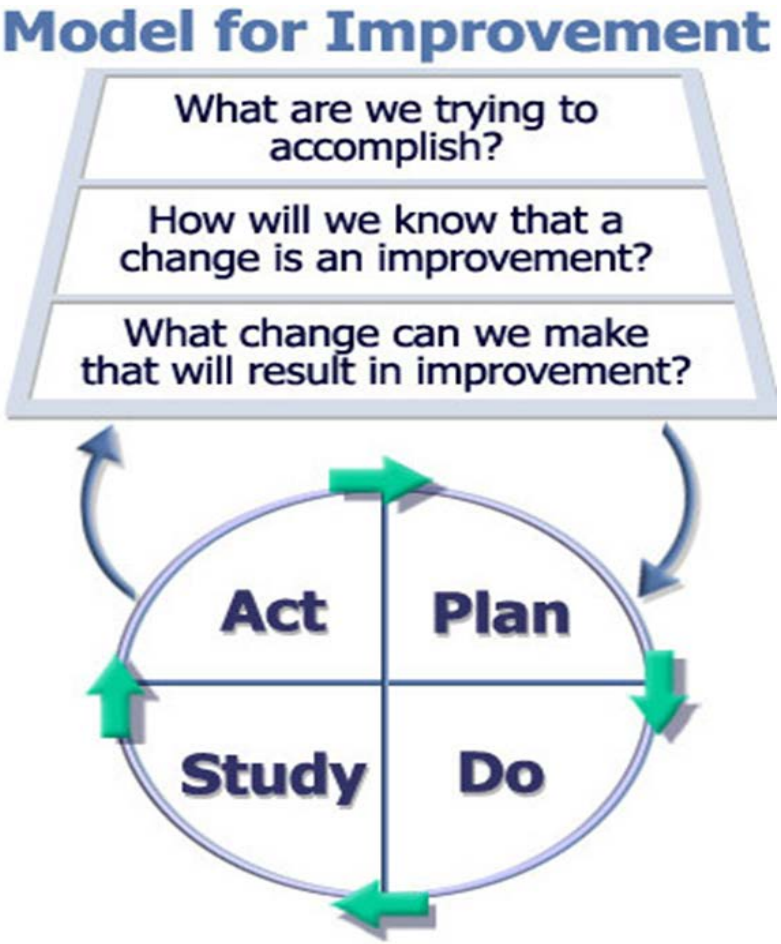
Organizational and Game Rules

- **Select Team Name , Timekeeper and Group Leader and Write Aim:**
  - All teams must select a Team Name and complete an Aim Statement prior to starting the Red Ball game..
  - 5 Minutes are allotted for this.
- **Complete a Driver Diagram and Select Ideas to Change Using the Normative Group Process:**
  - 15 minutes are allotted for this.
- **Benchmark Time for a Cycle is 65 seconds.**
  - A benchmarked baseline time of 65 seconds has already been established by a national testing committee.
- **Benchmark Error Per Cycle is One.**
- **In group PDSA events should be conducted between cycles based on testable ideas in the driver diagram and to test small changes in the process. Record PDSA's on the PDSA's sheet.**
- **Full group timed testing cycles will occur every 5 minutes.**
- **Every 3rd cycle, another 5 minutes may be given for teams to refine their driver diagrams.**
- **Data will be posted for each cycle in a run chart by an assigned team member.**
- **A total of 9 cycles will be run for the entire event.**
- **The team with the lowest time will be awarded the contract for the antiseptic ball process method.**

- If the ball is dropped on the ground, you must start the entire process over.
- The ball must physically change hands from one person to another in order for the antiseptic to work.
- You may not physically alter the shape, color or surface of the ball.
- If a member of the team drops out, you must use another member twice to equal the number of members on the other team.
- Your timekeeper is responsible to report all times and errors to the head timekeeper for the event for comparison. Failure to report a time or error will lead to your point for that part of the cycle equaling the benchmark time.
- You may not leave the room during the timed events.
- QA Inspectors will assure the count of the teams is correct, that rules are followed and errors and data are recorded correctly and that teams correctly report their times and accurately update their AIM statements, Driver diagrams, Run charts and Grids.
- Teams must stay within their zones in the room but are free to use their space however they like.

Team Information: Print and Hand to Team

The Model for Improvement



Team Information: Print and Hand to Team

Model AIM Statement

- **Primary Aim**
  - Our Group Will Improve The Red Ball Antiseptic Transfer Process by Reducing our Group Transfer Time to [ ] Seconds Within [ ] Cycles.
- **Secondary Aim:**
  - Our Group Will Reduce Red Ball Antiseptic Process Errors per Cycle for Our Group to [ ] Errors Within [ ] Cycles.

Team Information: Print and Hand to Team

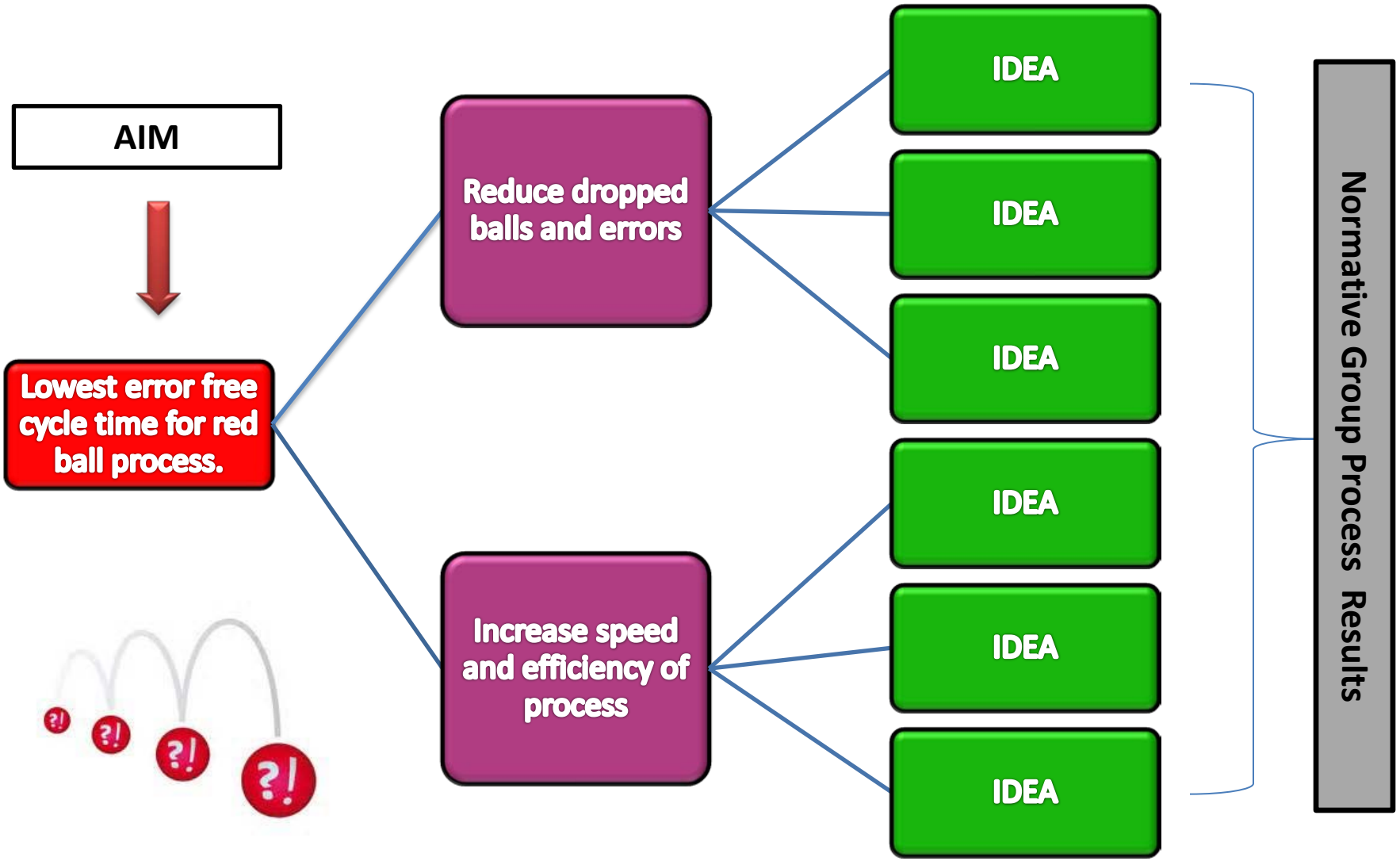
Metrics:

- **Metric One:**
  - Number of second to complete a red ball antiseptic delivery process cycle.
    - Seconds per cycle
- **Metric Two:**
  - Number of Errors per cycle
    - Errors per cycle
      - Annotate type of error in grid or on run chart.

What type of data are you collecting? (Attribute, Variable or Both)
If you had enough data points in a baseline, what type of control chart would you select for each metric?
Are these outcome, process or balancing metrics?

Team Information: Print and Hand to Team

Sample Driver Diagram for Red Ball Process



Team Name and Member List

Team Name:

Members:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.

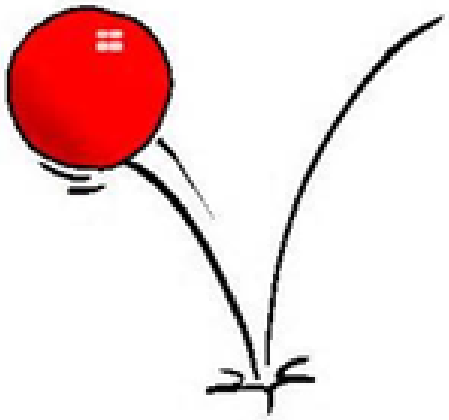
Members (continued):

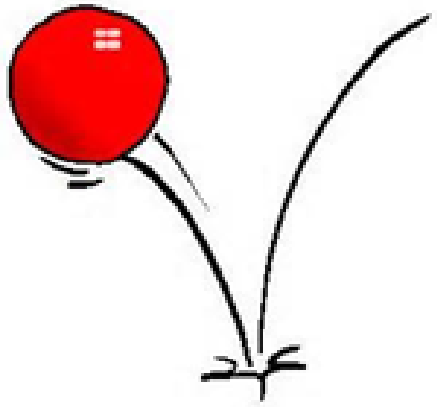
12.
13.
14.
15.
16.
17.
18.
19
20.
21.
22.
23.
24.
25.

Sponsor:
Timekeeper:
Group Leader(s):

Group Idea Collection Board

Reduce Errors	Improve Speed and Efficiency

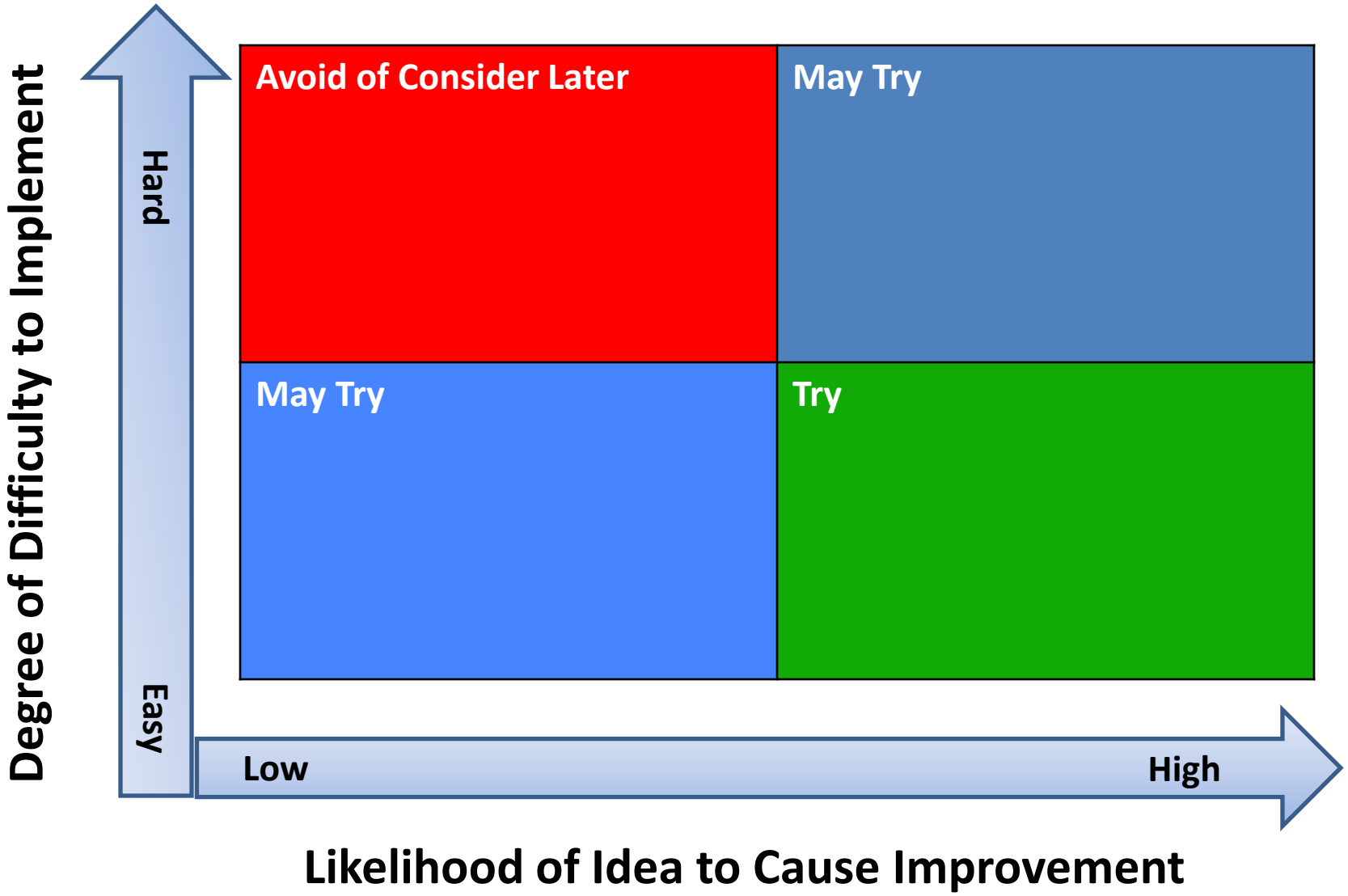




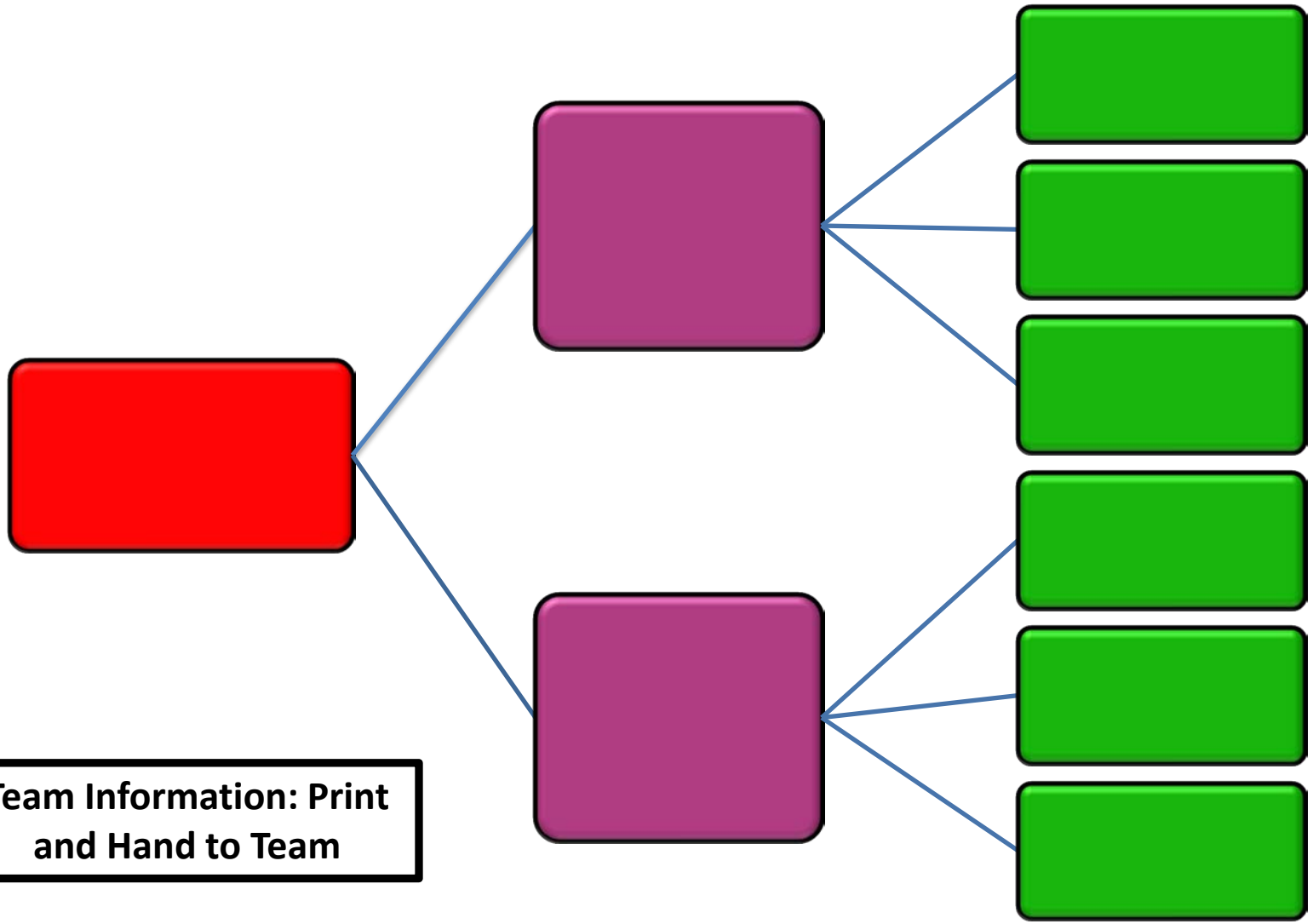
Team Information: Print and Hand to Team

Team Information: Print and Hand to Team

Normative Group Process Grid



Blank Driver Diagram for Group Use



Team Information: Print and Hand to Team

Team Information: Print and Hand 15 Copies to Each Team

PDSA Template

PDSA Test #_____ **Team:_____**

Plan: Describe the Test:_____
Desired Outcome?_____
What Will It Improve?_____
What is Our Prediction on Impact?_____

Do: Collect Data.

_____
_____

Study: What Did We Learn?

_____
_____
_____

Act: Should We Add it to the Red Ball Process, Revise With Another PDSA or Scrap Idea?

(Circle One): **ADD** **REVISE WITH ANOTHER PDSA** **SCRAP THE IDEA**

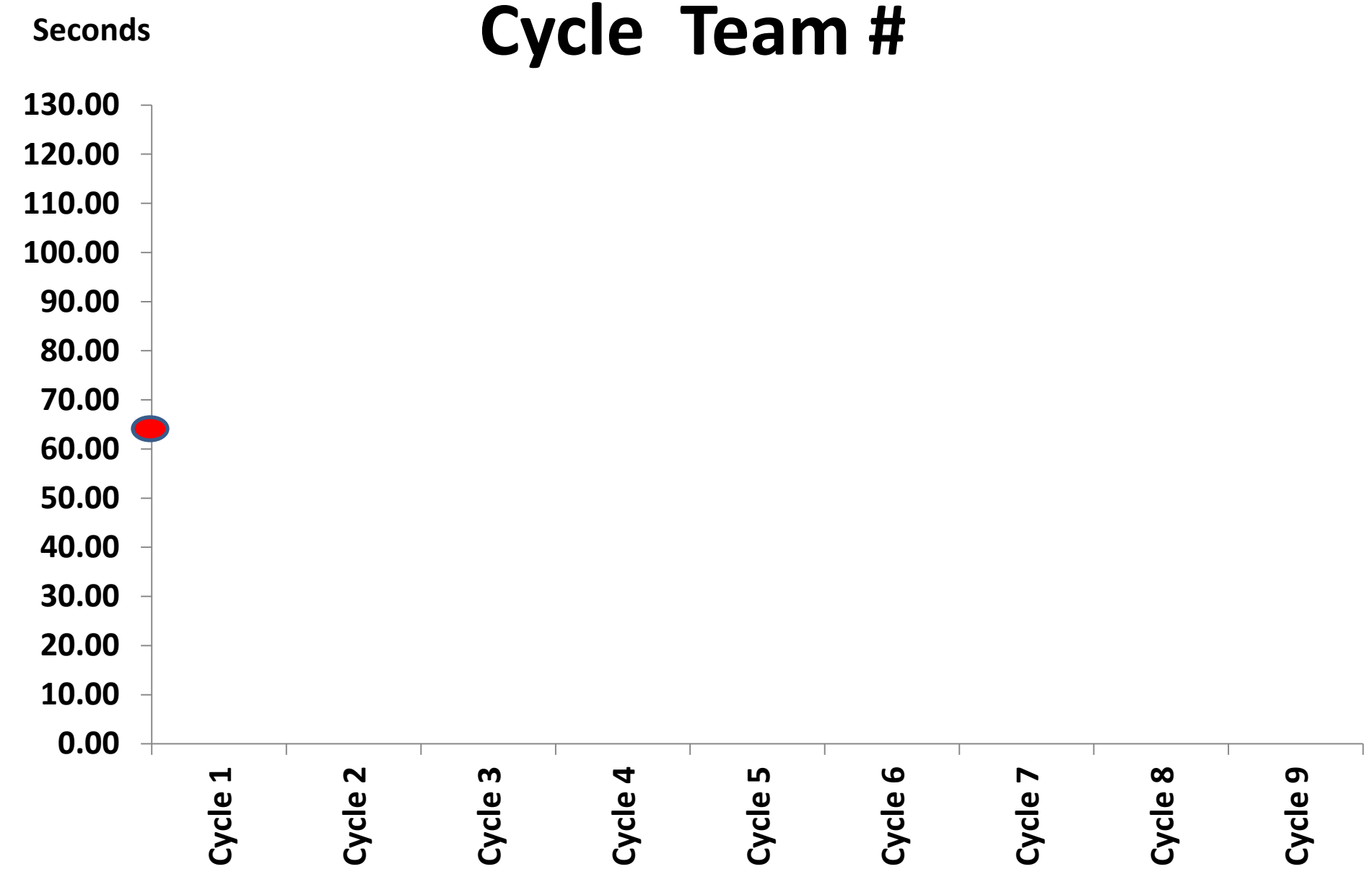
Team Information: Print and Hand to Team. Have One Copy For Each Group For Group Moderator

Data Sheet For Run Chart(s)

Test Cycle #	Seconds	Errors
1		
2		
3		
4		
5		
6		
7		
8		
9		

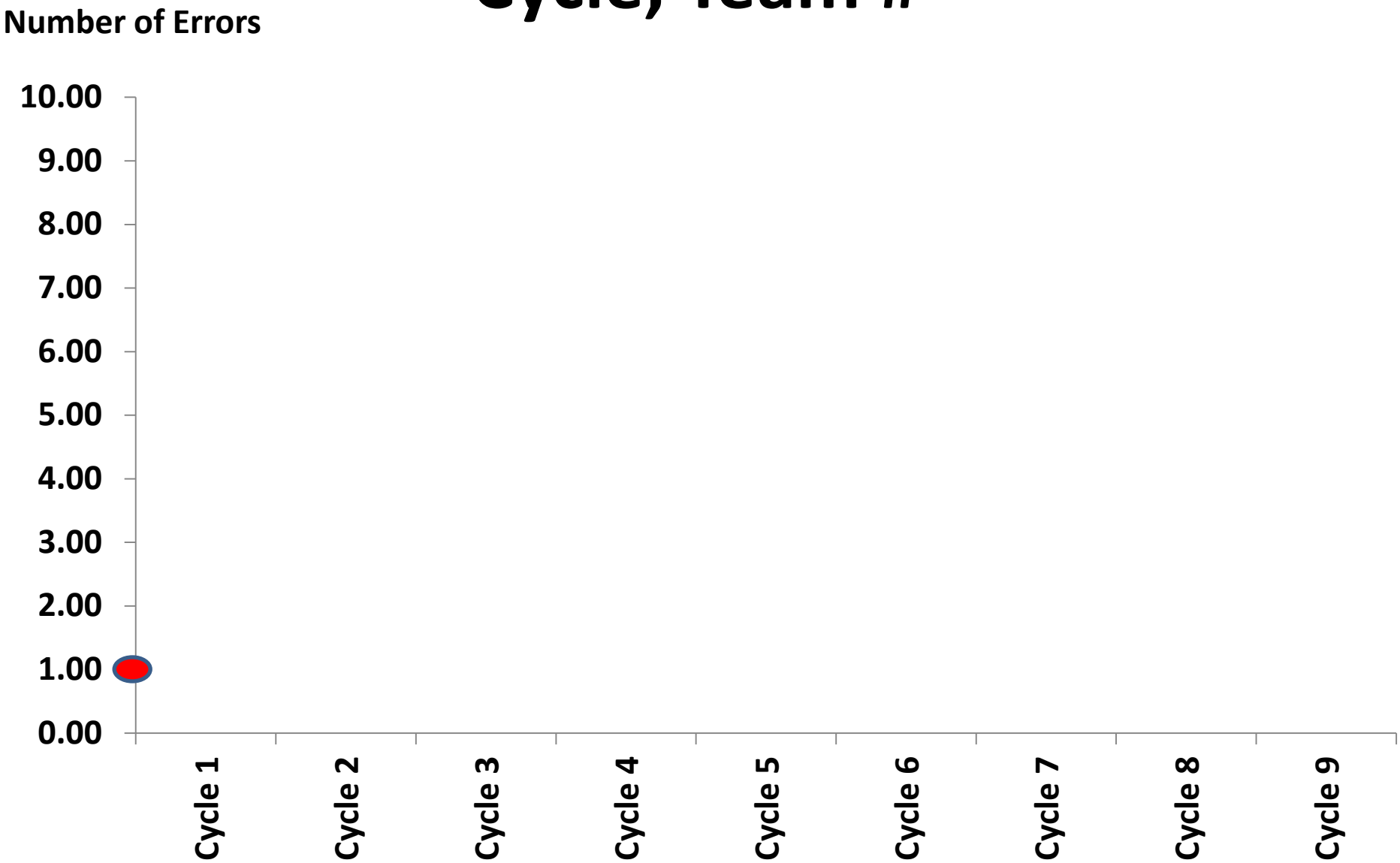
Team Information: Print and Hand to Team. One for Each Team on Display Board

Run Chart for Recording Seconds per Cycle Team



Team Information: Print and Hand to Team. One for Each Team on Display Board

Run Chart For Recording Errors per Cycle, Team



Team Exercise Wrap Up

- What did you think of the exercise?
- Discuss how you might use the theories and tools within this exercise to improve learning and testing regarding opioid safety?
- Was there anything that surprised you that you learned from this exercise?
- Did you have fun?
- Using the Lenses of Profound Knowledge, which ones did you think were most important for learning with todays exercise?
- Discuss how this exercise impacted your use of the Model for Improvement.

Instructions for Group Facilitators

- Attempt to break groups into even numbers. For example, if three groups, 25 members a group.
- Groups need to be from 18-30 participants each.
- If teams get “too successful, too fast” can introduce curveballs:
  - Smear of clear KY jelly on ball prior to each cycle start.
  - Team members not allowed to have face to face contact with the members to whom they are passing the ball.
  - Team must stand in circles of 3-5 participants.
  - Reduce time in between cycles
  - Team members have to balance on one foot.
  - Make teams change group members
  - Half of team members must lie or sit on the ground and other half must stand during cycles.
- Need a person dedicated to each group who will be the timer and referee for each team.
- Need a person who leads to call time and oversee whole operation.
- Need a charter to record the dots on board for all the teams.