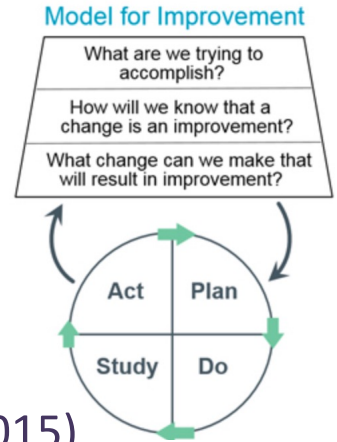# The OASCN Collaborative

(Optimizing Antibiotic Stewardship in California NICUs)

The Stewardship PDSA:

A Creative Endeavor

Kurlen Payton, MD

How well do we implement authentic PDSA cycles?

Model for Improvement
What are we trying to accomplish?
How will we know that a change is an improvement?
What change can we make that will result in improvement?

Act | Plan
Study | Do

- Transition of PDSA to healthcare has been oversimplified

    (Reed and Card, The problem with PDSA cycles, 2015)

- PDSA are not frequently applied authentically in published literature.

    (Taylor et al. Systematic Review of application of PDSA, 2014)

<20 % — iterative cycles
Very few — "small scale change"
Only 15% — rapid, quantitative cycles

- It's not about holding to a formula. It's about saving you time. Making improvements that otherwise would have not been realized.

PDSA cycles are rarely executed authentically in published literature and collaborative quality improvement

Learning Objectives

You should feel confident convincing others that...

1. Prioritizing learning over improvement is beneficial

2. Rapid tests naturally create high return on failure

3. Iterative small scale changes naturally address resistance to change

4. Meticulous documentation of PDSA cycle saves time

Theory and Practice

- Understanding the theory is relatively easy.

- Understanding the nuances of the theory to optimize efficient cycle execution is challenging

- Truly putting the theory into practice is extremely challenging. It's also not intuitive. It feels uncomfortable when implemented authentically.

- We naturally want to focus on improvement because that's the goal.

- However, there are other underappreciated aspects of PDSAs.

- Overlooking these aspects will impede your progress

- When everyone understands the nuance in the theory, you save time

5 parts

I.   Learning cycle

II. Failing fast

III. Smaller is better

IV. Tasks vs Tests

V. Documenting cycles
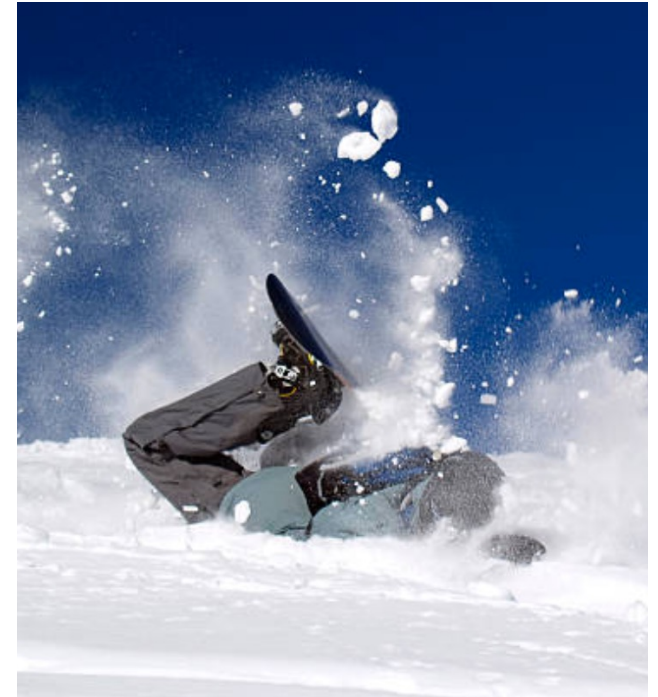
PDSA

Stewardship
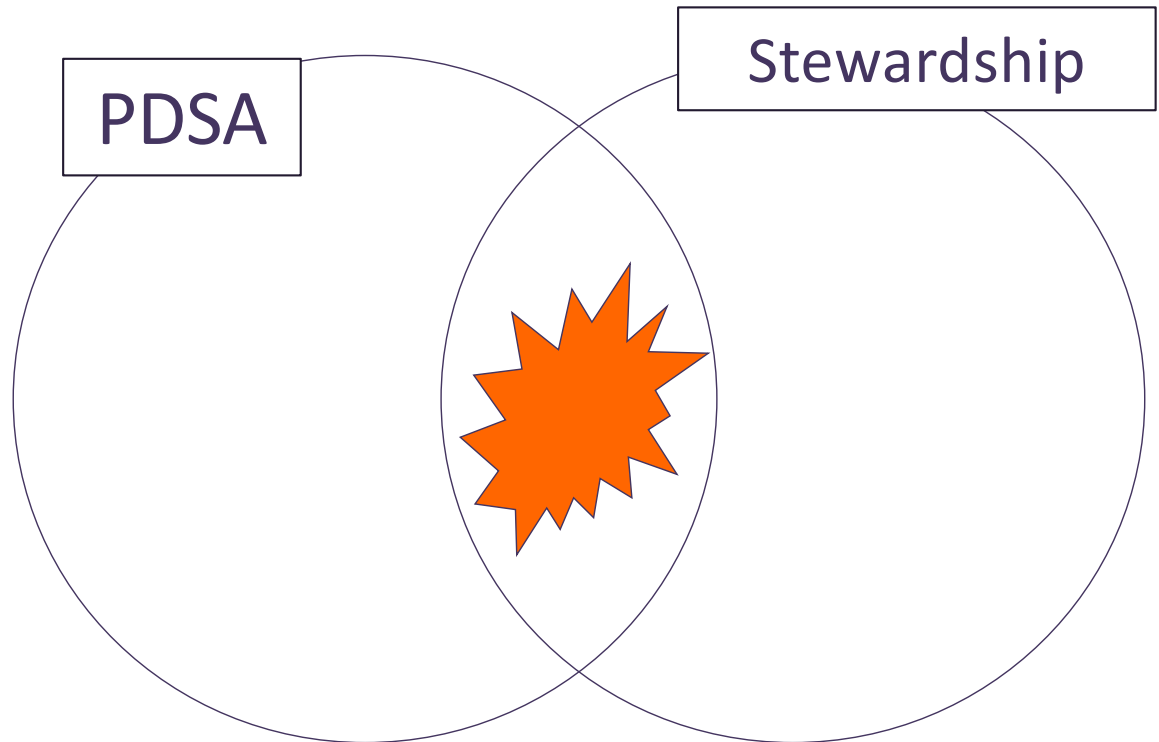
I. The "Learning Cycle"

- Some PDSA cycles should be called "Learning Cycles"

- Usually think of PDSAs as implementing to address the problem. Sometimes they are most effectively used for observation and understanding.

- Gemba walk of PDSA — about observation, not solutions.

- Early and late in Acknowledge it feels inefficient.

- ex. Cedars-Sinai PDSA #1…Nursing handoff discovery ("tested whether he handoff could serve as a time out")

Prioritizing learning over improvement — when the time is right — can save time/effort & uncover prerequisites for improvement

II. Failing fast

- **Gaining consensus** is "the dark side" of QI

- When executed effectively, early cycles can feel like you're **sneaking around** without buy in. It feels like that, because that's **exactly what your are doing**.

- **Conflict** with inclusive nature of QI.

- **The problem** is that when implementing rapid cycle changes, attempts to include EVERYONE and get buy in before "cycling" WILL KILL YOUR PROJECT. Or at least slow it down.

- ex. Cedars-Sinai NICU PDSA # 2-3 — Poor compliance with sepsis check folder

Knowing when to fail fast, when to conclude a cycle, and how to quickly execute a cycle is key.

III. Smaller is Better

- Ask yourself, "Is there anything I can learn from **a single patient?**". The critique… "but your N is one" may not be relevant for early PDSA cycles.

- There are usually resistors and believers. Save time by avoiding "resistor convincing". Test the early changes with the **believers**.

- **If you feel like you need to get buy in from everyone for your early initial PDSA cycles, you're **"going too big"**

- Example: 1. GBG experience … "next 1…" "next 3 patients"
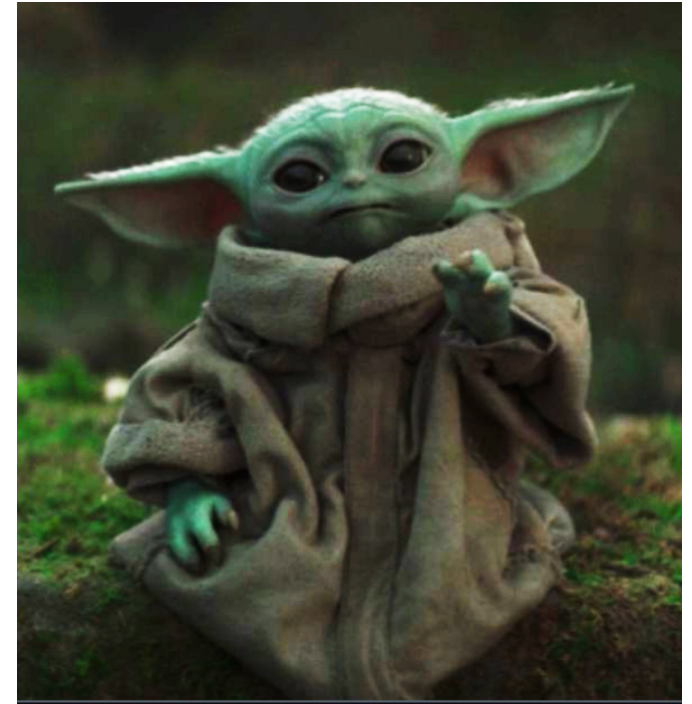
Testing with small numbers of patients goes against our drive for statistical significance. Abandoning this focus may optimize your improvement.

IV. Tasks vs Tests

- Tasks are frequently confused with process changes to be tested.

- **To be tested** — Process changes (EMR alerts, calculator roll out, abx default hard stops)

- **Tasks** with all QI work —Tasks = education, increased awareness

- Confusing tasks with tests dilutes the power of your PDSAs by testing things that don't need to be tested.

- Education and reminders are not process changes. They are foundational things that need to be done. They are examples of "weak" interventions.

Yeh et al. Parachute use to prevent death and major trauma when jumping from aircraft: randomized controlled trial BMJ 2018

Distinguish tasks from tests. The tasks should not be tested in PDSAs. This is a waste of resources.

IV. Recording the cycle

Cedars-Sinai GBG PDSA #1 Table — for Learning Session #1

CS GBG Feeding guideline v 1.0: Emailed to group NICU MD and NNP (11-28-2018). Reduced feeding guideline (GL) categories, fortifying earlier, and advancing more rapidly. GL posted in Bay. RNs huddled on changes. Updated tables in charts. Added to box and posted in MD signout room (11-29-18). Received summary of RN feedback (1/31).

Cycle #	Dates	Plan/Predict	Do	Study/Check	Act
1 Earlier fortification	11-28-2018 — 2-1-2019	• Predicting new simplified guideline(GL) will lead to earlier fortification and quicker to full feeds • **Baseline 65% fortification <90 cc/kg/day** • New GL fortify at 60-70 cc/kg/day(<1 kg, >1kg) • Plan to check after 5 VLBW reach fortification step on new GL • Metrics: 1) Fortified at <80 cc/kg/day 2) Days to reach **150 cc/kg/day** (for both hmf and prolacta infants)	• Implemented new GL on first VLBW on 12-3-18 1) GL condensed to 1 page 2) From 4 to 2 weight groups 3) GL posted in each bay & MPR 4) On Box	Patients (**See table below) Results/Metrics: 1) Fortification before 80 cc/kg: 6/6(100%) 2) Days to full feeds: range 8-18 (see below) Notes: • RN survey feedback (1/31) • MD feedback via Fac mtgs 1-2/2019 1. (+) day before text advance order 2. ($) GL on cover of bedside chart? 3. (+) Single page document streamlines GL use 4. (?) HyperMg status may delay progress b/c provider concern 5. (+) RNs like earlier fortification and motivated by ↓ line days and CLABSI risk 6. (-) sometimes RN and MD using different wt for calcs 7. ($)Nurse leadership rounds to get real time feedback 8. ($) Using primary RNs and engaging them in growth chart review 9. ($) GBG bedside sign to reinforce growth focus	

	DOB	GA/BW	Volume of first fortification	Day of life reached Full feeds (150cc/kg/day)	Notes
1	12/3	27.1/910g	75	12 (146)	
2	12/10	27.2/960g	80	8 (147)	
3	12/25	30.5/1100	65	13(160)	
4	12/25	24.4/900 g	62	18 (160) > 17 (145)?	Slower advance b/c of hypermag? Off track b/c not rounding up; Z fall>0.8 from birth
5	1/11	31.0/1330g	60	12 (147) > 12 (160)	
6	1/11	31.0/1165g	68	12(144) > 13 (165)	

(+) positive processes, (-) opportunities for improvement , ($) ideas, (?) "Notable"/ things to look into

Sutter Medical Center Sacramento – PDSA MAP (4/8/19)
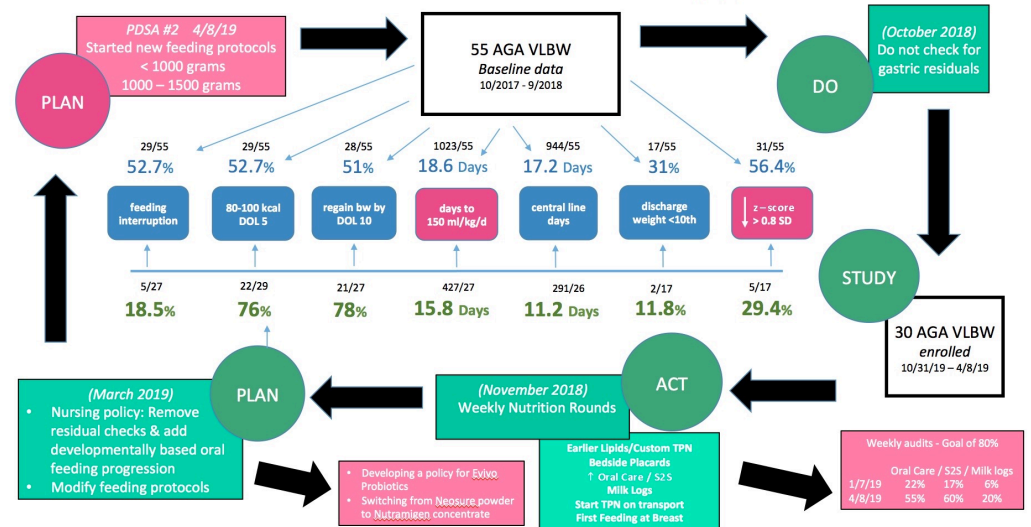
1) **Name your cycles**
2) **Date your cycles (start and stop)**
3) **Summarize your cycles**

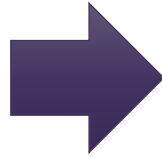→ Documentation

"scaffolding" for discussion

"Grading" your PDSA

Table 2 Proposed self-assessment tool for plan–do–study–act (PDSA) applications

✓Inauthentic execution of PDSA	✓Authentic execution of PDSA
☐ A single hypothesis was formed about the effect of the change idea	☐ Multiple consecutive predictions made throughout development and implementation of the change idea
☐ The initial change idea led to improvement	☐ The initial change idea needed to be abandoned or refined to achieve improvement
☐ Data collection focused only on changes in the main outcome measure	☐ A variety of different measures used to assess adequacy of change idea and degree of implementation
☐ Implementation proceed uneventfully	☐ Barriers to implementation were identified and addressed
☐ The final intervention looks similar to the initial change idea	☐ Final intervention substantially modified from the initial change idea
Ticking above boxes raises questions about the degree to which PDSA methodology was fully executed	*Ticking above boxes increases confidence in the authentic application of PDSA methodology*

Taylor et al. Systematic Review of application of PDSA. BMJ 2014

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Using the 4 PDSA hacks…

Let's critique these cycles together. What are you thoughts?
1. Learning?
2. Rapid?
3. Small?
4. Tasks or Tests?

Table 1 PDSA cycles in the design and implementation of an intervention to reduce unnecessary urinary catheters on general medical wards*
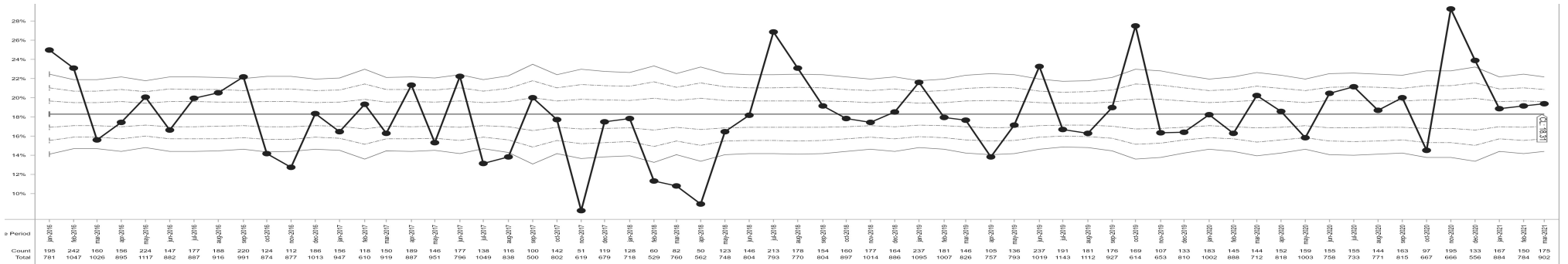
Cycle	Prediction	Do	Study	Act	Time required
1	There is unnecessary catheter use on medical wards.	Point prevalence of catheter use on medical wards (null hypothesis: 80% or more catheters are appropriate).	54/278, including 17 (31%, 95% CI 21% to 45%) with appropriate clinical indication→null hypothesis refuted (p<0.001).	There is a problem worth investing time to improve. Staff on the ward feel the ED inserts majority of unnecessary catheters.	1 day
2	Catheter insertions in the ED are the main contributor of unnecessary use.	Interview of staff and chart review to identify whether the unnecessary use was driven by inappropriate insertions as opposed to appropriately inserted urinary catheters that were simply left in too long.	Chart review showed roughly equal contributions from unnecessary insertion and prolonged maintenance. Interviews revealed residents hesitant to remove because they are unsure of initial indication in ED; ward nurses often asking residents to reassess.	Catheters left in place are just as frequent contributors to problem and improving documentation in the ED would facilitate reassessment on the ward.	2 days
3	Improving awareness of initial catheter indication in the ED will facilitate early removal.	Meeting with ED to add catheter indication to 'transfer of accountability' form for patients admitted to the ward from the ED.	The 'transfer of accountability' form is not a chart copy. Emergency staff perceive adding catheter will increase workload.	Because of inability to measure fidelity and lack of engagement, this intervention will not successfully address the problem.	2 weeks
4	Admission order sets that promote catheter insertion lead to overuse.	Pareto diagram of unnecessary catheter insertions to identify whether admission order set was checked off for the majority of cases.	On stroke unit, 89% (8/9) unnecessary catheter insertions are associated with order set.	The stroke unit order set should be revised through the forms committee. Because this will take time, another intervention should be developed first.	2 days

Leis et al. A primer on PDSA: executing plan–do–study–act cycles in practice, not just in name. BMJ Quality and Safety. 2016
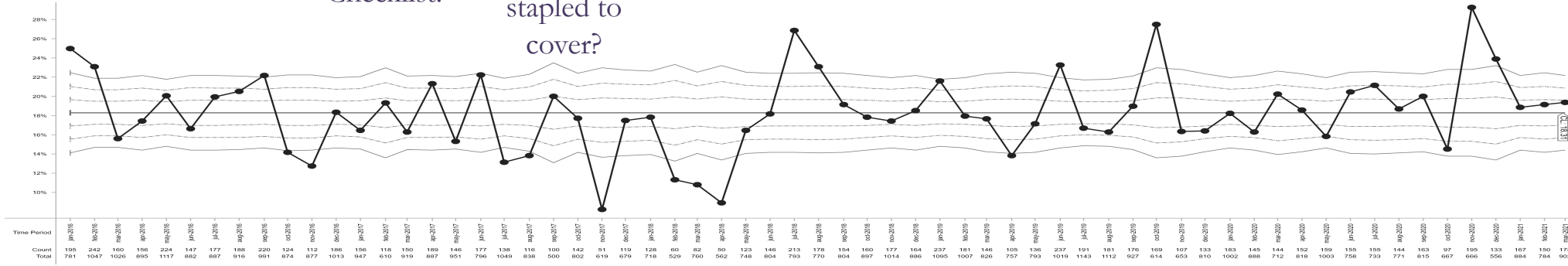
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PDSA Myths

1. All cycles should be expected to result in improvement

2. You must take your time to ensure that everyone is aware of the cycle

3. You must have high numbers of patients to have an adequate sample size

4. Education of staff should be tested in PDSA cycles

PDSA Conclusions: The 5 truths

1. Intended output of PDSA may be "only learning"…not necessarily improvement.

2. RAPID cycles accelerate your improvement.

3. The gradual gaining of momentum of small scale changes uniquely and organically addresses resistance to change.

4. Distinguishing tasks from tests can optimize your time and resources.

5. Meticulous documentation of PDSA work leads to improved and more efficient collaboration among team members and stakeholders

Discussion of your PDSA plans…

Handoff as Time Out? → Sepsis Checklist? → Sepsis Checklist stapled to cover? → #4??