Infection Reduction in the ICU

A hypothesis based on Kato's 5 Step Up Model

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Presenters Today

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Paulo Borem, MD has practiced as a vascular surgeon. He has served as a Patient Safety Officer, Improvement Advisor, and directed multiple improvement collaboratives. He is currently a senior director at the Institute for Healthcare Improvement leading projects in Brazil.
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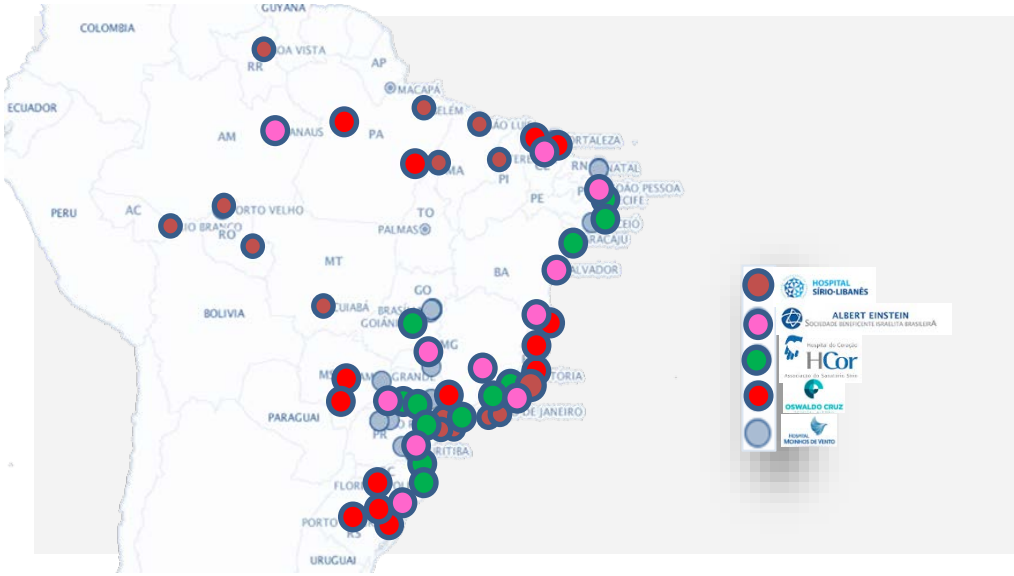
Project Challenge

Assure 200 public hospitals in Brazil can cut ICU infections* in half and maintain the improvement

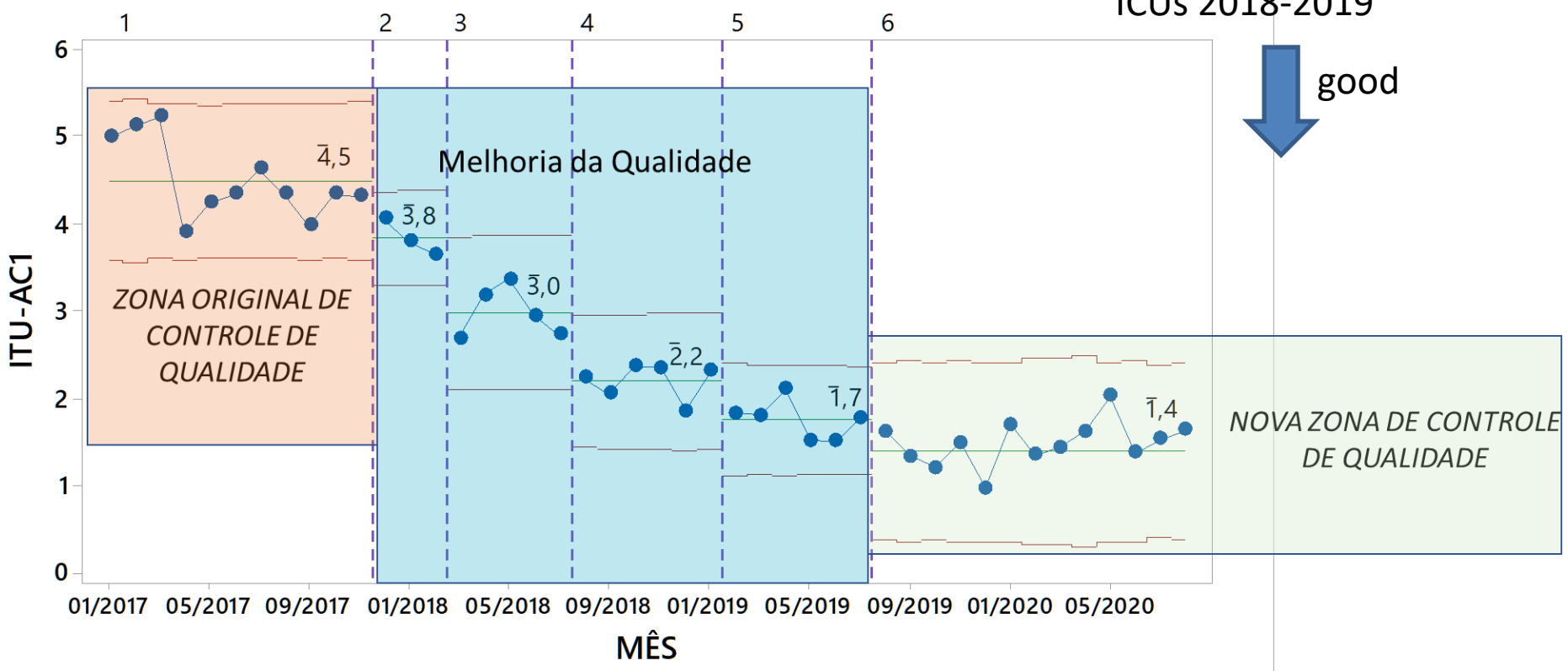
*Infections common in the ICU are associated with ventilators, urinary catheters, and central lines



Evidence of Potential

Reduction of urinary tract infections in 114 ICUs 2018-2019

good



Testes realizados com tamanhos amostrais desiguais
Subgrupos omitidos dos cálculos: 38-44

Joseph Juran: The Quality Trilogy

- Manage the work

"Quality Control"

- Improve the work

"Quality Improvement"

- Design and manage systems capable of delivering quality

"Quality Planning"

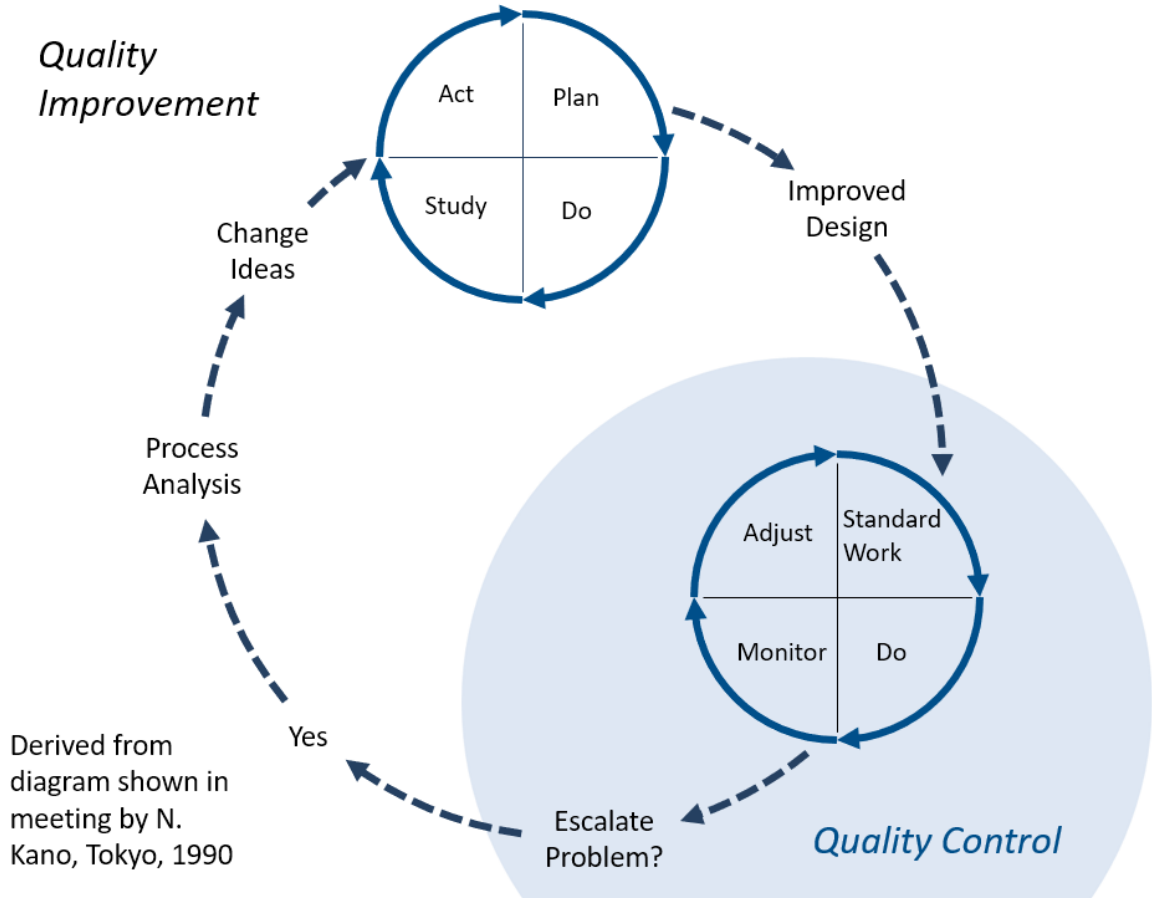
Source: Juran Institute

Hypothesis 1.0

1. A management system organizes people to control quality

2. The control of quality depends on standardized work.

We need a model of standardized work to meet the project challenge!



Isao Kato's Step Up Model

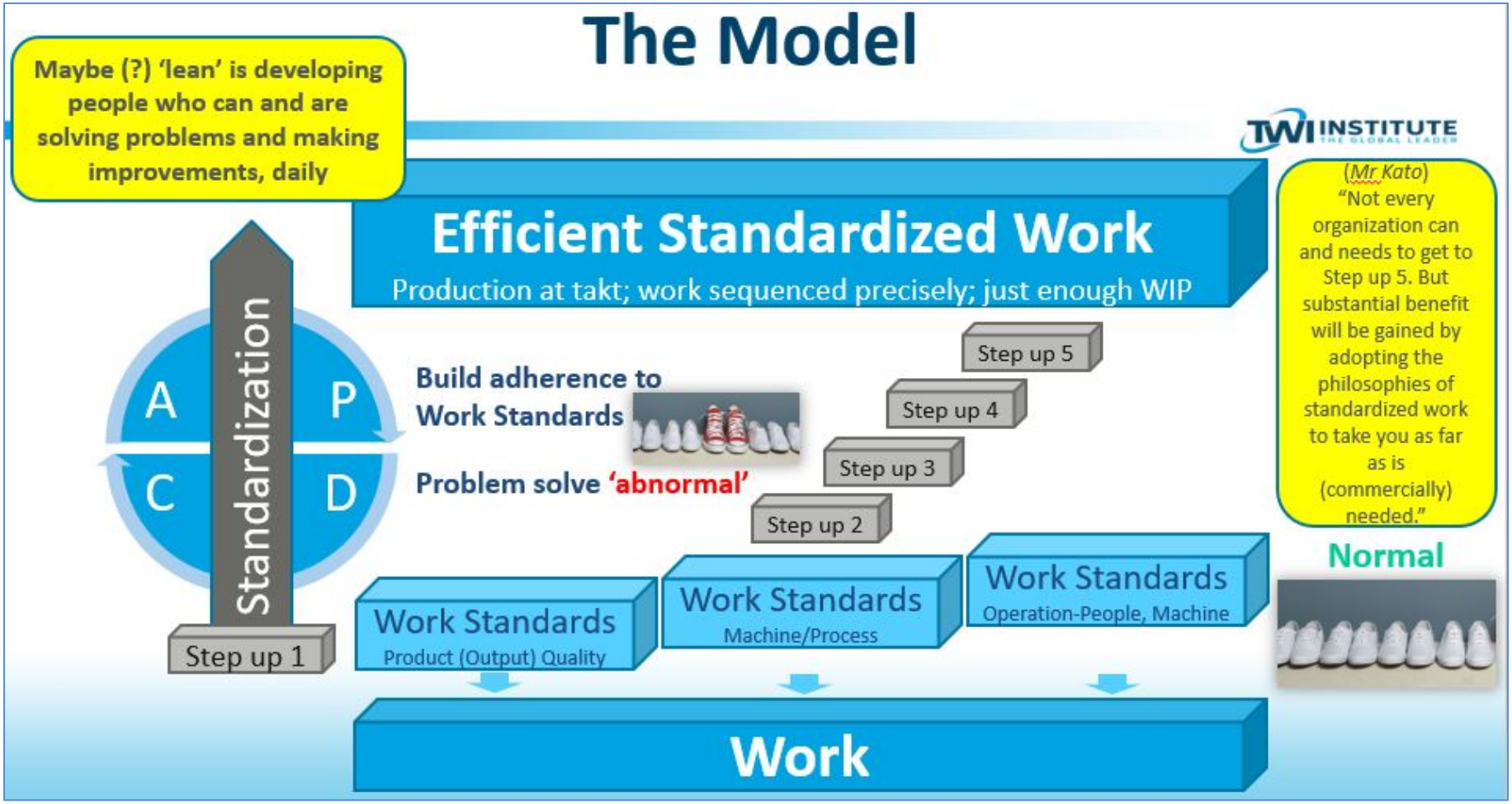
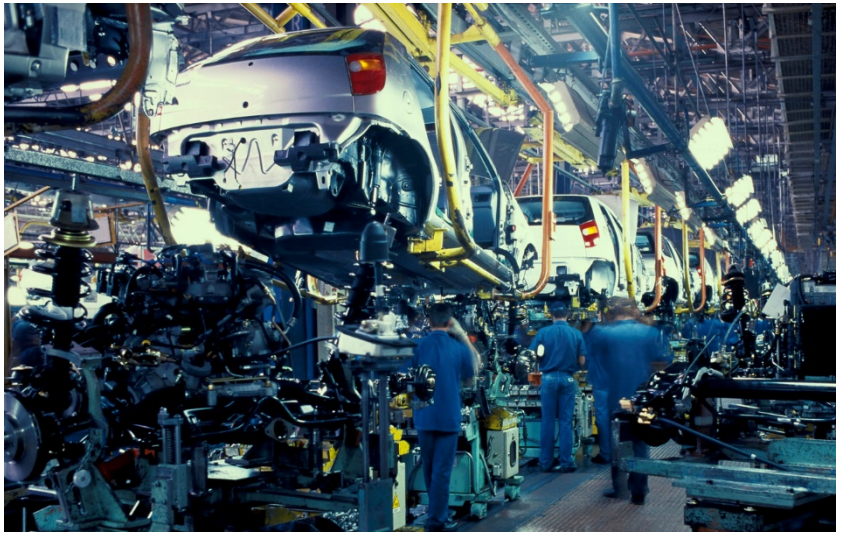
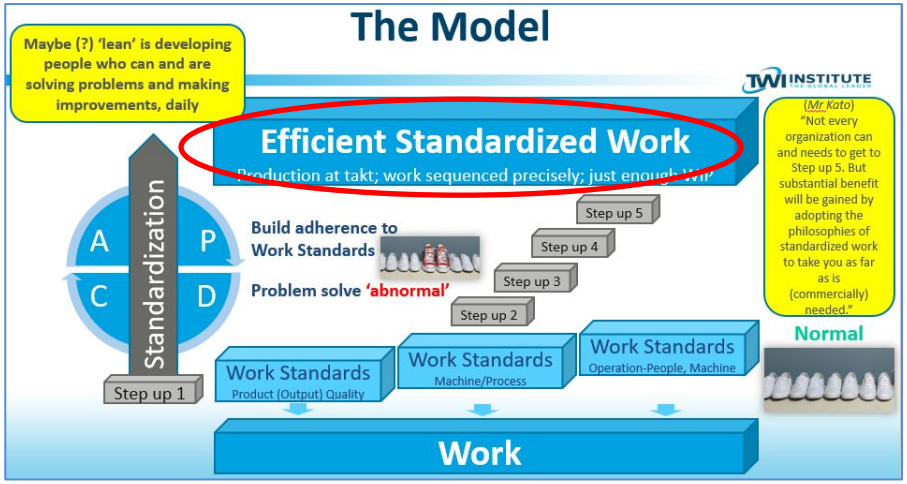


Image used with permission from TWI Institute

Learn more about Mr Kato's model by viewing Oscar's 'What Is…' video produced for Lean Frontiers

ICU Care ≠ Product Assembly

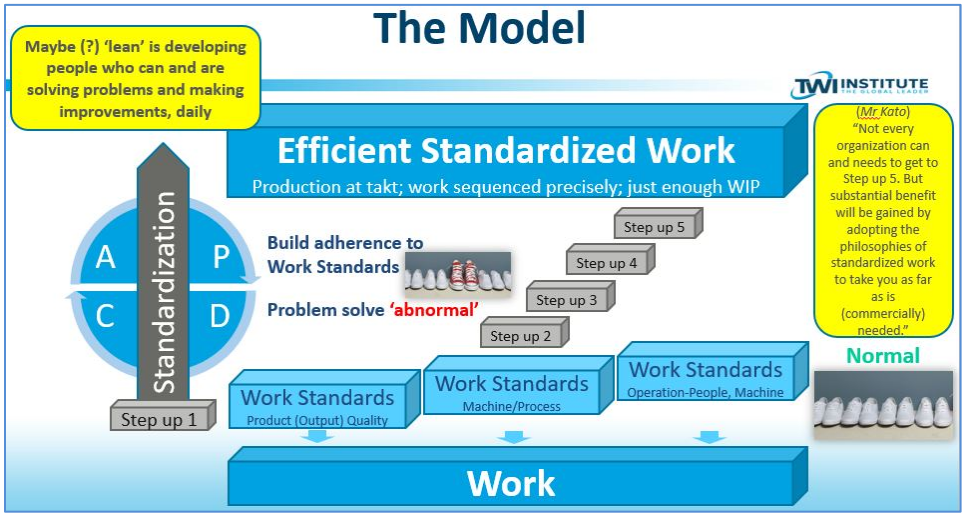




Revised Hypothesis

The control of quality depends on standardized work. Standardized work requires work standards.

To meet our project challenge, we need to understand and describe relevant **work standards**.



If we adapt Mr. Kato's model to the ICU setting, then

(1) we will have a way to meet our challenge;

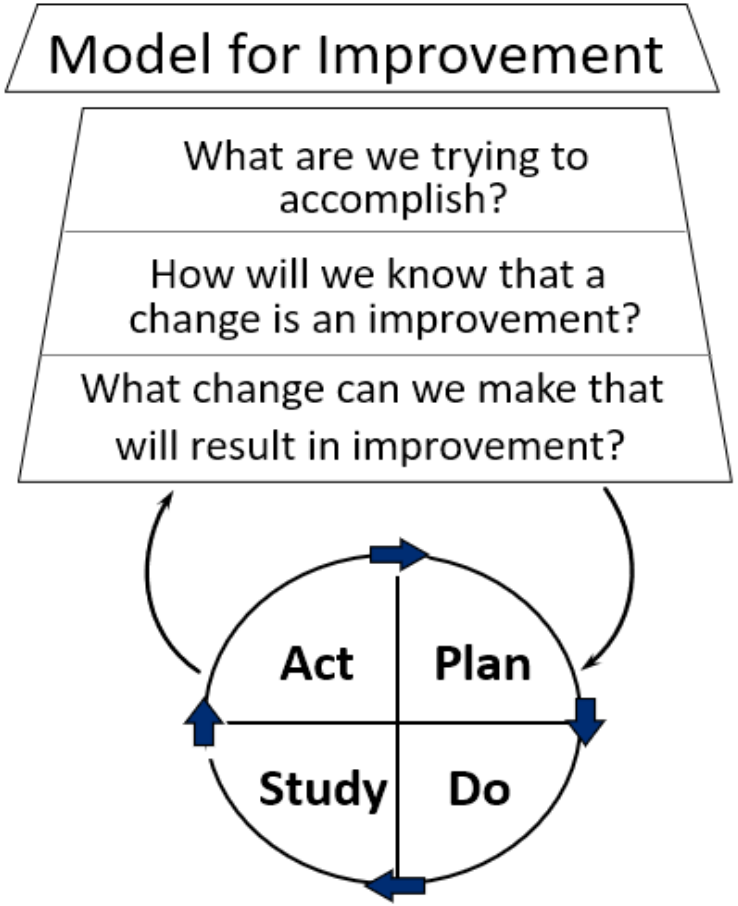
(2) development of standardized work for infection prevention offers a foundation for other aspects of ICU care.

Reasons for Optimism--Method

Teams and coaches already use the Model for Improvement.

M4I's first question, 'what are we trying to accomplish?' can be answered by a work standard.

Teams and coaches have skills using PDSA discipline

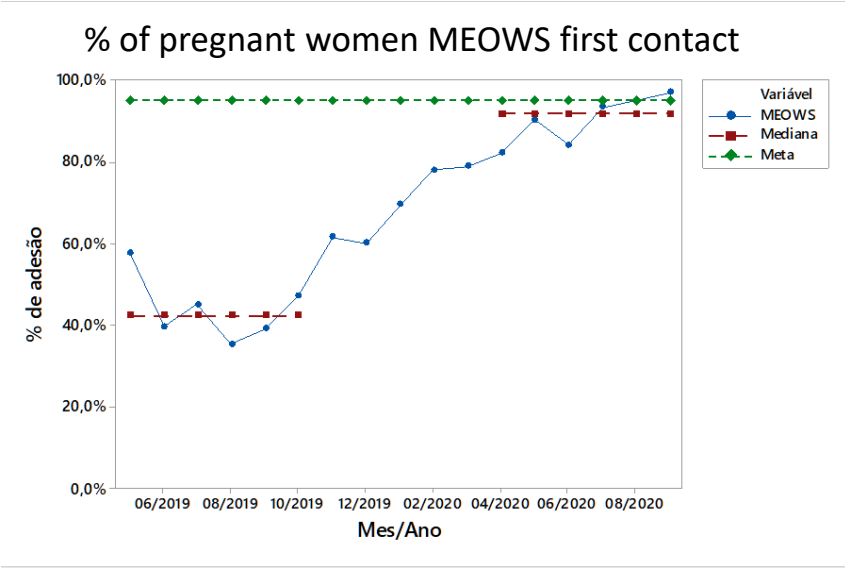


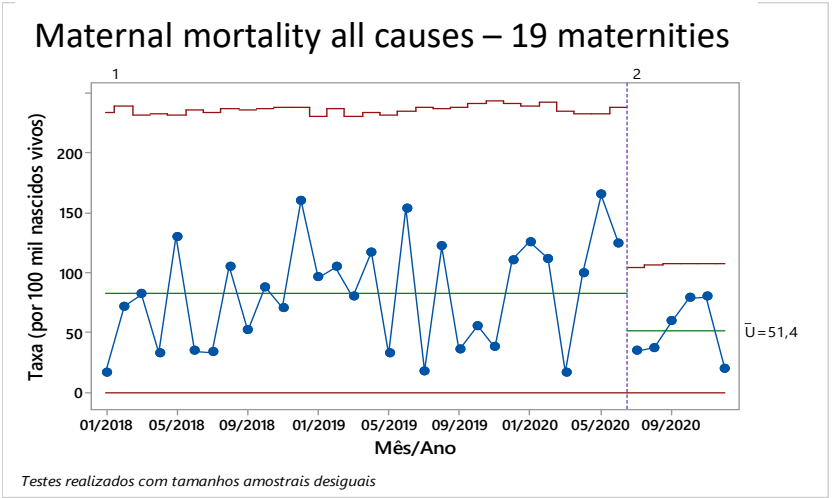
Developed by Associates in Process Improvement

Reasons for Optimism--Experience

The 2019-2020 Maternal Mortality project in Brazil defined a trigger system (MEOWS*), promoted use of MEOWS and care intervention, and used **Job Instruction** to train staff.

Results: mortality rate achieves 30% reduction goal





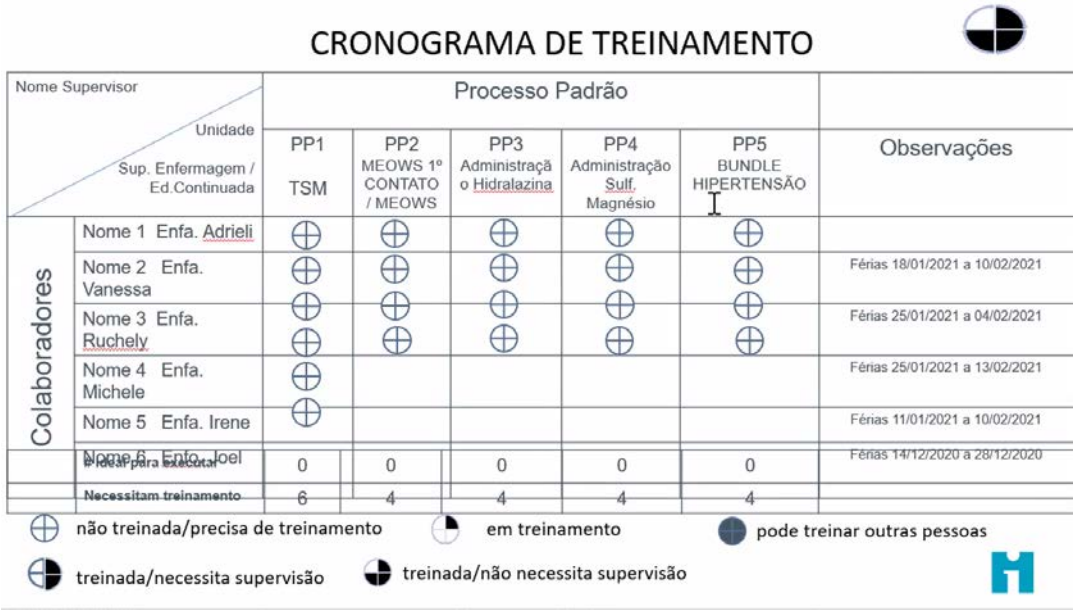
*Modified **E**arly **O**bstetric **W**arning **S**cores

Reasons for Optimism--Simplification

In Step Up 2:

--focus training on 'Don't Know' and 'Can't Do' items of the work standard

--Make it easy to see gap between 'normal' and 'abnormal' to reduce reliance on experts and projects to find and fix problems

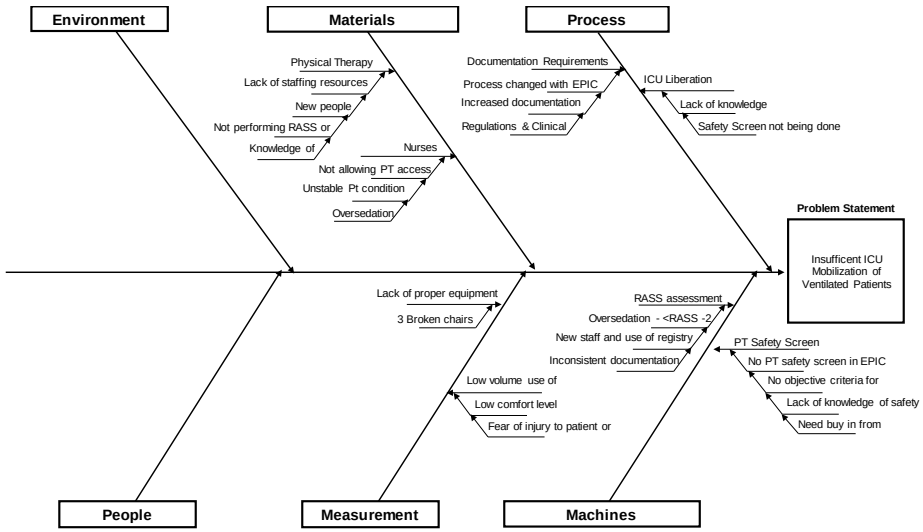


CRONOGRAMA DE TREINAMENTO

Nome Supervisor / Unidade: Sup. Enfermagem / Ed.Continuada		Processo Padrão					Observações
		PP1 TSM	PP2 MEOWS 1º CONTATO / MEOWS	PP3 Administração Hidralazina	PP4 Administração Sulf. Magnésio	PP5 BUNDLE HIPERTENSÃO	
Colaboradores	Nome 1 Enfa. Adrieli	⊕	⊕	⊕	⊕	⊕	
	Nome 2 Enfa. Vanessa	⊕	⊕	⊕	⊕	⊕	Férias 18/01/2021 a 10/02/2021
	Nome 3 Enfa. Ruchely	⊕ ⊕	⊕ ⊕	⊕ ⊕	⊕ ⊕	⊕ ⊕	Férias 25/01/2021 a 04/02/2021
	Nome 4 Enfa. Michele	⊕					Férias 25/01/2021 a 13/02/2021
	Nome 5 Enfa. Irene	⊕					Férias 11/01/2021 a 10/02/2021
	Nome 6 Enfa. Joel	0	0	0	0	0	Férias 14/12/2020 a 28/12/2020
	Necessitam treinamento	6	4	4	4	4	

⊕ não treinada/precisa de treinamento ◔ em treinamento ● pode treinar outras pessoas

◕ treinada/necessita supervisão ◕ treinada/não necessita supervisão



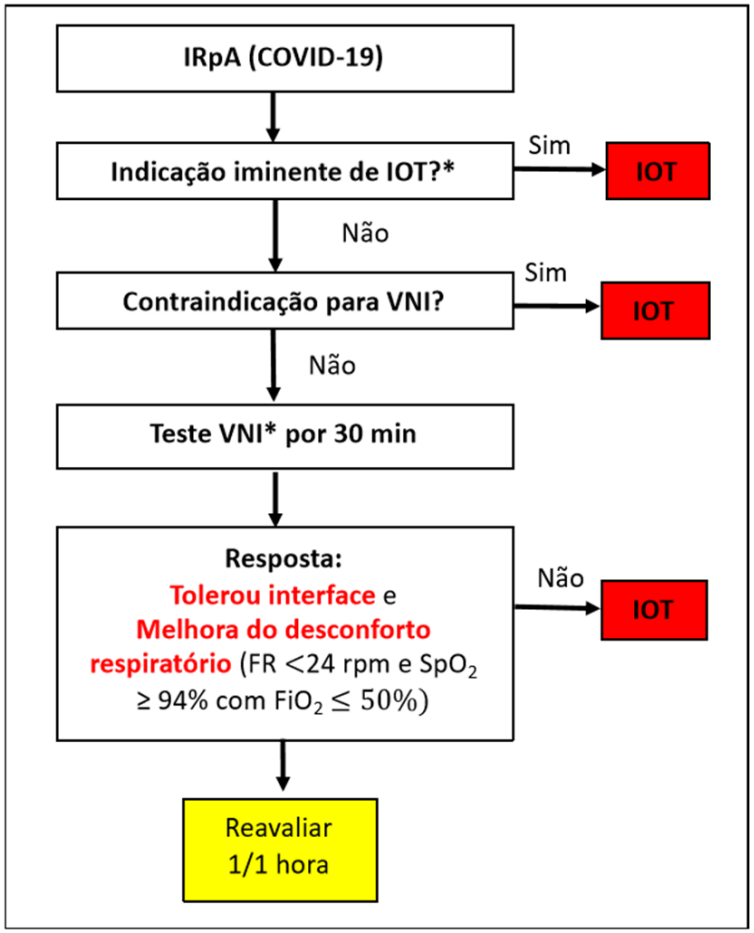
Infections common in the ICU are associated with ventilators, urinary catheters, and central lines

WORK STANDARDS TO PREVENT VENTILATOR ASSOCIATED PNEUMONIA (VAP)

Major Components of Care per National Guidance to prevent VAP

- Ventilation only when indicated
- For ventilated patients:

1. Perform routine oral hygiene
2. Keep the head of the bed elevated (30 ° -45 °)
3. Reduce sedation
4. Check extubating daily
5. Keep the cuff pressure of the tracheal cannula (cuff) between 25 to 30 cmH2O (or 20-22 mmHg)
6. Maintain the mechanical ventilation system per local regulatory agency recommendations



Work Standard 1: Service Quality

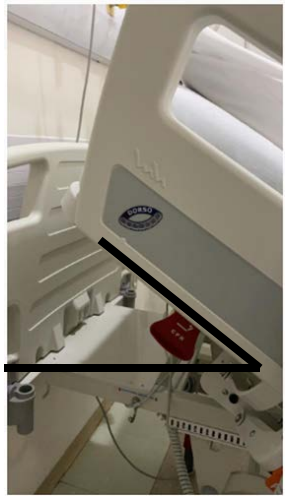
Patients leave the ICU without experiencing venitilator associated pneumonia (VAP).

This work standard tells us we need an operational definition of VAP: how to decide if a patient has VAP or not that is clear to all.

Work Standard 2: Environment and Equipment Settings

For ventilated patients:

- Bed elevation between 30^{o} and 45^{o} (except Covid patients with pronated position)



- Cuff pressure of tracheal cannula between 25-30 cm H_2O

Work Standard 3: Operations and Staff Roles

0.12% chlorhexidine oral solution is effective against gram-positive and gram-negative bacteria, and against fungi and some viruses; Has prolonged bacteriostatic action of more than 12 hours

Aspiração de saliva e fluidos antes, durante e depois da Higiene Bucal

Pair of Nurse Technicians will carry out oral hygiene:

Oral Hygiene Protocol	When	Why
Prepare Care	Three times each 24 hours	To remove microorganisms that if aspirated can lead to pneumonia
1.1 get kit		
1.2 assure hand hygiene		
1.3 check patient ID		
Clean using Clorexidine w aspiration		
2.1 clean tube	2.1 - 2.4 at least 7 minutes	
2.2 clean bottom of mouth		
2.3 clean tongue		
2.4 clean teeth		
End Care		
3.1 check cuff		
3.2 check head elevation		
3.3 assure hand hygiene		

Next Steps

Our work:

- Express the national care guidance as work standards
- Prepare the calendar of training and field application

Waiting for Green Light:

- Changes in Ministry of Health leadership
- Covid pandemic means high ICU utilization and stress

Appendix: Brent James' Approach "Mass Customization"

Kato	James
Step up 1 Work Standard (1)	implicit
Step up 1 Work Standard (2)	Focus on electronic medical record system aligned with definition of clinical care pathway (define the EMR data fields and reminders--the data/info environment)
Step up 1 Work Standard (3)	Clinical care and decision steps explicit; staffing implicit ("work top of license")
Step up 2	Design information environment to make it easy to see deviation from care pathway AND capture deviation from standard. No emphasis on physical environment.
Step up 3 Problem-solve to close gap between Normal and Abnormal	Feedback from care cycles to revise the care pathway based on review of deviations. Normal will be revised! Implicit: reduce/eliminate waste and quality problems.
Click here for more on James' approach	