Patientsikkert Sygehus

Institute for Healthcare Improvement

How to Design Reliable Processes in Healthcare

Prepared and Presented

Frank Federico, Roger Resar, and Karen Dodt

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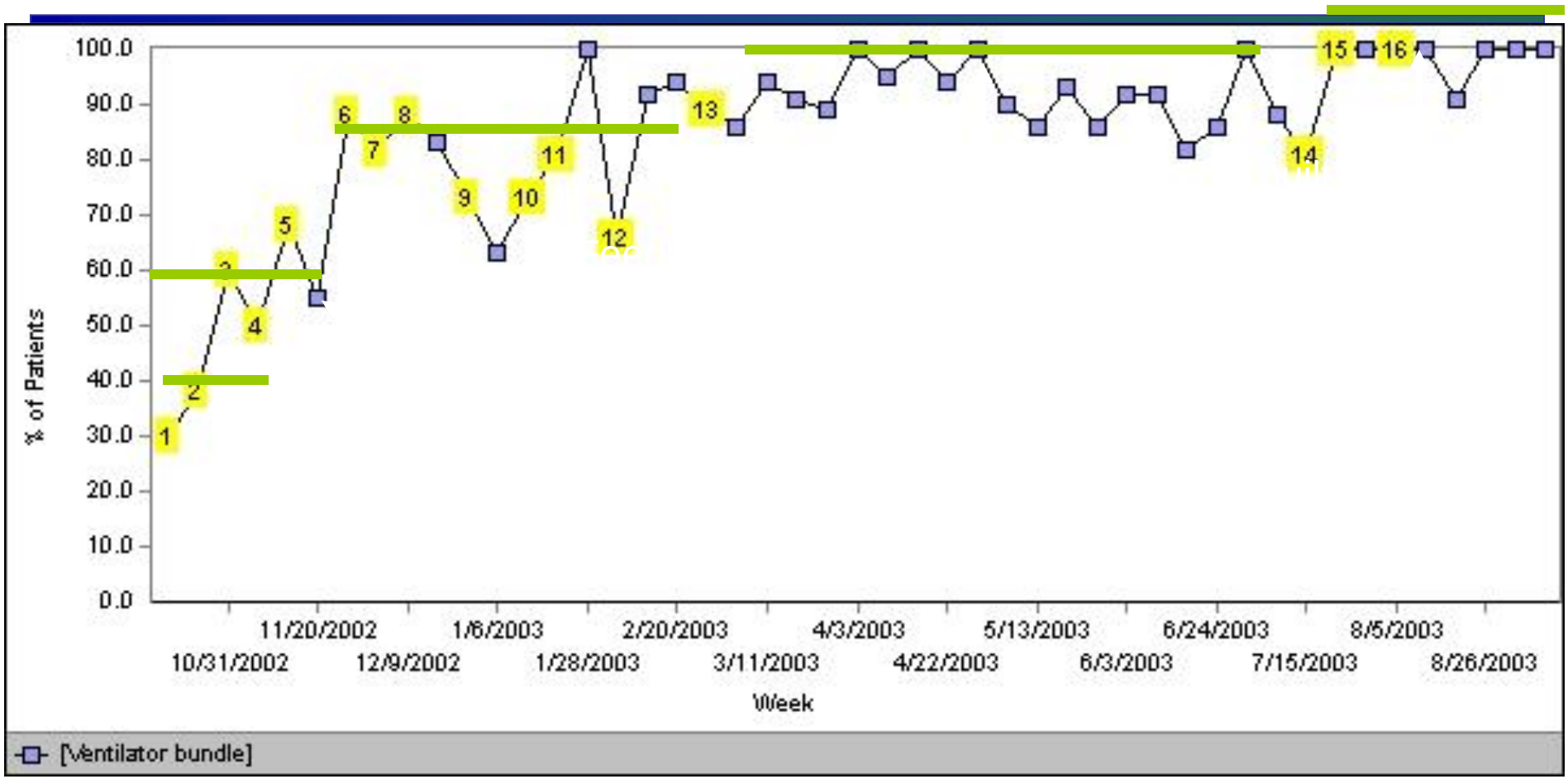
Observation: The reliability of applying known or required processes commonly is 80% or worse

(**When dealing with non-catastrophic processes**)

Why should you care?

Example of 3 Step Design in Implementing the Ventilator Bundle



Framework for Reliable Design

- Process is the action point of all improvement methodologies
- Reliability occurs by design not by accident
- Segmentation allows the perfection of the design

Starting Labels of Reliability

- Chaotic process: Failure in greater than 20% of opportunities
- 80 or 90 % success. 1 or 2 failures out of 10 opportunities
- 95% success: 5 failures or less out of 100 opportunities
- Success in parts per one thousand: 5 failures or less out of 1000 opportunities

Premises – IHI Innovation Team

For healthcare processes where failure does not cause immediate catastrophic consequences:

- 80% or less performance demonstrates that staff do not consistently and clearly understand the process (5 front line process users can not easily describe the process)
- 95% or better: performance has some variation but 5 front line users can easily articulate the process.
- Parts per thousand: performance indicates a well designed system with low variation and cooperative relationships

Non-Catastrophic Processes

- Definition: Failure of the process does not lead to death or severe injury within hours of the failure
- 80% or less reliability is most commonly seen in these processes (hand-washing as an example)
- Poor outcomes do not occur with each defect due to either to biologic or system resilience.

Reasons for the Reliability Gap In Healthcare

- Current Improvement methods in healthcare are highly dependent on vigilance and hard work

- The focus on benchmarked outcomes tends to exaggerate the reliability within healthcare hence giving both clinicians and leadership a false sense of security

- Often excessive clinical autonomy creates and allows wide performance margins

- The use of deliberate designs to achieve reliability goals seldom occurs

Improvement Concepts Associated with Performance Resulting in 80-90% Process Reliability

(Primarily can be described as intent, vigilance, and hard work)

- Common equipment, standard order sheets, multiple choice protocols, and written policies/procedures
- Personal check lists
- Feedback of information on compliance
- Suggestions of working harder next time
- Awareness and training

Improvement Concepts Resulting in 95% Process Reliability

(Uses human factors and reliability science to design failure prevention, failure identification, and mitigation)

- Decision aids and reminders built into the system
- Desired action the default (based on scientific evidence)
- Redundant processes utilized
- Scheduling used in design development
- Habits and patterns know and taken advantage of in the design
- Standardization of process

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Biology Protects Us

- All defects in process do not lead to bad outcomes
- Healthcare tends to look at outcomes and not the reliability of the process leading to outcomes (hand washing is an example)
- Benchmark to best practice not aggregate averages

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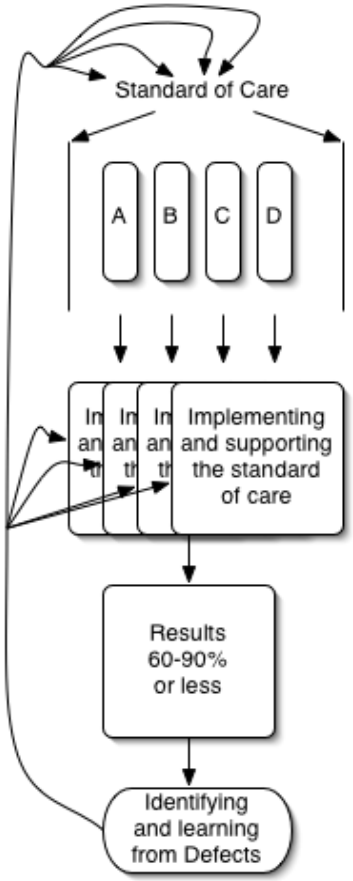
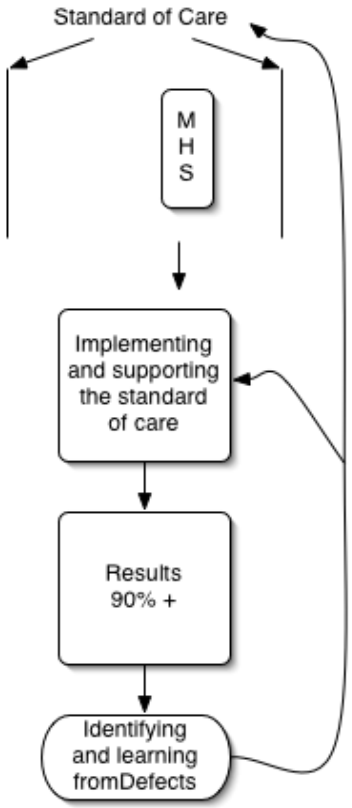
Health Care Processes

Current - Variable, lots of autonomy not owned, poor if any feedback for improvement, constantly altered by individual changes, performance stable at low levels





Desired - variation based on clinical criteria, no individual autonomy to change the process, process owned from start to finish, can learn from defects before harm occurs, constantly improved by collective wisdom - variation

Terry Borman, MD Mayo Health System

Why Standardize?

- Contributes to building an infrastructure (who does what, when, where, how and with what)
- Support training and competency testing to sustain the process
- Achieve front line articulation of key processes by staff
- Allows the appropriate application of Evidence Based Medicine consistently
- Feedback about defects and application of learning to design is possible

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The Reliability Design Strategy

- Prevent initial failure using intent and standardization
- Back-up/contingency function (identify failure and mitigate)
- Measure and then communicate learning from defects back into the design process

Why Segmentation is Helpful

- Allows for the control of some variables
- Defines the boundaries for testing
- More likely to test the validity of the design rather than deal with barriers
- Allows a deeper understanding of the design complexity required for the project
- Forces understanding of the differences between segments as design strategies
- Allows the formation of more predictable timelines

Finding your First Segment

- The segment must represent a reasonable volume
- The segment should have clear cut defined boundaries
- The segment should have willing participants so the barrier of agreeing is not a problem
- The segment should allow for key articulated variables or barriers to be neutralized
- The first segment should establish a design theme

The Reliability Design Strategy

- Prevent initial failure using intent and standardization
- **Back-up/contingency function (identify failure and mitigate)**
- Measure and then communicate learning from defects back into the design process

Why the Step is Needed

- Allows less than perfect design in the standardization step (we do not have to plan for every possible contingency)
- Anticipates and allows failure in the prevent failure (standardization function) step
- Allows a better balance of resource use (no need to spend months coming up with the perfect design)
- Fosters the atmosphere of mitigation and recovery

Science and Outcomes

- Process reliability is linked to outcomes by science
- If the process is “reliable” and the outcome is not achieved either the science is wrong or the process really is not being done correctly
- Outcomes are linked to the processes by the confirmation the hypothesis

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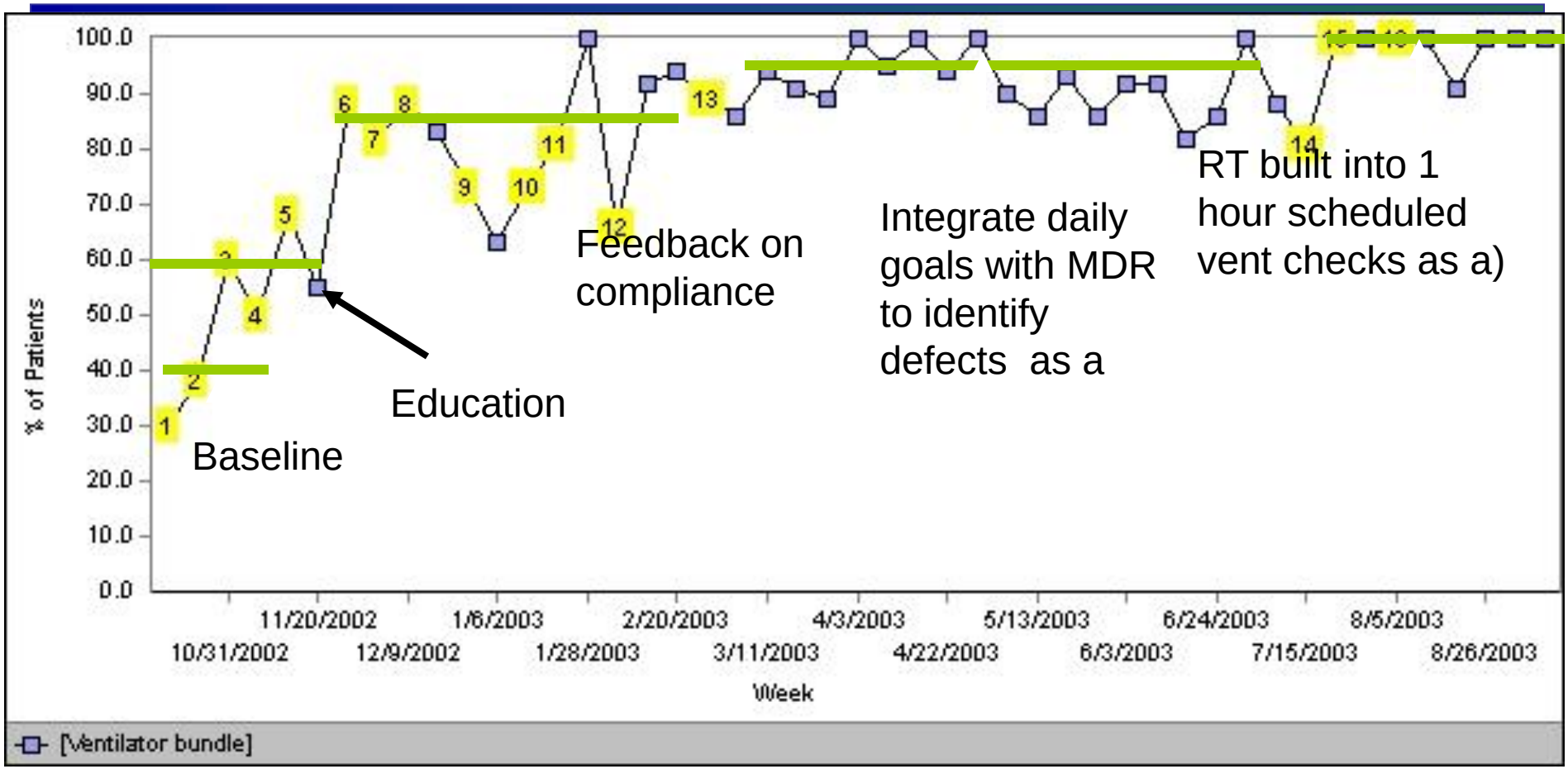

Getting Started

The “Set Up” for Reliability

- Select a topic whose outcome you want to improve; articulate the outcome goal
- Determine a high volume segment for initial design testing
- Build a high level flow chart for that segment
- Determine where the defects occur in the current system
- Determine where your design work will begin with by identifying where the commonest defects occur
- Verbalize the reliability (hint: it is always 10-2)

Topic: Ventilator Care Bundle

Segment: Medical ICU for patients cared for by the intensivist team

Patient Placed on Ventilator	4 Elements of the bundle prescribed	4 Elements of the bundle carried out	Patient removed from ventilator

Of the 4 elements of the bundle, the head of the bed elevation is most commonly not accomplished

Our aim is to with a reliability of 95% or 10^{-2} achieve keeping the head of the bed elevated.

Report Out Formula For Your Team

- Identify the topic area whose processes you have chosen to make more reliable
- Describe the segment on which you will test your design
- Describe your high level flow chart (5 boxes max)
- In which box do most of your defects occur
- Describe generally the process you make more reliable
- State your reliability goal for the process in the segment

Put it Together

You have a first segment, with an articulated process goal, a clear outcome goal connected to the process with some good medical evidence. In addition you have now set up a theoretical design using the prevent, identify, mitigate and with the knowledge of failures how to redesign

- Now you need to design your first test of change

and

- Determine the tempo of change you will “dance to”

Design the First Test of Change

Describe the change

Determine

- Who
- What
- When
- Where
- With What/How