Institute for Healthcare Improvement

From ‘Failure to Rescue’ to ‘5Rs to Rescue’: Tracking Surgical deaths using an adapted 5Rs Safety Calendar and Run Charts

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Disclosure Statement

We make the following declaration in relation to this presentation:

- There is no conflict of interest
- There is no bias, either commercial or non-commercial
- There is no plagiarism or copyright infringement

Learning Objectives

- Have a good understanding of the 5Rs Model, which is Risk Assessment, Recognize, Respond, Reassess, and Reflect.
- Gain insights into the significance of each 'R' in preventing post-operative complications and promoting patient safety.
- Feel competent to use specific visual management tools (adapted Safety Calendar and Run Charts) to track outcomes for reflection and to inform improvement.

Workshop

Recommended for those new to quality improvement

African Surgical Outcomes

- 1 in 5 surgical patients develop a perioperative complication, following which 1 in 10 die
- Patients in Africa are 2 X more likely to die from these complications compared with global outcomes
- 95% of deaths occur in the postoperative period
- Many lives can be saved by effective surveillance and response to physiological deterioration

Biccard, B. M., *et al*. (2018). Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. The Lancet, 391, 1589-1598.

Phased Scale-up Design for 5Rs to Rescue

Future Campaign

Countries for Phases 1-3

- Ethiopia
- Uganda
- Tanzania
- South Africa

Phase 0
Set up

- (Aug 2022-Feb 2023)

Completed

LEARNINGS INCORPORATED INTO DESIGN

Phase 1
Built a Scalable Model
(intensive innovation)

- 9 hospitals, 4 country collaborative
- Intensive support (Feb '23 - Aug '24)

Completed

LEARNINGS INCORPORATED INTO DESIGN

Phase 2
Refining a Scalable Model
(light touch support)

- 20 hospitals
- 4 country collaborative
- Proven approach and tools
- Light touch support (Sept '24 – Mar '26)

In Progress

LEARNINGS INCORPORATED INTO DESIGN

Phase 3
Test Large Scale Implementation

- ?? hospitals
- ?? countries RCT
- Proven intervention "package"
- Nov '25 to Nov '27

Planning

LEARNINGS INCORPORATED INTO DESIGN

Phase 4
Continent Wide Campaign

- Continent-wide campaign targeting all hospitals across the continent seeking partnerships with national governments and the World Health Organization
- Scale up to 1000s of hospitals (campaign methods)
- 18 months

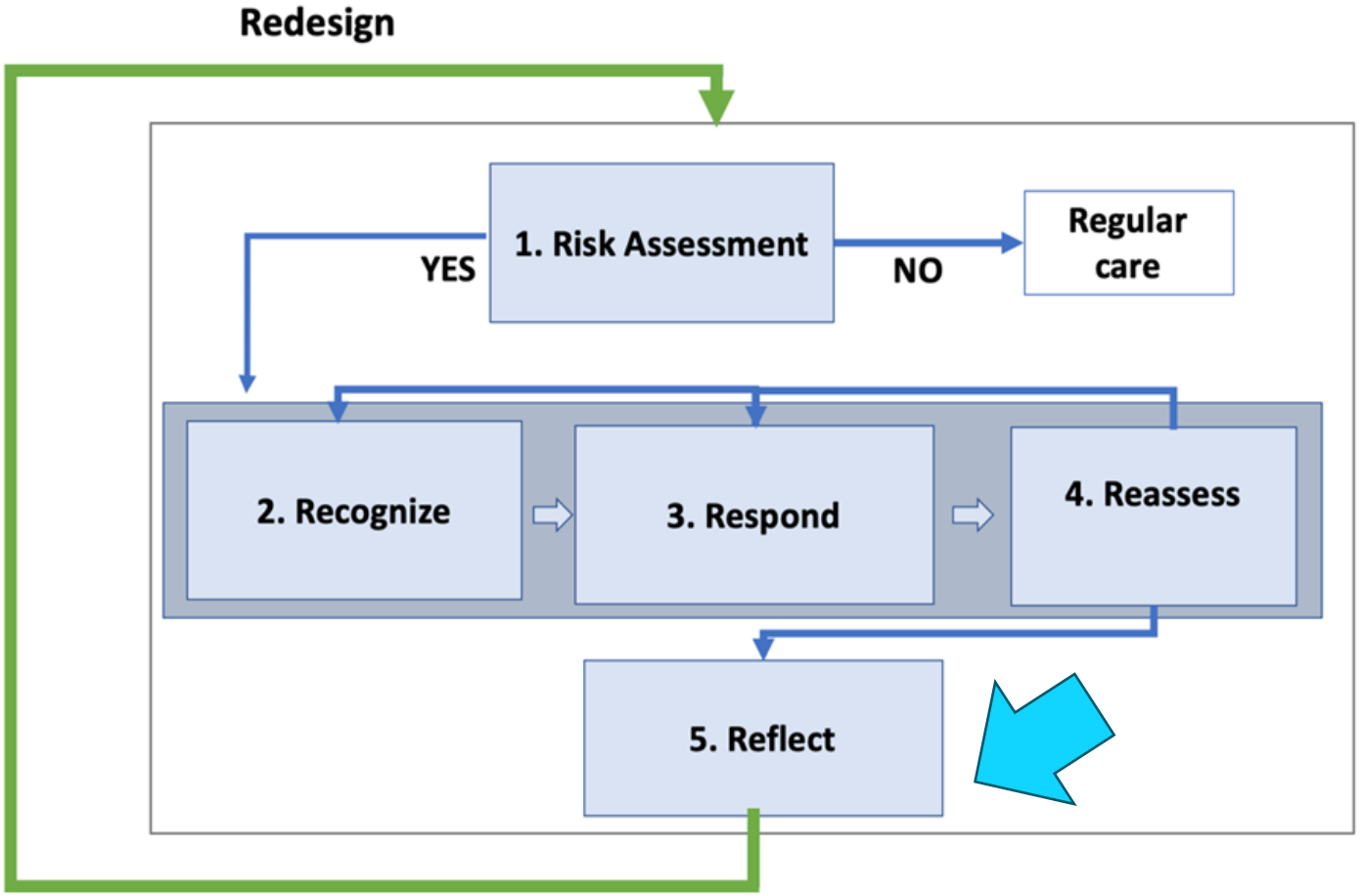
Future

The Change: From ‘Failure to Rescue’ to ‘5Rs to Rescue’

‘5Rs to Rescue’

A model of care that supports the hospital teams to recognize and respond to deterioration early

Each ‘R’ describes one of 5 steps needed to achieve better outcomes



APPRISE

5Rs to Rescue

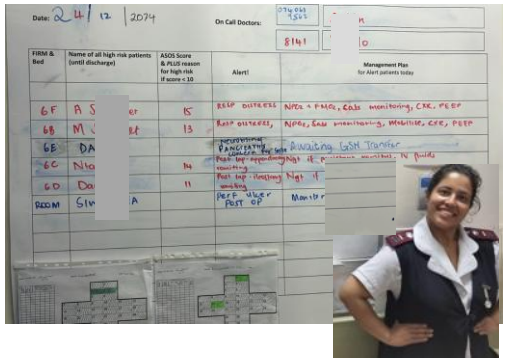
1. Risk Assessment

Know who the high-risk patients are

ASOS Risk Assessment for every surgical patient

Keeping high risk patients visible in the ward

Communication Board

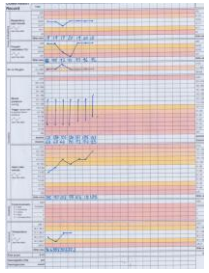


'Huddles'

2. Recognize

Recognise deterioration early

Display Vital Signs to make *early* recognition *easy*



3. Respond
4. Reassess

Rapid escalation & response

Increase vitals signs monitoring to at least 1 hourly

Reassess

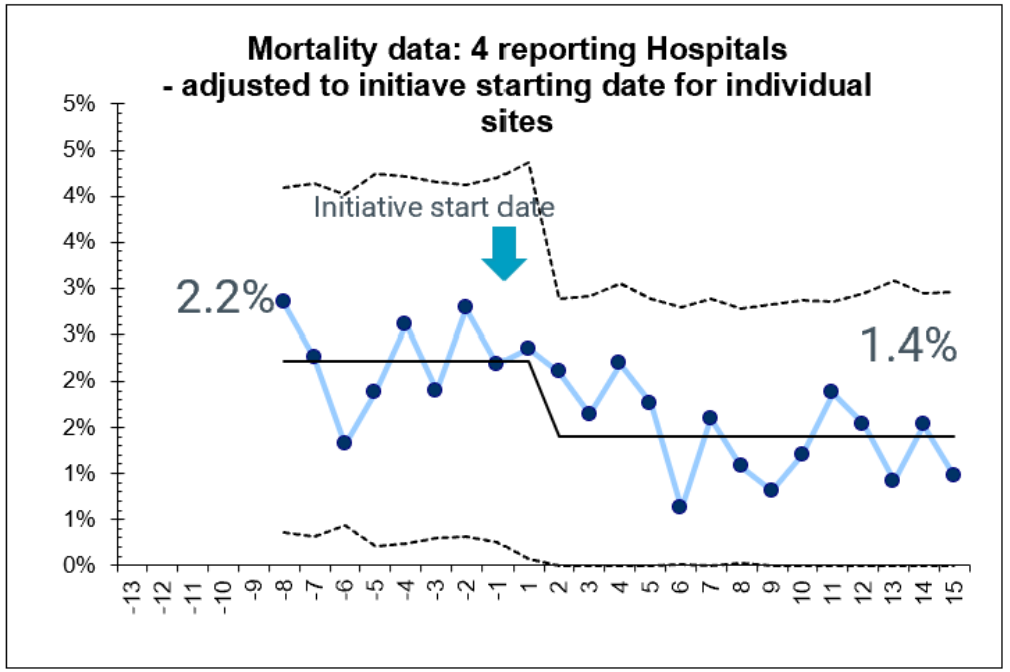
“5Rs to Rescue” Project: Phase 1

Phase 1

Aim: Build a scalable model (intensive innovation)

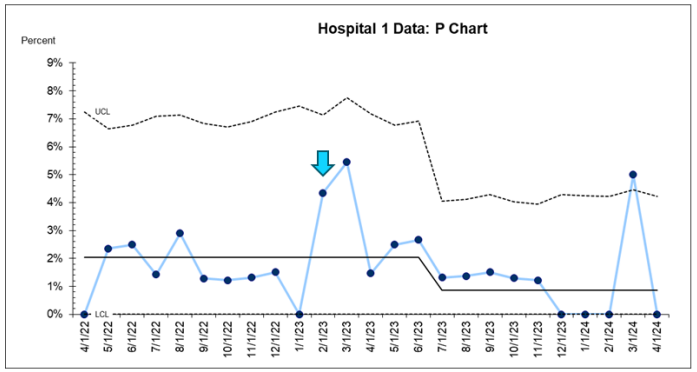
Geography & Scope: 9 hospitals across 4 countries in Africa (Ethiopia, Tanzania, South Africa & Uganda)

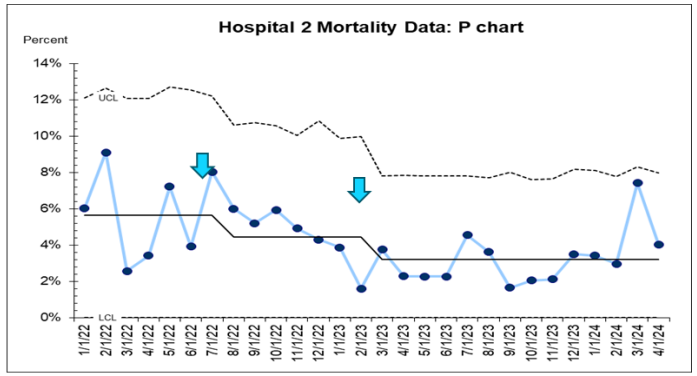
Results: *36% decrease in mortality over 15 months

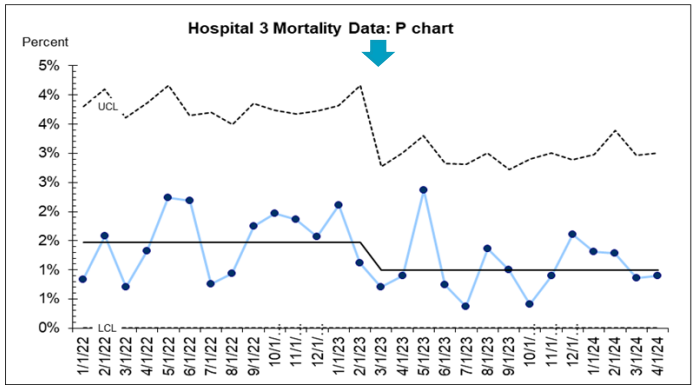


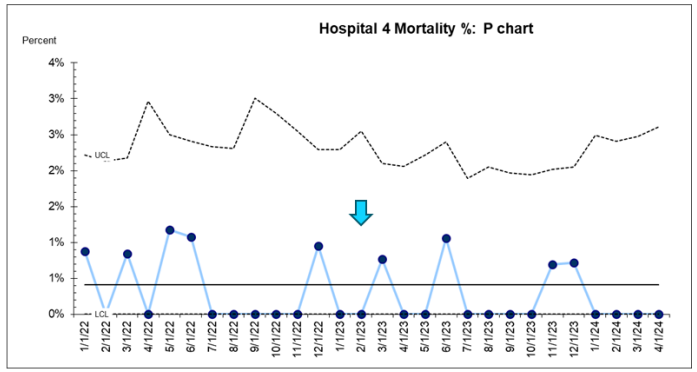
Phase 1 Mortality Data – from 4 hospitals only

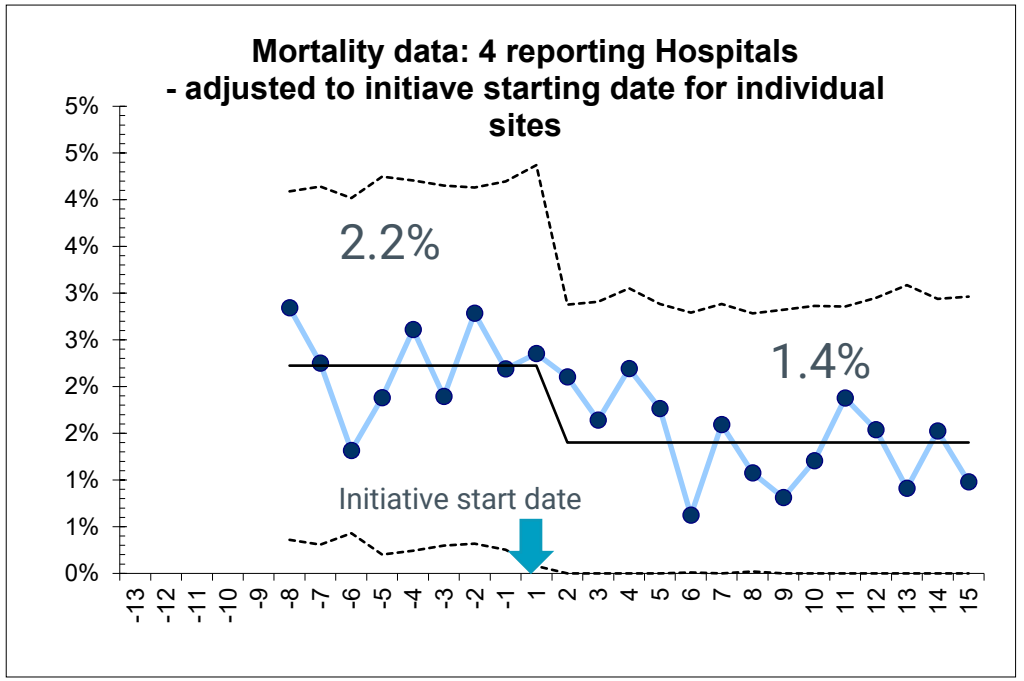
% Mortality in 4 of the pilot hospitals











“5Rs to Rescue” Project: Phase 2

Phase 1

Aim: Build a scalable model (intensive innovation)

Geography & Scope: 9 hospitals across 4 countries in Africa (Ethiopia, Tanzania, South Africa & Uganda)

Results: *36% decrease in mortality over 15 months

Phase 2

Aim: Refine a scalable model (intensive innovation) and reduce post-operative mortality by 25%

Geography & Scope: 20 hospitals across the same 4 countries in Africa

The Need: *To be able to measure mortality better*

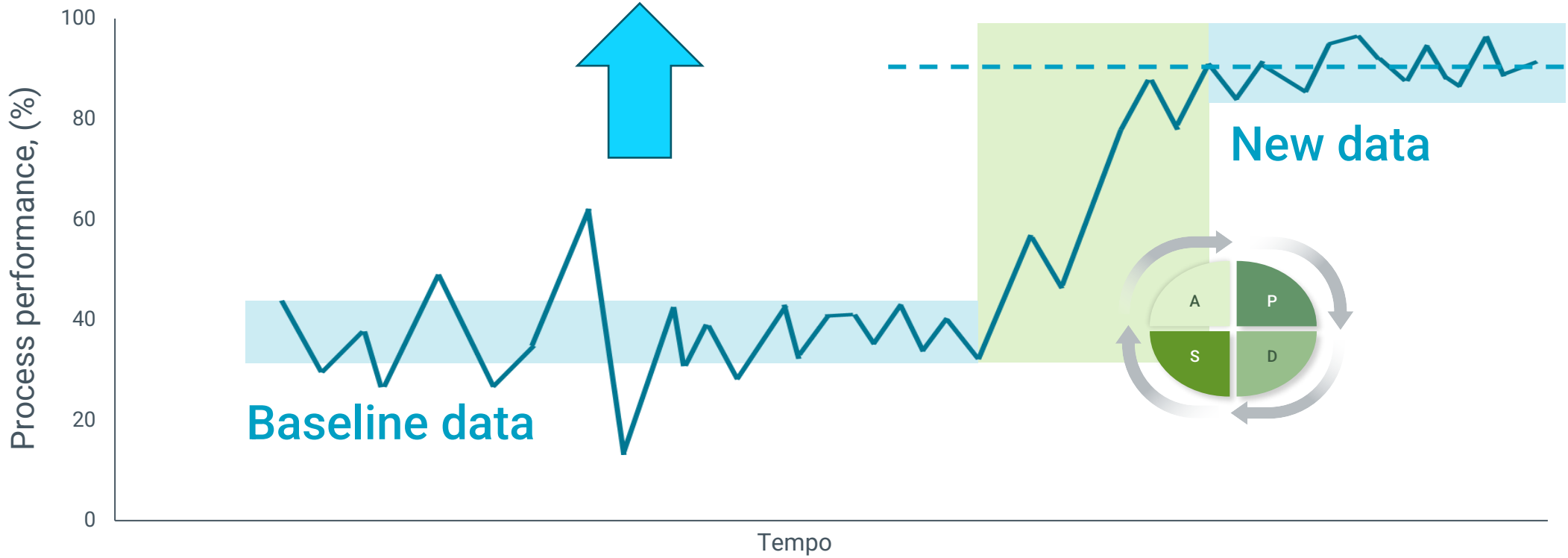
Joseph Juran's Quality Trilogy

Path to Scale and Sustainability

Quality Planning

Quality Control (during operations)

Quality improvement



What is quality control?

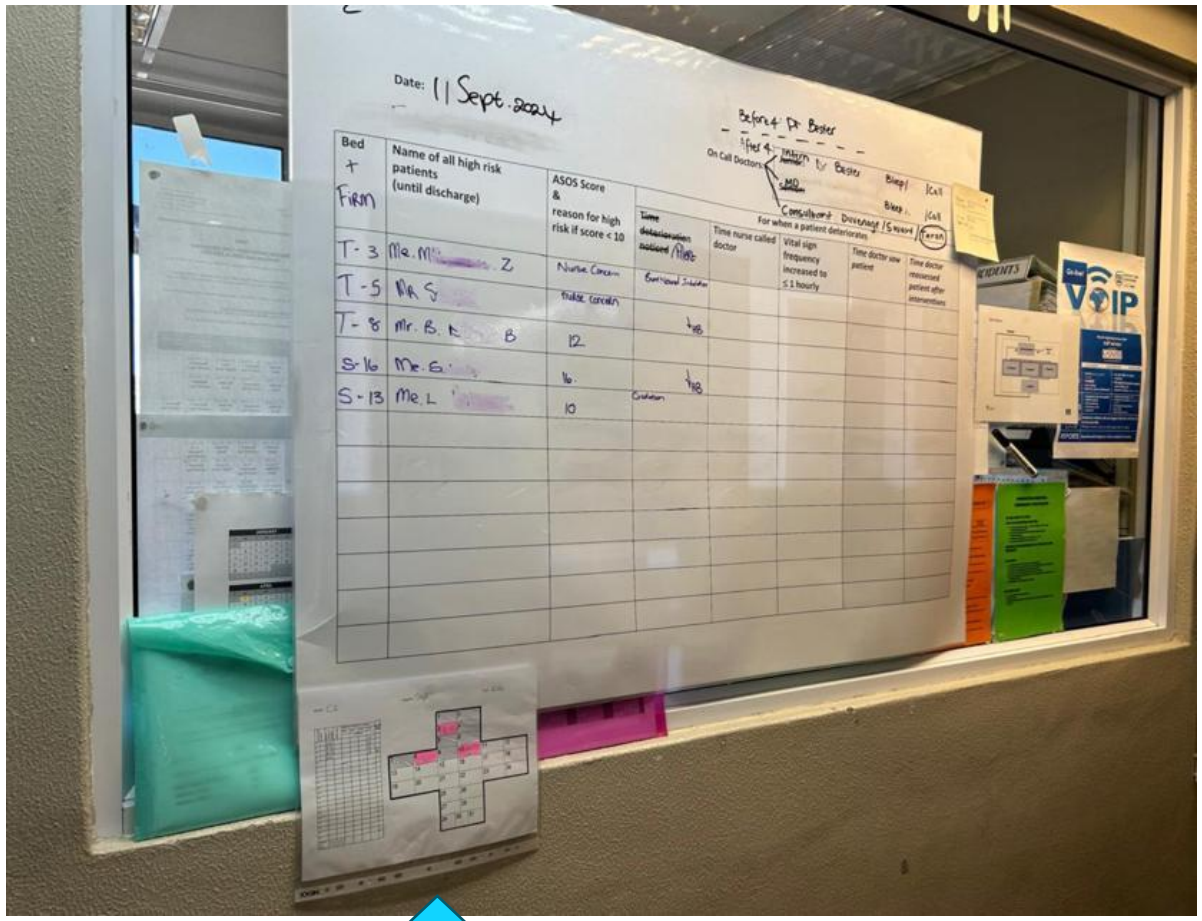
One way to describe it:

Comply with critical-to-quality requirements and international standards or regulatory authorities

Method carried out every day to reliably deliver the care according to our “normal” or standard – during the care to meet patients' needs

Quality control (during care)

"*Inspection does not improve quality, nor does it guarantee quality. The inspection is too late. The quality, good or bad, is already in the product. As Harold F. Dodge said, "You can't inspect the quality of a product*."
Deming, Out of the Crisis, page29



Safety Calendar

Why is visual problem management important?

- Differentiate normal from abnormal ***during care***
- Manage repetitive or chronic problems in a systematic way;

Overcoming common challenges in using data for improvement

ESSENTIALS

Using data for improvement

OPEN ACCESS

Amar Shah *chief quality officer and consultant forensic psychiatrist, national improvement lead for the Mental Health Safety Improvement Programme*

East London NHS Foundation Trust, London, E1 8DE, UK

One of the key challenges faced by healthcare teams across the globe is being able to access data that is routinely collected, in order to use it for improvement. Large volumes of data are collected in healthcare, but often little is available to staff or service users in a timescale or in a form that allows it to be useful for improvement. One way to work around this is to have a simple form of measurement on the unit, clinic, or ward that the team own and update. This could be in the form of a safety cross[8] or tally chart. A safety cross (fig 3) is a simple visual monthly calendar on the wall which allows teams to identify when a safety event (such as a fall) occurred on the ward. The team simply colours in each day green when no fall occurred, or colours in red the days when a fall occurred. It allows the team to own the data related to a safety event that they care about and easily see how many events are occurring over a month. Being able to see such data transparently on a ward allows teams to update data in real time and be able to respond to it effectively.

Shah, A. BMJ 2019;364:l189


MAY

Method of tracking and displaying data: Safety Cross

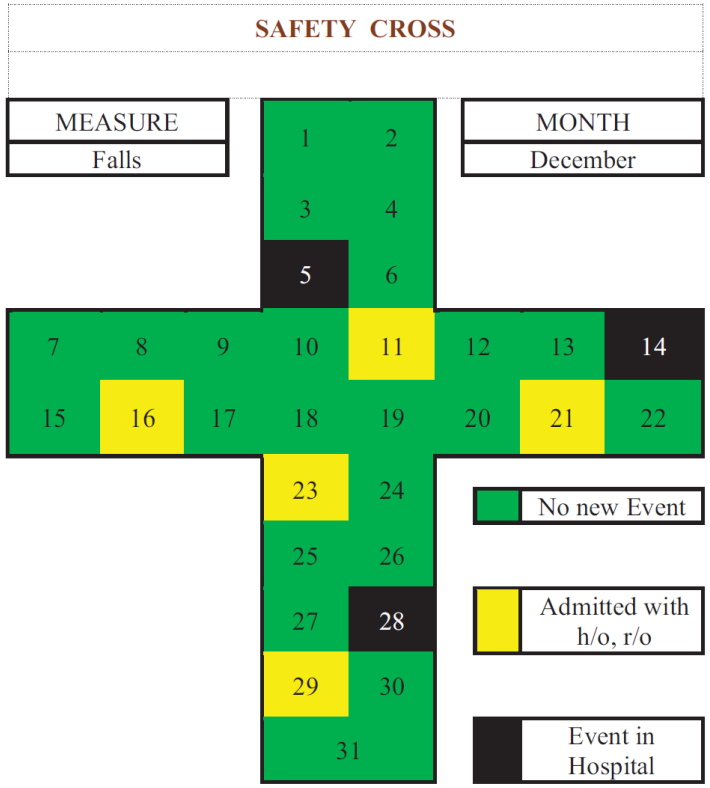


Figure 1: Safety cross showing the data on the metric 'Falls'.

Fig 3 Example of a safety cross in use

References: Pressure Ulcers to Zero Collaborative; Using data for improvement

Method of tracking and displaying the outcomes data: Safety Cross/Safety Calendar

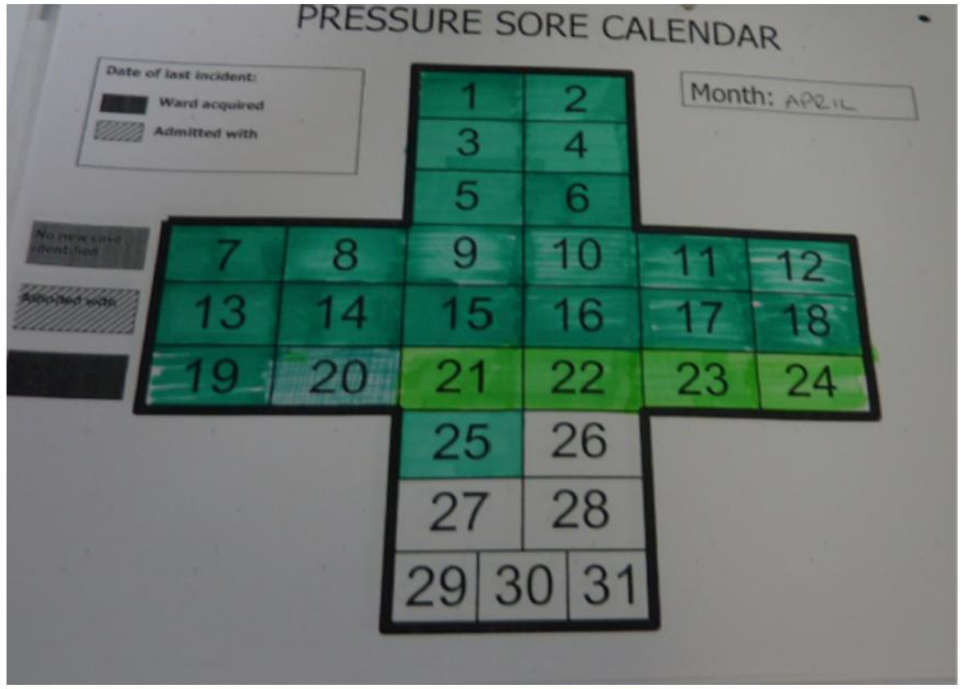
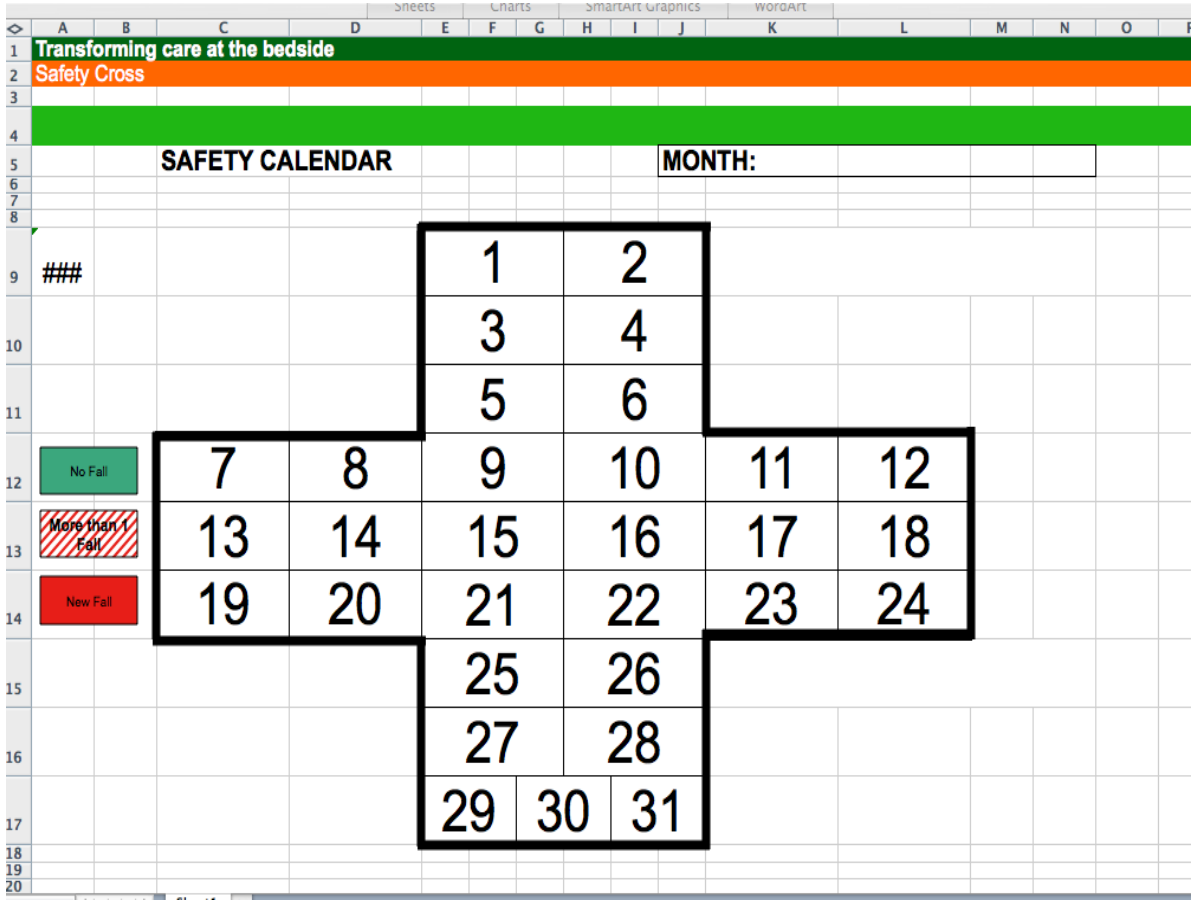


FIGURE 18 Safety Crosses at (top) site B (ward 1); and (bottom) site C (ward 1). (*continued*)



Reference: The 10-year impact of a ward-level quality improvement intervention in acute hospitals: a multiple methods study;

The 5Rs Safety Calendar: adapted from the Welsh Safety Calendar

Developed for the 1000 Lives Campaign in Wales, UK

A tool used to **record rare events.**

One cross for each calendar month
Each cell is a day of the month

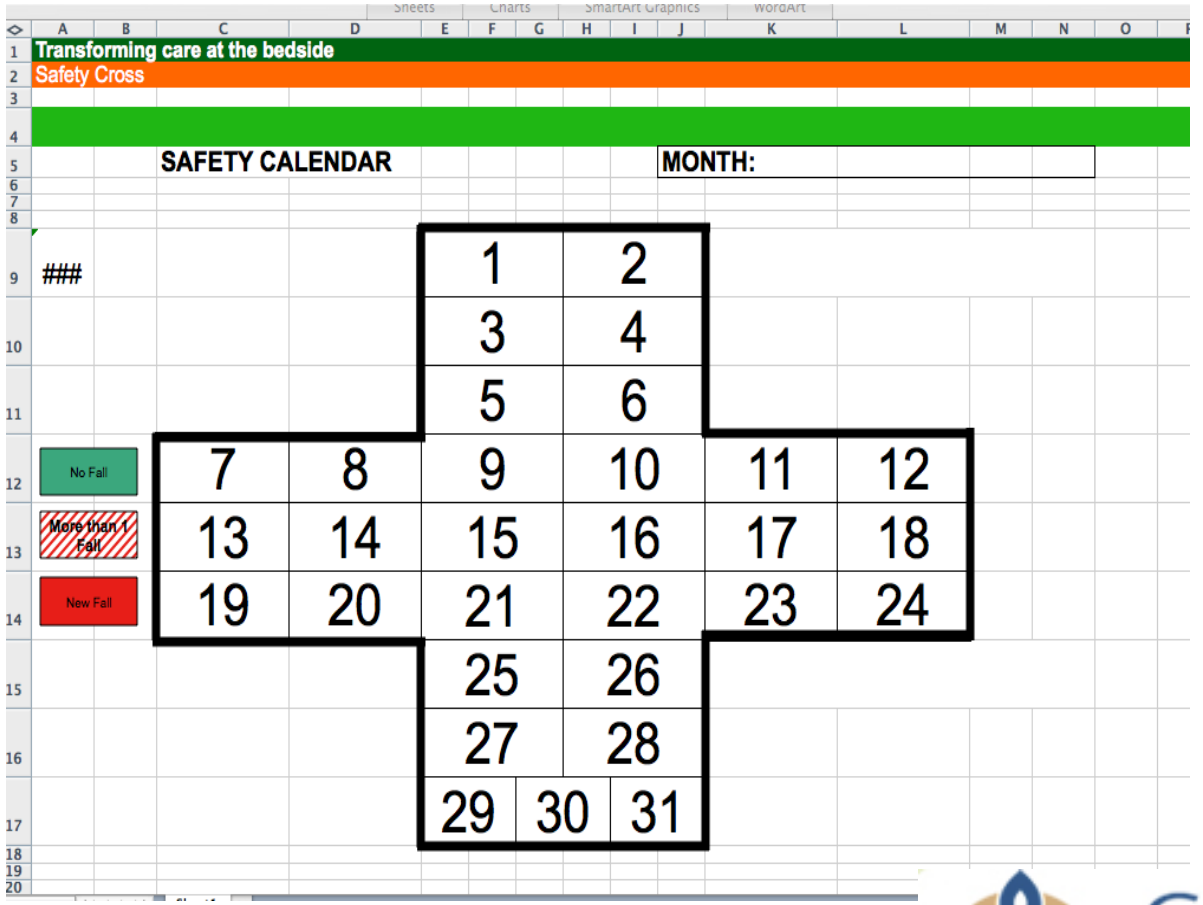
The original instructions:

KEY

No incident — No incident

More than 1 incident — More than one incident

New incident — One incident



Developed by Annette Bartley

GIG CYMRU NHS WALES

Measures to know if the changes are an improvement

Aim: to reduce postoperative mortality by 25% within 12 months so we want to look at deaths in the participating surgical ward

Measure postoperative deaths (as an **outcome measure**):

i. Number of postoperative deaths/month
ii. % postoperative deaths/surgeries/month

Also measure ALL deaths (as a **balancing measure**):

i. Number of all deaths/month
ii. % all deaths/admissions/month

The 5Rs Safety Calendar (adaptations)

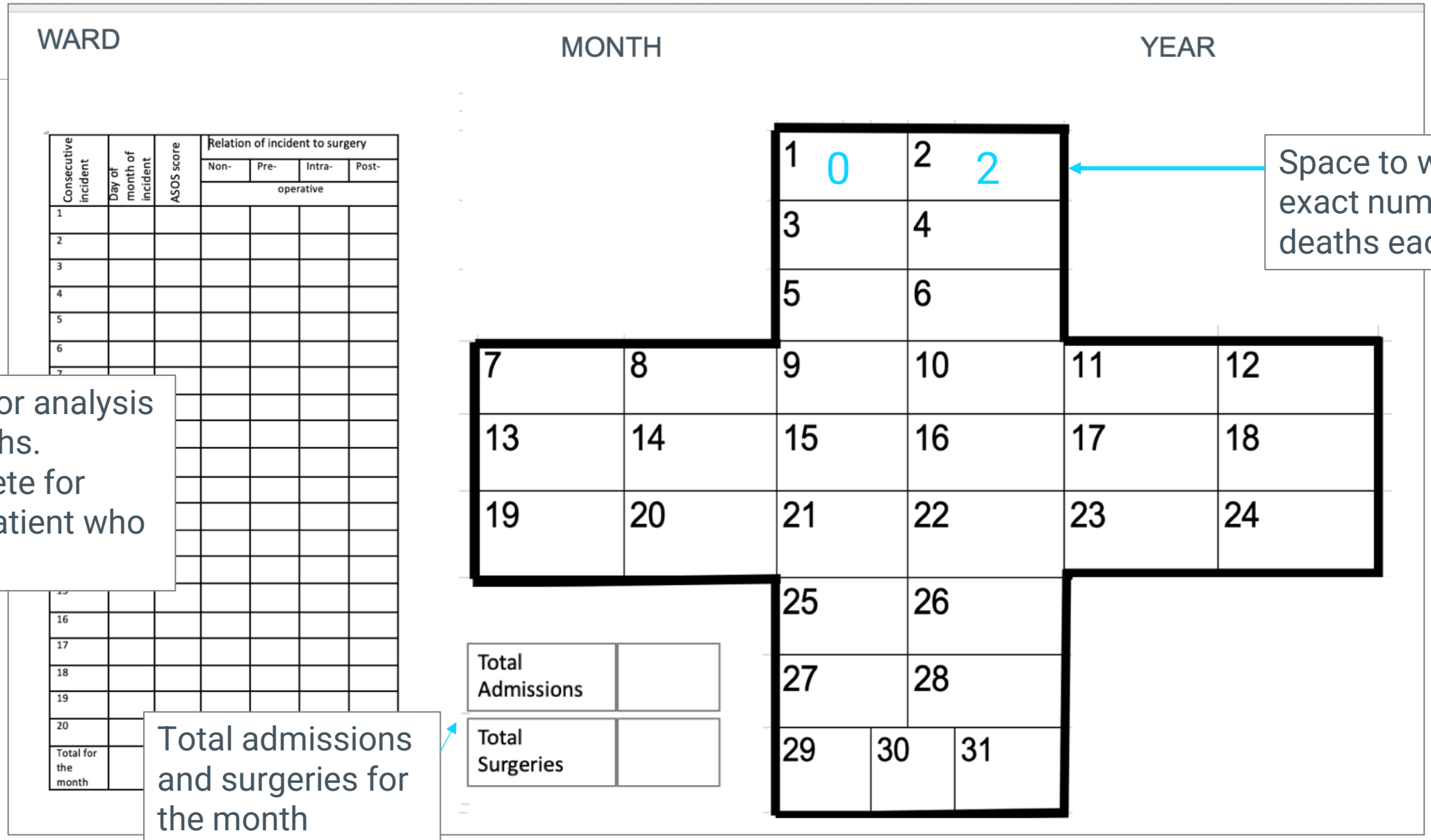


Table for analysis of deaths. Complete for each patient who died

Space to write in the exact number of deaths each day

Total admissions and surgeries for the month

5Rs Safety Calendar table

Note: The **ASOS Score** = African Surgical Outcomes Safety Score (Risk Score)

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1						
2						
3						
4						

Getting Started

Complete the ward name, year and month

WARD General Surgery MONTH June YEAR 2024

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total for the month						

Total Admissions	
Total Surgeries	

		1	2		
		3	4		
		5	6		
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
		25	26		
		27	28		
		29	30	31	

Adjust the number of calendar days for this month

APPRISE

1st day if the month

WARD General Surgery

MONTH June

YEAR 2024

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total for the month						

Total Admissions	
Total Surgeries	

1	2				
3	4				
5	6				
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26				
27	28				
29	30	31			

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Add information to the table for each patient who died

WARD General Surgery MONTH June YEAR 2024

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1	2	15		X		
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total for the month						

Total Admissions	
Total Surgeries	

1 0	2 1				
3	4				
5	6				
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26				
27	28				
29	30	31			

APPRISE

WARD General Surgery

MONTH June

YEAR 2024

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1	2	15		X		
2	14	12				X
3	14	/				X
4	18	10				X
5	19	7				X
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total for the month						

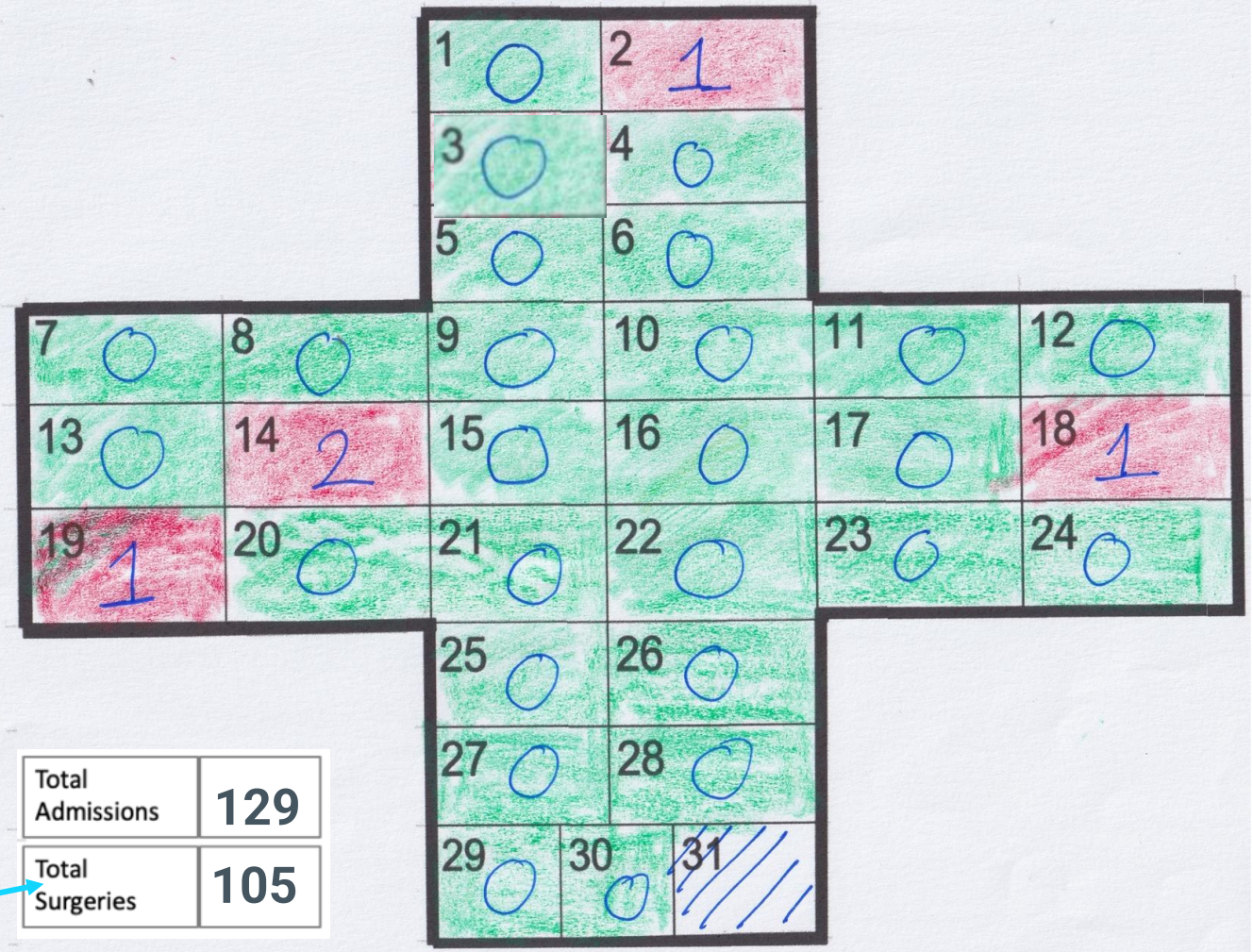
Total Admissions	
Total Surgeries	

1 0	2 1					
3 0	4 0					
5 0	6 0					
7 0	8 0	9 0	10 0	11 0	12 0	
13 0	14 2	15 0	16 0	17 0	18 1	
19 1	20 0	21 0	22 0	23	24	
25	26					
27	28					
29	30	31				

APPRISE

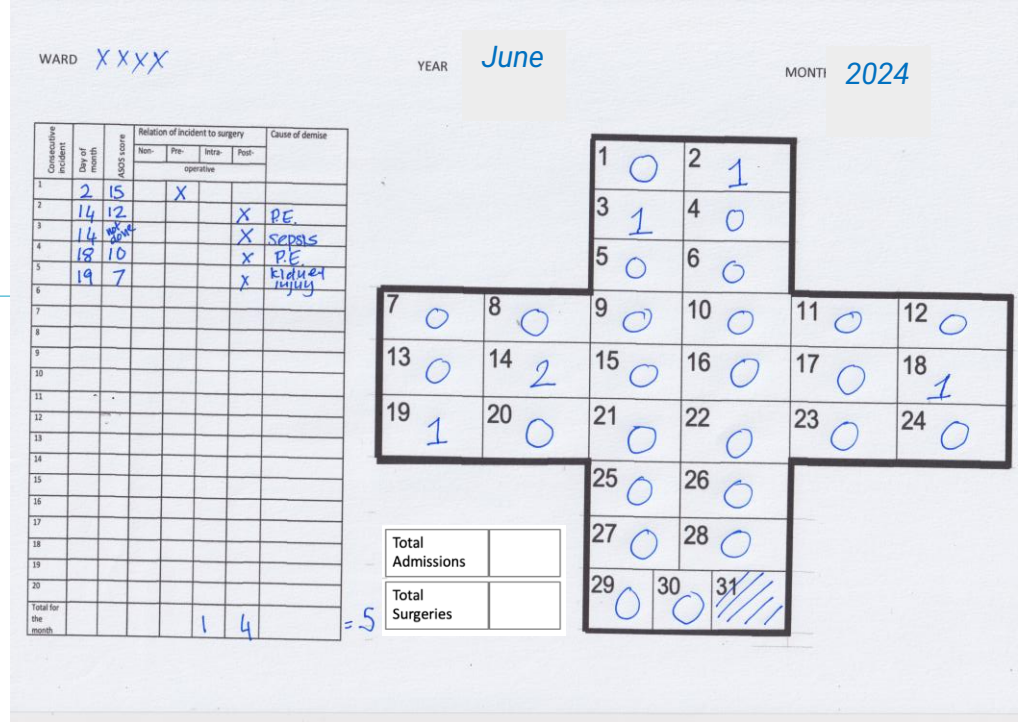
WARD General Surgery MONTH June YEAR 2024

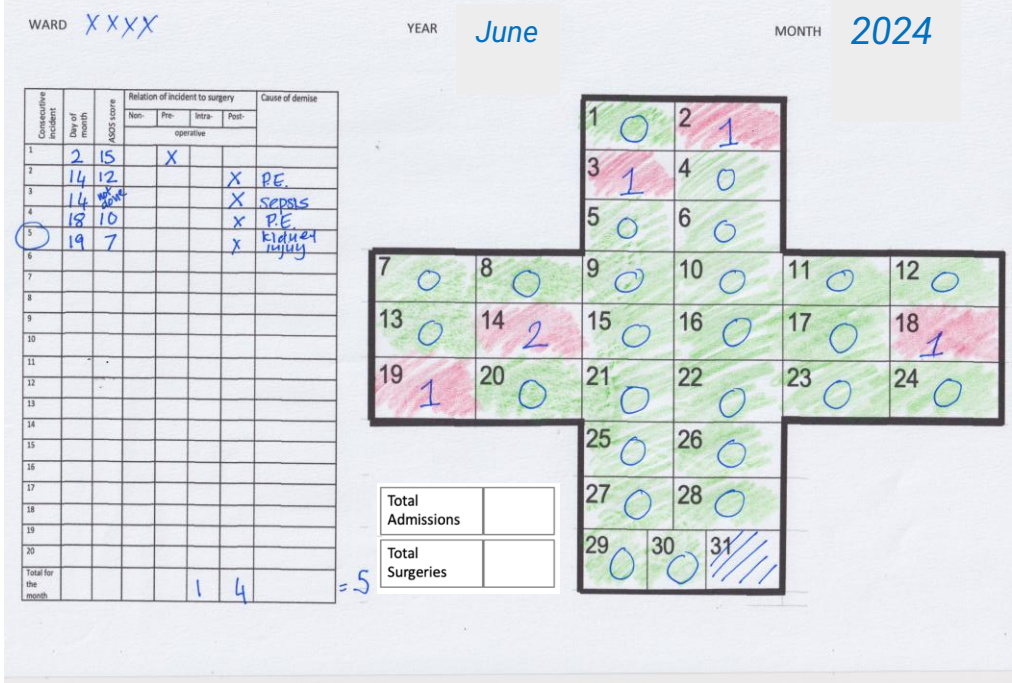
Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1	2	15		X		
2	14	12				X
3	14	/				X
4	18	10				X
5	19	7				X
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total for			0	1	0	4



Total Admissions	129
Total Surgeries	105

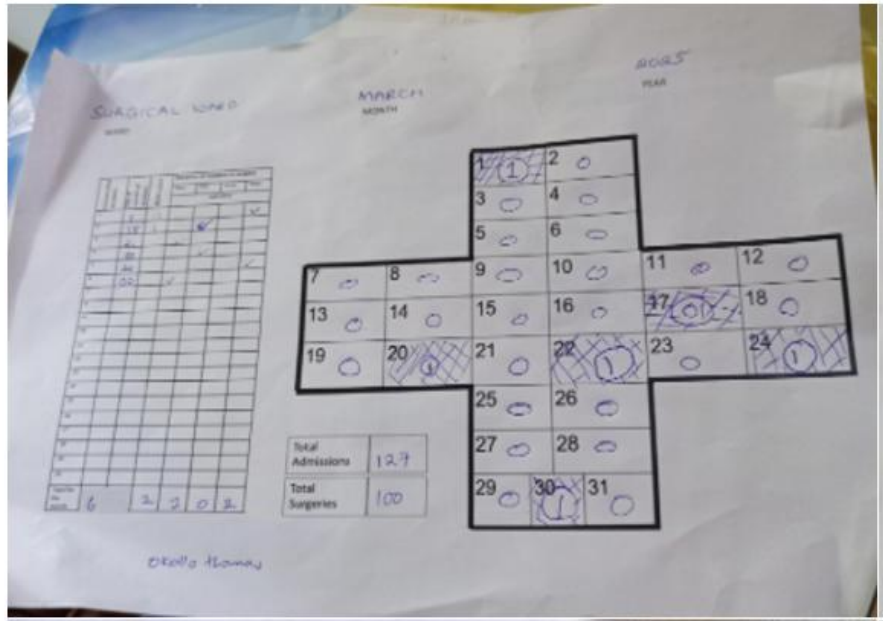
Complete the denominator box

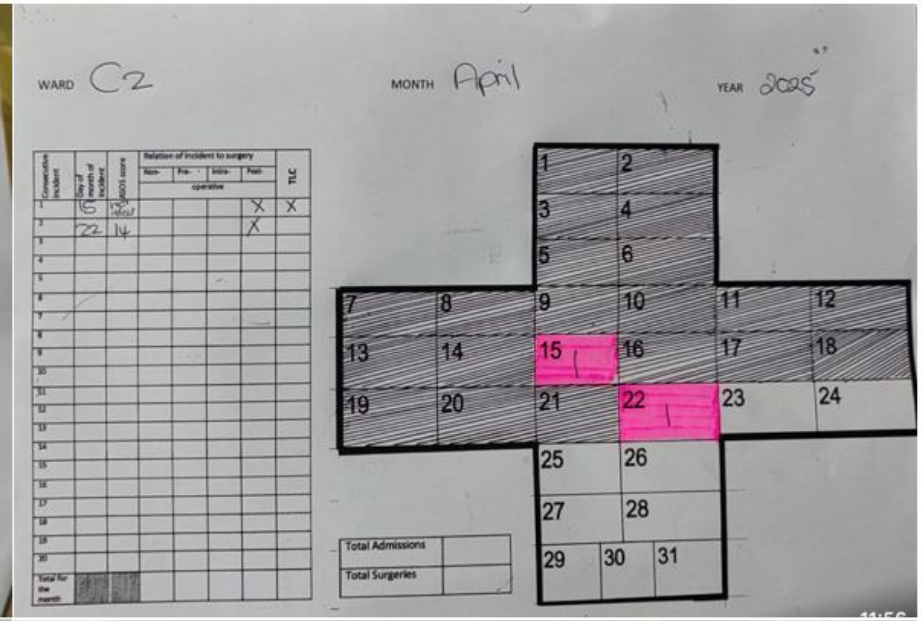


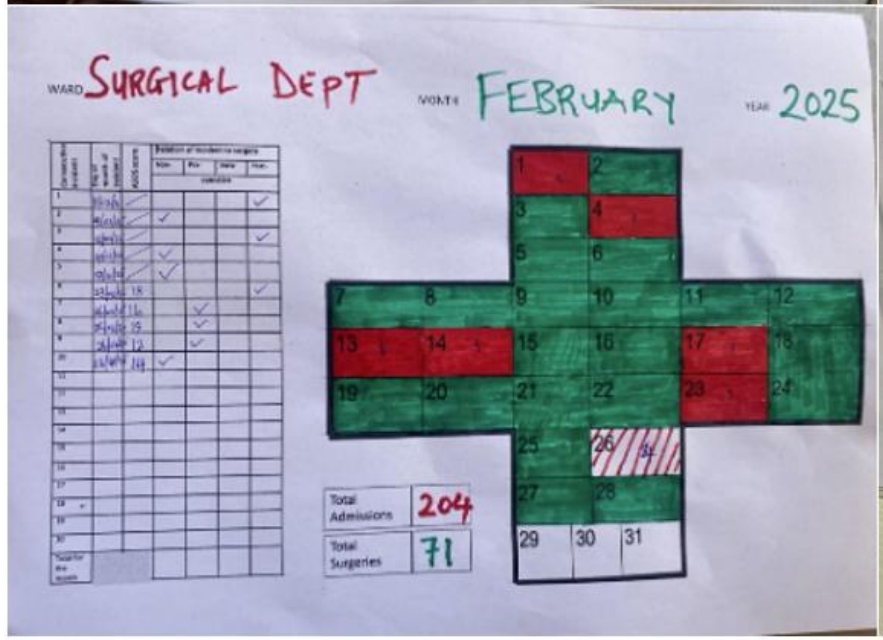


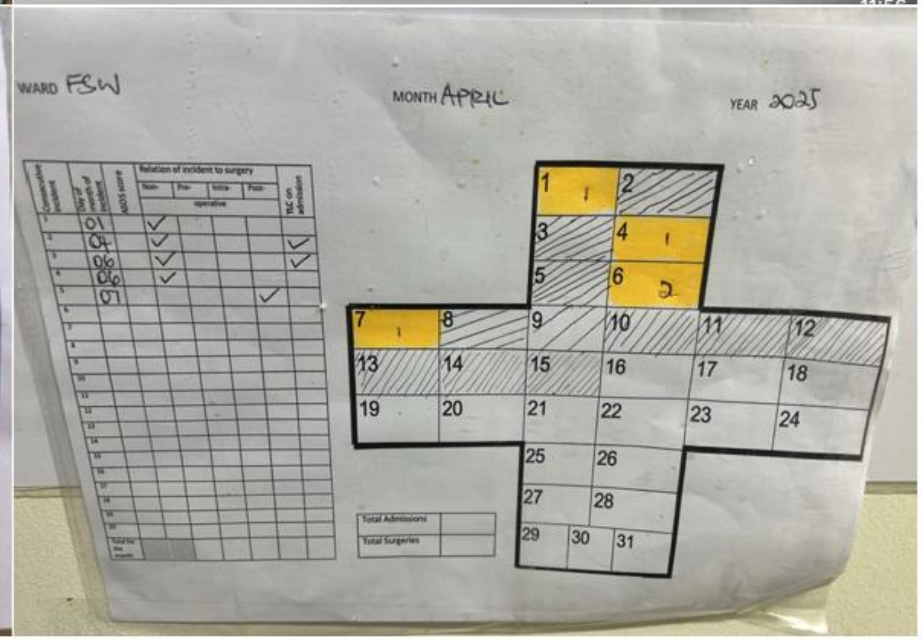
These three charts display the same data for the same month, just colored in differently

APPRISE


SURGICAL WARD
MARCH
Total Admissions 127
Total Surgeries 100

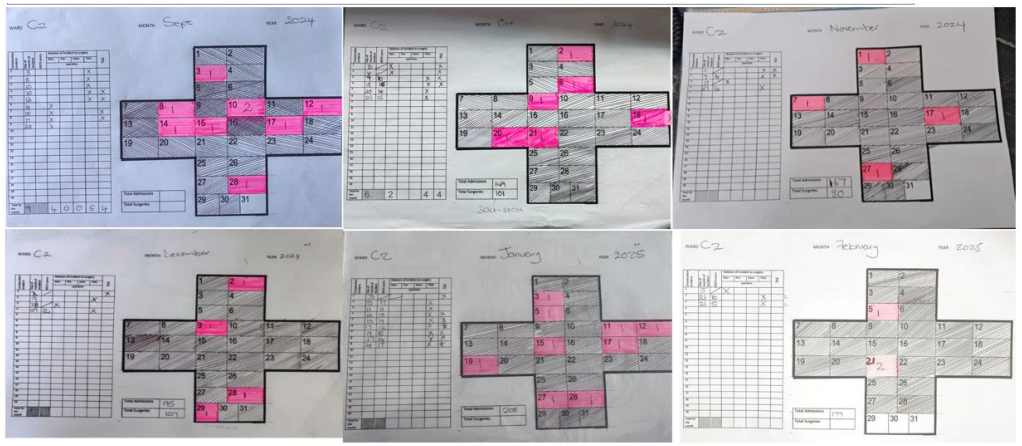

WARD C2
MONTH April
YEAR 2025
Total Admissions
Total Surgeries

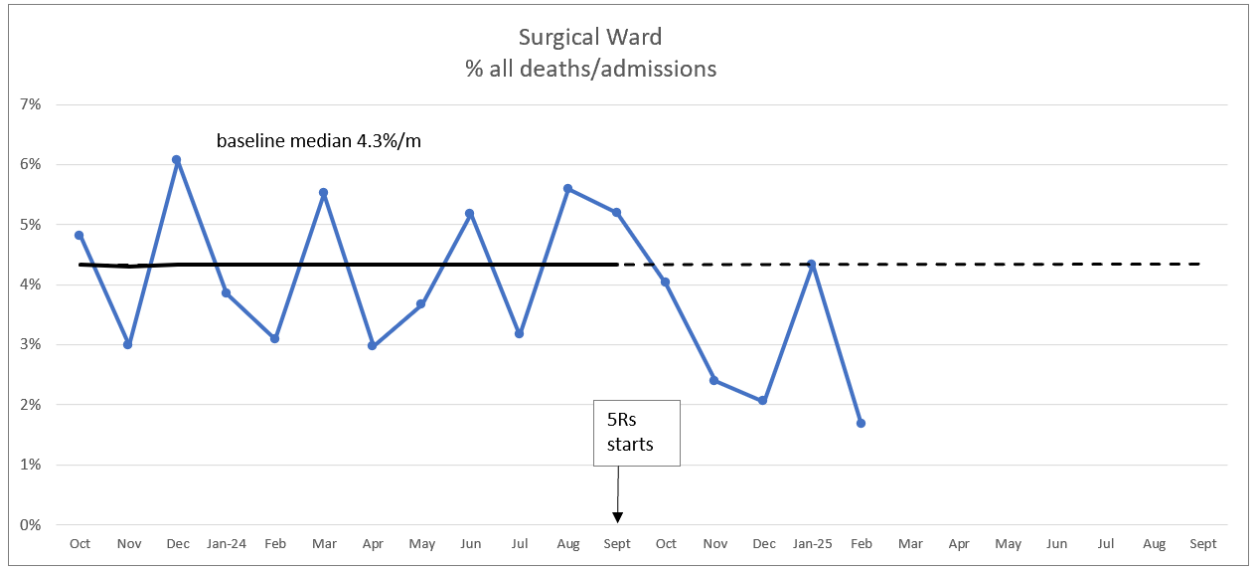

WARD SURGICAL DEPT
MONTH FEBRUARY
YEAR 2025
Total Admissions 204
Total Surgeries 71


WARD FSW
MONTH APRIL
YEAR 2025
Total Admissions
Total Surgeries

Tracking mortality over time – Intervention data

Tracking mortality over time as Run Charts





Intervention data Safety Calendars (September 2024 to March 2025)

% all deaths/admissions/month

APPRISE

Tracking mortality over time as Run Charts

The run chart: a simple analytical tool for learning from variation in healthcare processes

Rocco J Perla,[1] Lloyd P Provost,[2] Sandy K Murray[3]

DEFINITION AND CONSTRUCTION OF A RUN CHART

A run chart is a graphical display of data plotted in some type of order. The horizontal axis is most often a time scale (eg, days, weeks, months, quarters) but could also include sequential patients, visits or procedures. The vertical axis represents the quality indicator being studied (eg, infection rate, number of patient falls, readmission rate). Usually, the median is calculated and used as the chart's centreline. The median is required when using the probability-based rules to interpret a run chart (see below). The median is used as the centerline because (1) it provides the point at which half the observations are expected to be above and below the centerline and (2) the median is not influenced by extreme values in the data. Goal lines and annotations of

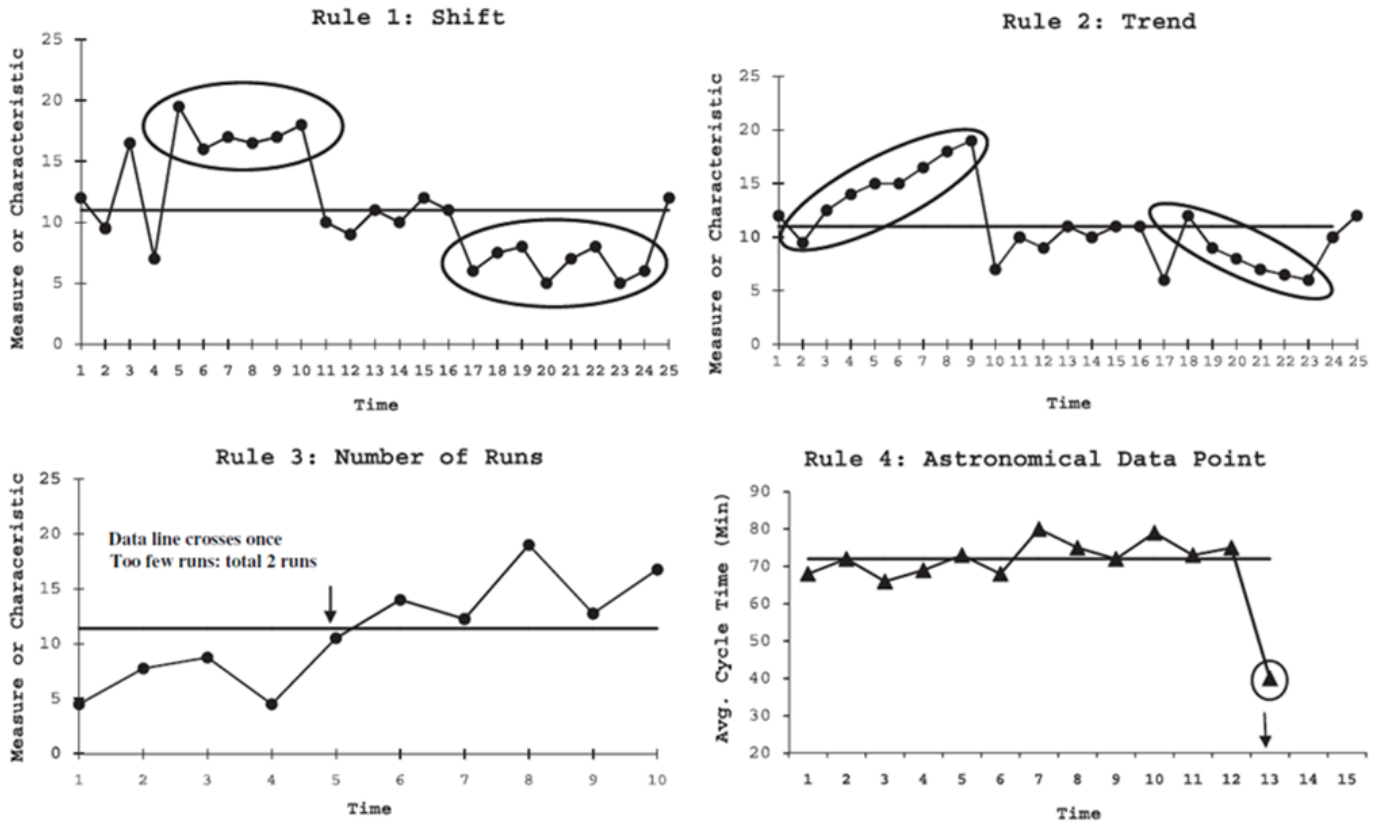
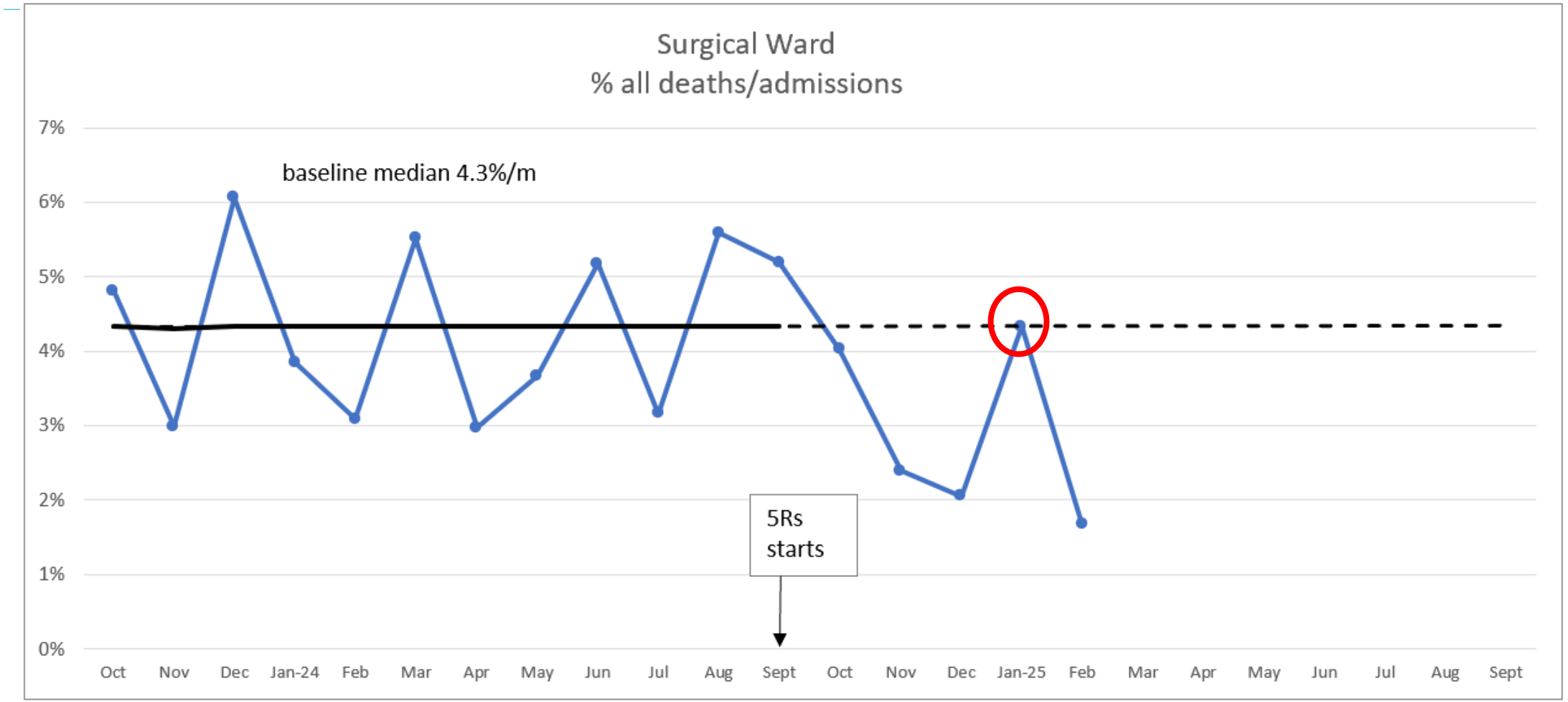


Figure 3 Rules for identifying non-random signals with run charts.

Perla, RJ., Provost, LP., Murray, SK. The run chart: a simple analytical tool for learning from variation in healthcare processes. *BMJ Qual Saf* 2011; 20:46e51

Tracking mortality over time as Run Charts



Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-	Intra-	Post-
1	3					X
2	5					X
3	6	17		X		
4	8	19		X		
5	14	10	X			
6	29		X			
7						

WARD Surgical D3 MONTH March YEAR 2025

			1 0	2 0		
			3 1	4 0		
			5 1	6 1		
7 0	8 1	9 0	10 0	11 0	12 0	
13 0	14 1	15 0	16 0	17 0	18 0	
19 0	20 0	21 0	22 0	23 0	24 0	
		25 0	26 0			
		27 0	28 0			
		29 1	30 0	31 0		

Total Admissions	166
Total Surgeries	125

17				
18				
19				
20				
Total for the month	2	2	0	2

Consecutive incident	Day of month of incident	ASOS score	Relation of incident to surgery			
			Non-operative	Pre-operative	Intra-operative	Post-operative
1	15	16				X
2	22	14				X
3	24		X			
4						
5						

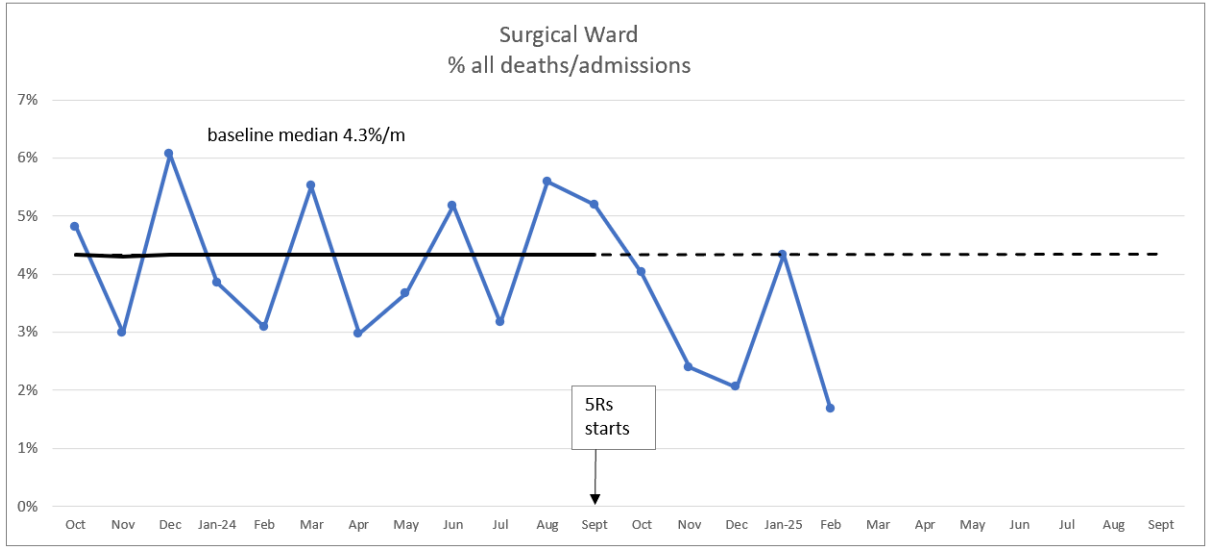
WARD Surgical D3 MONTH April YEAR 2025

		1 0	2 0			
		3 0	4 0			
		5 0	6 0			
7 0	8 0	9 0	10 0	11 0	12 0	
13 0	14 0	15 1	16 0	17 0	18 0	
19 0	20 0	21 0	22 1	23 0	24 1	
		25 0	26 0			
		27 0	28 0			
		29 0	30 0	31		

Total Admissions	154
Total Surgeries	122

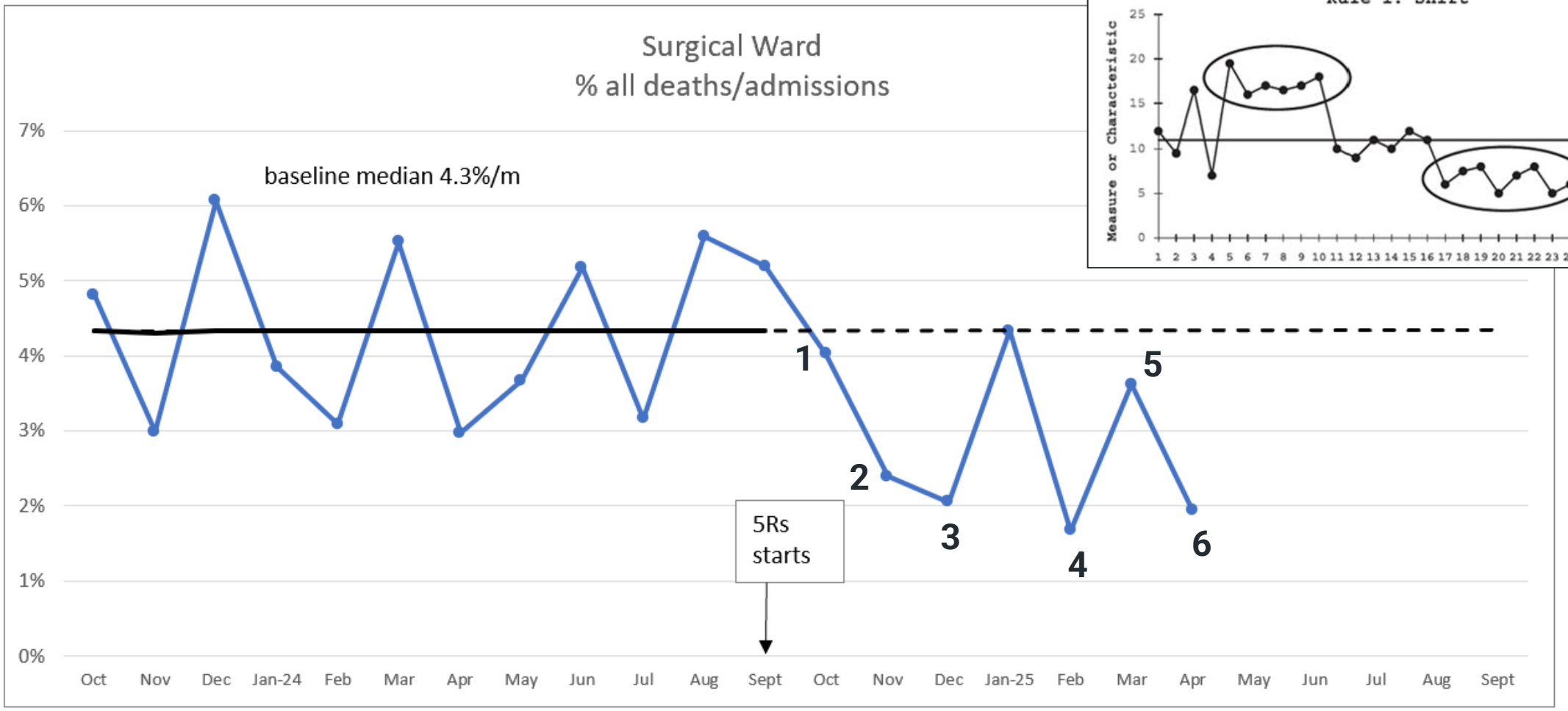
13						
14						
15						
16						
17						
18						
19						
20						
Total for the month						

Data elements					Indicators	
Months	B # Admissions	D # Surgeries for surgical ward	A # Deaths in surgical ward	C Post-operative deaths in surgical ward	% all deaths/ admissions	% post-operative deaths/ surgeries
Sept-23	150	110	8	4	5,3%	3,6%
Oct	187	102	9	5	4,8%	4,9%
Nov	167	106	5	5	3,0%	4,7%
Dec	165	95	10	2	6,1%	2,1%
Jan-24	182	98	7	6	3,8%	6,1%
Feb	194	106	6	3	3,1%	2,8%
Mar	145	103	8	5	5,5%	4,9%
Apr	168	115	5	2	3,0%	1,7%
May	191	118	7	5	3,7%	4,2%
Jun	174	99	9	4	5,2%	4,0%
Jul	158	105	5	3	3,2%	2,9%
Aug	143	113	8	4	5,6%	3,5%
Sept	154	116	8	4	5,2%	3,4%
Oct	149	101	6	3	4,0%	3,0%
Nov	167	80	4	2	2,4%	2,5%
Dec	195	107	4	2	2,1%	1,9%
Jan-25	208	112	9	2	4,3%	1,8%
Feb	179	130	3	2	1,7%	1,5%
Mar						
Apr						



1. Using the two Safety Calendars on your table, complete highlighted data fields in the table
2. % all deaths/admissions = A / B X 100%
3. % post-operative deaths/surgeries = C / D X 100%
4. Complete the run chart above

Tracking mortality over time as Run Charts



% all deaths/admissions/month

Dank u! Thank you! Obrigado! Siyabonga! Dankie!