



Bundle to Reduce the Complications of Long Line Insertion In Neonatal ICU

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BACKGROUND

Central long line is essential for long-term parenteral nutrition support for premature infants. Occurrence of redness, swelling, or extravasation from the line would warrant an immediate removal. Infants subjected to prophylactic antibiotics and re-insertion procedure, and their hospitalization stay extended. Parents showed distress on their little one's condition and also the increased cost of hospitalization.

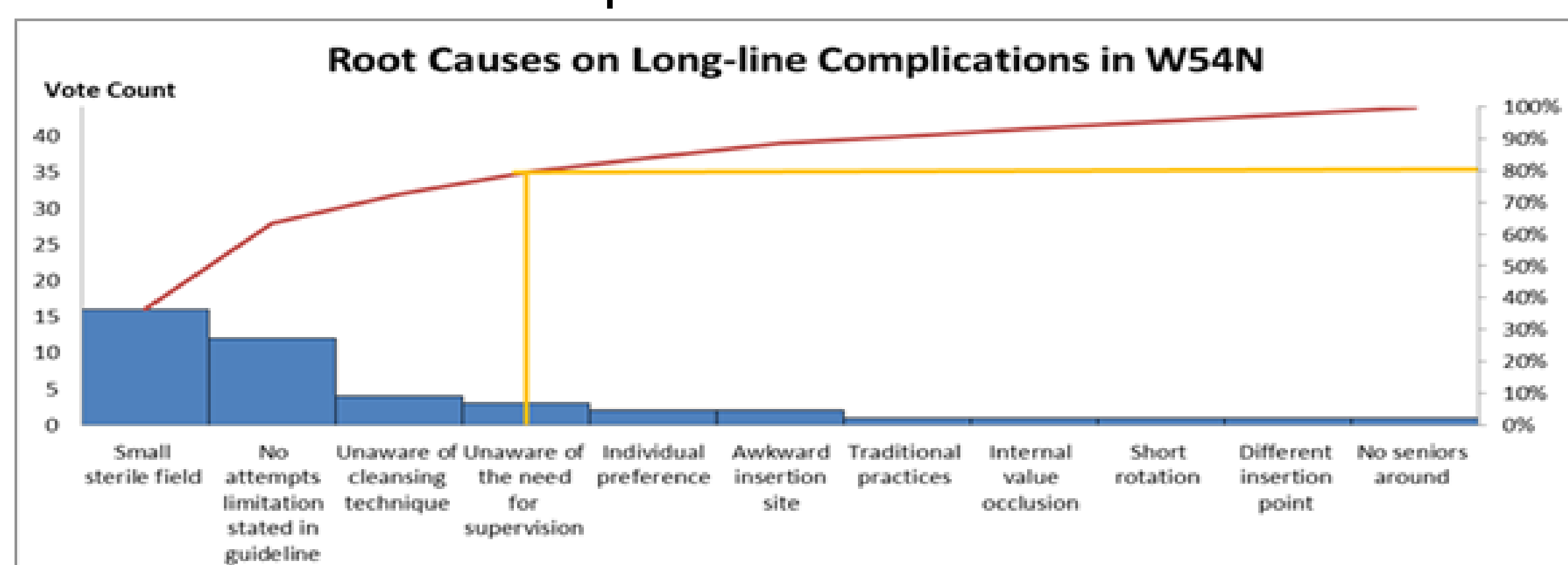
OBJECTIVE

The objective of this project is to reduce the complications of Long Line insertion at least 50% within 6 months.

METHODOLOGY

Root causes of long line complications were brainstormed. A cause and effect diagram was developed. Multi-voting was done and causes were plotted in a Pareto chart to facilitate team to eliminate the "Vital Few" causes, namely:

1. Small sterile area
2. No attempt limitation stated in guideline
3. Unaware of cleansing technique guideline
4. Unaware the need of supervision



Tree diagram was also deployed as it recognized possible solutions based on the vital root causes identified. Different solutions are identified for different causes.

Solution	Effectiveness	Time saving	Easy to apply	Patient comfort	Total	
1. Increase sterile field	"STOP" signage to create awareness	5	3	5	3	14
	Use more sterile dressing towel	5	1	1	1	8
	Assistant to wear surgical gown	2	1	1	1	5
2. Impose limitation of catheter insertion through policy changes	State the number of attempts in the policy	4	3	4	5	16
	Introduction of checklist	5	4	5	3	17
	Inform doctor number of attempts before they start procedure	2	2	4	1	9
	Staff to restrict number of attempts during procedure	1	1	2	1	5
3. Improve cleansing technique	Allow solution to dry in 30 sec	5	5	5	4	19
	Use another brand cleansing solution	3	3	3	3	12
	Scrub the selected limbs with cleansing solution	5	2	1	1	9
4. Educate Junior doctors on the need of supervision	Buddy System	5	5	5	5	19
	Orientation to doctors the needs of supervision	4	3	4	3	14
	In-service to all doctors on long line procedure	4	2	1	1	8

INTERVENTIONS

Phase 3 – Buddy system

The new badge of rotating doctors will "buddy" with the senior doctors when performing the procedure. Restriction to **TWO** attempts per doctor.



Phase 4 - Cleansing method

All the doctors need to ensure that the cleansing solution was completely dry before punctuation of infant's skin.

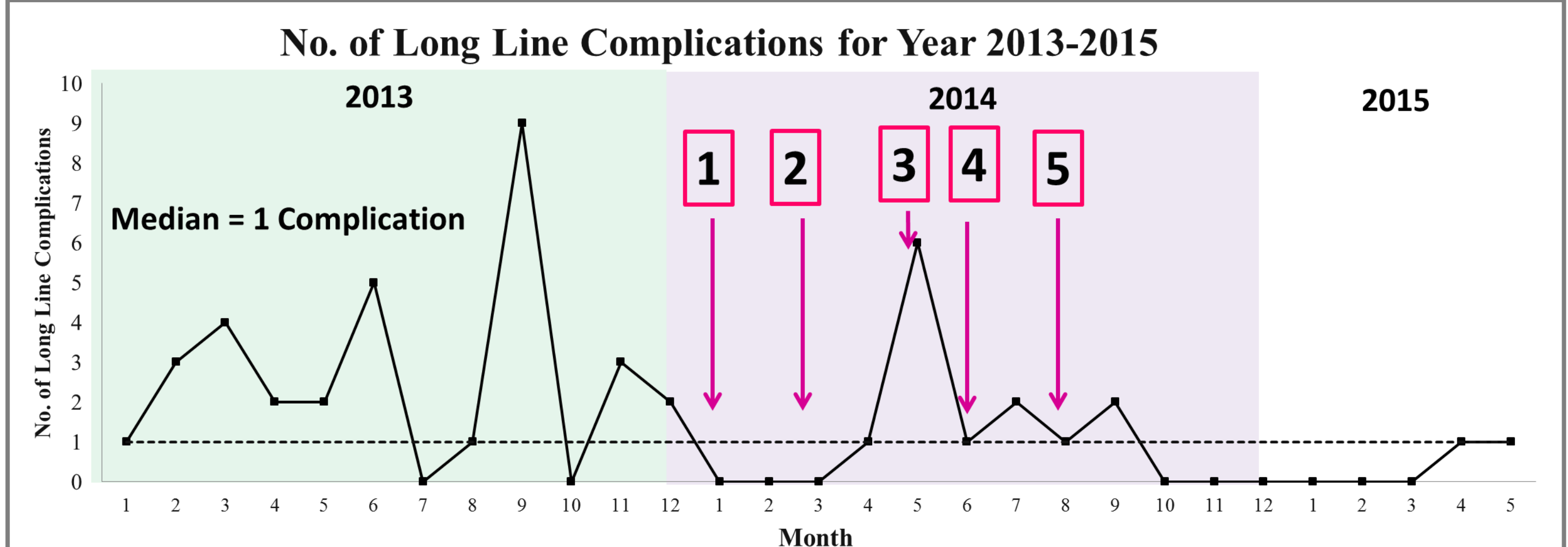
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Phase 5 – Introduction of checklist

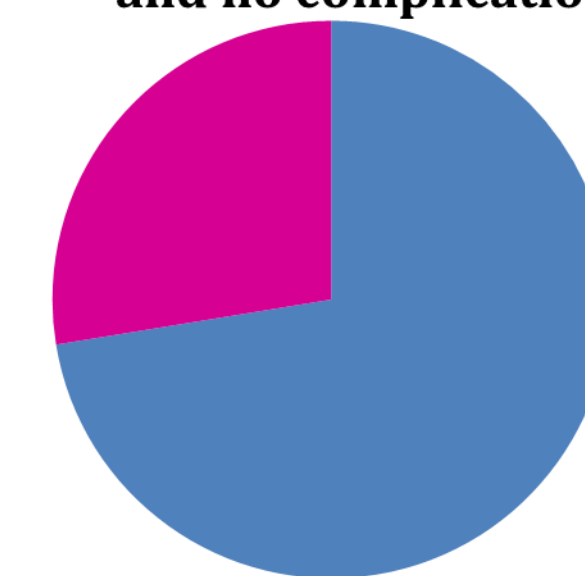
A step by step guideline was developed using a checklist to facilitate and to standardize procedure.

RESULTS

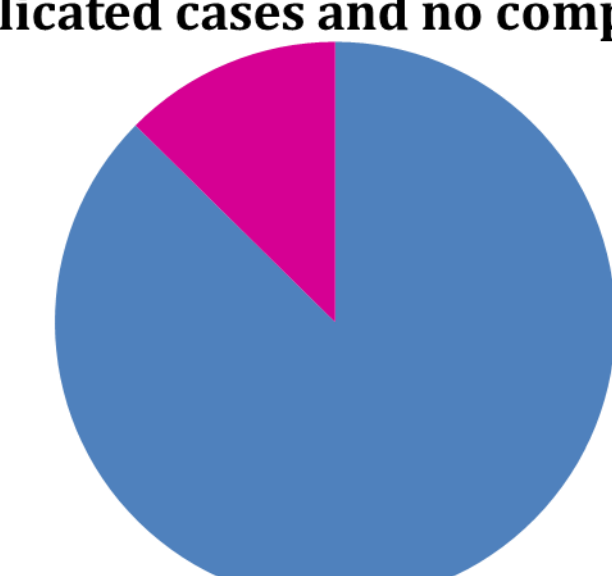


Every Solution was tested for 8 weeks. Solution 4 was implemented 4 weeks earlier concurrently with Solution 3 to reinforced cleansing techniques.

Baseline Yr 2013 Ratio of complicated cases and no complications



Post-Implementation Yr 2014 Ratio of complicated cases and no complications



Cases with complications

Cases with no complications

There was improvement as the cases with complications in Year 2014 was 50% lesser than Year 2013. Results are sustainable as showed in Year 2015.

From this project, infants experienced lesser traumatic procedures thus improved comfort and neurodevelopmental growth.

With the implementation of the procedure checklist, the work processes is now standardize and it has been incorporated into daily operation. Procedure checklist and updated practices were also uploaded into SGH intranet procedure guidelines.

INTERVENTIONS

Phase 1 – Use of "STOP" signage

To reduce the human traffic and to bring awareness to the staffs of on-going procedure, STOP signage was created and it was hanging at the entrance of Neonatal ICU.



Phase 2 - Use of extra dressing towels

Extra sterile dressing towels were used to increase the sterile field area thus to reduce cross contamination.



CONCLUSION

Work process efficiency increased as health care providers are more careful handling infants with long line. With the implemented solutions, our patients' safety is enhanced which in line with our organization's mission statement. In future, our team will continue to search for alternative to further improve the bundle to prevent bloodstream infection from central long line.