

### **Project Title**

Improving the Safety of the External Drainage Monitoring System (EDMS)

### **Project Lead and Members**

Project lead: Dr Ira Sun

Project members: Theng Li-Ping, Dr Lim Su Lone, Yong Yen-Ling, Smitha Anie John,  
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### **Organisation(s) Involved**

Ng Teng Fong General Hospital

### **Healthcare Family Group Involved in this Project**

Medical, Nursing

### **Applicable Specialty or Discipline**

Neurosurgery

### **Project Period**

Start date: Nov 2018

Completed date: Feb 2021

### **Aims**

Reduce the incidence of EDMS breakage and malfunction.

### **Background**

See poster attached

### **Methods**

See poster attached

## **Results**

See poster attached

## **Lessons Learnt**

See poster attached

## **Conclusion**

See poster attached

## **Project Category**

Care Continuum

Acute Care, Intensive Care

Care & Process Redesign

Quality Improvement, Quality Improvement

## **Keywords**

External Ventricular Drainage, Patient Safety

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# IMPROVING THE SAFETY OF THE EXTERNAL DRAINAGE MONITORING SYSTEM

- SAFETY
- PRODUCTIVITY
- QUALITY
- COST
- PATIENT EXPERIENCE

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## Define Problem, Set Aim

- External Ventricular Drainage (EVD) is a common neurosurgical procedure performed to treat hydrocephalus. Cerebrospinal fluid (CSF) drains into an 'external drainage and monitoring system' (EDMS).
- Breakage or malfunction of the EDMS affects patient safety due to compromise of the sterile closed system, resulting in:

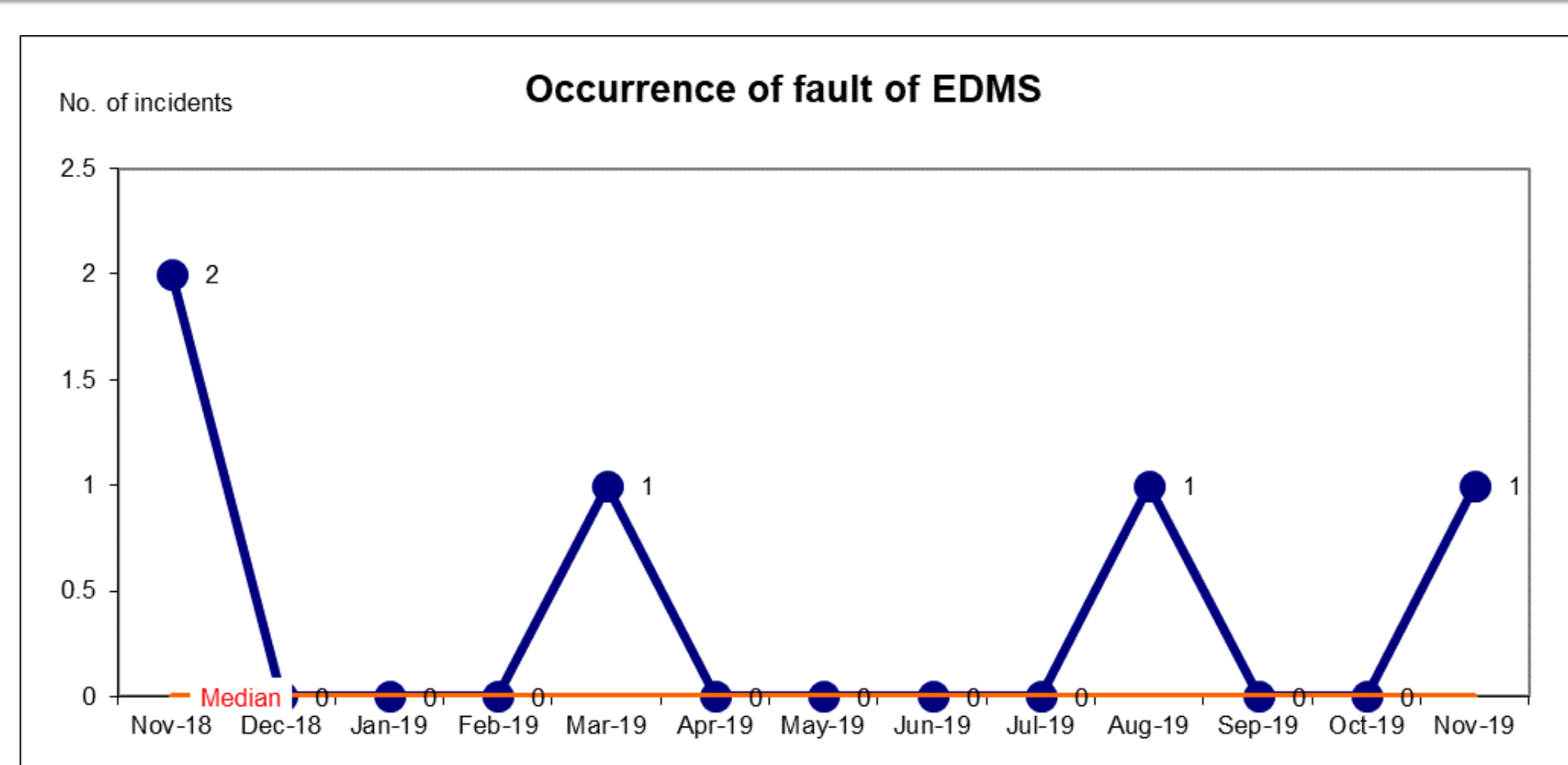
- **Ventriculitis**, a life-threatening condition. Treatment involves a long period of antibiotics or further surgery. The EDMS will have to be replaced.
- **Inadvertant changes in the flow-rate of CSF**, leading to over-drainage or inaccurate charting of CSF drainage volume.

**From November 2018 to November 2019, there were 5 cases of hardware malfunction involving the EDMS in current use.**

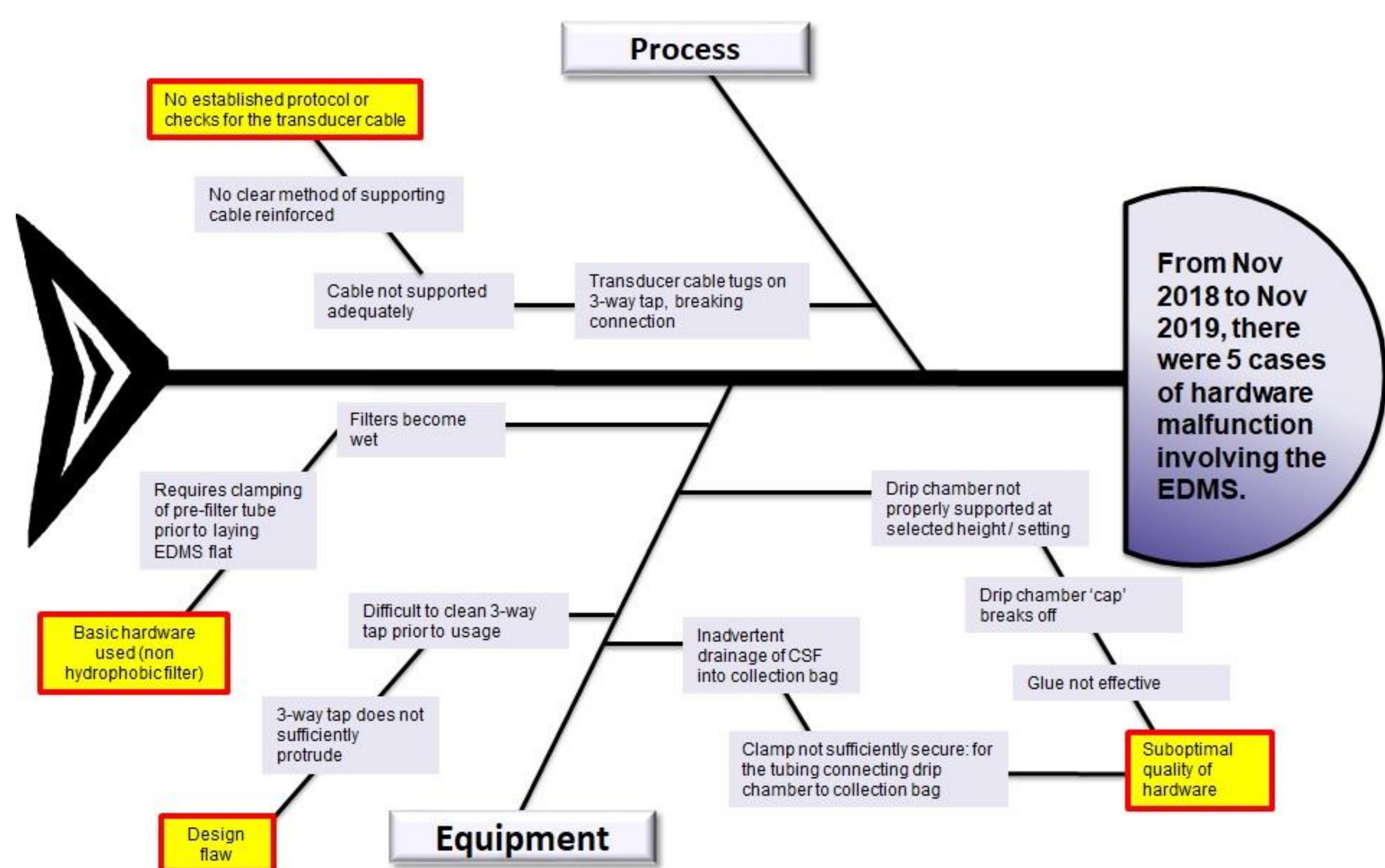
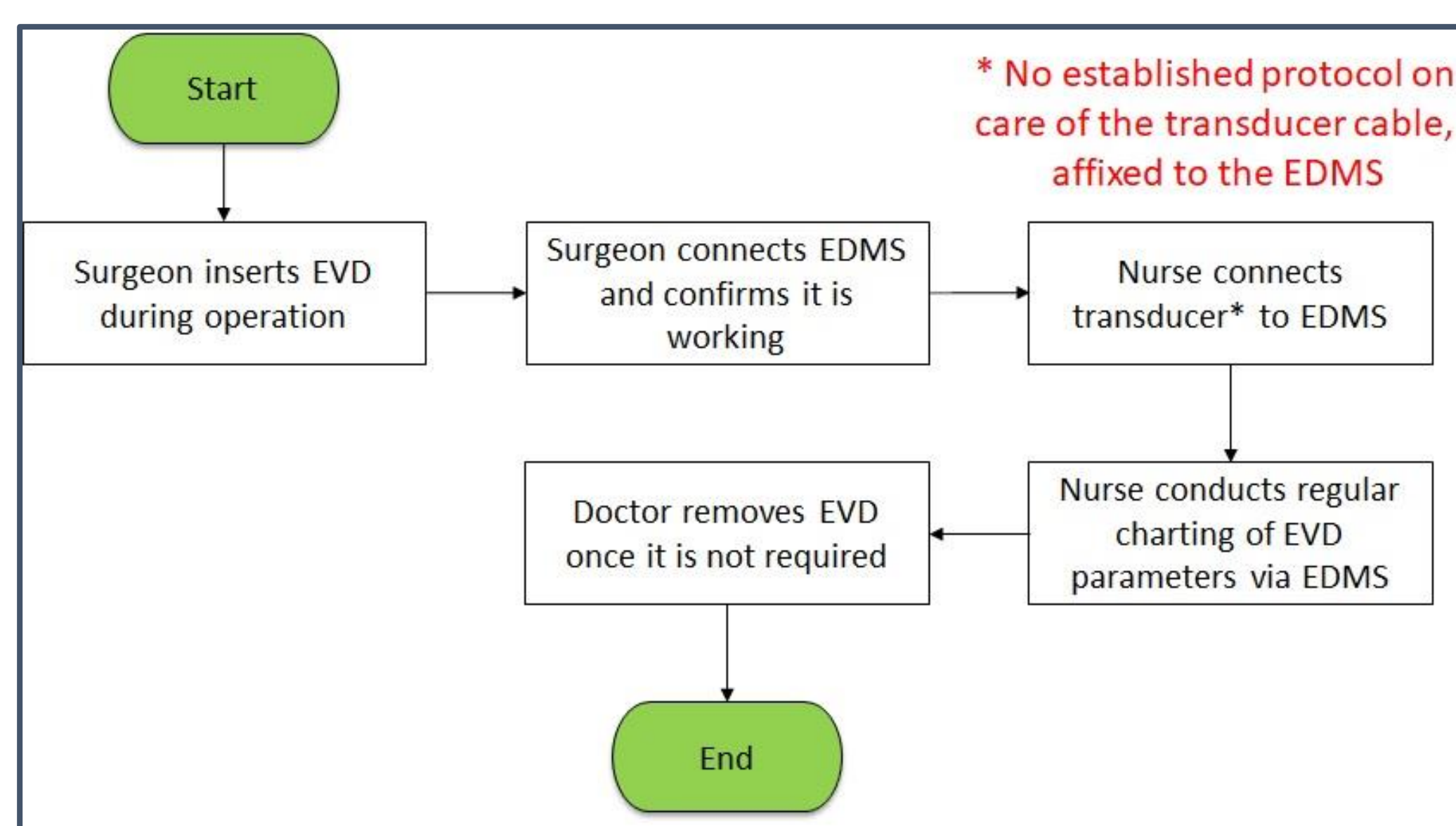
**AIM:**

**Reduce the incidence of EDMS breakage and malfunction.**

## Establish Measures

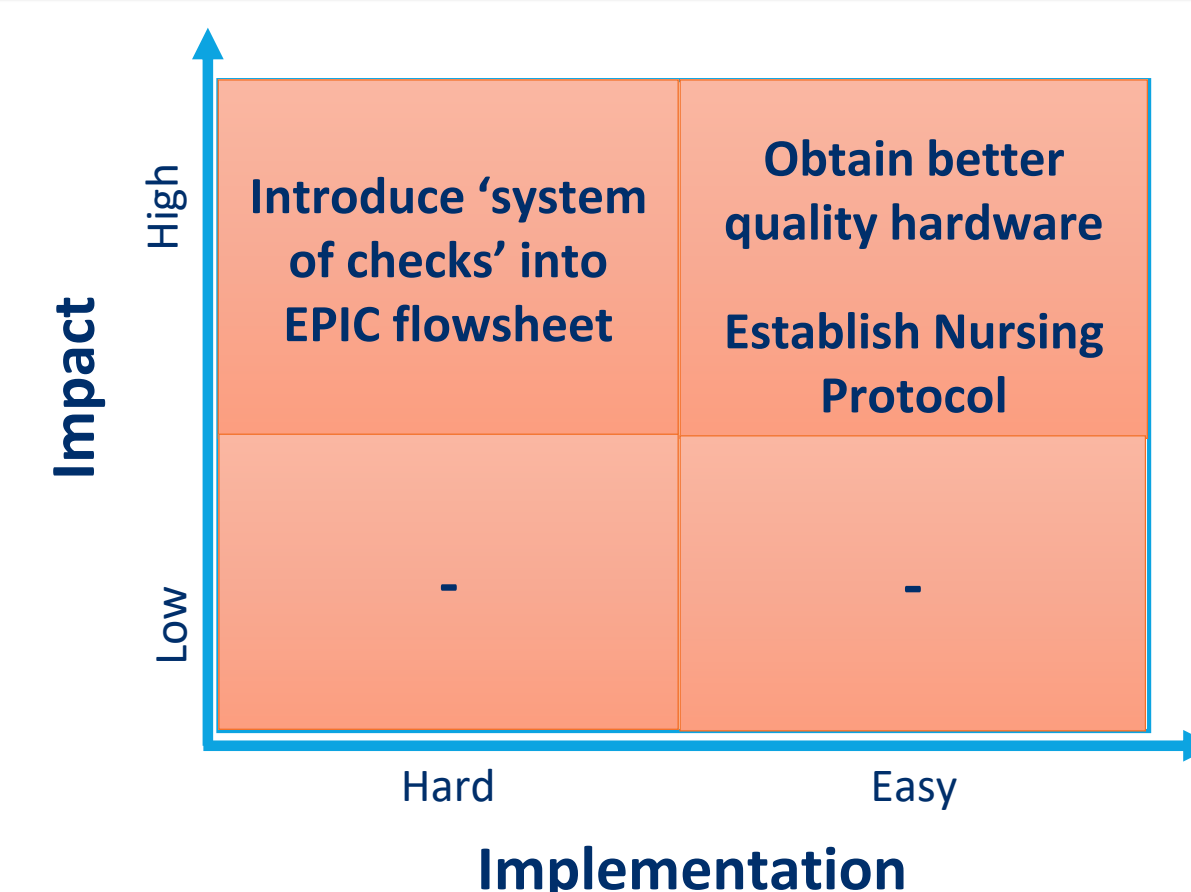


## Analyse Problem



## Select Changes

Root Cause	Potential Solutions
Suboptimal quality of equipment (EDMS)	1 Obtain better quality hardware
No established protocol for checks on the EDMS cable	2 Establish a nursing protocol
	3 Introduce a 'system of checks' as part of daily flowsheet



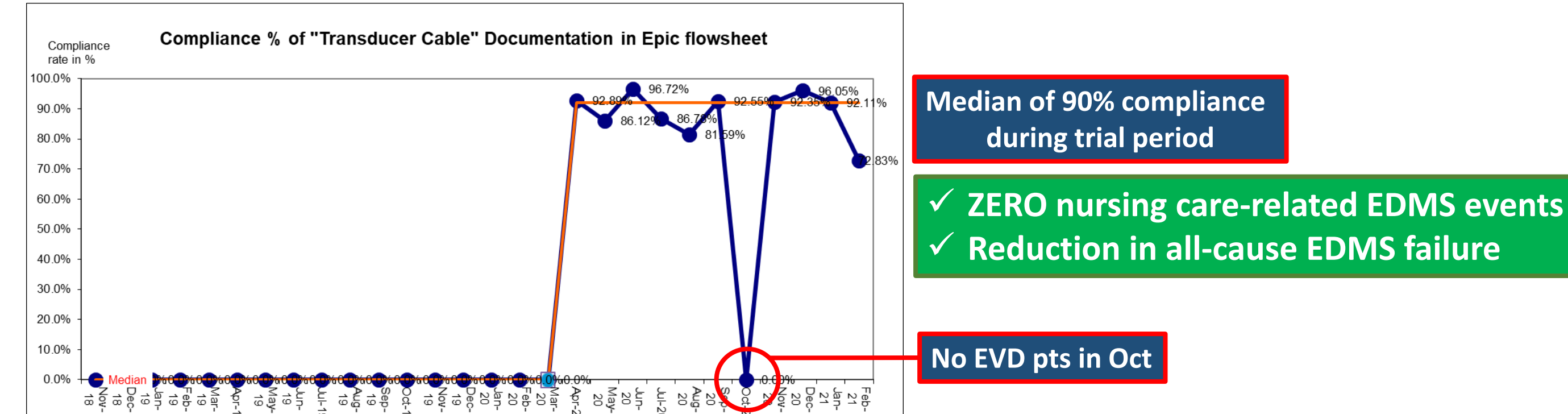
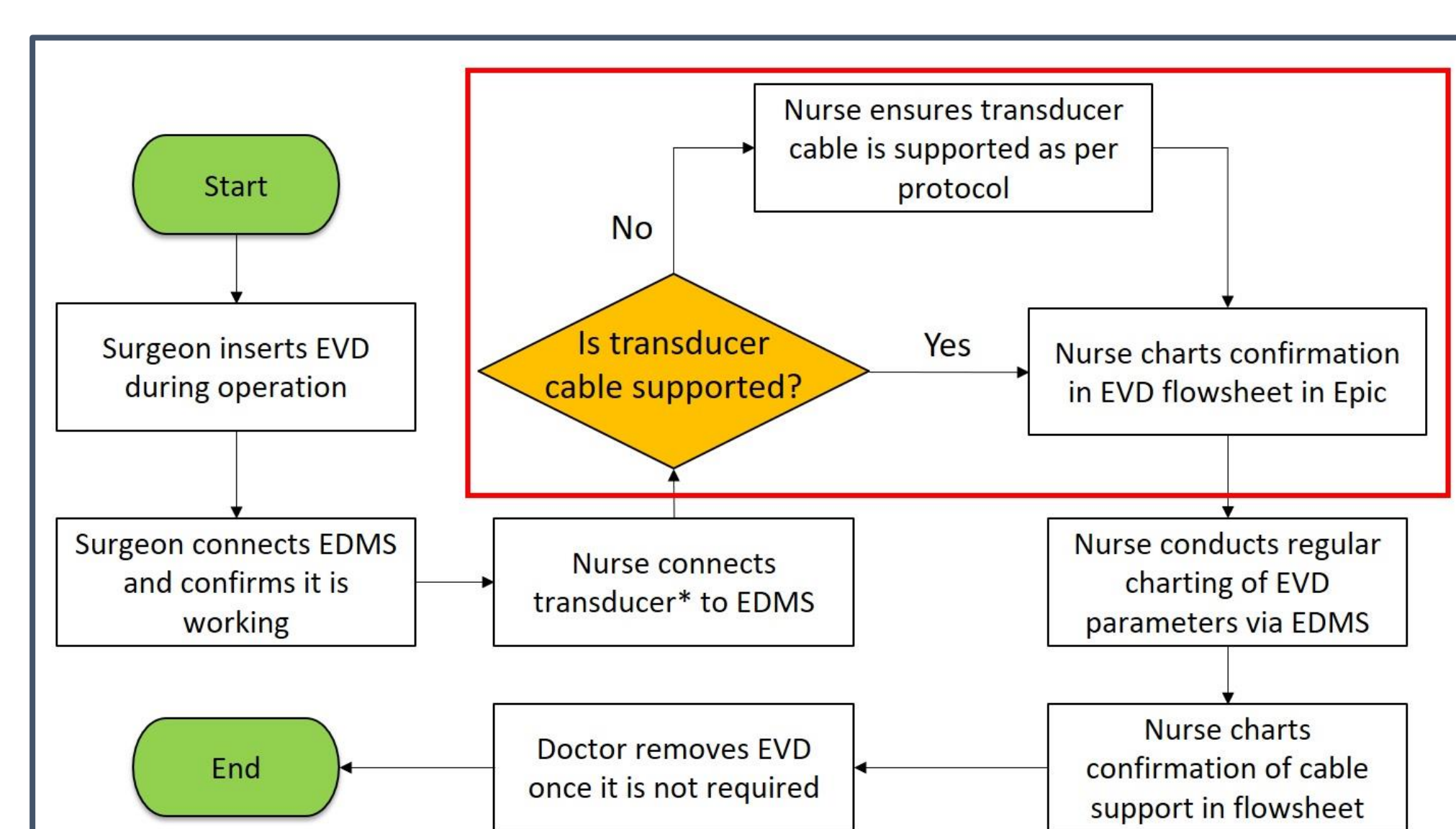
## Test & Implement Changes

CYCLE	PLAN	DO	STUDY	ACT
1	Change the EDMS	New EDMS system with improved specification OT: cheaper Ward: Easier to clean and manage	Less occurrence of failure due to intrinsic equipment issue  Unit cost: cheaper	Adopt new EDMS as the standard system
2	Establish Care Protocol for the EDMS Transducer Cable	Identified best practices to establish new nursing protocol Conducted training to ICU nurses  'System of checks' via a new parameter introduced into the EPIC flowsheet	NO occurrences of equipment failure due to improper handling Median of 90% compliance in flowsheet  Presence of parameter in flowsheet served as a constant and useful reminder to nurses	Adopt new nursing protocol  Flowsheet parameter adopted into NGEMR system

**Before Implementation**

**After Implementation**

EVD Right Frontal Region	
EVD Properties	Placement Date/Time:
Site Assessment	
Dressing Status	
Dressing Intervention	
Dressing Change Due	
Hourly Total(mls)	2
Cumulative Total(mls)	
CSF Color	Slight blood stained
Height of Drip Chamber (cmH2O)	+10
Oscillating	Yes
ICP monitoring	Yes
Remarks	
EVD Clamp	No
Transducer cable supported	Yes



## Spread Changes, Learning Points

Nursing to continue promotion and compliance with the updated EDMS protocol.

Share updated protocol + EMR documentation with other EPIC-enabled institutions.

**Learning Point:** A multi-pronged approach (hardware, nursing and harnessing available technology – EPIC) allows for effective, long-lasting improvements in the care of the EDMS.

**ZERO** nursing care-related EDMS events TO DATE, since start of implementation