INTEGRATION OF A PAEDIATRIC RAPID RESPONSE SYSTEM WITH A CLINICAL DECISION SUPPORT TOOL (PSE), TOWARDS ACHIEVING ZERO PAEDIATRIC CODES DUE TO PREVENTABLE CARDIAC ARREST, IN NON-CRITICAL CARE AREAS OF A TERTIARY CARE HOSPITAL

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PAEDIATRIC CODES –BACKGROUND & PROBLEM STATEMENT

- Paediatric codes due to In Hospital Cardiac Arrest(IHCA) in non critical care areas are highly preventable, infrequent events .

- Manipal Hospital ,Bangalore treats close to 80-100 paediatric inpatients on any given day

- A robust Paediatric RRS called the Paediatric Emergency Team(PET) and a Paediatric Code blue system, established a decade ago, achieved and documented a reduction in mortality from 6.7% to zero in floor patients on whom early warning signs had been identified, stabilized and subsequently shifted to the PICU.

- This reduction could not be sustained (after the first 32 months of its implementation) and the incidence of preventable codes in non critical care areas,thereafter has been 0.11 to 0.39% between May 2017 and May 2022
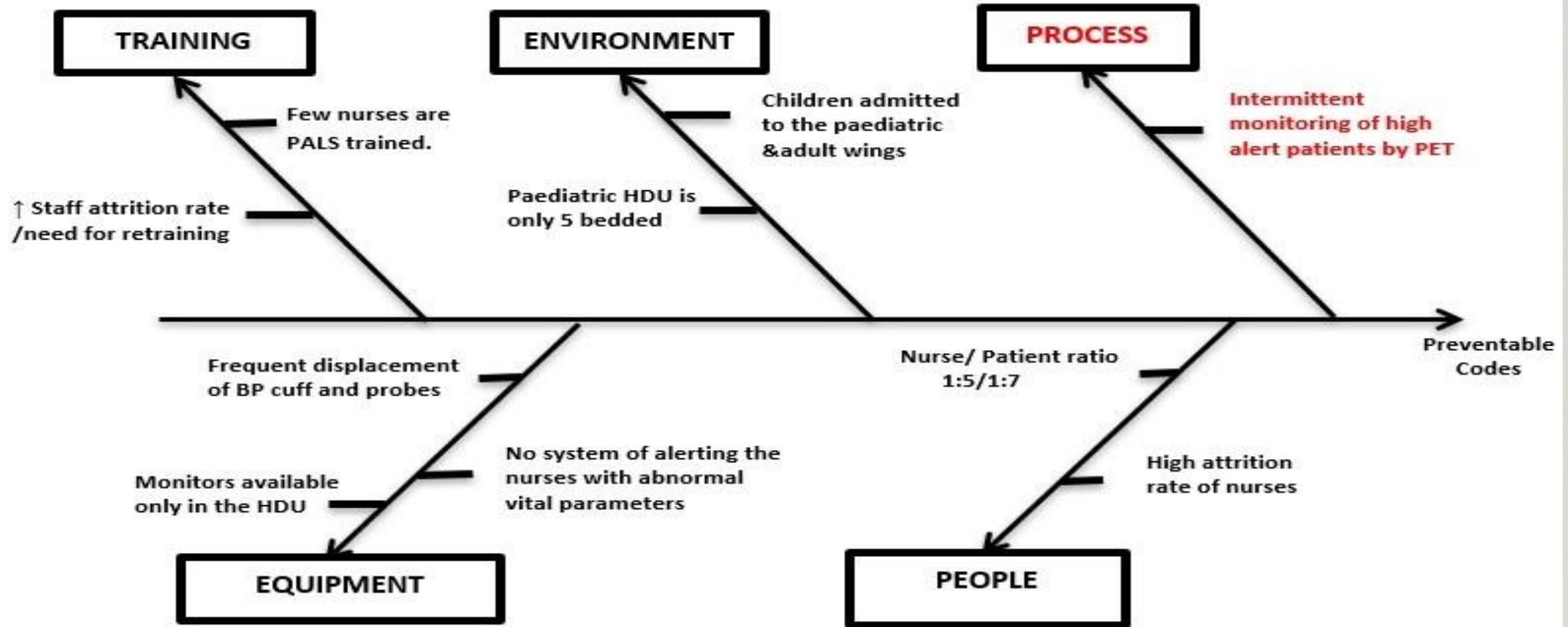
THE PAEDIATRIC RRS AT MANIPAL HOSPITAL

PET was revamped in 2021 to a 3 –tiered system-

- Tier 1 (Green): All patients admitted to the wards are screened for the presence of EWS by the PET nurse on D1 of admission and monitored for 24 hours for the same.

- Tier 2(Orange): Those with upto 2 EWS are monitored intermittently by the nurse and Paediatric resident(twice during the day and once at night)

- Tier 3(Red/ High Alert): Select patients >/= 3 warning signs are reviewed by the PICU/PER fellow +/_ consultant ,in addition.

PAEDIATRIC CODES DUE TO PREVENTABLE IHCA - RCA

Root Cause Analysis- Paediatric Codes due to preventable cardiac arrest in non-critical care areas

TRAINING

- Few nurses are PALS trained.
- ↑ Staff attrition rate /need for retraining

ENVIRONMENT

- Children admitted to the paediatric &adult wings
- Paediatric HDU is only 5 bedded

PROCESS

- Intermittent monitoring of high alert patients by PET

EQUIPMENT

- Frequent displacement of BP cuff and probes
- Monitors available only in the HDU
- No system of alerting the nurses with abnormal vital parameters

PEOPLE

- Nurse/ Patient ratio 1:5/1:7
- High attrition rate of nurses

Preventable Codes

OBJECTIVES

PRIMARY AIM :

To reduce the number of codes due to preventable cardiac arrest in children between 1 month and 18 years of age, admitted to noncritical care areas of the hospital from 0.39% to less than 0.05% ,in 6 months after implementation of the proposed intervention, and thereafter aim for *eliminating such preventable codes*.

SECONDARY AIM :

To ensure Situational awareness oriented simulation based training of all healthcare workers involved in paediatric care once in 3 months.

STAKEHOLDERS

Executive sponsors:

Directors of Departments of Paediatrics, Nursing & IT, Manipal Hospitals and Isansys advanced patient monitoring platform,

Project Lead: Dr Gnanam R, Consultant, Paediatric Emergency Room and Clinical Patient Safety Chairperson, Paediatrics.

Team members: The PET consisting of the PICU and Paediatric ER team of doctors and the PET nurses, paediatric residents and staff nurses, IT team and parents of children admitted to noncritical care areas

METHODOLOGY- INTEGRATION OF THE RRS WITH A CDS TOOL (PATIENT STATUS ENGINE)

The proposed intervention was

- To integrate intermittent monitoring of select High Alert patients, admitted to non critical care areas by PET with continuous wireless remote monitoring of vital parameters using the Patient Status Engine (PSE), designed by Isansys.

Visualization of trends in real time and smart alarm activation with abnormal parameters and PEW score were facilitated in the Central Monitoring Unit and the PET mobile(carried by the on call resident)

- To conduct Simulation based training every 3 months on recognition of EWS (and initial stabilization) in paediatric patients admitted to non critical care areas
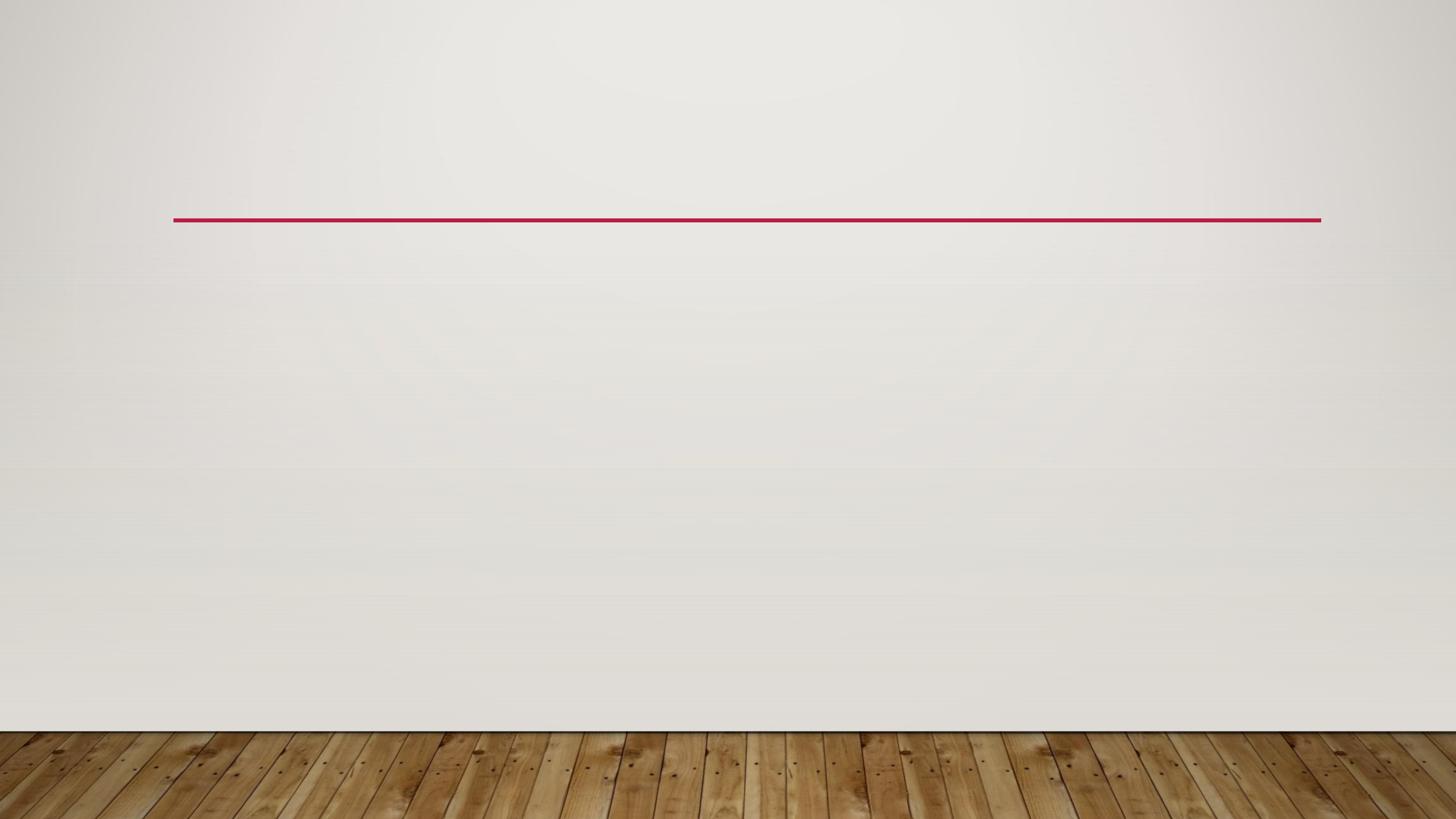
METHODOLOGY – THE PSE

MOBILE INTERFACE   CENTRAL MONITOR INTERFACE

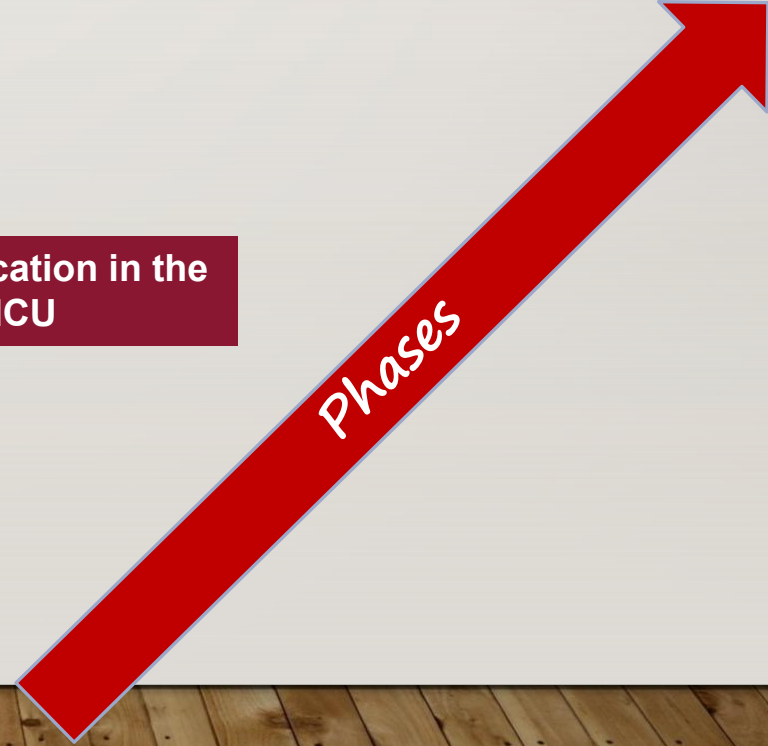# Methodology – Learning Health System(LHS) Cycles

Stakeholders'
feedback & literature
review

Integrated monitoring in the HDU

Stakeholders'
feedback & literature
review

PSE application in the PICU

K2P
Interpret
Result

External evidence

D2K
Assemble
Data

P2D
Take action

Training of care providers on the integration

Phases

METHODOLOGY –MEASUREMENT

	Outcome	Process	Balancing
Name & Definition	• % of preventable codes due to IHCA in non critical care areas • Mortality rate within 24 hours of transfer to PICU	• % of HA patients among all admissions & % codes in them • Ave no of additional reviews by PET, triggered by the PSE • % of HA patients transferred to PICU	• Low threshold for PICU transfer • Alarm fatigue /desensitization • Burdening of PET by repeated alerts from PSE
Data collection	Computable data on code details. Weekly collection and analysis of data	Computable data on patients reviewed by PET Weekly data collection and analysis	Computable PET & code blue data
Baseline & target	1. B :0.11-0.39% T :zero 2. B : 0.2-1 % T: zero		

INTEGRATED MONITORING-RESULTS

Incidence of preventable pediatric codes
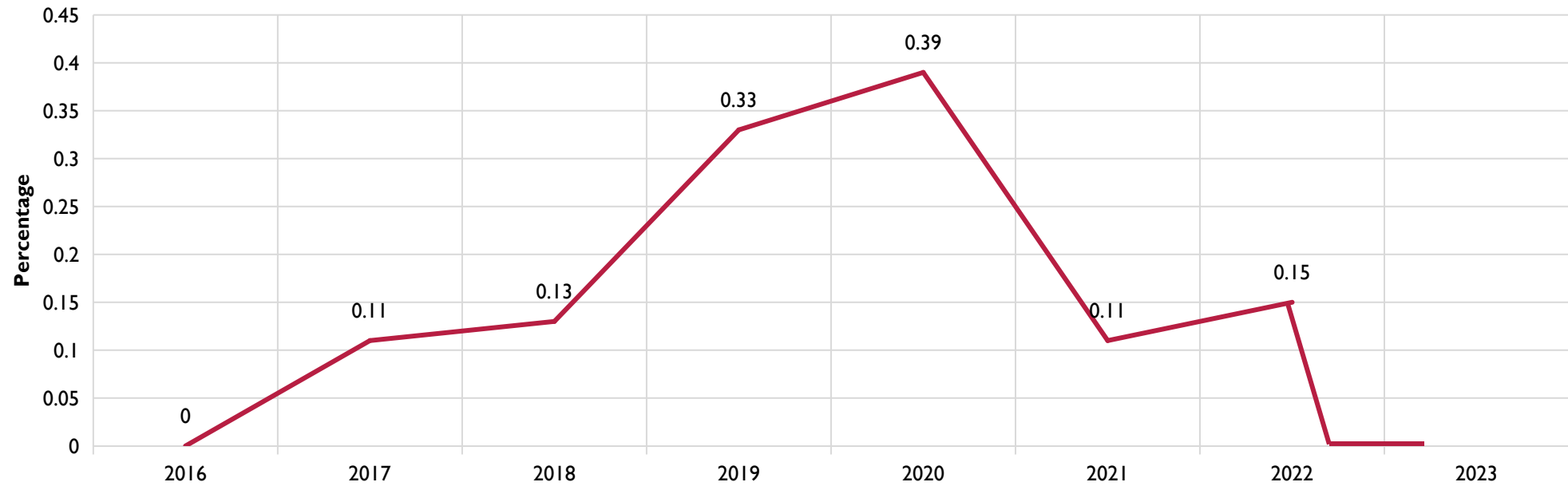
INTEGRATED MONITORING- SUSTAINABILITY & SCALABILITY

Sustainability:

- Structure: Leadership involvement and support

- Procedure: Weekly audits

- Policy: Prioritizing patient safety

- Proving that the model is cost-effective

- Ownership and Empowerment

Scalability:

- Of provision of the service

- Of extended monitoring at home

- Of partnership

- Of predictive modelling

CONCLUSION

- Minimizing /Achieving zero preventable codes due to IHCA in non critical care areas is an achievable goal

- RRT's proactively identify clinical deterioration and move such patients to critical care areas after stabilization

- CDS tools like the PSE ,supply information tailored to the current situation and augment Situational Awareness oriented monitoring of relatively sick patients

- Not only are preventable codes reduced/eliminated by such integrations, the model also offers cost effective solutions for patients and hospitals.

'ZERO HARM' IS ACHIEVABLE IN HEALTHCARE'

Thank You