



TEAM EXCELLENCE AWARDS  
*for* **CONTINUAL QUALITY  
IMPROVEMENT BREAKTHROUGHS**



Ventilator pathway: Clinical pathway as an emerging tool for quality improvement



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# INTRODUCTION

Clinical pathways are:

- Tools to be adopted or developed
- An effective tool for evidence based care
- Adherence to pathway leads to standardized care & better outcomes

***With an objective to enhance our mechanically ventilated patient outcomes,  
we adopted a “Ventilator pathway” at RFH.***



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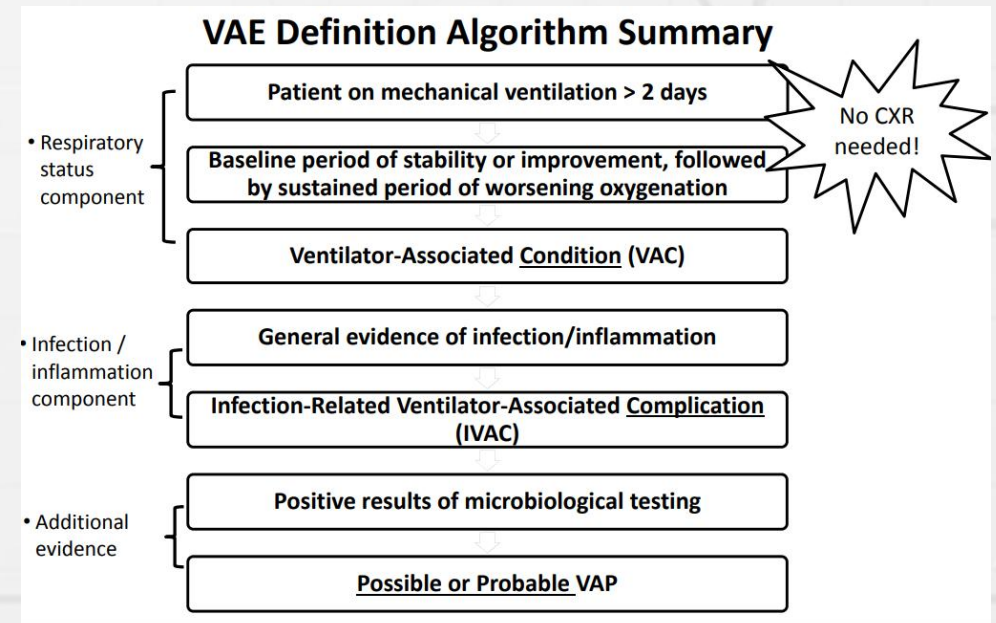
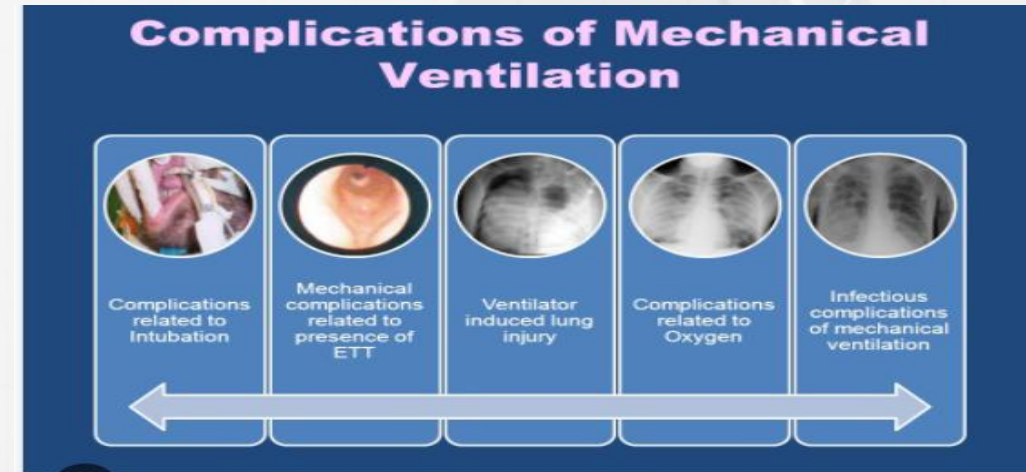
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# PROBLEM DEFINITION

- The Centre for Disease Control has estimated 300,000 patients each year receiving mechanical ventilation has poor outcome due to poor monitoring, difficult weaning and prolonged stay
- Initially VAP bundle was used to prevent Ventilator associated pneumonia but it was more of subjective, complex, poor sensitivity and specificity compared to VAE which focuses more on objective criteria and identifies a broad range of conditions, complications leading to VAE.
- At RFH retrospective analysis of 5 months from Mar-July 2021 revealed:
  - Ventilator associated event (VAE) rate of 33.8% (VAC rate 20%, IVAC rate 8.5%, PVAP rate- 6%)
  - ALOS (Average length of stay) of 37 days &
  - mortality rate of 14%

*‘Probably, due to lack of standardized practice guidelines’*



# PROBLEM DIAGNOSIS

## Internal Survey – ICU Doctors and nurses on awareness of components of care of patient on ventilator

Category of HCW (Doctor-D, Nurse-N)	For patients who are intubated/have a tracheostomy, how often do you change the ventilator circuit?		When used, how often do you change the closed endotracheal suction system?		In your ICU, how often is condensate drained away from the ventilator circuit ?	Does your ICU actively promote—	Daily Care Processes							
	Not routinely changed unless soiled or malfunctioning	Routinely changed at regular interval; please specify in days	Not routinely changed unless soiled or malfunctioning	Routinely changed at regular interval; please specify in days	Though there is awareness, 50% of the team said they are doing. On daily rounds non-compliance was noted.	Use of noninvasive ventilation protocol?	Early mobility protocol for patients receiving mechanical ventilation?	In your ICU, how often are patients placed with the head of bed elevated at least 30 degrees when there is no contraindication?	Does the patient have a subglottic secretion drainage endotracheal tube?	Do you use RASS sedation scale in your unit	Are target RASS scores set for this patient? If Yes specify__	What delirium assessment tool do you use in your unit? If yes specify__	Has the patient had an SAT (spontaneous awakening trial) today? If No Specify	Was the SBT performed with the sedatives off?
D	87%	7%	67%	40%		93%	93%	95%	87%	67%	27%	20%	93%	93%
N	72%	6%	53%	3%		92%	100%	95%	83%	100%	33%	14%	42%	58%



# PROBLEM DIAGNOSIS

- **Objectives and Targets:**

- Provide well defined standards of care for patients on mechanical ventilator in ICU, thereby reducing variations in patient care evidenced through AHRQ sustainability scorecard (ventilator pathway compliance measure): '**Green score on AHRQ sustainability scorecard**'
- Help ensure patient safety by reducing ventilator associated events / risks and its sub-categories: ventilator associated condition (VAC), infection-related ventilator associated complications (IVAC), ventilator associated pneumonia (PVAP): '**Reduction by 50% from baseline for all categories**'
- Reduce hospital length of stay: '**Reduction by > 50% from baseline**'
- Reduce Mortality rates: '**Reduction by > 50% from baseline**'

- **Inclusions:** All adult patients above age 18 on mechanical ventilation after admission at RFH

- **Exclusions:** Patients Intubated and on mechanical ventilator from outside RFH

- **Data collection & Implementation:** EMR, VAE calculator online on CDC



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# PROBLEM REMEDY: Ventilator pathway



# Daily Assessment Data collection tool



# LOCKING THE IMPROVEMENT

- Training sessions were conducted by the Intensivist and Respiratory therapist for creating awareness of the pathway.
- The ICU Nurse Manager's were involved in ensuring compliance to the pathway.
- The progress & actionable were discussed in Critical Care Improvement committee meetings for any challenges & solutions thereof.





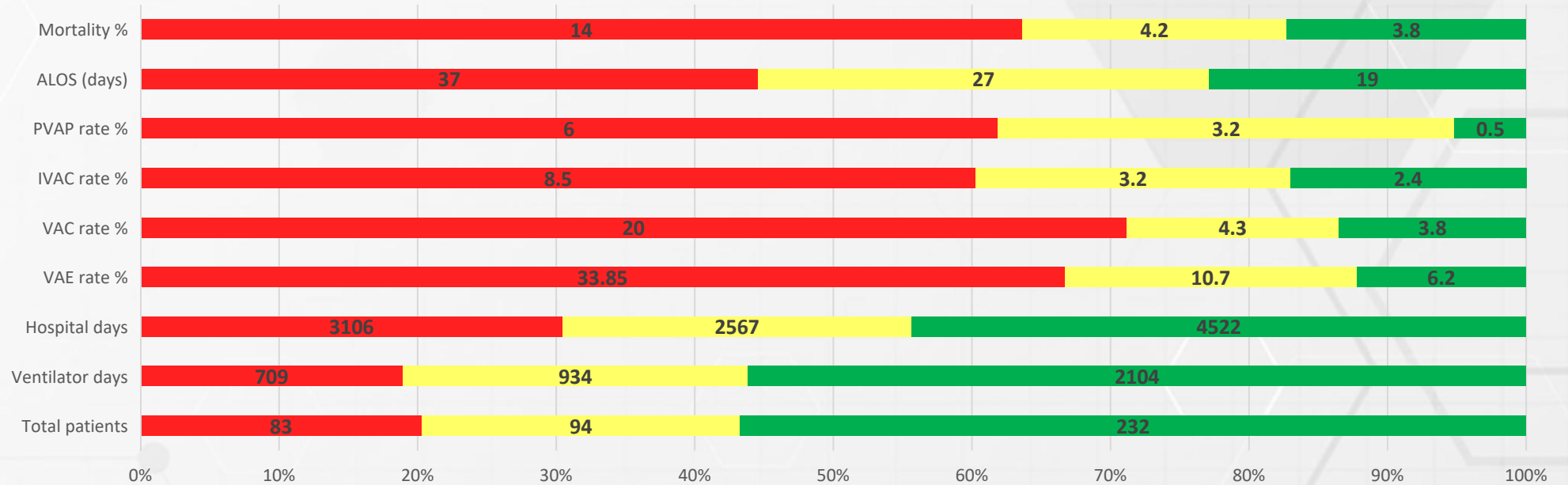
# CLONING THE IMPROVEMENT

The pathway was implemented in all 4 ICUs together since it was a evidence based standardised practice guideline (AHRQ).

# TANGIBLE RESULTS:

## Pre & Post ventilator pathway implementation results

Pre & Post implementation pathway results



	Total patients	Ventilator days	Hospital days	VAE rate %	VAC rate %	IVAC rate %	PVAP rate %	ALOS (days)	Mortality %
■ Mar to July 2021	83	709	3106	33.85	20	8.5	6	37	14
■ Aug to Dec 2021	94	934	2567	10.7	4.3	3.2	3.2	27	4.2
■ Jan 2022 to Dec 2022	232	2104	4522	6.2	3.8	2.4	0.5	19	3.8

■ Mar to July 2021 ■ Aug to Dec 2021 ■ Jan 2022 to Dec 2022



# TANGIBLE RESULTS:

## Sustainability Scorecard (Ventilator pathway compliance measures)

MEASURES	Aug to Dec 2021 (434 patients)	Jan to Dec 2022 (1320 patients)
How many months of VAE data have you collected in the last 6 months?	4 or more	4 or more
How many months of objective outcome measures data (e.g., total number of ventilator days, intensive care unit length of stay, total number of deaths) have you collected in the last 6 months?	5 or more	5 or more
How many of your eligible patients were given Head of bed elevation (HOB)?	81-100%	81-100%
How many of your intubated / tracheostomised patients had Subglottic suction drainage (SSD tube)?	61-80%	81-100%
How many of your mechanically ventilated patients received a RASS (Richmond Agitation-Sedation Scale) or SAS (Sedation-Agitation Scale) assessment?	81-100%	81-100%
How many of your patients received a delirium assessment?	0-60%	61-80%
How many of your eligible patients received a spontaneous awakening trial (SAT)?	81-100%	81-100%
How many of your eligible patients received a spontaneous breathing trial (SBT)?	61-80%	81-100%
How many of your patients receive tailored daily goals to maximize their mobility?	61-80%	81-100%
How often do you actively monitor positive end-expiratory pressure (PEEP), plateau pressure, and tidal volume to ensure that they are within the recommended ranges?	61-80%	81-100%
How often do you achieve the recommended ranges for PEEP, plateau pressure and tidal volume?	61-80	81-100%



# INTANGIBLE RESULTS

- The improvements in outcome measures shows that Clinical pathways are indeed a tool for quality improvement and achieving sustainability.
- The pathway also improved multidisciplinary communication, team work and care planning amongst doctors, nurses, respiratory therapists, physiotherapist