PAEDIATRIC CRITICAL CARE CHALLENGES



Preventing and Monitoring Ventilator-Associated Complications

Noor Azizah Mohd Ali

IIUM Press

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PREFACE

Managing ventilator-associated pneumonia (VAP) in critical care remains a significant challenge, affecting both adult and paediatric patients. This preventable condition contributes to increased morbidity, prolonged hospitalisation, and a considerable burden on healthcare resources worldwide. Despite ongoing research and evolving clinical protocols, current VAP surveillance definitions remain inadequately adapted for paediatric patients, creating a notable gap in effective care for this vulnerable population.

The introduction of the ventilator-associated event (VAE) surveillance definition marked a meaningful advancement by reducing the subjectivity inherent in conventional VAP definitions, primarily benefiting adult critical care. However, this updated criterion has yet to be widely adopted in paediatric units, raising important questions regarding its potential impact on paediatric outcomes. This book examines VAP and VAE in paediatric intensive care units (PICUs) and evaluates whether applying VAE definitions alongside traditional VAP criteria could establish a clearer, more reliable diagnostic framework in paediatric care.

This study documented VAP and VAE incidence rates, evaluated compliance with preventative measures, and captured insights from parents and healthcare staff regarding infection control, particularly around hand hygiene. The findings underscore the impact of structured VAP education and compliance audits in reducing infection rates and improving adherence to prevention strategies. Hand hygiene, a recognised cornerstone of infection control, was assessed in terms of compliance and perception, revealing valuable insights into parent-provider dynamics in PICUs.

Additionally, this book presents findings from a prospective study that demonstrated a significant reduction in VAP/VAE rates following

an intensive education initiative. The "Speaking up for Hand Hygiene" campaign fostered more open discussions between parents and staff, leading to a marked improvement in compliance with VAP prevention measures. However, implementing change in PICUs presents challenges, as parents may feel hesitant to remind staff about hand hygiene, while staff may be mindful of the emotional challenges faced by the families under their care.

By synthesising these findings, this book provides a comprehensive view of VAP prevention and evolving standards of paediatric care, offering insights that may guide future research and clinical practice. It aims to contribute to a growing body of knowledge focused on engaging families and healthcare teams in a shared commitment to improving patient outcomes in paediatric intensive care.

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ABBREVIATIONS

ANZPIC	Australia and New Zealand Paediatric Intensive Care
CDC	Centre for Disease Control and Prevention
CHQ	Children Health Queensland
CHRC	Children Health Research Centre
CI	Confidence Interval
FiO_2	Fraction Inspired Oxygen
HCAIs	Healthcare-Associated Infections
HR	Hazard Ratio
IHI	Institute for Healthcare Improvement
IQR	Interquartile Range
IRR	Incidence rate ratio/hour of ventilation
IVAC	Infection-Related Associated Condition
MAP	Mean Airway Pressure
MV	Mechanical ventilation
NHSN	National Healthcare Safety Network
NICU	Neonatal Intensive Care Unit
OR	Odd Ratio
PCCRG	Paediatric Critical Care Research Group
PEEP	Positive End Expiratory Pressure
PFCC	Patient-Centred and Family-Centred Care
PICU	Paediatric Intensive Care Unit
PIMS3	Paediatric Index of Mortality Score 3
PNU	Pneumonia
PVAP	Possible Ventilator- Associated Pneumonia

QCH	Queensland Children's Hospital
SD	Standard deviation
VAC	Ventilator-Associated Condition
VAE	Ventilator-Associated Events
VAP	Ventilator-Associated Pneumonia
VICNISS	Victorian Healthcare Associated Infection Surveillance System
WBC	White Blood Cells
WHO	World Health Organisation

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PAEDIATRIC CRITICAL CARE CHALLENGES

Preventing and Monitoring Ventilator-Associated Complications

The diagnostic and preventive gaps related to ventilator-associated pneumonia (VAP) and events (VAEs) in paediatric intensive care units are methodically addressed in *Paediatric Critical Care Challenges: Preventing and Monitoring Ventilator-Associated Complications*, published by IIUM Press. This book evaluates surveillance systems to create reliable diagnostic criteria for paediatric patients who are at risk by synthesising retrospective and prospective clinical data.

This book also explores parent-staff collaborations and the challenges of family empowerment in extremely stressful PICU settings, highlighting the revolutionary Speaking up for Hand Hygiene initiative. This book provides invaluable, comprehensive insights for paediatricians, critical care nurses, intensivists, researchers, and healthcare administrators dedicated to enhancing patient safety/outcomes and promoting clinical practices by balancing rigorous clinical audits with compassionate healthcare-family partnerships.

NOOR AZIZAH MOHD ALI is an Assistant Professor at the Kulliyyah of Nursing, International Islamic University Malaysia (IIUM). She began her clinical career with a USM Diploma in Nursing in 1999 and practiced as an Intensive Care Unit (ICU) nurse for over six years. She holds a Bachelor's degree from USM, a Master of Nursing Science (First Class) from Universiti Malaya, a PhD from the University of Queensland, where she researched paediatric ventilator-associated complications, and a Post-Basic Certificate in Peri-Anaesthesia Care from the Ministry of Health Malaysia. Having twice served as Head of the Department of Critical Care Nursing, she has extensive pedagogical experience across undergraduate, post-basic, and postgraduate (Master and PhD) levels. Specialising in ICU patient safety and mechanical ventilation complications, Noor Azizah has published widely in esteemed journals, including *Australian Critical Care*, and has co-authored several academic handbooks and clinical nursing guidelines.

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