EFFECTIVELY REDUCING INCIDENCE OF VENTILATOR-ASSOCIATED PNEUMONIA IN THE INTENSIVE CARE UNIT SUNWAY MEDICAL CENTRE

Presented by

Infection Prevention and Control Department

SUNWAY MEDICAL CENTRE®
Sunway City Kuala Lumpur

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Sunway City Kuala Lumpur

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A BRIEF DESCRIPTION

Infection prevention and control (IPC) is a practical, evidence-based approach preventing patients and health workers from being harmed by avoidable infections.

Effective IPC requires constant action at all levels of the health system, including policymakers, facility managers, health workers and those who access health services.

IPC is unique in the field of patient safety and quality of care, as it is universally relevant to every health worker and patient, at every health care interaction.

Defective IPC causes harm and can kill.

Without effective IPC it is impossible to achieve quality health care delivery.

-World Health Organization-

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DEFINITION OF TERMS

1	VAP	Ventilator-associated pneumonia
2	IPC	Infection prevention and control
3	NG	Nasogastric feeding
4	VCB	Ventilator care bundle
5	HCAI	Healthcare associated infection

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PROBLEM IDENTIFICATION

LIST OF OPPORTUNITIES FOR IMPROVEMENT

1. **High incidence of VAP in ICU**

2. **Low Influenza vaccination uptake rate**

3. **Poor compliance to hand hygiene in the outpatient department**

4. **Incomplete N95 respirator fit testing conducted for staff**

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PROBLEM PRIORITIZATION

NO	PROBLEM	S	M	A	R	T	SCORE
1	**High incidence of VAP in ICU**	**15**	**15**	**15**	**15**	**15**	**75**
2	Low Influenza vaccination uptake rate	14	14	15	15	14	72
3	Poor compliance to hand hygiene in the outpatient department	10	14	15	10	14	63
4	Incomplete N95 respirator fit testing conducted for staff	10	14	8	14	8	54

Weightage: 1= Low, 2= Medium, 3= High
Voting performed by 5 group members

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GLOBAL BURDEN OF VAP

	GLOBAL	U.S.A	EUROPE	NATIONAL
				
INCIDENCE	9-27%	9.3-15%	8-28%	26.5%
MORTALITY	6.3-67%	13%	29.9%	30-70%
AVERAGE INCREASE IN LOS	10 DAYS	8.9 DAYS	13.6 DAYS	11 DAYS

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ECONOMIC IMPACT OF VAP

COST

ADDITIONAL COST

$ 99, 598 → RM 167, 072

EUR 20, 965 → RM 98, 185

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PROBLEM VERIFICATION

NO	PROBLEM	PROBLEM VERIFICATION
1	**High incidence of VAP in ICU**	**Incidence of VAP in ICU increased by 15.75% within 1 month**
2	Low Influenza vaccination uptake rate	Only 64% of staff received influenza vaccination
3	Poor compliance to hand hygiene in the outpatient department	Compliance towards hand hygiene practices was 85% in outpatient departments
4	Incomplete N95 respirator fit testing conducted for staff	Only 30% of staff have been fit tested for N95 respirator

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PROBLEM ANALYSES

WHAT	**High incidence of VAP increase by 15.75%**
WHERE	**Intensive Care Unit, Sunway Medical Centre**
WHEN	**February to March 2022**
WHO	**Teams involved: ICU, ID, Microbiology, Infection Control, Housekeeping**
WHY	**VAP is associated with high treatment COST, prolonged ICU stay, prolonged mechanical ventilation and HIGH MORTALITY**
HOW	**Guidelines for nosocomial infection prevention in place but the incidence of VAP was still increasing in trend**

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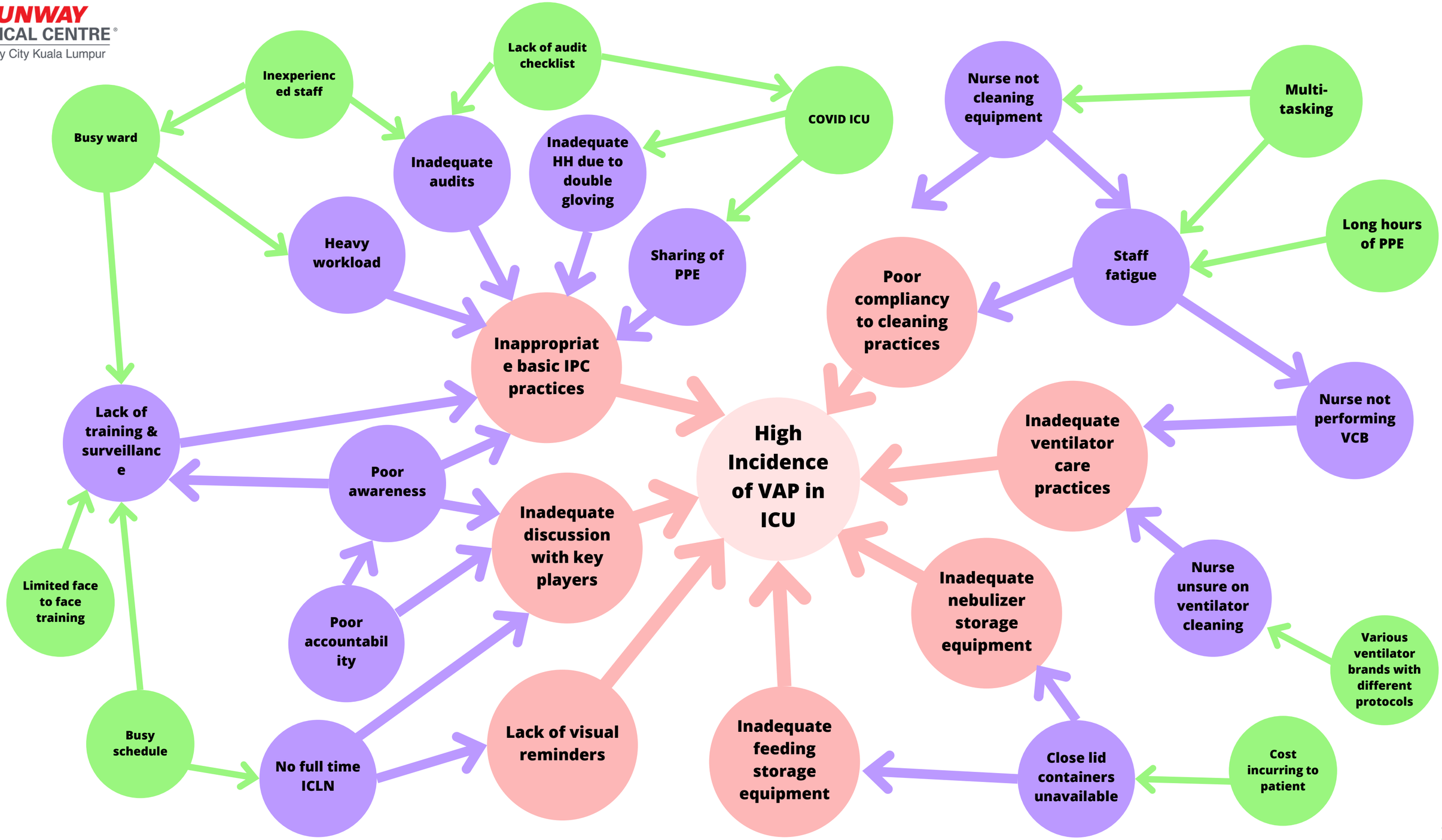

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FINAL PROBLEM STATEMENT

HCAI surveillance report showed increase in incidence VAP in ICU by 15.75% from February to March 2022

VAP is associated with high treatment COST, prolonged ICU stay and HIGH MORTALITY rates

Multiple factors including various infection control practices and preparation and storage practices of equipment, contributed to this problem

This study aims to effectively reduce incidence of VAP in ICU

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OBJECTIVES

GENERAL

To reduce the incidence of VAP in ICU

SPECIFIC

- **To verify the incidence among patients with VAP**
- **To identify the contributing factors of the increase in VAP incidence in ICU**
- **To formulate and implement remedial measures for VAP**
- **To evaluate the effectiveness of remedial measures**

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INDICATOR AND STANDARD

INDICATOR:
Incidence Rate of VAP in ICU

NUMERATOR:
Number of patients with VAP per month in ICU

DENOMINATOR:
Total number of ventilator days per month in ICU

FORMULA:

$$\frac{\text{Number of patients with VAP}}{\text{Total number of ventilator days}} \times 100\%$$

STANDARD:
The standard for this indicator is rate <5%*

*Standard obtained from Sunway Medical Centre Infection Control Meeting No. 3/2021

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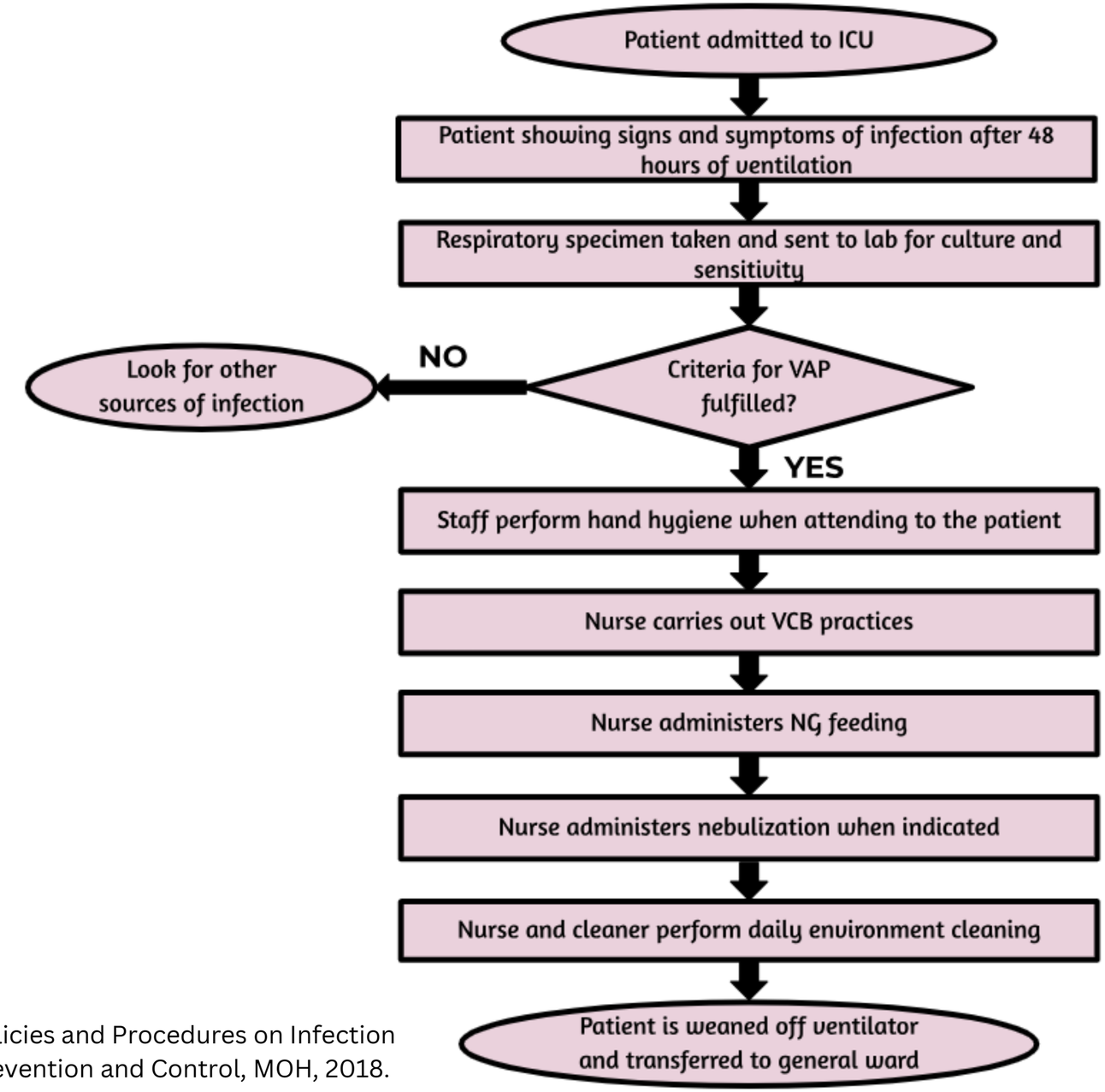
WORK PROCESS CHART



Policies and Procedures on Infection Prevention and Control, MOH, 2018.

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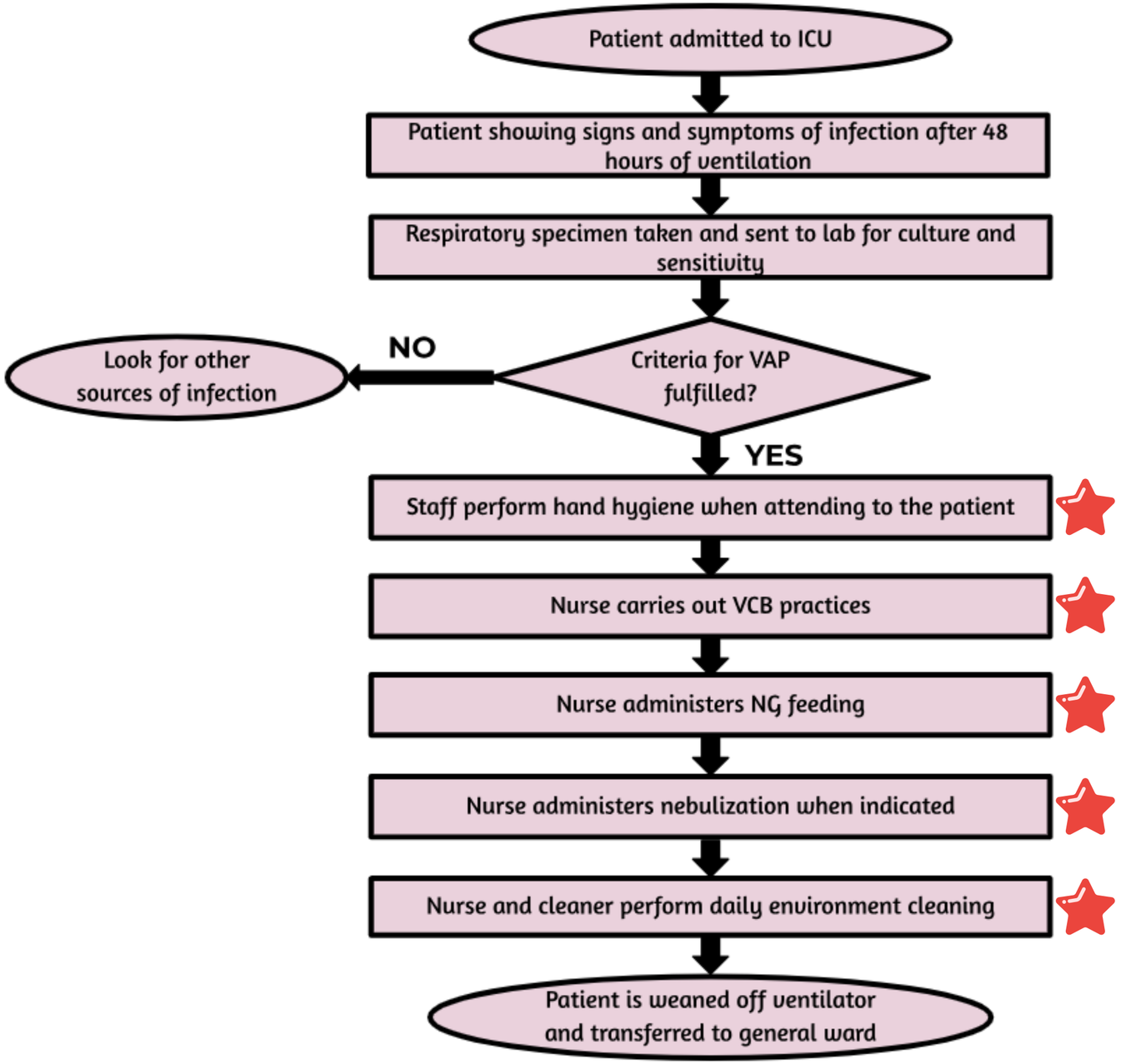
MODEL OF GOOD CARE



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MODEL OF GOOD CARE

NO	CRITICAL STEP	CRITERIA	STANDARD
1	Staff perform hand hygiene when attending to the patient	Hand hygiene is done by all the attending healthcare workers according to WHO 5 moments	100%
2	Nurse carries out VCB practices	Nurse checks ETT cuff pressure and performs oral hygiene 4 hourly	100%
		Department orientation and privileging process is conducted for all new nurses who are assigned to ICU	100%
		Doctor assesses daily if patient is fit for sedation vacation	100%
3	Nurse administers NG feeding	Nurse prepares NG feeding through aseptic technique at designated clean area	100%
		Nurse cleans and stores the feeding equipment in the dedicated clean closed container	100%
4	Nurse administers nebulization if indicated	Nurse prepares nebulization through aseptic technique at the patient's bedside	100%
		Nurse cleans and stores the nebulization equipment in the dedicated clean closed container	100%
5	Nurse and cleaner perform daily environment cleaning	Nurse performs daily medical equipment cleaning	100%
		Cleaner performs daily cleaning of the patient's surroundings and environment	100%

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DATA COLLECTION VERIFICATION

PROBLEM	**High incidence of VAP cases in ICU**
INDICATOR	**Incidence rate of VAP in ICU**
NUMERATOR	**Number of patients with VAP per month***
DENOMINATOR	**Total number of ventilator days per month***
STANDARD	**The standard for this indicator is rate < 5%**
VARIABLES THAT NEED TO BE COLLECTED	• **Number of VAP cases in ICU** • **Date and time of collection is after 2 days of admission to ICU and > 48 hours of invasive ventilation***
DATA COLLECTION TOOL	• **Positive culture report** • **HCAI surveillance form** • **HCAI line listing**

- **CDC National Healthcare Safety Network criteria, 2024**
- **Point Prevalence Survey Manual, 3rd Edition, 2018, MOH Malaysia**

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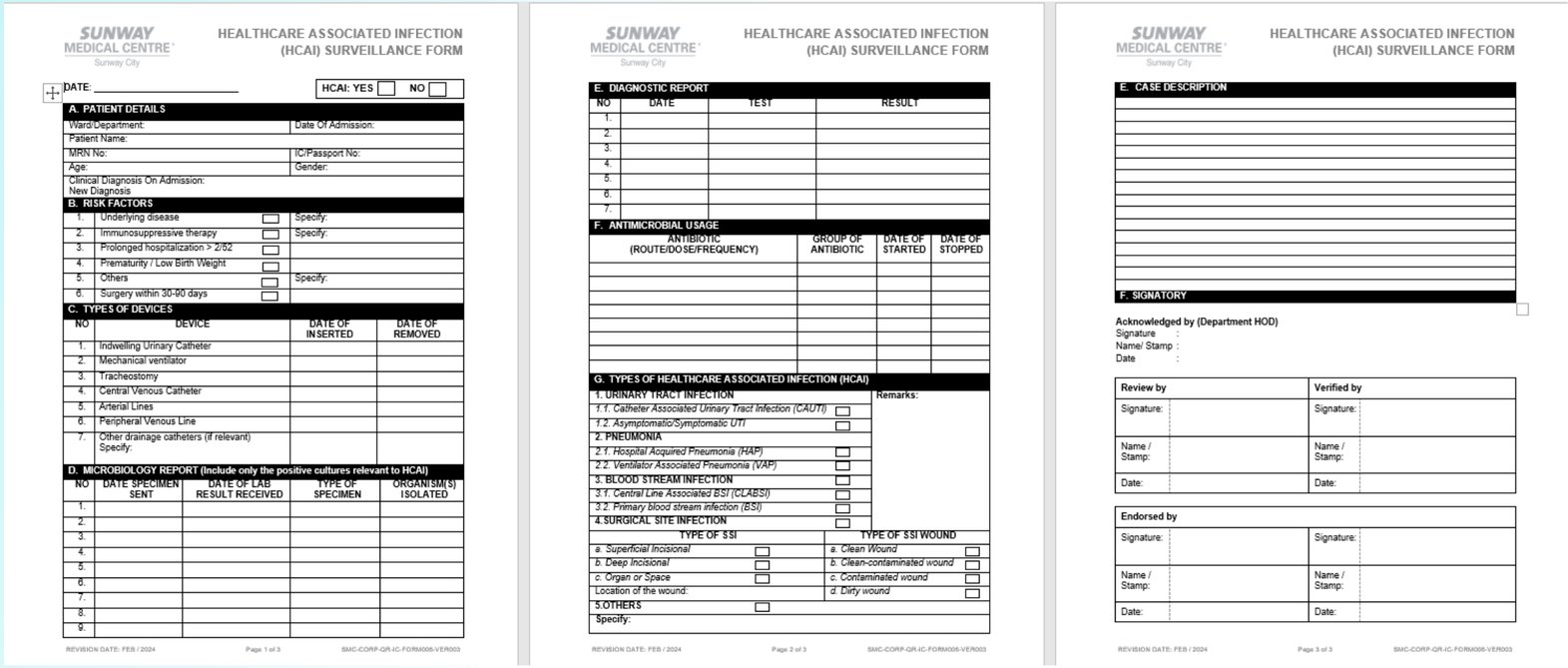
Patient number	Birthdate	Sex	Request #	Sample#	Collection date	Hos. numb	Admission	Location	Doctor	Sample ma	Collection	Technique	Topograph	Prot.	Organism	A
0000526221	5/2/1992	Female	450033033	SWA00276	31/1/2024 18:04	000045479	31/1/2024	A-5-29 - DF	JANANI SI	High vaginal swab				msw	Candida.sp	
1001169344	1/6/2023	Male	450032831	STO002268	30/1/2024 21:05	000044878	29/1/2024	D-L9-03 - D	LIM WEI LE	Stool				mst	Salmo.sp	S
1001169637	5/7/1957	Female	450033197	MIS011366	1/2/2024 10:13	000045209	31/1/2024	ICU	Dr Swee Ji	Sputum				Lower resp	Klebsiella	P
0000565837	5/1/1989	Female	450033267	SWA00276	1/2/2024 13:39	000045733	1/2/2024	B-2-07 - DF	JASON M.I	High vaginal swab				msw	Candida.sp	
1001169754	20/10/2022	Male	450033000	STO002269	31/1/2024 13:26	000045356	31/1/2024	D-7-05 - DF	DR ONG SI	Stool				mst	Salmo.sp	P
1001168110	6/4/2003	Male	450033289	URI006800	1/2/2024 15:36	000045754	1/2/2024	C-L1-07 DR	CHIEW YEC	Urine				MUA	Escherichi	P
0000352589	16/12/1975	Female	450033244	SWA00276	1/2/2024 12:01	000045679	1/2/2024	B-2-08 - DF	WONG YA	High vaginal swab				msw	Strep.agal	S
0000292804	28/10/1965	Female	450033194	URI006799	1/2/2024 10:11	000045598	1/2/2024	B-2-02 - Ou	Dr Tan Gail	Urine				MUA	Klebsiella	P
0000292804	28/10/1965	Female	450033194	URI006799	1/2/2024 10:11	000045598	1/2/2024	B-2-02 - Ou	Dr Tan Gail	Urine				MUA	M. morgan	P
0000084738	11/5/1968	Female	450033323	MIS011368	1/2/2024 20:18	000045787	1/2/2024	B-2-16 - DF	LEE YIN YI	Swab	Hand		Right	Pus/Woun	Staph.aur	
1001169864	4/3/1995	Male	450033062	MIS011365	1/2/2024 0:29	000045491	31/1/2024	A&E Clinic	Dr Lim Jinr	Swab	Ankle		Right	Pus/Woun	Pseu. aeru	
0000017949	17/12/1959	Female	450033256	URI006800	1/2/2024 12:48	000045722	1/2/2024	B-1-28 - DF	CHUA CHO	Urine				MUA	Escherichi	P
0000742159	30/6/1987	Female	450033297	MIS011367	1/2/2024 16:12	000044891	30/1/2024	WARD 6C	TAN GEOK	Swab	Face			Pus/Woun	Staph.aur	
0000664814	28/5/1969	Female	450033076	URI006799	1/2/2024 6:25	000045488	31/1/2024	D-L9-04 - D	Poongkodi	Urine				MUA	Escherichi	P
0000821749	30/1/1986	Female	450033232	SWA00276	1/2/2024 11:34	000045635	1/2/2024	B-2-08 - DF	WONG YA	High vaginal swab				msw	Candida.sp	
0000671069	7/12/1985	Male	450032981	MIS011363	31/1/2024 11:58	000045366	31/1/2024	D-L4-02 - D	CHEE CHIA	Swab			Right	Pus/Woun	Strep.agal	S
0000671069	7/12/1985	Male	450032981	MIS011363	31/1/2024 11:58	000045366	31/1/2024	D-L4-02 - D	CHEE CHIA	Swab			Right	Pus/Woun	Corynebact	
1001170034	4/10/2023	Male	450033266	BLO010586	1/2/2024 13:36	000045704	1/2/2024	WARD 6G	CHYE JOO	Blood	Aerobic			Blood Cult	Escherichi	P
1001170034	4/10/2023	Male	450033303	URI006800	1/2/2024 16:59	000045704	1/2/2024	Paediatric	CHYE JOO	Urine				MUA	Escherichi	P
0000842654	2/12/1984	Male	450033219	URI006799	1/2/2024 10:49	000045580	1/2/2024	C-L1-43A -	MURALI SU	Urine				MUA	Prot. mira	P
1001149640	13/10/1952	Female	450033030	MIS011364	31/1/2024 17:25	000044520	28/1/2024	WARD 4C	AHMAD HI	Swab	Back		Right	Pus/Woun	Escherichi	P
1001149640	13/10/1952	Female	450033030	MIS011364	31/1/2024 17:26	000044520	28/1/2024	WARD 4C	AHMAD HI	Swab	Back		Left	Pus/Woun	Escherichi	P

Positive culture report



SUNWAY MEDICAL CENTRE Sunway City — HEALTHCARE ASSOCIATED INFECTION (HCAI) SURVEILLANCE FORM

DATE: _____ HCAI: YES ☐ NO ☐

A. PATIENT DETAILS

Ward/Department:	Date Of Admission:
Patient Name:	
MRN No:	IC/Passport No:
Age:	Gender:
Clinical Diagnosis On Admission: New Diagnosis	

B. RISK FACTORS

1.	Underlying disease	☐	Specify:
2.	Immunosuppressive therapy	☐	Specify:
3.	Prolonged hospitalization > 2/52	☐	
4.	Prematurity / Low Birth Weight	☐	
5.	Others	☐	Specify:
6.	Surgery within 30-90 days	☐	

C. TYPES OF DEVICES

NO	DEVICE	DATE OF INSERTED	DATE OF REMOVED
1.	Indwelling Urinary Catheter		
2.	Mechanical ventilator		
3.	Tracheostomy		
4.	Central Venous Catheter		
5.	Arterial Lines		
6.	Peripheral Venous Line		
7.	Other drainage catheters (if relevant) Specify:		

D. MICROBIOLOGY REPORT (Include only the positive cultures relevant to HCAI)

NO	DATE SPECIMEN SENT	DATE OF LAB RESULT RECEIVED	TYPE OF SPECIMEN	ORGANISM(S) ISOLATED
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

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SUNWAY MEDICAL CENTRE Sunway City — HEALTHCARE ASSOCIATED INFECTION (HCAI) SURVEILLANCE FORM

E. DIAGNOSTIC REPORT

NO	DATE	TEST	RESULT
1.			
2.			
3.			
4.			
5.			
6.			
7.			

F. ANTIMICROBIAL USAGE

ANTIBIOTIC (ROUTE/DOSE/FREQUENCY)	GROUP OF ANTIBIOTIC	DATE OF STARTED	DATE OF STOPPED

G. TYPES OF HEALTHCARE ASSOCIATED INFECTION (HCAI)

1. URINARY TRACT INFECTION	Remarks:
1.1. Catheter Associated Urinary Tract Infection (CAUTI) ☐	
1.2. Asymptomatic/Symptomatic UTI ☐	
2. PNEUMONIA	
2.1. Hospital Acquired Pneumonia (HAP) ☐	
2.2. Ventilator Associated Pneumonia (VAP) ☐	
3. BLOOD STREAM INFECTION	
3.1. Central Line Associated BSI (CLABSI) ☐	
3.2. Primary blood stream infection (BSI) ☐	
4.SURGICAL SITE INFECTION ☐	

TYPE OF SSI		TYPE OF SSI WOUND	
a. Superficial Incisional	☐	*a. Clean Wound*	☐
b. Deep Incisional	☐	*b. Clean-contaminated wound*	☐
c. Organ or Space	☐	*c. Contaminated wound*	☐
Location of the wound:		*d. Dirty wound*	☐
5.OTHERS	☐		
Specify:			

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SUNWAY MEDICAL CENTRE Sunway City — HEALTHCARE ASSOCIATED INFECTION (HCAI) SURVEILLANCE FORM

E. CASE DESCRIPTION

F. SIGNATORY

Acknowledged by (Department HOD)
Signature :
Name/ Stamp :
Date :

Review by		Verified by	
Signature:		Signature:	
Name / Stamp:		Name / Stamp:	
Date:		Date:	

Endorsed by			
Signature:		Signature:	
Name / Stamp:		Name / Stamp:	
Date:		Date:	

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HCAI surveillance form

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HCAI MASTERLIST

Search for tools, help, and more (Alt + Q)

Home Insert Share Page Layout Formulas Data Review View Help Draw

Comments

Calibri (Body) 11 General

	C	D	E	F	G	H	I	J	K	L	M	N
	N		DATE OF COLLECTI	DATE OF ADMISS	LOCATION	SPECIMEN TYPE	SOURCE	ORGANISM	MDRO	CLASSIFICATI	TYPE OF HCAI	REMARK
	903798	JAN	27/12/2023 02:12	14/12/2023	WARD 6A	Urine		Achromobacter xylosoxidans	NO	CAI	NA	does not fit criteria/colonizer
	1001153242	JAN	28/12/2023 05:38	16/11/2023	4G ICU	Sputum		Pseu. Aeru (CRPS)	MISCELLANEOUS	NOT HCAI	NA	does not fit criteria/colonizer
	259773	JAN	30/12/2023 11:23	30/12/2023	B-1-11 - DR WONG MING	Urine		Escherichia coli	NO	CAI	NA	< 2 calendar days of admission
	1001162807	JAN	29/12/2023 02:04	28/12/2023	WARD 8F	Urine		Enterococcus faecalis	NO	CAI	NA	< 2 calendar days of admission
	1001162807	JAN	29/12/2023 02:04	28/12/2023	WARD 8F	Urine		Prot. mira	NO	CAI	NA	< 2 calendar days of admission
	1001163202	JAN	30/12/2023 16:13	30/12/2023	WARD 8F	Urine		Escherichia coli	NO	CAI	NA	< 2 calendar days of admission
	423045	JAN	30/12/2023 13:37	20/12/2023	C-LG-08 - DR JOHN LOW	Sputum		Klebsiella pneumoniae	NO	NOT HCAI	NA	does not fit criteria/colonizer
	116749	JAN	30/12/2023 10:38	29/12/2023	WARD 5B	Sputum		Klebsiella pneumoniae	NO	NOT HCAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:33	29/12/2023	3C HDU	Swab	PEG Tube	Prov. stua	NO	CAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:33	29/12/2023	3C HDU	Swab	PEG Tube	Klebsiella pneumoniae	NO	CAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:33	29/12/2023	3C HDU	Swab	PEG Tube	Strep. pyo	NO	CAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:34	29/12/2023	3C HDU	Swab		Klebsiella pneumoniae	NO	CAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:34	29/12/2023	3C HDU	Swab		Enterococcus faecalis	NO	CAI	NA	< 2 calendar days of admission
	91484	JAN	29/12/2023 15:34	29/12/2023	3C HDU	Swab		Strep.agal	NO	CAI	NA	< 2 calendar days of admission
	1116990	JAN	30/12/2023 12:45	22/12/2023	WARD 6B	Sputum		Steno. mal	MISCELLANEOUS	CAI	NA	does not fit criteria/colonizer
	41219	JAN	30/12/2023 18:58	30/12/2023	Ward 6B	Blood	Aerobic	Klebsiella pneumoniae ssp pneumoniae	NO	CAI	NA	< 2 calendar days of admission
	41219	JAN	30/12/2023 18:59	30/12/2023	Ward 6B	Blood	Anaerobic	Klebsiella pneumoniae ssp pneumoniae	NO	CAI	NA	< 2 calendar days of admission
	1062769	JAN	29/12/2023 17:46	25/12/2023	WARD 4B	Ascites fluid		Staph. cap	NO	CAI	NA	does not fit criteria/colonizer
	1001162788	JAN	28/12/2023 22:32	28/12/2023	B-1-27 - DR THIRUVENTHIRAN	Swab	Femoral catheter site	Acinetobacter baumannii complex	NO	NOT HCAI	NA	does not fit criteria/colonizer
	1001162788	JAN	28/12/2023 22:32	28/12/2023	B-1-27 - DR	Swab	Femoral	Klebsiella pneumoniae ssp	YES	NOT HCAI	NA	does not fit criteria/colonizer

HCAI surveillance masterlist

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MODEL OF GOOD CARE: WHERE IS THE PROBLEM?

NO	CRITICAL STEP	CRITERIA	STANDARD	VERIFICATION
1	Staff perform hand hygiene when attending to the patient	Hand hygiene is done by all the attending healthcare workers according to WHO 5 moments	100%	0%
2	Nurse carries out VCB practices	Nurse checks ETT cuff pressure and performs oral hygiene 4 hourly	100%	30%
		Department orientation and privileging process is conducted for all new nurses who are assigned to ICU	100%	28%
		Doctor assesses daily if patient is fit for sedation vacation	100%	15%
3	Nurse administers NG feeding	Nurse prepares NG feeding through aseptic technique at designated clean area	100%	10%
		Nurse cleans and stores the feeding equipment in the dedicated clean closed container	100%	0%
4	Nurse administers nebulization when indicated	Nurse prepares nebulization through aseptic technique at the patient's bedside	100%	18%
		Nurse cleans and stores the nebulization equipment in the dedicated clean closed container	100%	0%
5	Nurse and cleaner perform daily environment cleaning	Nurse performs daily medical equipment cleaning	100%	20%
		Cleaner performs daily cleaning of the patient's surroundings and environment	100%	67%

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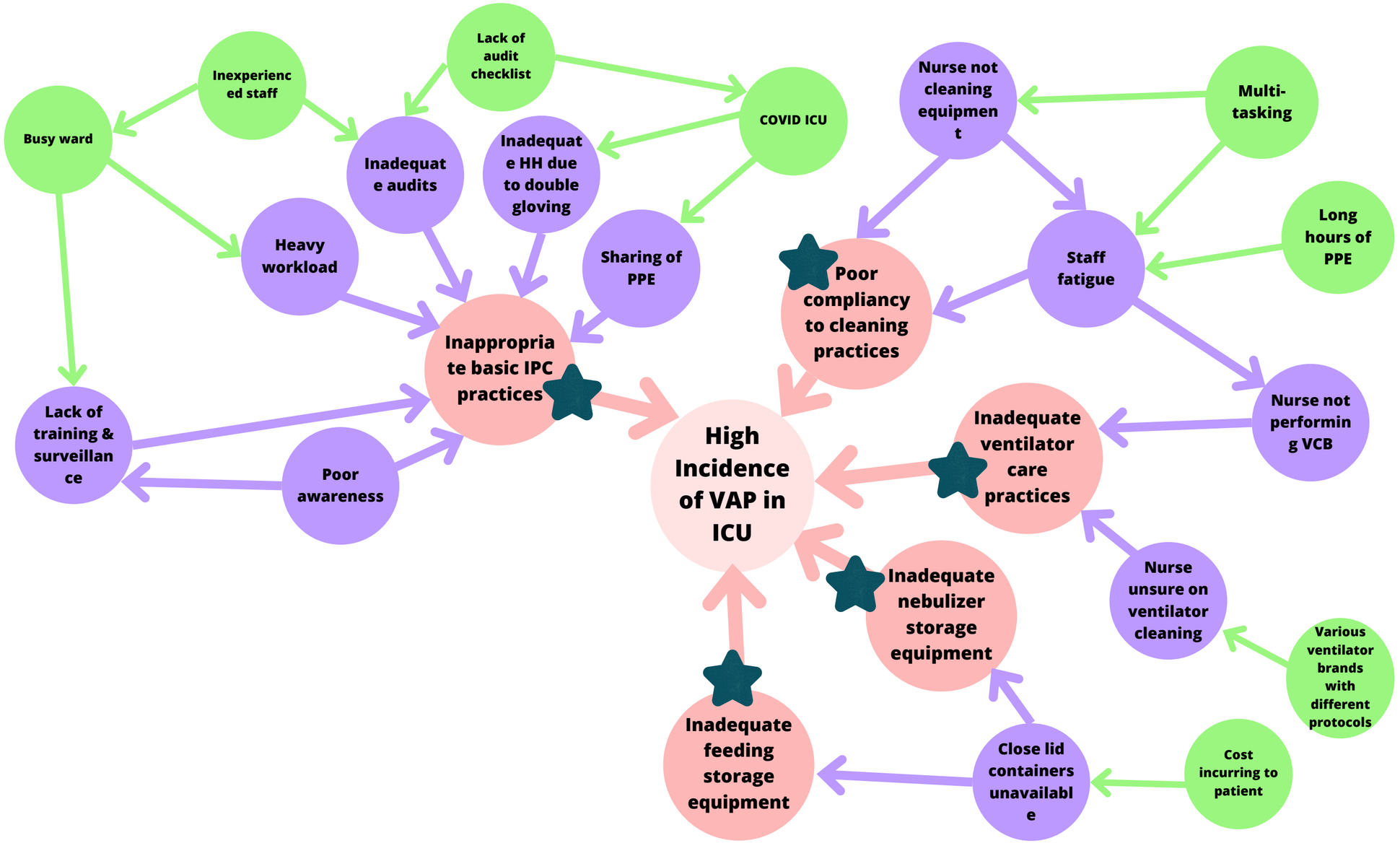
PROBLEM ANALYSIS CHART: WHY IS THE PROBLEM?



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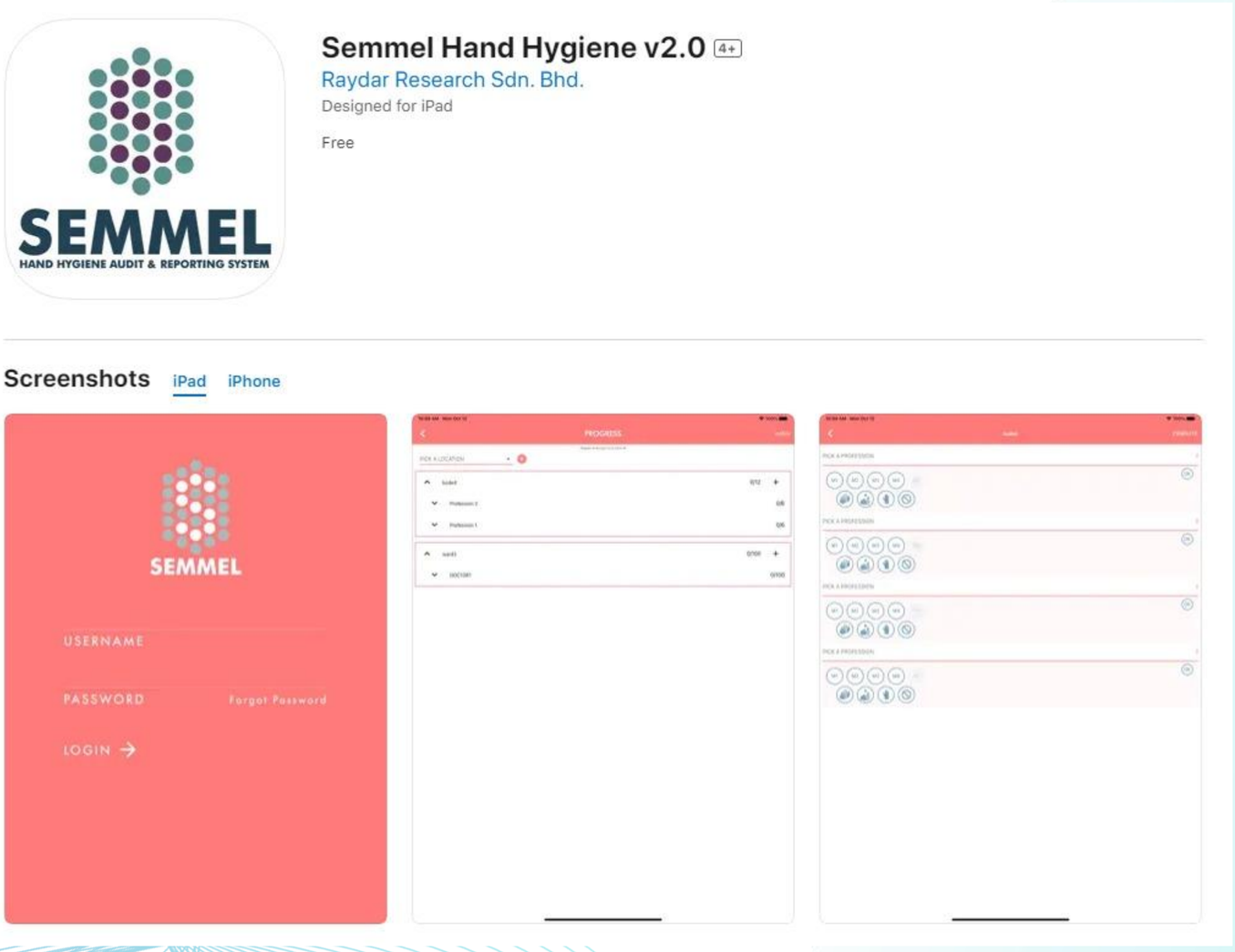
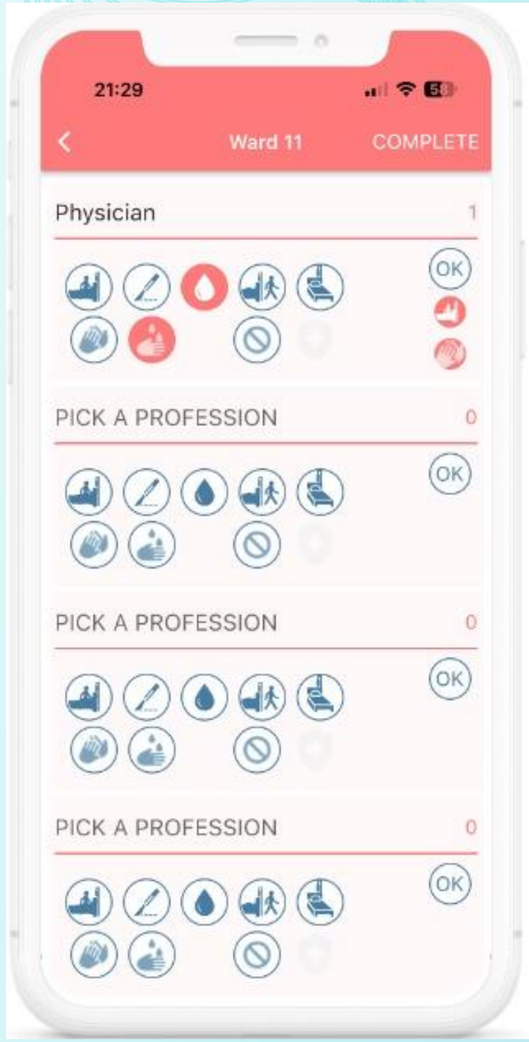
DATA COLLECTION: IDENTIFY CONTRIBUTING FACTORS

PROBLEM	HIGH INCIDENCE OF VAP CASES IN ICU			
FACTORS IDENTIFIED	Basic infection control practices by nurses and doctors	Ventilator care practices by nurses	Cleaning performance by nurses and cleaners	Preparation and storage of patient care equipment
VARIABLES NEED TO BE COLLECTED	1.Hand hygiene compliancy rates	1.VCB compliancy rates	1. Daily ventilator cleaning compliancy rate by nurses 2. Daily cleaning compliancy rates by cleaners	1. Compliancy rate of prep and storage of feeding equipment 2. Compliancy rate of prep and storage of nebulizer set
DATA COLLECTION TOOL	Hand hygiene audit through Semmel app	Observational audit through e-forms	Observational audit through e-forms	Observational audit through e-forms





Semmel app for hand hygiene audit

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IDENTIFY CONTRIBUTING FACTORS: HOW TO PLAN STRATEGY FOR CHANGE

CAUSES OF HIGH INCIDENCE OF VAP IN ICU	FREQUENCY	PERCENTAGE	CUMULATIVE FREQUENCY	CUMULATIVE PERCENTAGE
INAPPROPRIATE BASIC IPC PRACTICES	154	47.4%	154	47.4%
INADEQUATE VENTILATOR CARE PRACTICES	110	33.8%	264	81.2%
INADEQUATE FEEDING STORAGE EQUIPMENT	35	10.8%	299	92.0%
POOR COMPLIANCY TO CLEANING PRACTICES	20	6.2%	319	98.2%
INADEQUATE NEBULIZER STORAGE EQUIPMENT	6	1.8%	325	100%

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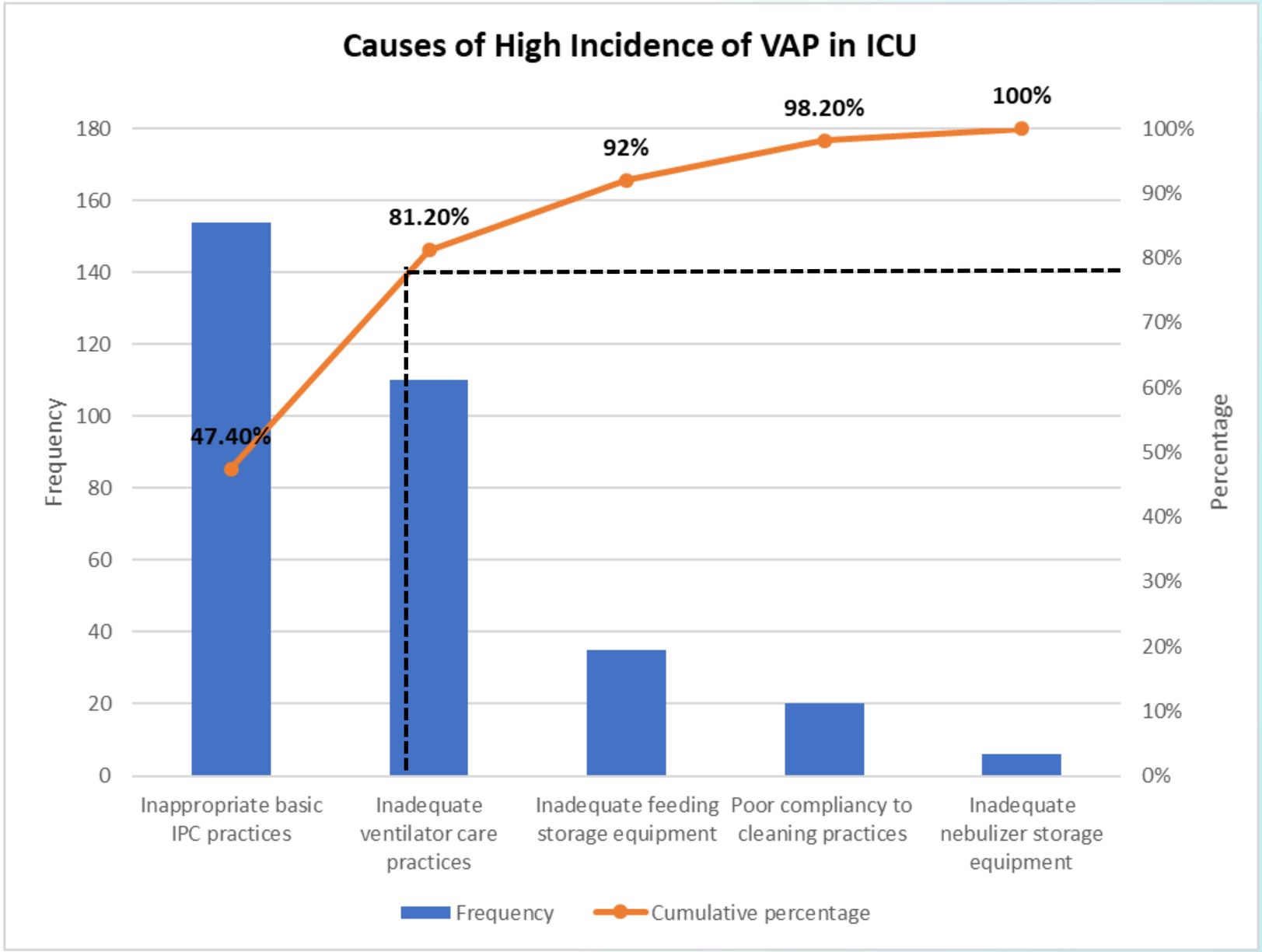
IDENTIFY CONTRIBUTING FACTORS: PARETO CHART



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STRATEGIES FOR CHANGE

STUDY FINDINGS	WHAT NEEDS TO CHANGE	HOW	WHO	WHEN
Inappropriate basic IPC practices	Level of awareness and compliancy towards hand hygiene practices	Online and physical training sessions Audits	ICU HODs, nurses and doctors Trainers: Infection Control Team	Daily
Inadequate ventilator care practices	Importance of VCB and compliance to the components	Audit, training and re-audit Demonstration	ICU HODs, nurses and doctors Trainers: Infection Control Team	Daily
Inadequate feeding storage equipment	Availability of closed containers for feeding equipment	Implementing dedicated closed containers Audit on practices	ICU HOD and nurses Auditors: Infection Control Team	Twice/ week
Poor compliancy to cleaning practices	Consistency and compliance towards cleaning practices	Audit, training and re-audit Demonstration	ICU nurses and cleaners Trainers: Infection Control Team	Twice/ week
Inadequate nebulizer storage equipment	Availability of closed containers for nebulizer set	Implementing dedicated closed containers Audit on practices	ICU HOD and nurses Auditors: Infection Control Team	Twice/ week

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EVALUATING THE EFFECTS OF CHANGE: CYCLE 1

FACTORS ADDRESSED	STRATEGY	WHEN STRATEGY WAS PERFORMED	PRE-REMEDIAL RESULT	POST-REMEDIAL RESULT
Poor hand hygiene practices	Doffing outer layer gloves after every patient	Jun-Dec 2022	52% (nurses) 78% (doctors)	100% (nurses) 100% (doctors)
	Performing hand rub on the clean inner gloves according to 5 moments	Jun-Dec 2022	0% (nurses) 0% (doctors)	96% (nurses) 95% (doctors)
	Hand hygiene and PPE training and orientation for ICU staff	Jun-Dec 2022	28% (nurses) 15% (doctors)	100% (nurses) 100% (doctors)
Poor VCB practices	Training and audit on ETT cuff pressure measurement and oral hygiene	Jun-Dec 2022	30%	98%
	Daily verbal reminders for doctors on sedation vacation	Jun-Dec 2022	15%	90%
Feeding equipment left exposed	Using clean closed containers to store NG feeding equipment	Jun-Aug 2022	0%	100%
	Auditing on aseptic technique during preparation of NG feeding	Jun-Aug 2022	10%	100%

Hand hygiene and VCB training

NG feeding storage container

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MODEL OF GOOD CARE: WHERE IS THE PROBLEM?

NO	CRITICAL STEP	CRITERIA	STANDARD	VERIFICATION	POST REMEDIAL ACTION CYCLE 1
1	Staff perform hand hygiene when attending to the patient	Hand hygiene is done by all the attending healthcare workers according to WHO 5 moments	100%	0%	96%
2	Nurse carries out VCB practices	Nurse checks ETT cuff pressure and performs oral hygiene 4 hourly	100%	30%	98%
		Department orientation and privileging process is conducted for all new nurses who are assigned to ICU	100%	28%	100%
		Doctor assesses daily if patient is fit for sedation vacation	100%	15%	90%
3	Nurse administers NG feeding	Nurse prepares NG feeding through aseptic technique at designated clean area	100%	10%	100%
		Nurse cleans and stores the feeding equipment in the dedicated clean closed container	100%	0%	100%

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MODEL OF GOOD CARE: WHERE IS THE PROBLEM?

NO	CRITICAL STEP	CRITERIA	STANDARD	VERIFICATION	POST REMEDIAL ACTION CYCLE 1
4	Nurse administers nebulization when indicated	Nurse prepares nebulization through aseptic technique at the patient's bedside	100%	18%	18%
		Nurse cleans and stores the nebulization equipment in the dedicated clean closed container	100%	0%	0%
5	Nurse and cleaner perform daily environment cleaning	Nurse performs daily medical equipment cleaning	100%	20%	20%
		Cleaner performs daily cleaning of the patient's surroundings and environment	100%	67%	67%

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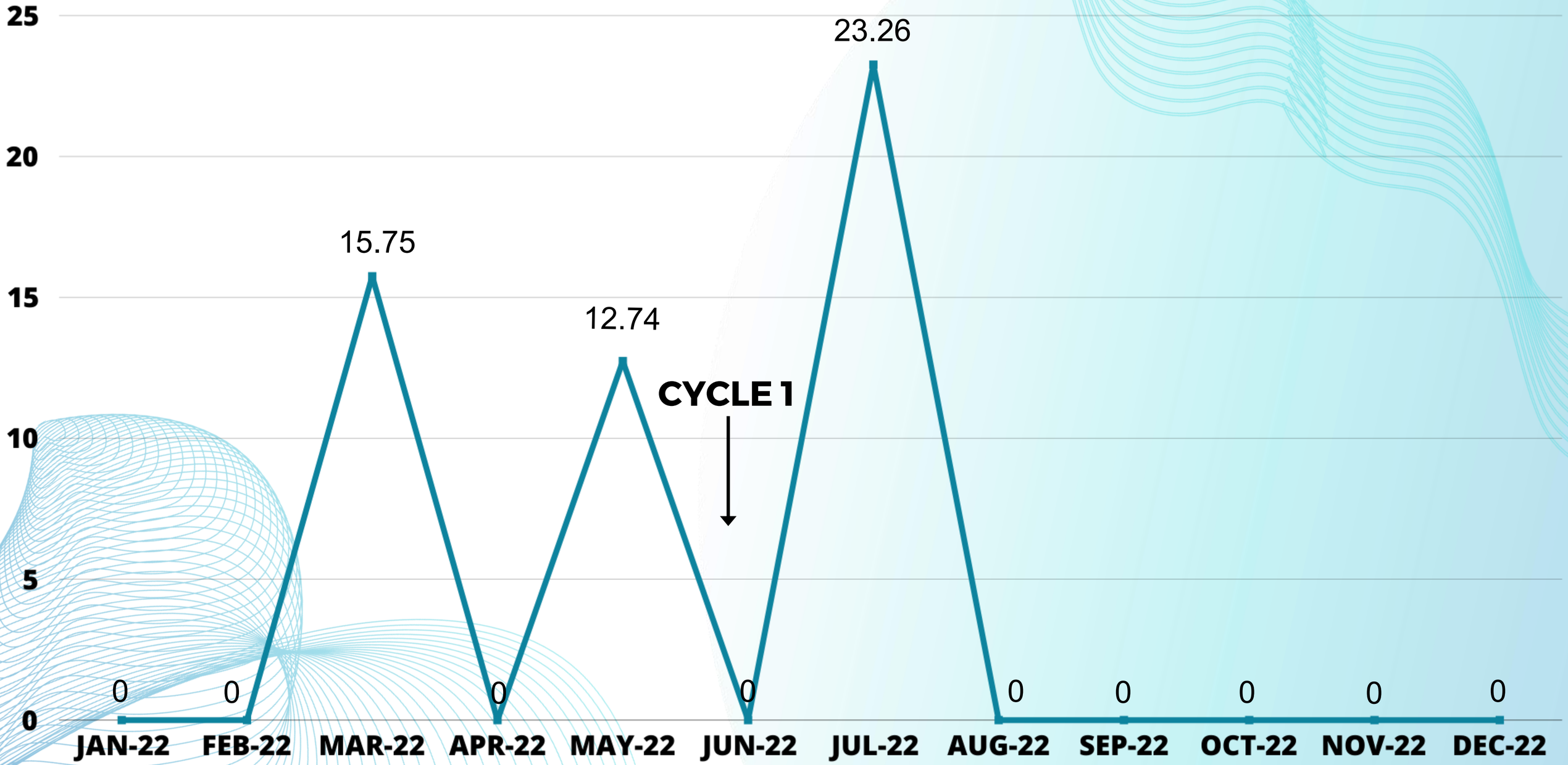
VAP INCIDENCE IN ICU 2022



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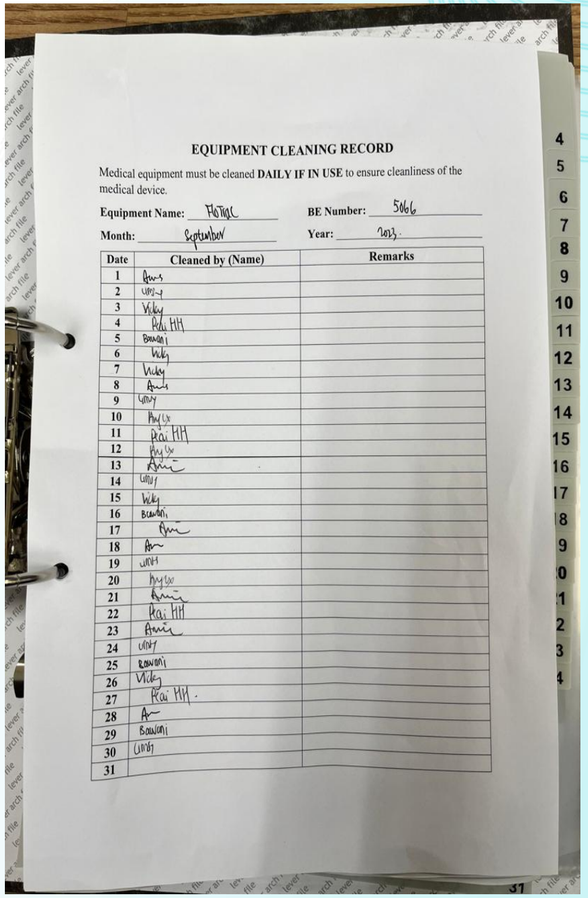
EVALUATING THE EFFECTS OF CHANGE: CYCLE 2

FACTORS ADDRESSED	STRATEGY	WHEN STRATEGY WAS PERFORMED	PRE-REMEDIAL RESULT	POST-REMEDIAL RESULT
Poor ventilator cleaning practices	Nurse education on ventilator machine cleaning	Jun-Aug 2023	25%	95%
	Creating cleaning record for ventilators	Jun-Aug 2023	0%	98%
	Audit on ventilator cleaning practices	Jun-Aug 2023	20%	93%
Inadequate environment cleaning	Training for cleaners on environment cleaning	Jun-Aug 2023	70%	96%
	Increasing cleaning frequency and focusing on high touch areas	Jun-Aug 2023	75%	97%
	Introducing UV light into environment cleaning protocols	Jun-Aug 2023	0%	93%
Poor nebulizer set storage practices	Using clean closed containers to store nebulizer equipment	May-Aug 2023	0%	100%
	Auditing on aseptic technique during preparation of nebulization	May-Aug 2023	18%	100%

UV light disinfection

Environment cleaning



EQUIPMENT CLEANING RECORD

Medical equipment must be cleaned **DAILY IF IN USE** to ensure cleanliness of the medical device.

Equipment Name: Ventilator **BE Number:** 5066

Month: September **Year:** 2023

Date	Cleaned by (Name)	Remarks
1	Amos	
2	Vicky	
3	Vicky	
4	Rai HH	
5	Bawani	
6	Vicky	
7	Vicky	
8	Amos	
9	Vicky	
10	Ayu Ux	
11	Rai HH	
12	Ayu Ux	
13	Amos	
14	Vicky	
15	Vicky	
16	Bawani	
17	Amos	
18	Amos	
19	Vicky	
20	Ayu Ux	
21	Amos	
22	Rai HH	
23	Amos	
24	Vicky	
25	Bawani	
26	Vicky	
27	Rai HH	
28	Amos	
29	Bawani	
30	Vicky	
31		

Cleaning record

Ventilator cleaning

Environment cleaning training for cleaners

Nebulization storage container

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MODEL OF GOOD CARE: WHERE IS THE PROBLEM?

NO	CRITICAL STEP	CRITERIA	STANDARD	VERIFICATION	POST REMEDIAL ACTION CYCLE 1	POST REMEDIAL ACTION CYCLE 2
1	Staff perform hand hygiene when attending to the patient	Hand hygiene is done by all the attending healthcare workers according to WHO 5 moments	100%	0%	96%	98%
2	Nurse carries out VCB practices	Nurse checks ETT cuff pressure and performs oral hygiene 4 hourly	100%	30%	98%	100%
		Department orientation and privileging process is conducted for all new nurses who are assigned to ICU	100%	28%	100%	100%
		Doctor assesses daily if patient is fit for sedation vacation	100%	15%	90%	96%
3	Nurse administers NG feeding	Nurse prepares NG feeding through aseptic technique at designated clean area	100%	10%	100%	100%
		Nurse cleans and stores the feeding equipment in the dedicated clean closed container	100%	0%	100%	100%

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MODEL OF GOOD CARE: WHERE IS THE PROBLEM?

NO	CRITICAL STEP	CRITERIA	STANDARD	VERIFICATION	POST REMEDIAL ACTION CYCLE 1	POST REMEDIAL ACTION CYCLE 2
4	Nurse administers nebulization when indicated	Nurse prepares nebulization through aseptic technique at the patient's bedside	100%	18%	18%	100%
		Nurse cleans and stores the nebulization equipment in the dedicated clean closed container	100%	0%	0%	100%
5	Nurse and cleaner perform daily environment cleaning	Nurse performs daily medical equipment cleaning	100%	20%	20%	93%
		Cleaner performs daily cleaning of the patient's surroundings and environment	100%	67%	67%	96%

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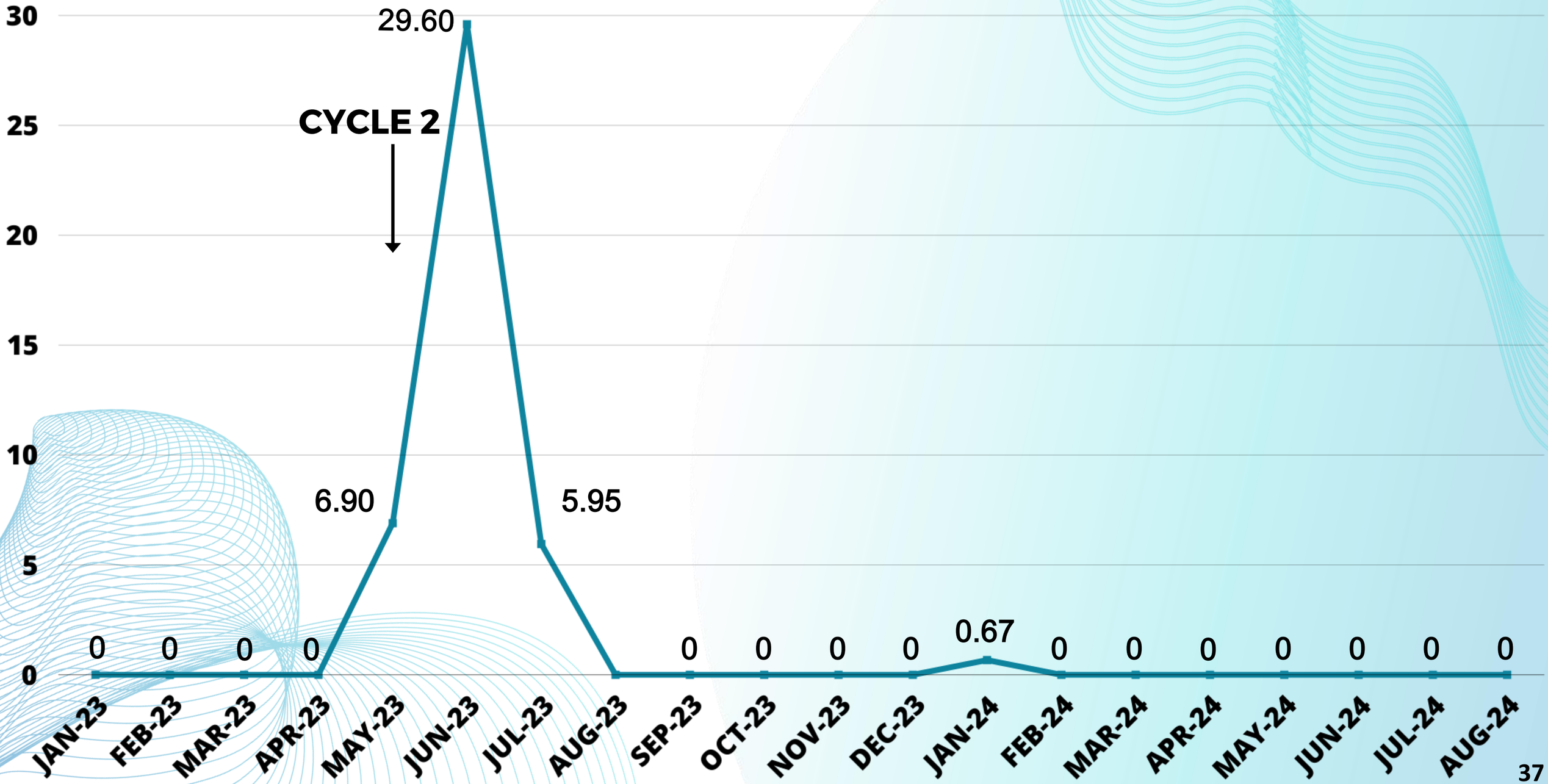
VAP INCIDENCE IN ICU 2023-AUGUST 2024



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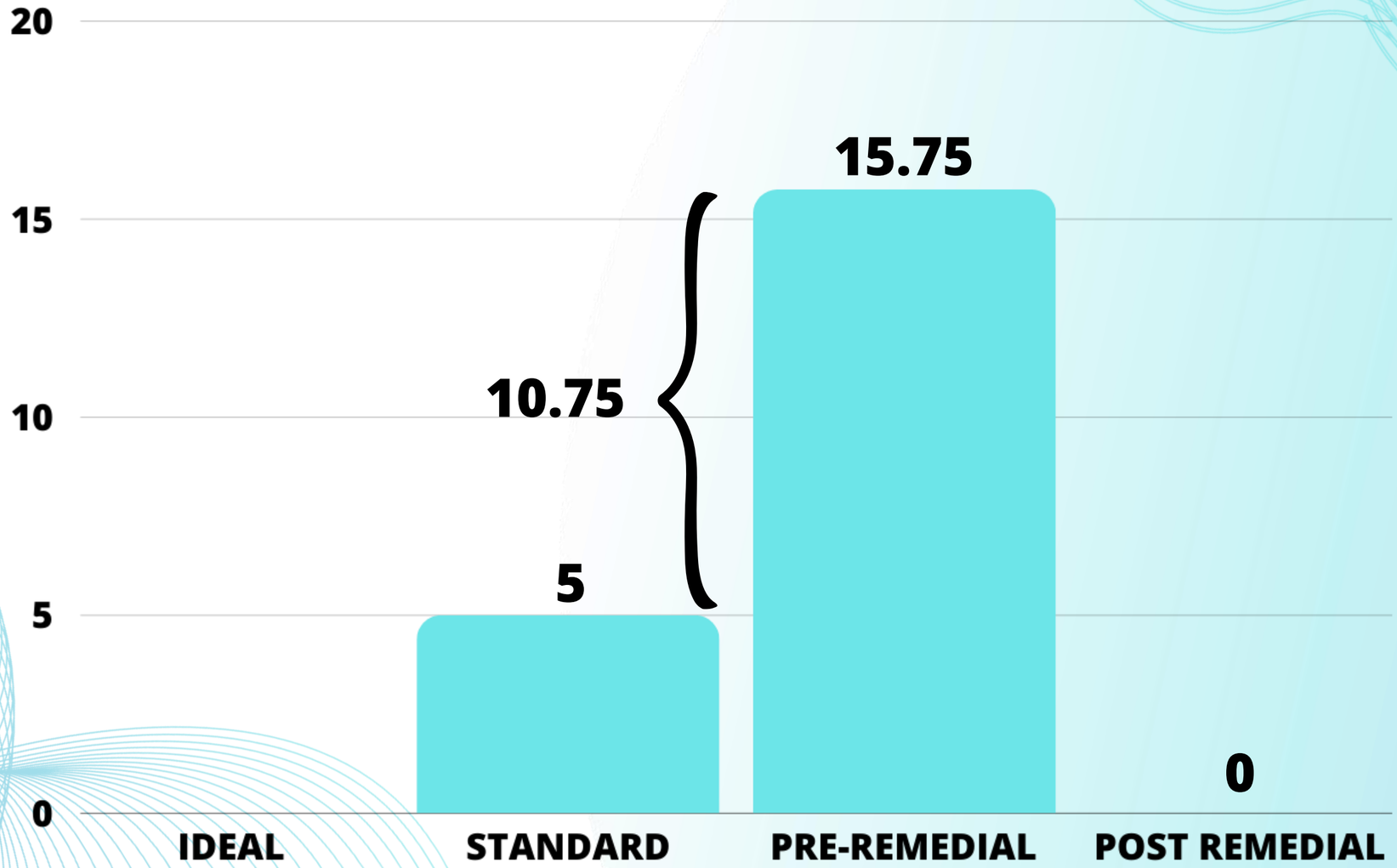
ACHIEVABLE BENEFITS NOT ACHIEVED (ABNA)

Effects of Changes on ABNA



ABNA was improved from 10.75% to -5%

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LESSONS LEARNT AND THE NEXT STEP

STRENGTHS:

- Active involvement of key players: Ward HODs
- Good teamwork and cooperation from ICU, ID, Microbiology, Housekeeping, IPC
- Seriousness of the outbreak was addressed appropriately
- Implementation strategies were conducted in an organized manner

LIMITATIONS:

- Lateness in identifying the problem thus resulting in delayed intervention
- Inadequate full time infection control link nurse in ICU

IF WE WERE TO REPEAT THE STUDY, WHAT WILL WE DO DIFFERENTLY?

- Create a better surveillance system for early identification and management of outbreaks
- Create an established team led by the Hospital CEO with all key stake holders as members responsible in reducing VAP rates

HOW WILL WE TAKE THIS PROJECT FORWARD?

- Identify and possibly narrow down the factors involved in the outbreak
- Create a standard checklist for the outbreak management of VAP
- Implement strategies that are sustainable long term

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CONCLUSIONS

NO	OBJECTIVES	CONCLUSIONS
1	To verify the incidence rate among patients with VAP	Pre-remedial data showed that INCIDENCE RATE in ICU increased by 15.75% in 1 month
2	To identify the contributing factors of the increase in VAP cases in ICU	The main contributing factor to this problem is inadequate hand hygiene practices. Other factors include poor VCB, environment cleaning and cleaning and storage of patient care equipment practices
3	To formulate and implement remedial measures for VAP	Strategies formulated include physical and online training sessions, enhanced audits and dedicated containers for patient care equipment
4	To evaluate the effectiveness of remedial measures	Post-remedial, the incidence of VAP in ICU has dropped to < 5% and these results are sustainable

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Any Questions?

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THANK YOU!