

Incidence Rate of Device-Related Infections At Abbassia Chest Diseases Hospital

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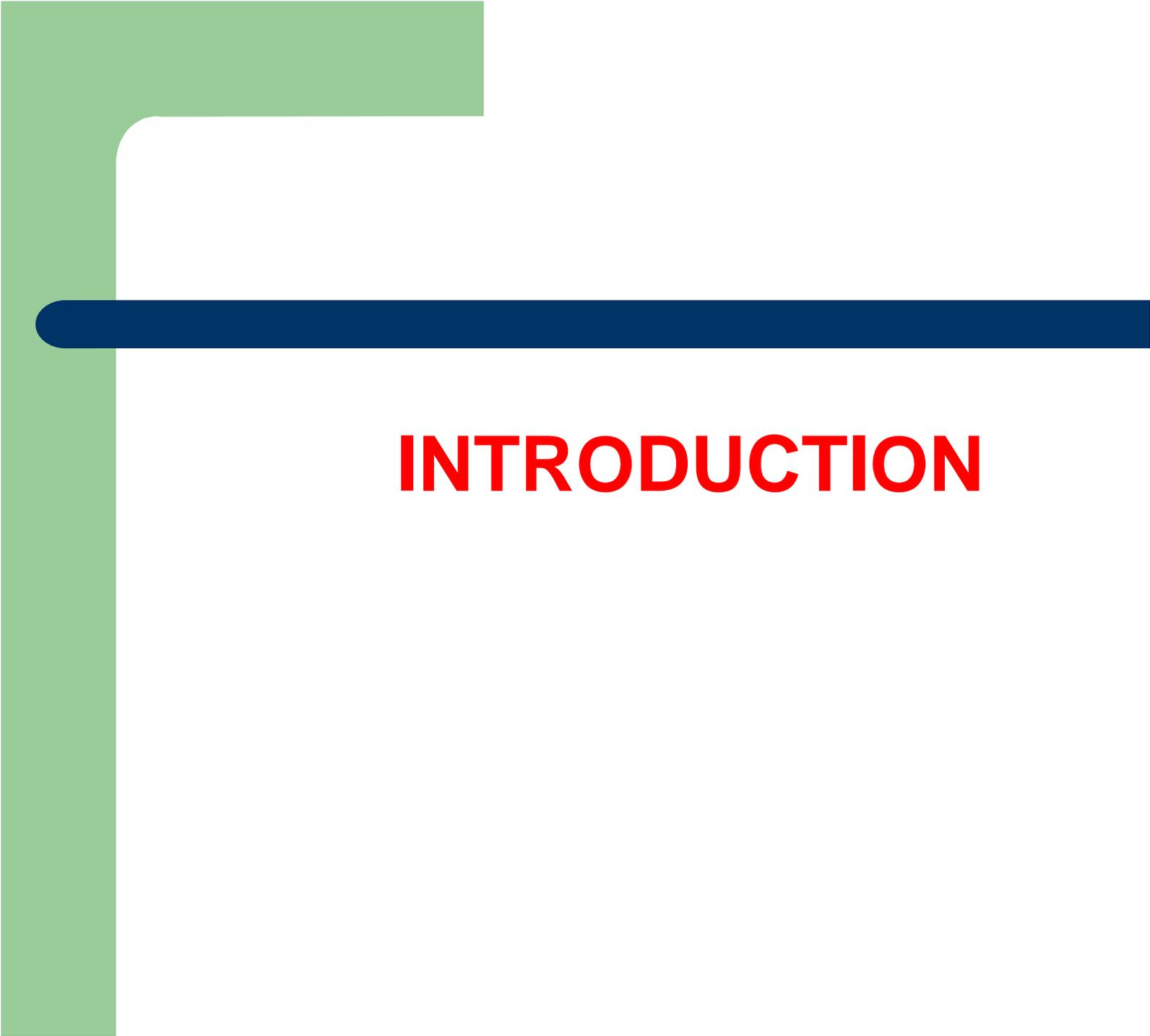
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CONTENTS

- KEY ELEMENTS OF A PROJECT PROPOSAL (Title page, introduction, problem or need assessment, aim and objective, activities / methods, evaluation plan, summary, conclusion, recommendation).



INTRODUCTION

Abbassia Chest Hospital

- Abbassia Chest Hospital in Cairo is a 460 bed hospital.
- It is considered a referral center, accepting referrals from all hospitals all over the city, in addition to Emergency & Causality cases.

Abbassia Chest Hospital (Cont')

- It contains departments of emergency, intensive and critical care units, operations and surgery, inpatient, outpatient, physiotherapy, dental, X-rays and Laboratories (bacteriology, biochemistry, hematology, pathology and intensive care lab).

Drainage of subglottic secretions

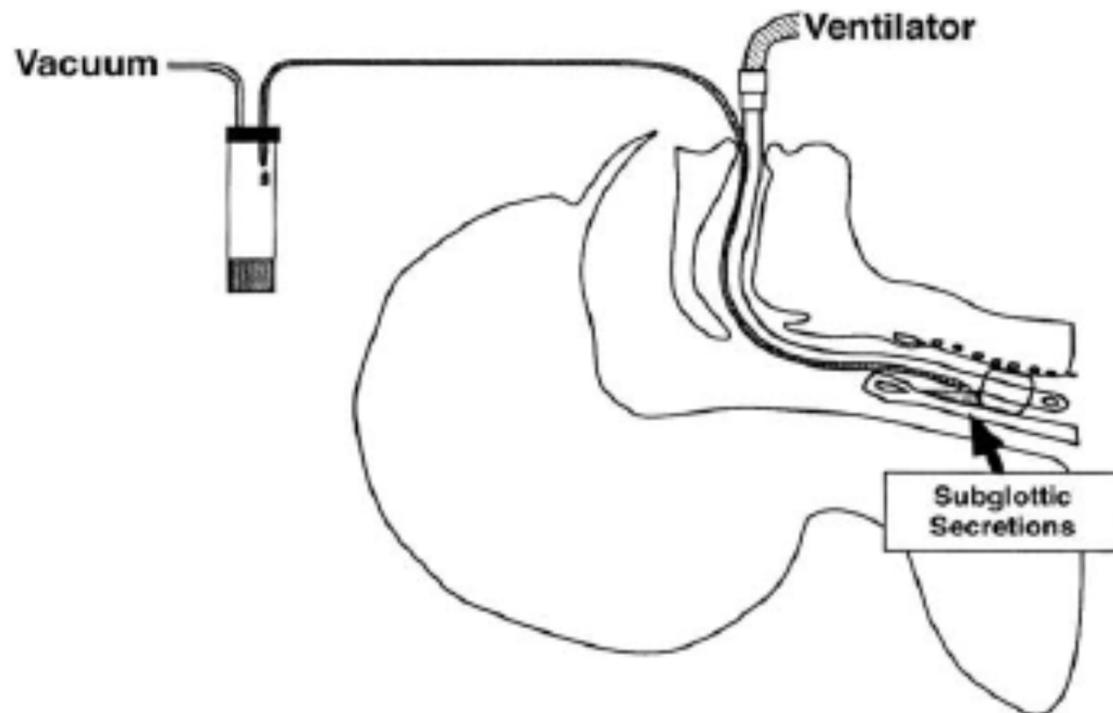
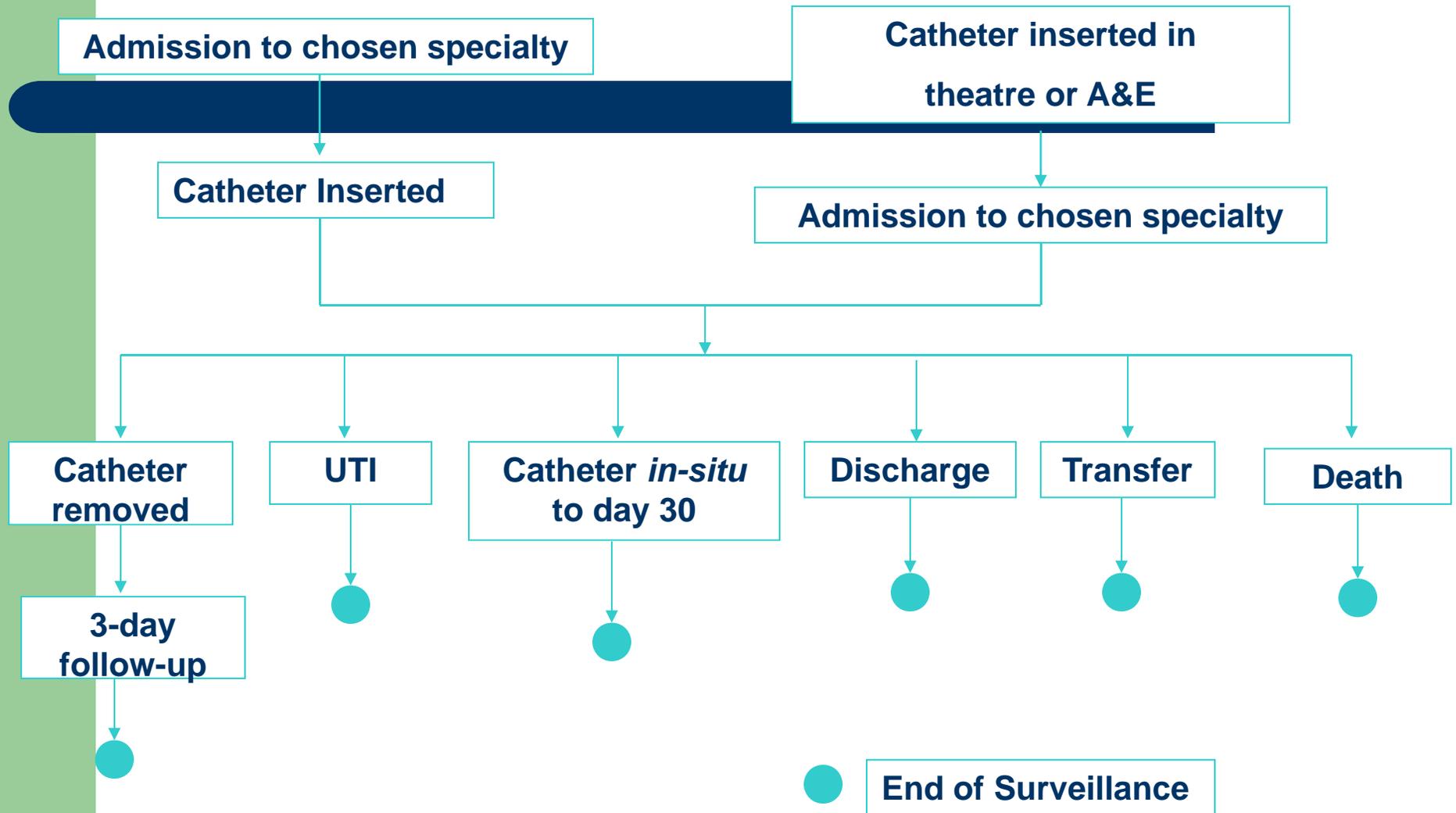
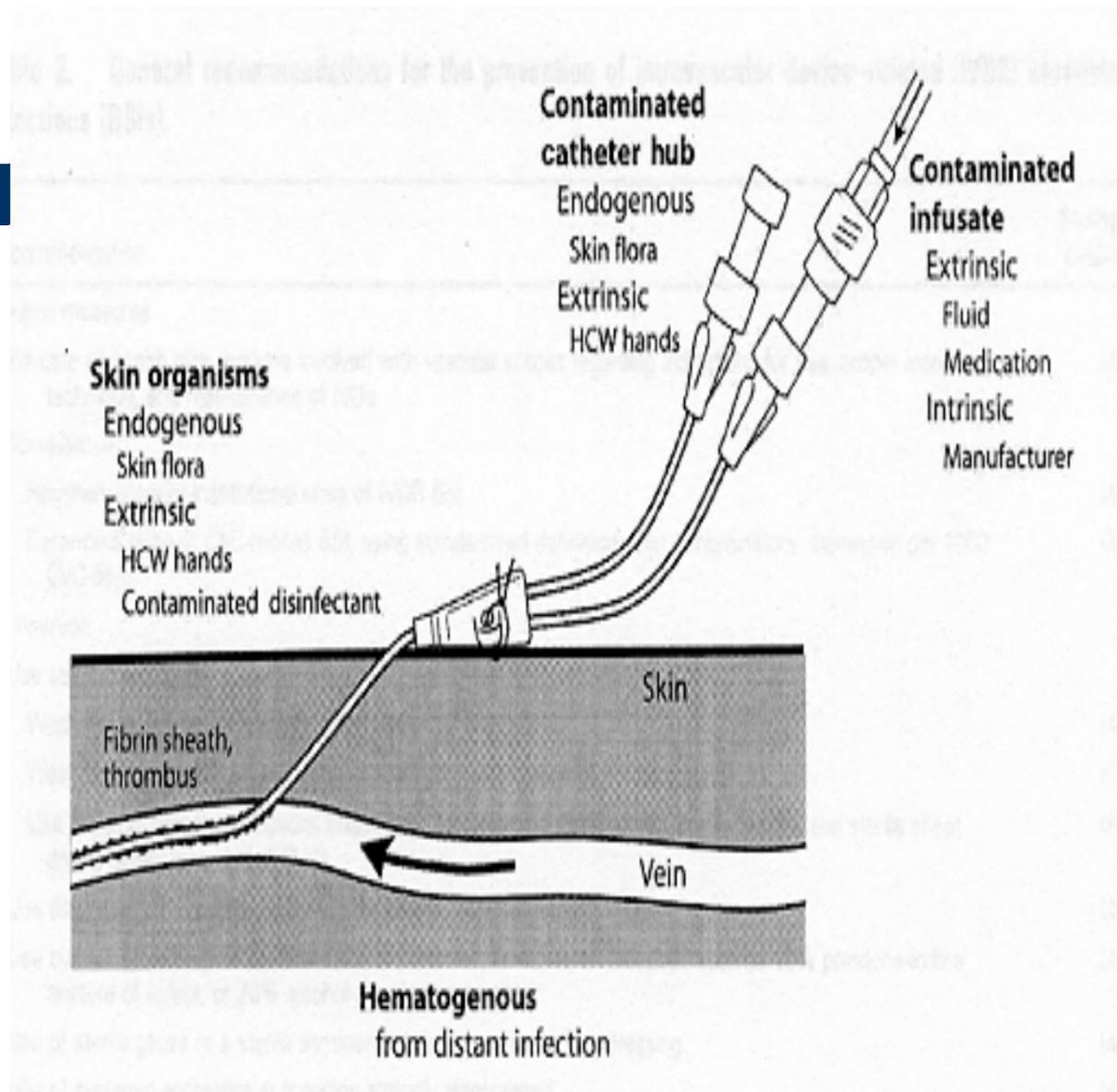


Figure 1 Diagram of a patient receiving subglottic secretion drainage. The patient is intubated with an endotracheal tube containing a dorsal lumen (black arrow) that opens above the cuff of the tube. This lumen can be connected to suction to remove the secretions that pool above the cuff in the subglottic space. Adapted with permission from Valles et al.¹⁸

Patient Pathways for CAUTI surveillance



Pathogenesis of CRBSI



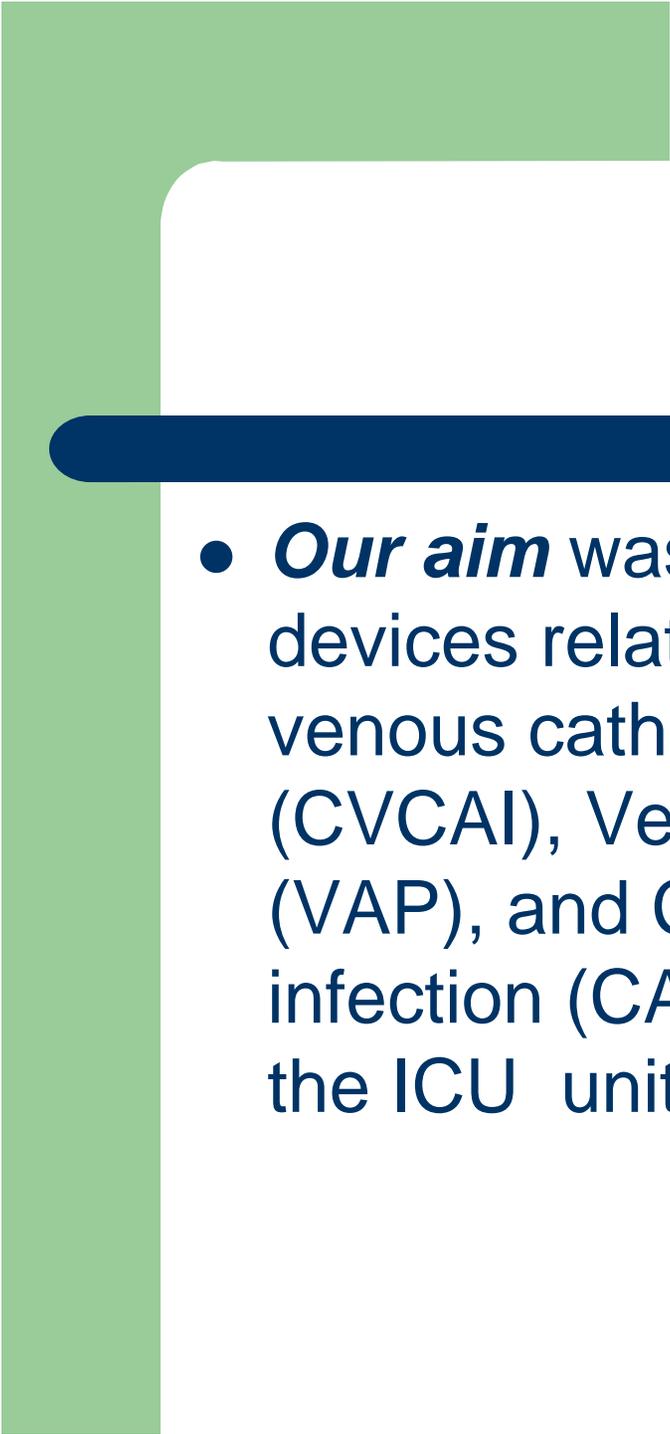
ICU and isolation rooms

- A Unit ----- for Avian flu care
- B Unit ----- for Traditional care
- C Unit ----- for T.B care
- D & E. Units ----- for Critical care

- Four isolation rooms

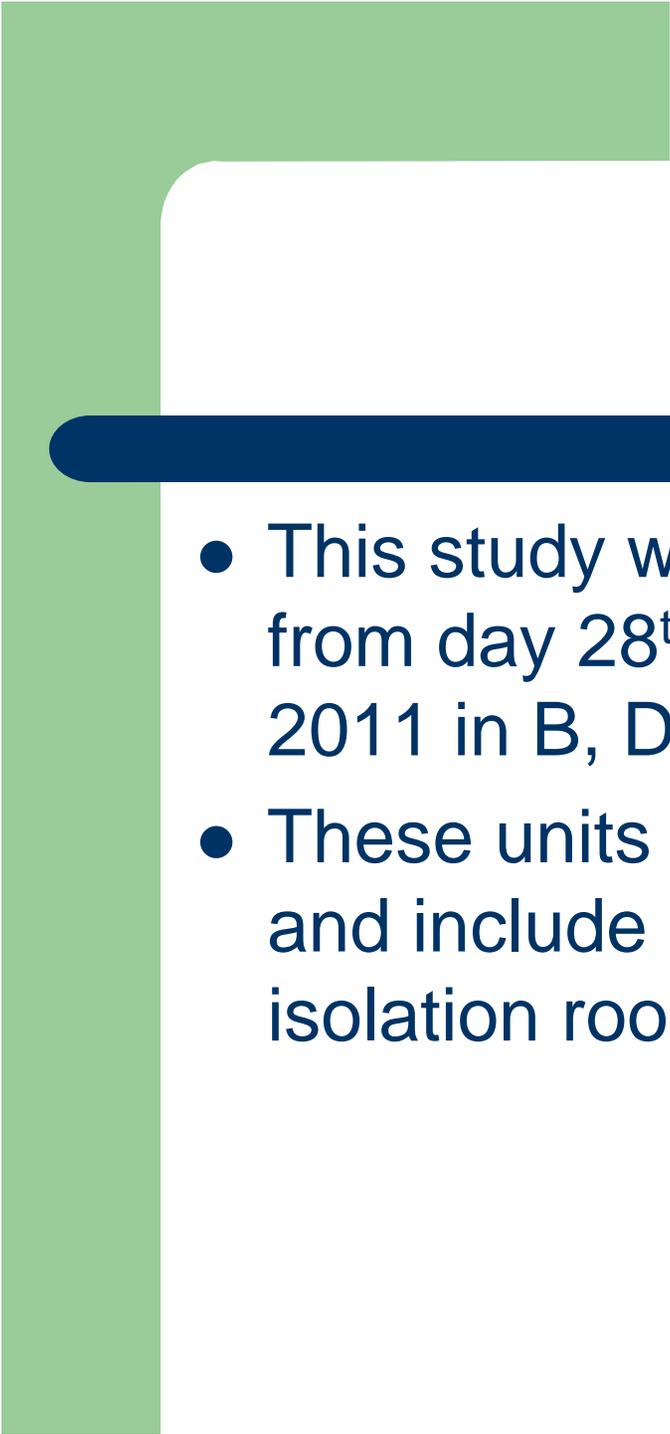


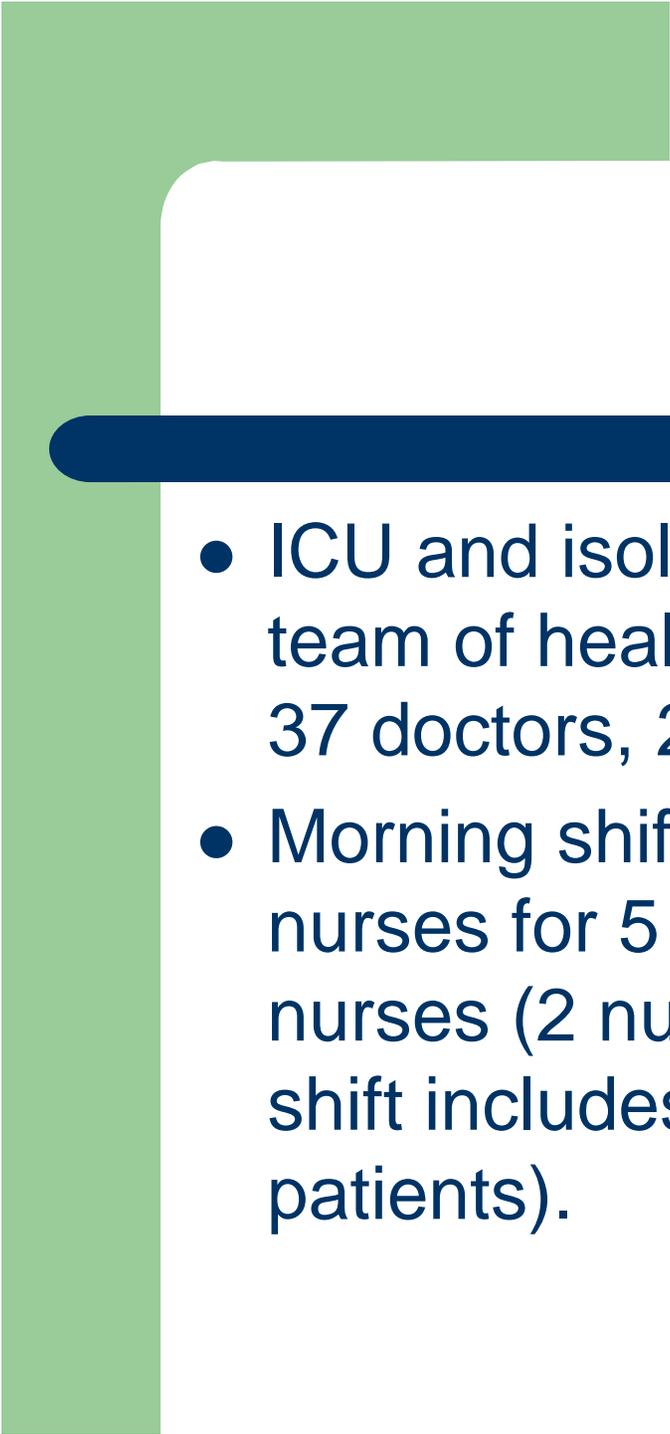
AIM OF THE WORK

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- ***Our aim*** was to study the incidence of devices related infections including Central venous catheter-associated infection (CVCAI), Ventilator-associated pneumonia (VAP), and Catheter-associated urinary tract infection (CAUTI) among patients admitted to the ICU units.



METHODS / ACTIVITIES

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- This study was carried out during the period from day 28th August to 28th September 2011 in B, D and isolation units.
 - These units are located at 2nd and 4th floor and include 19 beds (11 in ICU and 8 in isolation rooms).

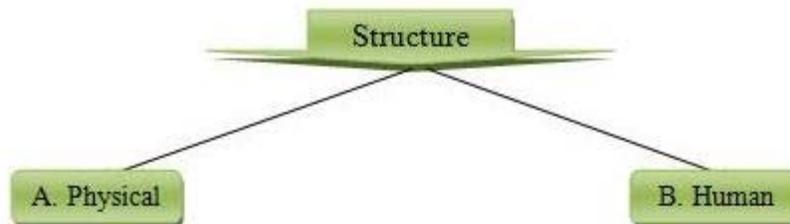
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- ICU and isolation rooms are served by a team of healthcare personnel including, 37 doctors, 27 nurses and five workers.
 - Morning shift includes 10-13 nurses (2 nurses for 5 patients), late shift includes 6 nurses (2 nurses for 6 patients) and night shift includes 5-6 nurses (one nurse for 4-5 patients).

Evaluation plan

- Evaluation of ICU/isolation structure and process was done through interview and observation of healthcare personnel, design and supplies using check list.
- Evaluation of ICU/isolation rooms outcome was done by measuring incidence rate of healthcare associated infection.

structure and process in ICU and isolation units

- Evaluation was carried out for physical and human factors.



A- Physical

Design				Supplies
Observation Items	Unit B	Unit D	Isolation Unit	
No. of beds	5	6	8/4 rooms	1. Personal protective equipment are available (latex clean & sterile gloves, surgical & high efficient masks, head caps, sterile gowns, aprons). 2. Antiseptics for patients are available (alcohol swab & 10% iodophore). 3. Waste receptacles: a) Bags for ordinary waste for patients & working staff are not found. b) Leak proof bags for infectious waste are found but not covered. c) Standard card boxes for sharp wastes are found. 4. Environmental cleaning soap are found. 5. disinfectant agents: a) for contact surfaces are 12% chlorine 1: 9 dilution. b) For blood / other body fluid spills 12% chlorine 1: 4 dilution. 6. liquid plain soap for hand washing are available. 7. Hand-drying materials (single use paper towel) are available. 8. Portable bottles of alcohol based hand rub are present.
Distance separating between 2 beds	2 steps	3 steps	-----	
separating between beds	Blackout curtains	CVC glass partitions	Blackout curtains	
Type of Ventilation	Air conditioner (split unit) + fans + exhaust fans	Air conditioner (split unit) + fans	Air conditioner (split unit)	
Distance between. the sink and further bed	3 Steps	6 Steps	Outside	
No. of Sinks	1	1	4/4 rooms	
Sinks specified for hand hygiene only	Yes	Yes	Yes	
Type of sink	Elbow	Hand	Hand	

B- Human

Observation Items	Result	
	Patient	Nurse
1- Average number of patients assigned to each nurse/ shift:-		
○ Morning shift	2	1
○ Afternoon shift	3	1
○ Night shift	3	1
2- Policies and procedures for basic infection control:-		
○ H.H	Present	
○ Use of PPE	Present	
○ Processing of patient care equipment	Present	
○ Done locally		
○ Centrally in SSD		
○ Environmental cleaning/disinfection	Present	
○ House keeping		
○ Clinical contact surfaces		
○ Handling blood/other body fluid spills		
○ Waste disposal	Present	
○ Personnel health and safety	Not found	
3- Trained LINK nurses	Present	
4- Trained working staff on IC practices	Present (On-job training)	
○ Clinical staff		
○ Nursing staff		
○ Environmental service personnel		
5- Manpower	Physicians 37	
	Nurse 27	
	Workers 5	

Healthcare associated infections were detected in three patients:

1. **Ventilator associated pneumonia (VAP) with *Pseudomonas spp.* , at B Unit**
2. **Catheter related Blood stream infection (CRBSI) with *Acinetobacter spp.*, at D Unit**
3.
 - a- **Catheter associated urinary tract infection (CAUTI) with *Escherchia coli* at D Unit and**
 - b- **Lower respiratory tract infection with MRSA and *Acinetobacter spp.*, at isolation Unit**

Table Cases developed Nosocomial Infections at ICU and isolation units during the period from 28/8-28/9/2011.

Patients	Age (in years)	Sex	Date of admission	Date of onset of infection	Infection site	Sample taken	Organism isolated
1	65	Male	28/08/2011	01/09/2011	Lower Respiratory Tract	Sputum	Pseudomonas spp.
2	60	Female	21/08/2011	12/09/2011	Blood	Central venous catheter	Acinetobacter Spp.
3	65	Male	13/09/2011	18/09/2011 & 24/09/2011	Urinary Tract Lower Respiratory Tract	Urine & Sputum	E. coli & MRSA - Acinetobacter Spp.

MRSA = Methicillin resistant Staphylococcus aureus

Table. Detailed culture and sensitivity of isolated pathogens

Organism	Sample	Sensitive	Resistant	Comment
Pseudomonas spp.	Sputum	Amikin, Tavanic, Fortum, pipril, rocephin, Maxipim	Unasyn, claform	Sensitive to most antibiotics
Acinetobacter	Sputum & Blood	Vibramycin, Gentamycin, Tavanic	Amikin, Unasyn, Fortum, Cefobid, Rocephin, Maxipim, Tinam, SXT	MDR
E.coli	Urine	Amikin, Tinam, Meronem	Cefobid, Claform, Gentamycin, Rocephin, Vibramycin	MDR
MRSA	Sputum	Vancomycin, Tetracyclin, Zithromax	Augmentin, Ampicillin	

NOSOCOMIAL INFECTIONS SURVELLANCE SUSTEM

- **INTENSIVE CARE UNIT (ICU) MONTHLY
REPORT FROM**
- **Month and Year 28 Aug to 28 Sept. 2011
Hospitals code B and D**
- **Type of ICU: (B) Traditional Respiratory
Care and (D) Critical Respiratory Care**

Month 28 Aug to 28 Sept. 2011

First Day of Month

Number Of Patients in ICU 3(D)

No. of Previous days in ICU for these Patients 23 (A)

ICU: B and D

First Day of Next Month

3(F)

32(C)

Date	New arrivals	No. of pat (bed days)	Urinary catheter	Cent. Line	Ventilator
28/8	1	3	2	1	1
29/8	0	3	2	1	1
30/8	0	3	2	1	1
31/8	0	3	2	1	1
1/9	0	3	3	1	1
2/9	0	3	3	1	1
3/9	0	3	3	1	1
4/9	0	3	3	1	1
5/9	1	4	4	1	2
6/9	0	4	4	1	2
7/9	1 (-1)	4	4	1	2
8/9	0	4	4	1	2
9/9	1	5	5	1	3
10/9	0	5	5	1	3
11/9	2 (-1)	6	6	1	6
12/9	0	6	6	0	6
13/9	0	6	6	0	6
14/9	1 (-1)	6	6	0	7
15/9	1 (-1)	5	5	0	6
16/9	0 (-1)	4	4	0	5
17/9	0	3	3	0	4
18/9	0	3	3	0	4
19/9	0	3	3	0	4
20/9	0	3	3	0	4
21/9	0	3	3	0	4
22/9	0 (-1)	2	2	0	3
23/9	0	2	2	0	3
24/9	0	2	2	0	3
25/9	0	2	2	0	3
26/9	1	3	3	0	4
27/9	0	3	3	0	4
28/9	0	3	3	0	4
Total	9(E)	115(B)	111(G)	15(H)	102(I)

Number of Patients With Infections

- TOTAL NUMBER OF INFECTIONS (ICU) = 4
- URINARY TRACT INFECTION (ICU) = 1
- BLOOD STREAM INFECTIONS (ICU) = 1
- RESPIRATORY TRACT INFECTION (ICU) = 2

Table. Overall and individual device related infections per 1000 device days

No.	Item	Calculations
1	Overall Infection Rate In ICU/ 1000	TOTAL INF (ICU)/ (B) × 1000 = /1000 (4/115) × 1000 = 35/1000 bed days
2	Indwelling Urinary Catheter Rate/ 1000	U.T.I (ICU)/ (G) × 1000 = /1000 (1/111) × 1000 = 9/1000 urinary cath. day
3	Central Line Associated With Bacteraemia/ 1000	B.S.I (ICU)/ (H) × 1000 = /1000 (1/15) × 1000 = 67/1000 venous cath. day
4	Ventilator Associated With Pneumonia/ 1000	R.T.I (ICU)/ (I) × 1000 = /1000 (2/102) × 1000 = 20/1000 ventilator day
5	Overall Patient Infection Rate/ 100	TOTAL INF (ICU)/ (D) + (E) × 100 = % (4/12) × 100 = 33.3 %

Method (procedures)
Lack of aseptic technique during insertion:
• endotracheal tube
• Change of circuit
• Usage of distilled water
Lack of sterilization of (respiratory bag, humidifier, respiratory circuit,.....)
Defective Sedation

Staff
Defect staff no. (Shortage)
Lack of compliance to infection control manual
Unqualified, untrained

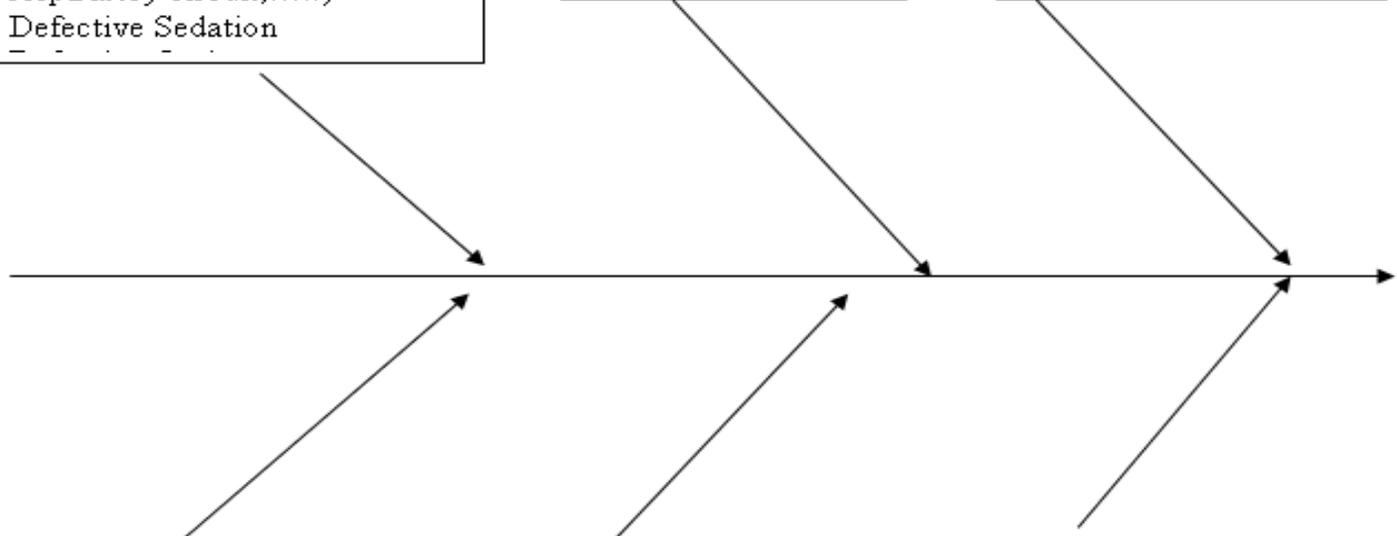
Patient
Underling medical condition
Immuncomprised
COPD
Other respiratory syndrome
Level of consciousness

Incidence Rate of Ventilator associated Pneumonia

Material
-Lack of distilled water
-Lack of suction tube, respiratory circuit, filter and endotracheal tube
-Lack of PPE

Equipment
Lack of hand washing facilities and alcohol dispensers
Lack of Laryngoscope

Environment
-Pt. position 30
-Distance between beds
-Improper environmental

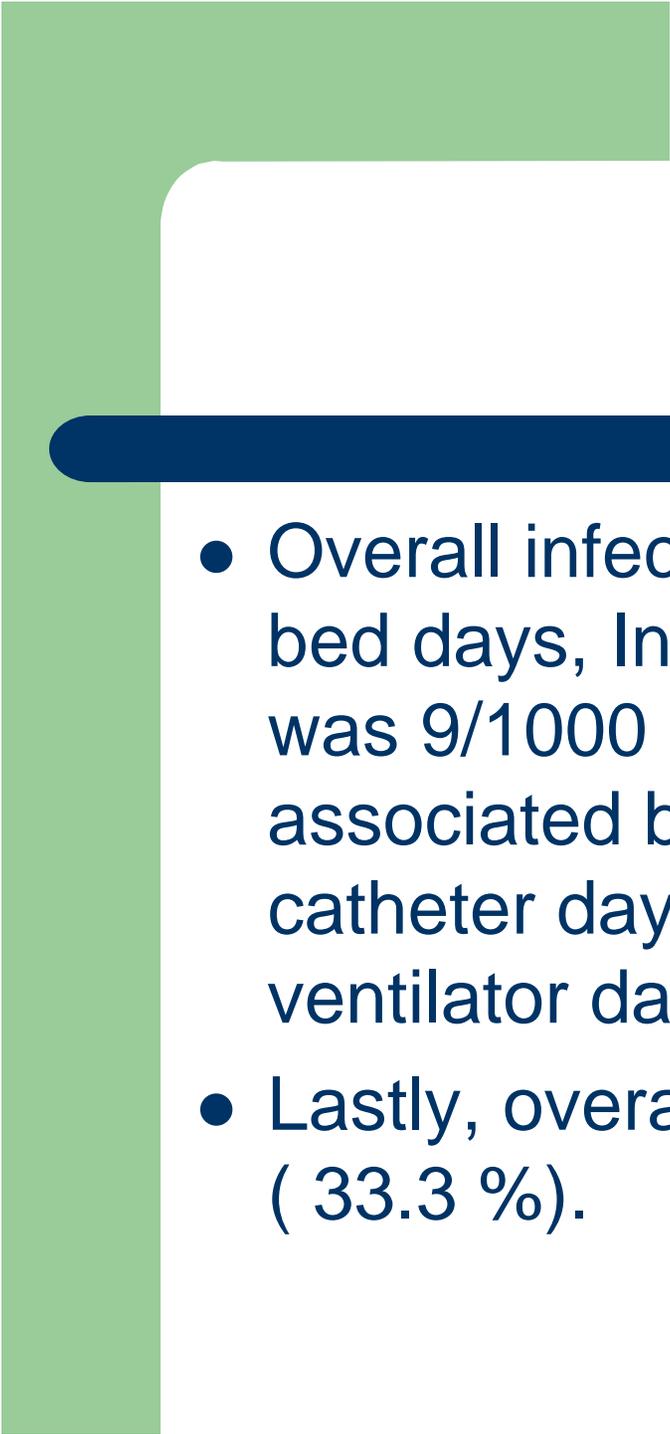


Points of Strength and Weakness in the studies ICU and Isolation Units

<i>Strength</i>	<i>Weakness</i>
<i>Adequate supply of PPE</i>	<i>Breach of aseptic techniques during insertion of some devices</i>
<i>Nurses are trained</i>	<i>Shortage of nurses</i>
<i>Adequate supply of disinfectants</i>	<i>Non compliance of P& P of use, storage, etc.</i>
<i>Different types of isolation units</i>	<i>Some are not well structured , e.g, absence of central condition and use of fans</i>
<i>Adequate supply of red bags for infectious waste</i>	<i>Mixing of infectious and non infectious waste</i>

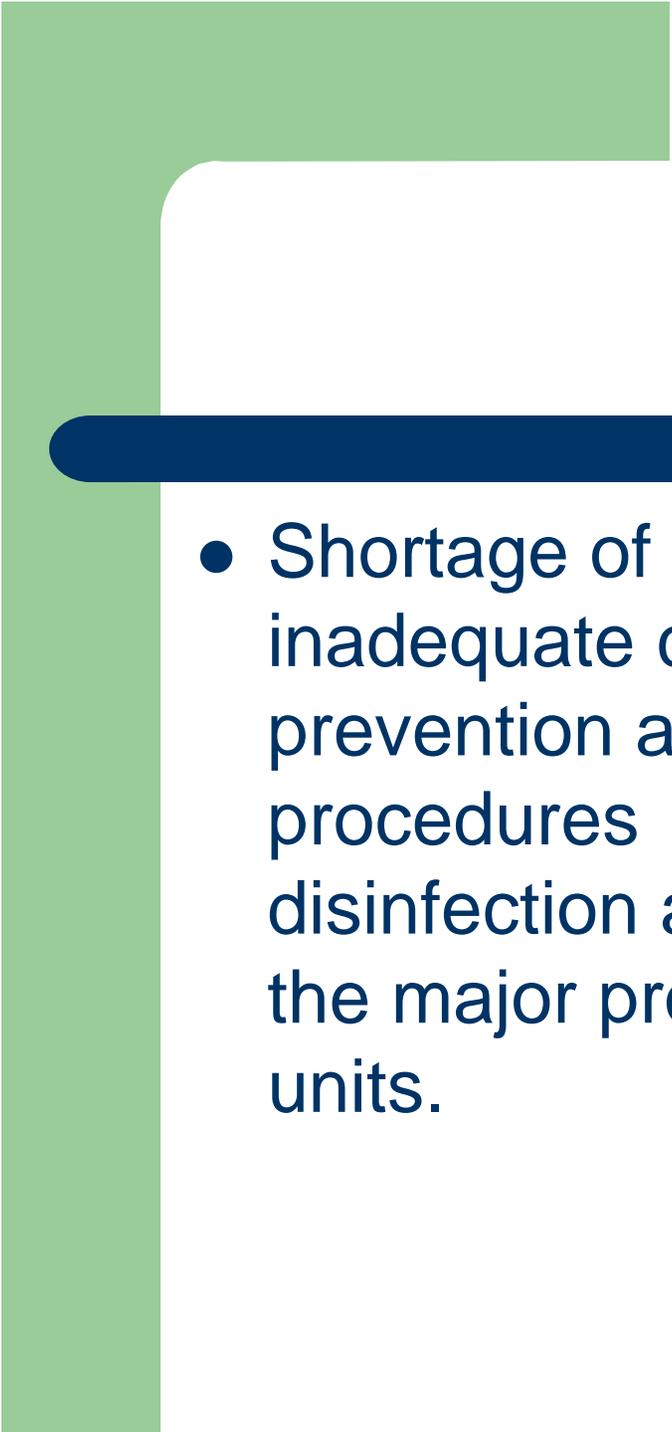
Summary

- Healthcare associated infections were detected in three patients during the One-month study, namely ventricular associated pneumonia, VAP) with *Pseudomonas spp.* , blood stream infection with *Acinetobacter spp.*.
- The third patient showed two episodes of infections. Urinary catheter associated infection which was positive for *E.coli and lower respiratory tract infection with MRSA and Acinetobacter spp.* which were isolated from sputum. *Acinetobacter spp.* and *E.coli* showed multiple resistance to most antibacterial agents.

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- Overall infection rate in ICU was 35/1000 bed days, Indwelling Urinary Catheter Rate was 9/1000 urinary catheter, central associated bacteraemia was 67/1000 venous catheter day and VAP rate was 20/1000 ventilator days.
 - Lastly, overall patient infection rate 4/12 (33.3 %).

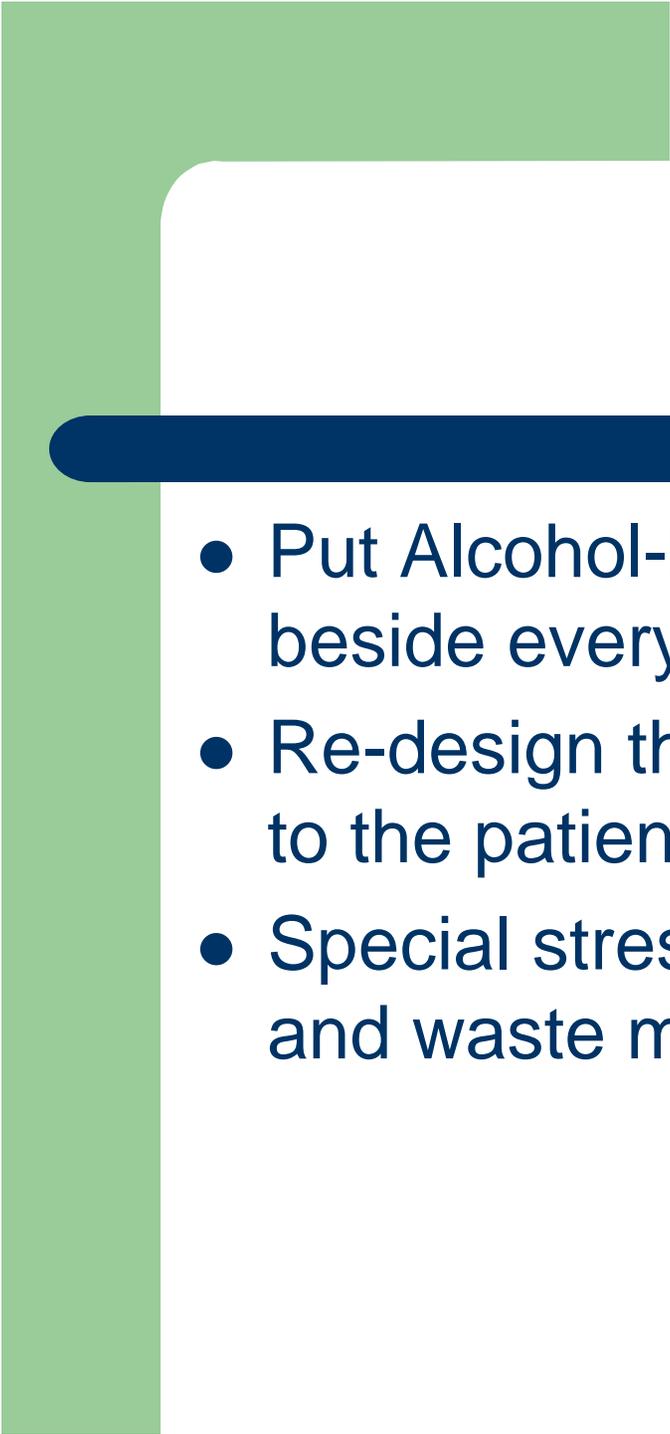
Conclusion

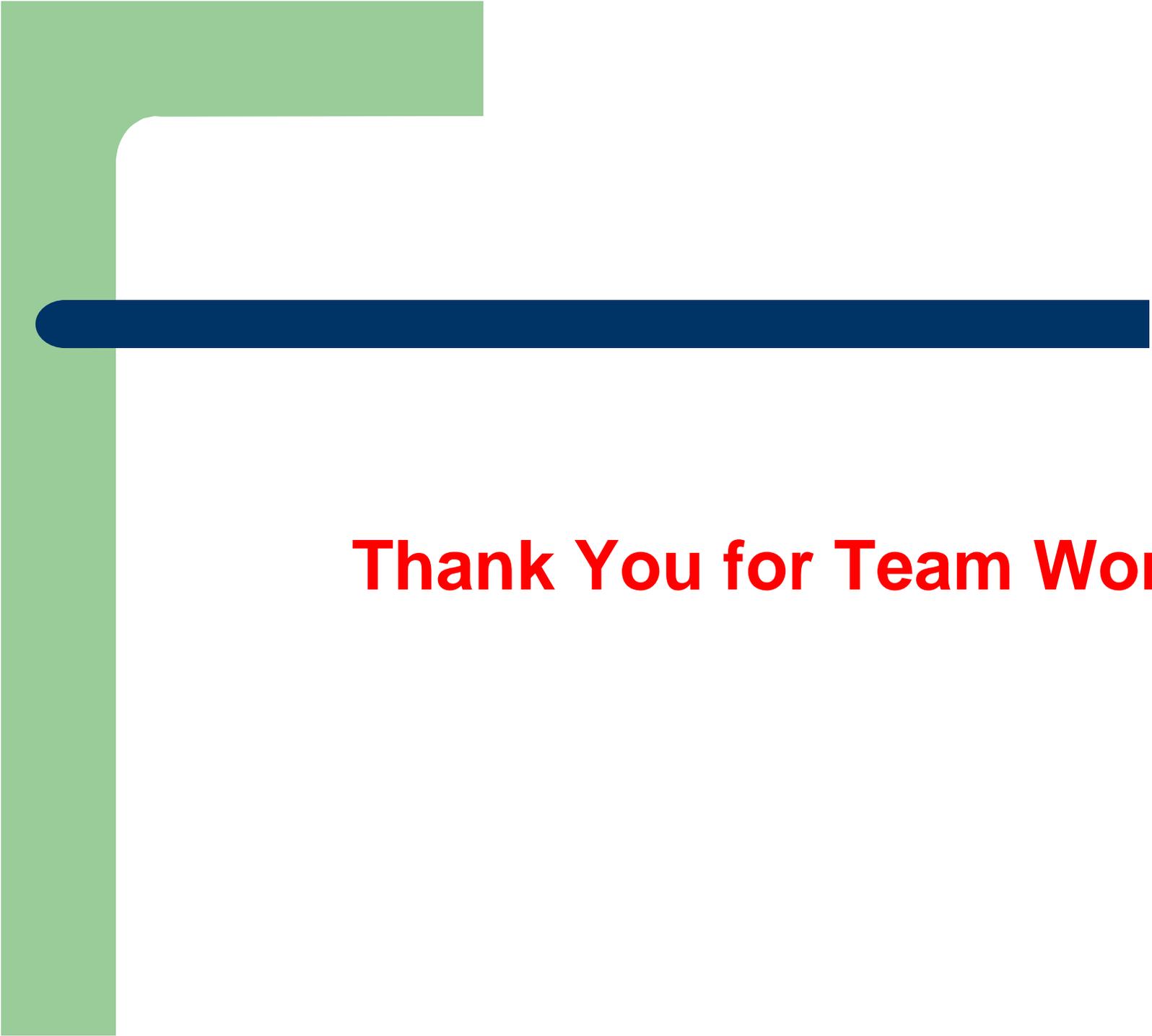
- Device associated infections are a major problem in ICU due to multiple use of invasive procedures, like CVC, indwelling urinary catheter and ventilator and some other devices.

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- Shortage of staff and supplies, non or inadequate compliance to infection prevention and control policies and procedures including hand hygiene , disinfection and aseptic technique are among the major problems in ICU and isolation units.

Recommendtion for Improvement

- Increase number of nurse by Increasing salary
- Good distribution of staff between shifts
- Educational programs on job training for both doctors and nurses based on the correct guidelines with administrative support to help in compliance to attendance.
- Increase number of hand wash sinks to be easily accessible by staff

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- Put Alcohol-based hand rub dispensers beside every bed to be easily accessible
 - Re-design the unit in the form of supply near to the patient
 - Special stress on environmental cleaning and waste management



Thank You for Team Work