

# Infection Prevention Strategies for Paediatric Patients



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# Royal Children's Hospital Melbourne



## Melbourne

- Second largest city
- Population - 4.5 million
- State capital of Victoria
- Population about 6 million

# Royal Children's Hospital



Major specialist paediatric hospital in Victoria

- Extends to other states and overseas.
- National liver and cardiac transplant centre
- State trauma centre , rehabilitation and palliative care



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# Risk factors for infections

Pregnancy

Age

- Prematurity
- Newborn
- Toddlers
- Child
- Adolescent





# Risk factors for infections



## Susceptible

- Decreasing maternal immunity
- Incomplete immunisation
- immune competence related to age

## Behavioral/Development stage

- incontinence/toilet training,
- inadequate hygiene.
- mouthing – hands objects, dribbling

# Hospital Acquired Infection - HAI



Major cause of

- morbidity & mortality
- increased length of stay
- increased hospital costs



Transmitted via

- contaminated or inadequately cleaned equipment
- hands of health care workers
- poor aseptic technique



# Costs? Adult data

- 7-10% of patients will acquire 1 or more hospital acquired infections (HAI's)
- 7,000 deaths per year
- Fed Gov. spends >\$950M annually on HAI's
- Av. HAI cost \$3500+ increases LOS 4+days
- MRSA BSI approx \$22,000 - high mortality rates 35%
- Surgical site infections cost >\$268M annum

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Victorian Surveillance System (VICNISS) Coordinating Centre Data 2007



# Risk Factors for HAI in Paediatrics



Varies with age

- Under 1 year

Significant proportion of inpatients

Invasive diagnostic procedures & treatment

High rate of viral infections

- Can shed pathogens –asymptomatic





# Risk Factors for HAI in Paediatrics

- Close physical contact with HCW (unanticipated exposure of staff)
- Physical contact with environment
- Previous lack of exposure  
eg. Viral infections
- Care by Parent
- Over crowding
- Under staffed



# Higher risks



- Organ/cell transplants
- Immunosuppressive therapy
- Chemotherapy
- Complex cardiac surgery/external hearts/ECMO
- Complex surgery – congenital malformations
- Extreme prematurity





# Minimise Risk – Standard Precautions

Protect patients and staff from potentially infectious blood and body substances

Used for all patients regardless of diagnosis or infectious status

Protective barriers

Personal Protective Equipment - PPE

- ▶ Gloves
- ▶ Gowns / plastic aprons
- ▶ Masks / goggles/glasses

Handling and disposal of waste

Equipment cleaning

Specimen collection and transport

### How to don PPE

**Sequence of donning PPE**

- Gown
- Mask
- Face shield or protective eyewear
- Gloves

**Gowns**

Gowns are required if your clothes are likely to come into contact with infectious matter. Gowns should be discarded each time they are removed. When a gown is required, it is the first item of PPE to be donned.

**How to don a gown**




- Use a new gown each time
- Secure gown at neck and waist

**Masks**

Surgical masks [or P2 (N95, PFR95) for airborne precautions as directed] are required whenever aerosolisation or splash from blood or body fluids may occur. If a mask is required, this is the second item of PPE to be donned.

**How to fit an N95 mask**

- Place the mask over nose, mouth and chin
- Fit flexible nose piece over nose bridge
- Secure on head with elastic ties
- Adjust to fit
- Perform a fit test:
  - Inhale – mask should collapse
  - Exhale – check for leakage around face



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# Minimise Risk – Standard Precautions



## Hand Hygiene

- Product placement
- Staff education and competency
- WHO 5 Moments
- "Bare below the elbows"
- Compliance auditing & feed back
- Parent/patient education







# Transmission Based Precautions

- Used when additional precautions beyond “Standard Precautions” are required to interrupt the transmission of infections in hospital.
- Isolate on suspicion
  - Contact
  - Droplet
  - Airborne

**Contact Precautions**  
In addition to standard precautions

**STOP VISITORS**  
Please see nurse before entering

Before entering room	Before leaving room
<ul style="list-style-type: none"><li>Put on a gown/plastic apron for patient contact</li></ul>	<ul style="list-style-type: none"><li>Discard gloves and plastic apron into waste bag</li></ul>
<ul style="list-style-type: none"><li>Perform hand hygiene</li></ul>	<ul style="list-style-type: none"><li>Then put gown into linen skip</li></ul>
<ul style="list-style-type: none"><li>Wear gloves for blood/body fluid contact</li></ul>	<ul style="list-style-type: none"><li>Perform hand hygiene</li></ul>

**Visitors**  
See a nurse for information before entering the room

**For all staff**  
**Contact Precautions**  
In addition to Standard Precautions

Before entering room	On leaving room
1 Perform hand hygiene	1 Dispose of gloves
2 Put on gown or apron	2 Perform hand hygiene
3 Put on gloves	3 Dispose of gown or apron
	4 Perform hand hygiene

**Standard Precautions**

And always follow these standard precautions

- Perform hand hygiene
- Use and dispose of sharps safely
- Perform routine environmental cleaning
- Use PPE when risk of exposure to blood and body fluids
- Clean and separate laundry
- Follow respiratory hygiene and cough etiquette
- Use aseptic technique
- Handle and dispose of waste and sharps safely

HEALTH & COMMUNITY SAFETY & QUALITY HEALTH CARE

# Transmission Based Precautions

## Patient placement



- Single room – contact & droplet precautions
- Negative pressure air isolation – airborne precautions
- Cohort - like pathogen or illness



# Single & Negative Pressure Rooms



- Minimal stock – shift or 24 hours
- Equipment cleaned before use on another patient.
- Toys washed before use on another patient
- Daily room clean
- Discharge/or completion of precautions- clean/disinfect bed and surrounds
- Separate infectious waste





# Immunocompromised patients

Protection from airborne infection & fungal spores

- Positive pressure air flow
- High efficiency particulate air filtration - HEPA
- Control measures during construction /renovation

Additional personnel protective equipment - PPE





# Minimise risk - Aseptic Technique

Asepsis is ensured by identifying and protecting key sites and key parts from contamination.

Achieved by correct

- Hand Hygiene
- Non touch technique
- Using sterile equipment or
- Cleaning existing key parts to a standard that renders them aseptic prior to use.

Competency training and auditing



# Minimise risk – Invasive/surgical procedures



- Central line insertion/maintenance – competency training
- Prevention of ventilator associated pneumonia
- Prevention of surgical site infection

Skin asepsis, pre operative antiseptic washes, appropriate antibiotic prophylaxis

# Minimise risk - Anti microbial resistance



- Intensive care/oncology units – high risk of infection
- Contact precautions – colonized multi resistant organisms
- Drug Utilization/Antimicrobial Stewardship committee

Restricted use/approval to use

- Monitoring resistance





# Minimize Risk

## Admission Screening

- Infectious diseases contacts
- International travel

## Environmental cleaning

- Appropriate to the pathogen
- Long stay patients
- Routine ventilation duct cleaning

Monitoring for legionella – warm water systems/air conditioning





# Minimize Risk



## Equipment cleaning

- Semi/critical/critical items processed in sterilising department
- “clean between”
- toy cleaning – toy selection



## Pet/animal visitation

# Minimize risk



## Immunisation

- Opportunistic immunisation of patients
- Pre employment for staff

## Exclusion – sick staff

## Guidelines for pregnant staff

## Outbreak/exposure management



# Minimize risk



## Surveillance

- Viral infections, central line related blood stream infections, device/site related infections, multi-resistant organisms
- Outcome measure – aseptic technique/hand hygiene
- Identify trends outbreaks/clusters/antibiotic resistance

# Minimise risk – Parents/carers



## Education

- Hand hygiene
- Isolation precautions
- Procedures

## Visiting

- Siblings

## Report if unwell

## Food safety

## Expressed breast milk collection & transport

### Infection Prevention and Control Guidelines

#### Parent information:

*What do we do if your child has a known or suspected infection?*



Sometimes we have to place children with a known or suspected infection that might be spread to others into "isolation" during their admission.

A door sign is displayed outside your child's room to indicate to all staff and visitors what they should do when entering the room.

The precautions are based on how infections are spread and are adapted for each patient's infection.



نحتاج في بعض الأحيان وضع الأطفال الذين ثبت أنهم ،  
إلى الآخرين ، في غرفة "عزل" عند دخولهم إلى المستشفى.

يتم وضع علامة على باب غرفة طفلك لتوضيح الإجراءات الوقائية التي يجب اتباعها من قبل العاملين  
والزوار عند دخول الغرفة .  
وتعتمد الإجراءات الوقائية على كيفية انتشار العدوى حيث يتم تكيفها لتتناسب مع إصابة كل مريض.

### Infection Prevention and Control Guidelines

**Methicillin-resistant *Staphylococcus aureus* (MRSA)**



*Staphylococcus aureus* is a gram positive bacteria that is commonly found on skin and in the nose.

*Staphylococcus aureus* can develop resistance to beta-lactam antibiotics such as Methicillin and Flucloxacillin - hence the term Methicillin-resistant *S.aureus* (MRSA).

#### Transmission

MRSA is spread through direct and indirect contact on hands and contamination of surfaces.



# Summary



- Risk varies with age
- Development stage
- Care by parent
- Immunity
- Invasive procedures
- Underlying illness & co morbidities



*The challenge is to adapt Infection Prevention strategies within a child/family centered framework to prevent hospital acquired infections*