Infection Prevention Strategies for Paediatric Patients

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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

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

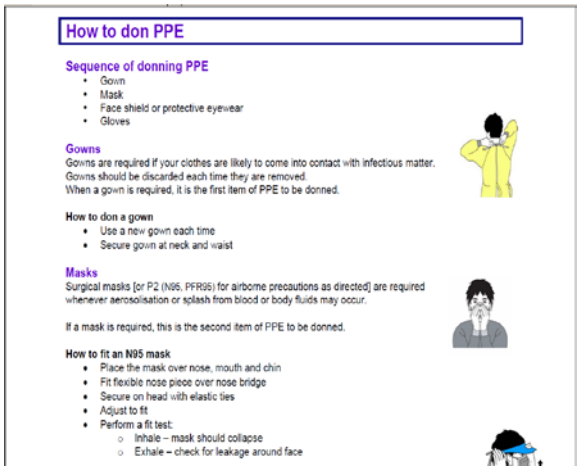
Personal Protective Equipment - PPE

- 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

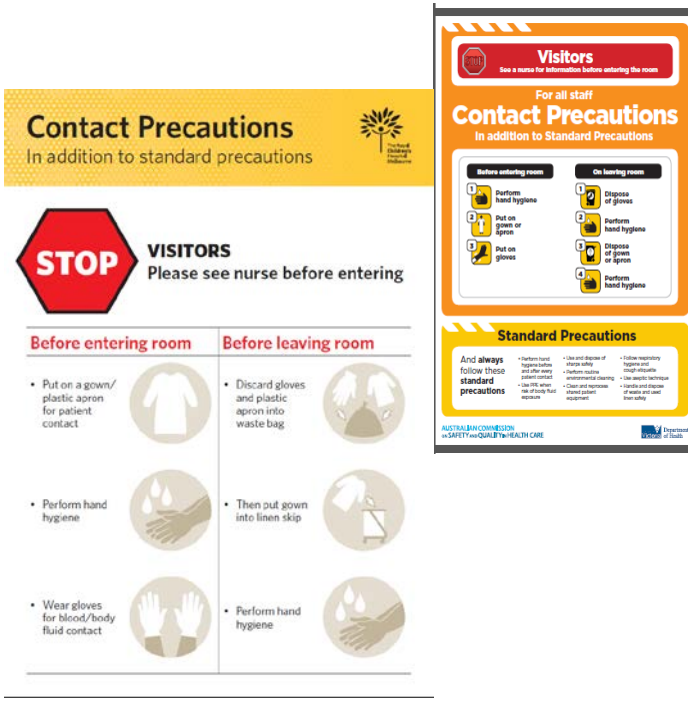
Minimise Risk – Standard Precautions

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



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

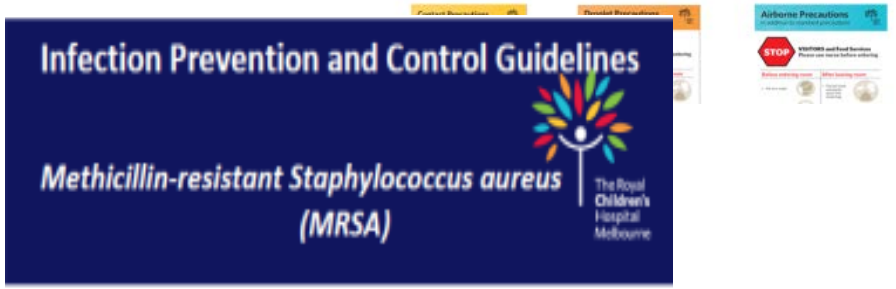
Visiting

- Siblings

Report if unwell

Food safety

Expressed breast milk collection & transport



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