



A TRADITION OF INDEPENDENT THINKING

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Safe Patient Care "Bugs and Drugs" The ongoing challenge of MDROs and AMR

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#bugsndrugs

"Bugs and Drugs"

Infection prevention and control management, Standard Precautions and Hand Hygiene

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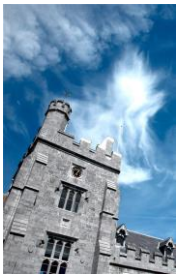
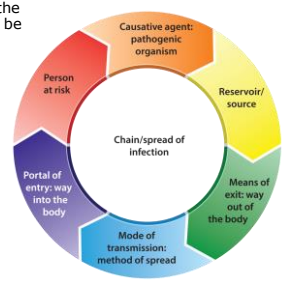


Principles of Infection Control

- Infection prevention and control principles aim to ensure the protection of those who are vulnerable to acquiring an infection i.e. healthcare associated infections - HCAIs
- "The basic principle of infection prevention and control is hygiene" (WHO 2016) - hand hygiene and environmental hygiene
- Strict adherence to Standard and Transmission-based precautions
- Prudent antibiotic stewardship "The right drug, for the right bug"

Chain of infection

In order for the spread of infection to take place, the 'chain of infection' must be completed.



Breaking the chain

- Break a link or multiple links in the chain so that infection cannot spread
- Action can be taken at all steps in the chain
- Not everybody who carries harmful micro-organisms will show symptoms
- Strict adherence to all the standard precautions (SP)

Key factors in preventing infection

- Modifying patient risk factors for infection:

Vaccinate, Get the devices out, Prevent surgical site infection, Prevent hospital-acquired pneumonia

- Effective diagnosis of infection
- Preventing transmission of infection
- Effective treatment of infection:

Get expert advice, Use surgical antibiotic prophylaxis wisely, Treat the patient - not the lab report

STANDARD PRECAUTIONS

....infection control practices used to prevent transmission of diseases that can be acquired by contact with blood, body fluids, non-intact skin (including rashes), and mucous membranes.....

1996 – CDC Introduced Standard Precautions

- Blood and Body fluid precautions for all patients regardless of their known or unknown blood-borne infection status
- Work practices required for a basic level of infection prevention and control

Standard Precautions

1. Hand Hygiene
2. Skin Care
3. Personal Protective Equipment (PPE)
4. Respiratory Hygiene and Cough Etiquette
5. Sharps Safety
6. Safe Injection Practices
7. Infection Control Practices for Lumbar Puncture
8. Laundry
9. Patient Care Equipment
10. Patient Environment
11. Patient Placement
12. Management of Blood and Body Fluid Spillages
13. Management of Blood and Body Fluid Exposure

Standard Precautions

Hand Hygiene

Hand hygiene is the single most important measure for preventing and reducing cross infection

- Alcohol based hand rubs (ABHRs) – on physically clean hands – allow to dry naturally
- Hand washing with soap and water
- Hand washing with antiseptic solution and water
- Skin Care: Use a hand moisturiser & barrier cream to protect your hands

HAND HYGIENE

Social Hand Hygiene

Two ways: alcohol based hand rubs or hand washing with a soap product

- Entering and leaving the hospital
- Entering and leaving a ward
- Before patient contact
- Between each patient contact
- Between different procedures for the same patient
- After patient contact
- After touching patient surroundings
- After bodily functions

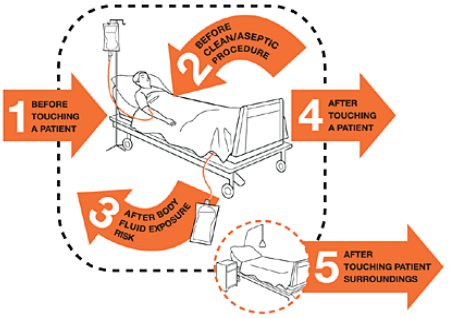
Antiseptic hand hygiene

Two ways: alcohol based hand rubs or hand washing with antiseptic soap product e.g. Hibiscrub

Before and after….

- Invasive procedures
- Transmission based precautions
- Contact with immuno-compromised patients
- Contact with wounds
- Burns etc.
- If hands have become heavily contaminated, use antiseptic hand-wash

WHO " 5 Moments of Hand Hygiene" 2009



Standard Precautions

Personal Protective Equipment (PPE)

Definition:

"specialized clothing or equipment worn by an employee for protection against infectious materials" (OSHA)

- Risk assess
- Choose appropriate PPE
- Ensure you have all items needed prior to donning PPE

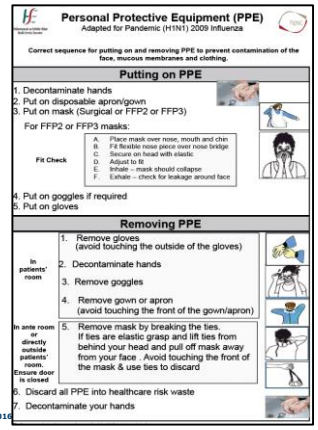
PPE
Used in Healthcare Settings

- **Gloves –** Touching, or where there is a risk touching, *blood, body fluids, secretions, excretions, contaminated items; for touching mucus membranes and non-intact skin*
- **Gowns/Aprons –** Use during procedures and patient care activities when contact of clothing/ exposed skin with blood/body fluids, secretions, or excretions is anticipated
- **Mask and goggles or a face shield -** Use during activities likely to generate **splashes or sprays** of blood, body fluids, secretions, or excretions
- **Respirators** – protect respiratory tract from airborne infectious agents

PPE
Transmission Based Precautions

- **Contact Precautions – Gown or apron and gloves** for contact with patient or environment (e.g., medical equipment, environmental surfaces) Infections spread by contact include: *C Diff, Norovirus, Shingles , and **drug resistant organisms MDROs***
- **Droplet Precautions** (large particles)– **Surgical** masks Infections spread by Droplet include: *influenza, mumps - Menningo-coccal disease, and group A strep for first 24 hours of antibiotic treatment*
- **Airborne Infection Isolation** * - **Particulate respirator** Infections spread by Airbourne include: *pulmonary or laryngeal tuberculosis, rubella, measles and chicken pox, and some **drug resistant organisms***
- **Combinations** of the above used for: *some MDRO's may require a combination of Contact/Droplet, or Contact/Airborne*

* Negative pressure isolation room required



Standard Precautions Patient placement

CDC recommendations for patient placement in **Standard Precautions**:

Prioritise for single patient room if patient is:

- at increased risk of transmission
- is likely to contaminate the environment
- does not maintain appropriate hygiene
- or is at increased risk of acquiring infection
- or developing adverse outcome following infection
- Risk assess the need for PPE – according to the activity and risk of blood and body fluid exposure

Transmission based patient placement is in addition to Standard Precautions.

- Isolation in single room en-suite
- Warning notice re: type of precautions to use on door
- Keep door closed
- Antiseptic hand hygiene and PPE to be donned before entry to the room
- Wear full sleeve gown for close physical contact with patient
- Remove PPE before leaving isolation room and discarded as HCW
- Hand hygiene after removal of PPE
- Remove masks outside the room
- Change as necessary for different care activities for the patient and perform hand hygiene as appropriate

Risk Assessment

Risk assessment to include:

- Diarrhoea
- Draining wounds
- Incontinence of urine or faeces
- Copious respiratory secretions

Lewisham Isolation Prioritisation System (LIPS)

- Used in many acute areas
- Calculates an Isolation score based on the ACDP (Advisory Committee on Dangerous Pathogens)

Lewisham Isolation Prioritisation Scoring System (LIPS)

The Lewisham Isolation Prioritisation Scoring System (LIPS)[1]

Criteria	Classification	Score	Comment
ACDP category*	2	5	
	3	10	
	4	40	
Route	Air-borne	15	
	Droplet	10	
	Contact	5	Includes faecal-oral transmission
	Blood-borne	0	
Evidence of transmission	Published	10	
	Consensus or likelihood	5	
	No consensus or likelihood	0	
	No evidence	-10	
Significant resistance	Yes	5	Eg MRSA,VRE,MDR-GNB
	No	0	
High susceptibility of other patients with serious consequences of infection	Yes	10	Specific for various infection and patient populations
	No	0	
Prevalence	Sporadic	0	
	Endemic	-5	This reflects the burden of infection in the hospital and cohort measures may be more applicable.
	Epidemic	-5	See above
Dispersal	High risk	10	This includes diarrhoea, projectile vomiting, coughing, infected patients, confused wandering patients
	Medium risk	5	
	Low risk	0	
Total score			

Advisory Committee on Dangerous Pathogens (ACDP), Extended spectrum β-lactamases (ESBL), Meticillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant enterococci (VRE), Multi-drug-resistant Gram-negative bacilli (MDR-GNB)

[1]Adapted from Jeanes A and Gopal R (1999) Lewisham Isolation Priority System (LIPS) University Hospital Lewisham and Jeanes A and Macrae B (2011) British Journal of Nursing 20(8):540-544

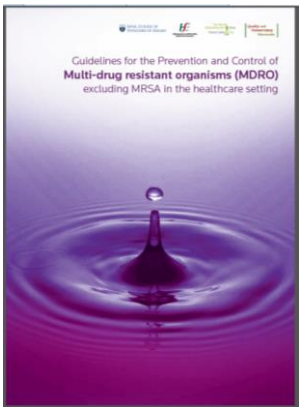
* Advisory Committee on Dangerous Pathogens (ACDP): "approved list of biological agents". http://dh.gov.uk/ab/ACDP

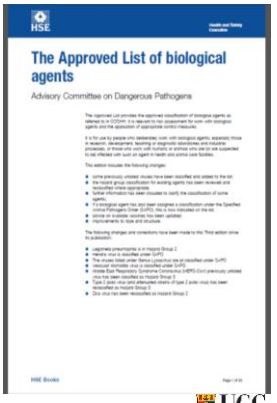
Example of Lewisham Prioritisation Scoring System (LIPS) (RCPI 2013)

Example for a patient with an MDRO such as VRE:

Patient colonised with VRE who is incontinent of faeces on a haematology/oncology ward in a hospital with endemic VRE	Score
ACDP=2	5
Route=contact	5
Evidence of transmission=published	10
Significant resistance=yes	5
High susceptibility of other patients with serious consequences of infection=yes	10
Prevalence=endemic	-5
Dispersal=high risk	10
Total score	**40 = High priority for isolation**

Ref: *"Guidelines for the Prevention & Control of MDRO excluding MRSA in the healthcare setting"*





Multi-drug Resistant Organisms MDROs

- MRSA – *Methicillin Resistant S.aureus*
- VRE – *Vancomycin Resistant Enterococcus*
- CRE/CPE–*Carbapenemase-resistant Enterobacteriaceae Carbapenemase-producing Enterobacteriaceae*
- MDR KP – *Multi Drug Resistant Klebsiella Pneumoniae*
- ESBL - *Extended Spectrum Beta Lactamase producer*

Colonisation V's Infection

Management of MDROs

Patient Information Management System (PIMS)

- Patients in the South/South West HSE group
- MDRO history known to the IPCN's → Green Triangle alert
- Alert remains in place
- Trigger for staff to investigate current MDRO status, screen and implement precautions
- Alert system activated by IPCN's in the South/South West HSE group
- Very important to perform Infection Control Checklist on admission as patient may disclose an unknown history.

MRSA (Methicillin Resistant *S.aureus)*

Carrier state ,asymptomatic, colonised - or infected

Recent reports of a vancomycin resistant strains of *S.aureus*
Certain to be an increasingly difficult management problem

Reduce transmission by detecting and treating all infected and colonized patients

Patients with infection or colonization – CONTACT isolation

Screening: admission body screens and include previous positive sites, any wounds, medical devices

Treatment: (Acute hospitals)
Body de-collinisation TX - nasal Bactroban, Chlorhexidine washes and CX body powder

Rescreen: 3 days after completing TX, sites as above and repeat twice more at 4 day intervals

Any positive site after rescreening: retreat again as above

If patient remains positive, maintain isolation with CONTACT precautions and, if not for surgical intervention, do not treat again – to prevent AMR

VRE Management

- Patient may be colonized or infected
- Consider patient colonised for duration of hospitalisation
- Ideally, isolate all patients with VRE in a single, en-suite room, with CONTACT precautions
- With limited isolation facilities, local risk assessment in conjunction with the IPCT (consider LIPS)

Success with de-collinization has not been proven

Screening: rectal swab or faecal swab

- *Patients admitted to high risk areas e.g. ICU, haematology, oncology, transplant – admission and weekly screens while in hospital*
- *Re-admission of patients with VRE positive HX*
- *Patients transferred from another Irish hospital, or any hospital abroad*
- *Where appropriate, 'at risk' patients – contacts of known VRE positive patients during an outbreak of VRE*

- High risk areas - Always isolate with CONTACT precautions & use Long Sleeve Gowns for close physical contact
- Low risk areas – if diarrhoeal, or VRE+ in drain or wound – always Isolate with CONTACT precautions and use Long Sleeve Gowns for close contact

NB: the most frequent mode of transmission is via HCWs hands - good hand hygiene is the cornerstone in preventing transmission

CRE/CPE Management

IC Management:

- Single en-suite room with CONTACT Precautions and Closed Door
- PPE before entering room
- Long sleeved gowns for physical contact with patient
- Local guidance regarding disposable aprons
- Single patient use or dedicated equipment
- Dispose of PPE within room
- Hand Hygiene
- Limited facilities: risk assess
- Priority:
  - Suspected or confirmed CRE
  - Uncontrolled secretions or excretions

Screen: Rectal or faecal sample

- Patients linked to infected case – shared a room or from a unit with an outbreak
- Direct transfers from a HCF in N Ireland
- Patients with inpatient HX in another jurisdiction
- Patients admitted to high risk areas: oncology, transplant, CCU, NICU, haematology – on admission and weekly after
- From long term care facilities
- From an Irish hospital with a HX of outbreaks, or from a High risk Unit – local policy or contact IPCT

ESBL Management

- Irish guidelines recommend isolation in a single en-suite room and use CONTACT precautions
- Limited facilities; risk assess with IPCT
  - Where has the ESBL been isolated from? Urine, wound or drain
  - Is the patient incontinent or wound oozing
  - Isolate patient with CONTACT precautions
  - Risk assess the need for a long sleeve gown for close contact nursing
- Priority to patients with diarrhoea, faecal/urinary incontinence, copious respiratory secretions and draining wounds
- Decollinization is not recommended

MDR Gram Negative Bacteria

- MDR gram negative rods - isolates that are susceptible to no more than one class of antimicrobial agents (excluding colistin)
- Increasingly problematic
  - *Acinetobacter baumanii*
  - *Stenotrophomonas maltophilia*
  - *Pseudomonas aeruginosa*
  - *Klebsiella pneumoniae*
- Habitat – GI tract, bowel and respiratory tract.
- **Contact Precautions and Droplet Precautions** if patient has respiratory carriage and aerosol producing procedures are to be carried out- Closed suction advised

Patient Environment

The basic principle of infection prevention and control is **HYGIENE**

Methods for removing and destroying micro-organisms

- Cleaning
- Disinfection
- Sterilisation

Clean and disinfect surfaces and equipment daily – special attention to bed rails, over bed tables, door knobs, surfaces in and surrounding toilets in patients' rooms

Patient-dedicated or single-use disposable noncritical equipment e.g., blood pressure cuff, stethoscope and instruments and devices

Local policies applied rigorously

Patient Environment

- Prioritize room cleaning of patients on Contact Precautions.
- Focus on cleaning and disinfecting frequently touched surfaces and equipment in the immediate vicinity of the patient.
- Disinfect room after the patient discharge with a chlorine releasing agent, such as hypochlorite
- Curtains should be removed and laundered if not single-use disposable curtains
- Pillows and mattress covers should be checked for damage.

- After an MDRO colonisation or infection, the ward environment must be cleaned thoroughly to reduce environmental contamination.
- Documents including the nursing notes and patient's chart should not be taken into an isolation room.
- Only essential equipment and supplies should be taken into the patient's room. No stockpiling inside the room
- Vacate units for environmental assessment and intensive cleaning when efforts to eliminate environmental reservoirs have failed

Patient movement and transfer

- **Communication:** inform the receiving clinical staff of the patient's MDRO status
- Maintain patient confidentiality during transportation
- PPE should be directed by Standard Precautions – usually unnecessary
- Avoid using unnecessary equipment and linen
- Patients on stretchers should be covered by a clean sheet before leaving the ward
- **Ambulance transportation**
- Ambulance staff should adhere to Standard Precautions with all patients
- If ambulance transfer is required, the ambulance service should be notified in advance of any infection risk by the responsible ward staff.

CONCLUSION

Infection Prevention and Control Management, Standard Precautions and Hand Hygiene

- Good hand hygiene and rigorous environmental cleaning reduce the risk MDROs spreading.
- Antibiotics should be prescribed only when needed, in the right dose, for the right duration, to reduce the chances of organisms becoming resistant.
- Transmission based Precautions ***on top of*** Standard Precautions when a hospital patient is colonised or infected with an MDRO
- Risk assessment – diarrhoea, draining wounds, incontinence of urine or faeces, copious respiratory secretions - when facilities are scarce

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