2nd year Medical Students

Infection Control

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Outline and ILOs

- Introduction
- Understand some basic definitions
- Understand how disease is transmitted , chain of infection

- Learn about the basic principles of infection and disease.
- Review some infection control measures.
- Hospital waste management

كان رسول الله- صلى الله عليه وسلم- إذا عطس غطى وجهه بكفيه أو طرف ثوبه

قال رسولَ اللهِ صلَّى اللهُ عليه وسلَّمَ:

(لا يُورَدُ مُمْرِضٌ على مُصِحٍّ)

(اجعل بينك وبين المجذوم قدر رمح أو رمحين)

(إذا سمعتم به بأرض فلا تقدموا إليه، فإذا وقع بأرض وأنتم فيها فلا تخرجوا فراراً منه)

هناك الكثير ايضا عن النظافة وغسل اليدين والجسم...

Infection Control:

- Includes all of the practices used to prevent the spread of microorganisms that could cause disease in a person.

- Infection control practices help to protect patients and healthcare providers from disease by reducing and/or eliminating sources of infection.

Disease: impairment of normal functioning, manifested by signs and symptoms

Infection: the state produced by the establishment of an infective agent in or on a suitable host , host may or may not have signs or symptoms

Carrier: individual harbors the agent but does not have symptoms. Person can infect others.

Reservoir: habitat (man, animal, etc.) in which the agent normally lives, grows, and multiplies

Agent: something (microorganism) that produces or is capable of producing an effect, i.e. infection

Nosocomial Infections:

- Result from delivery of health services in a healthcare setting, patients??? are at increased risk.

- Unfortunately, nosocomial infections lead to increased healthcare costs, extended hospital stays and prolonged recovery time.
    - Hospital acquired infection

Patients in healthcare settings are at risk for acquiring or developing infections because:

1. Lower resistance to infectious microorganisms (due to illness or disease).

2. Exposure to an increased number of and more types of disease-causing organisms. (Hospital harbors a high population of virulent strains of microorganisms that are resistant to antibiotics) MRSA, VRE – ***super bugs***.

3. The performance of invasive procedures. (IV cathetars etc.. Anything that crosses protective barriers)

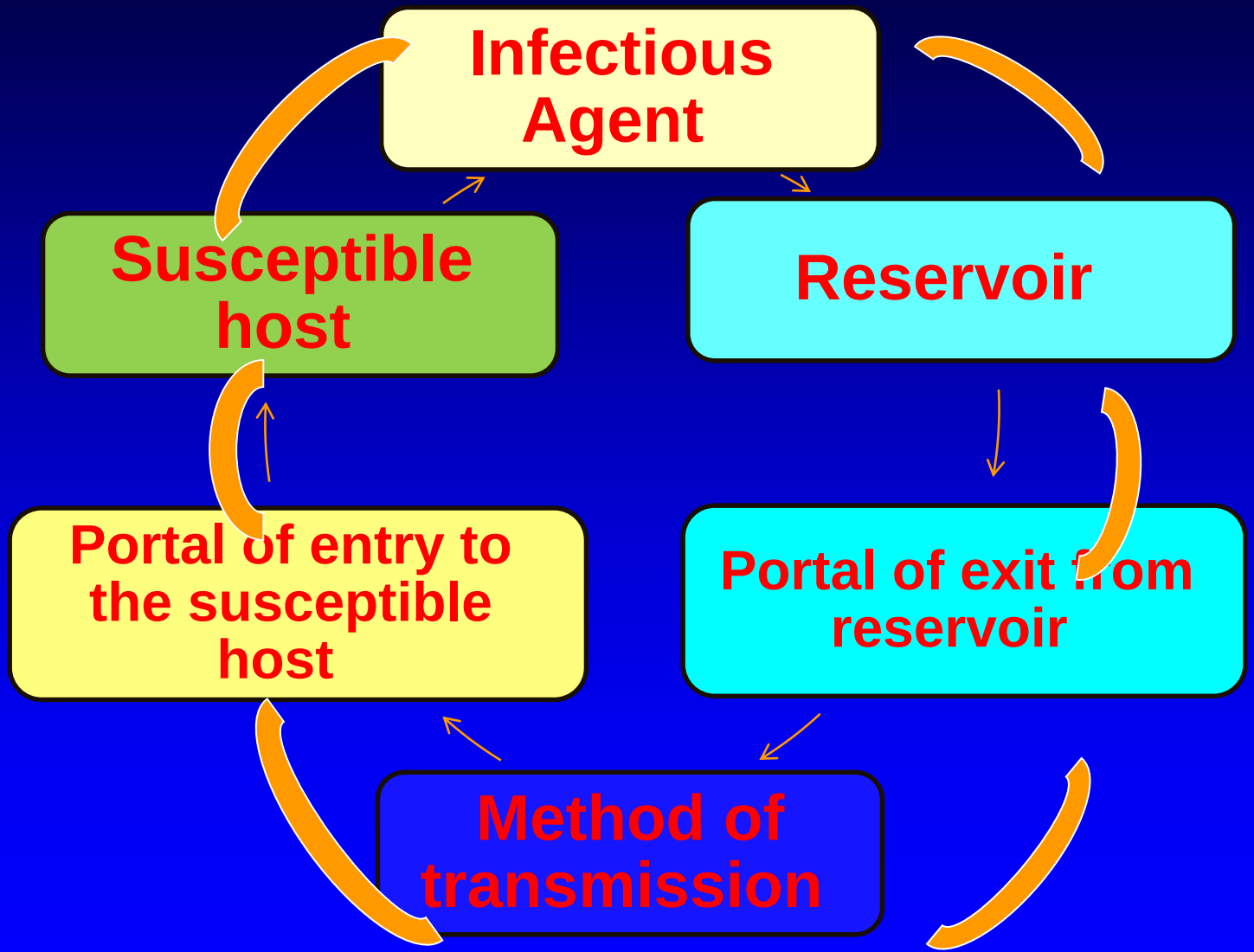
Nosocomial Infections:

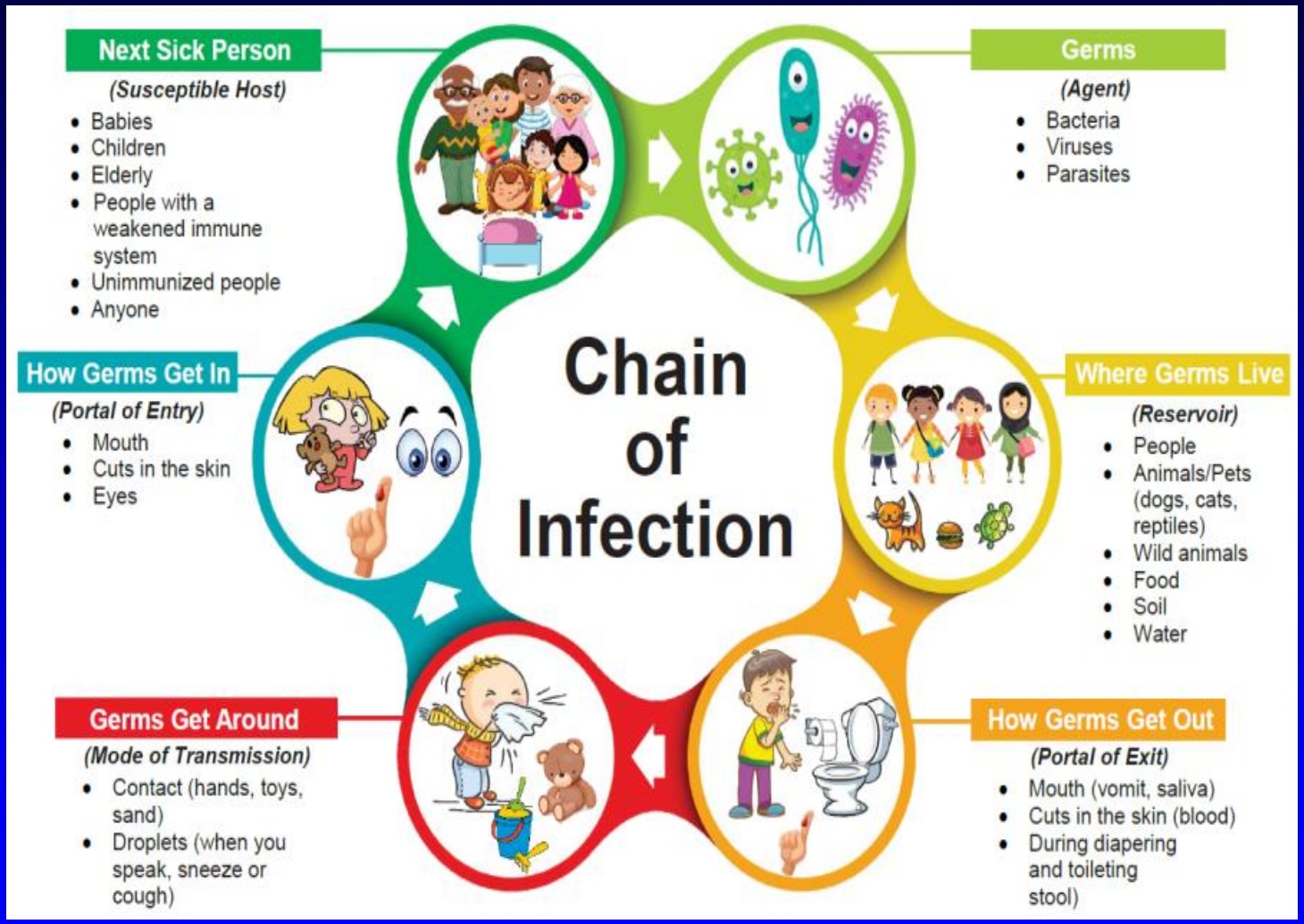
- Most nosocomial infections are transmitted by health care workers and patients as a result of direct contact.
- HCWs must pay particular attention to washing hands after contact with patients or equipment.

What are the Types of nosocomial infection?

- **Endogenous**: Autoinfection (infection occurs from the patients' own.
- **Exogenous:** occurs from one patient to another or health care workers and visitors (hospital environment and personnel).

Chain of Infection




Next Sick Person
(Susceptible Host)
• Babies
• Children
• Elderly
• People with a weakened immune system
• Unimmunized people
• Anyone
Germs
(Agent)
• Bacteria
• Viruses
• Parasites
How Germs Get In
(Portal of Entry)
• Mouth
• Cuts in the skin
• Eyes
Chain of Infection
Where Germs Live
(Reservoir)
• People
• Animals/Pets (dogs, cats, reptiles)
• Wild animals
• Food
• Soil
• Water
Germs Get Around
(Mode of Transmission)
• Contact (hands, toys, sand)
• Droplets (when you speak, sneeze or cough)
How Germs Get Out
(Portal of Exit)
• Mouth (vomit, saliva)
• Cuts in the skin (blood)
• During diapering and toileting stool)

Infection Prevention

Education and Training

- Hygiene
- Follow standard precautions e.g respiratory precautions

1. Cover coughs and sneezes (everyone, always) 2. Distancing / separation (everyone, always) 3. Hand hygiene (everyone, always) 4. Personal protective equipment (PPE) for essential staff (according to risk assessment ie what procedures or duties you are doing)

Note: PPE = masks/gloves/goggles/Gowns and Overshoes and head and face shield when necessary

Vaccination

- Keep up to date

Medicine

- Prophylactic antibiotics – meningitis, pertussis

Routes of transmission

- Respiratory:
  - Droplet
  - Airborne
- Fecal-oral
- Blood borne
- Vector-borne
- Zoonotic (animals)
- Direct Contact:
  - Host comes into contact with reservoir

  e.g Kissing, skin-to-skin contact, sexual contact
- Indirect Contact:
  - Disease is carried from reservoir to host

  e.g by Contaminated surfaces (fomites)

Universal precautions (UP)

- Are techniques to be used with all patients to decrease the risk of transmitting unidentified pathogens.

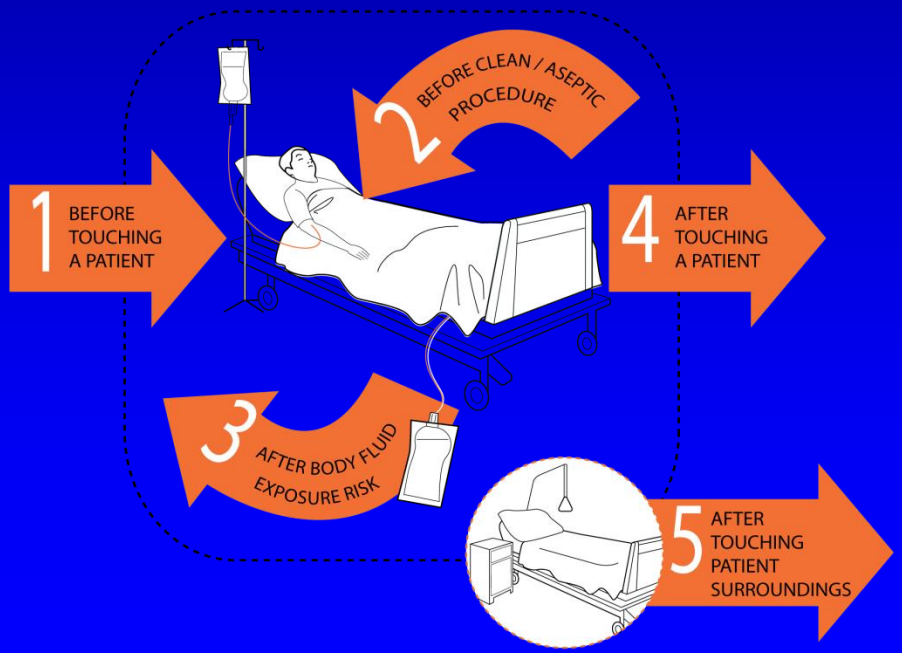
- UP obstruct the spread of pathogens that are capable of infecting other persons.

Universal precautions (UP)

- Include:
  - Hand hygiene
  - Use of personal protection equipments e.g gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure
  - Safe injection practices e.g never recap a needle that has been used (NSI)

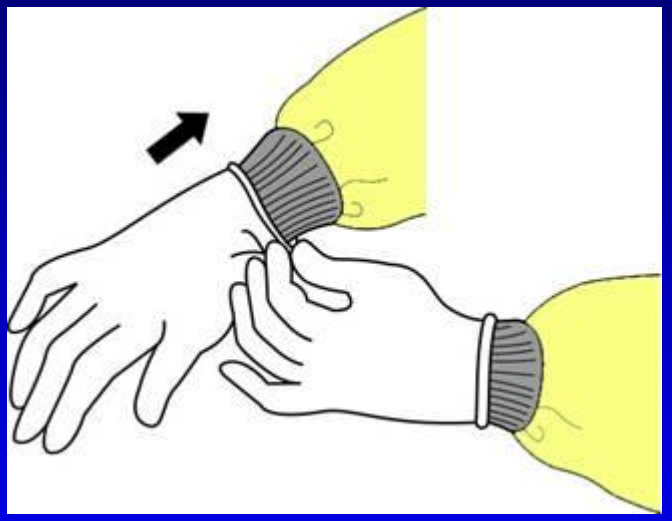
Hand hygiene (Wash, alcohol rub)

- Is the single most important means of preventing cross – infection
- When:



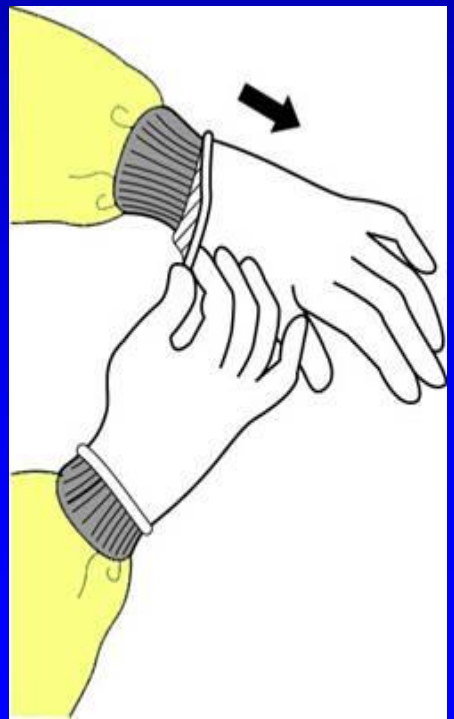
personal protection equipments PPE

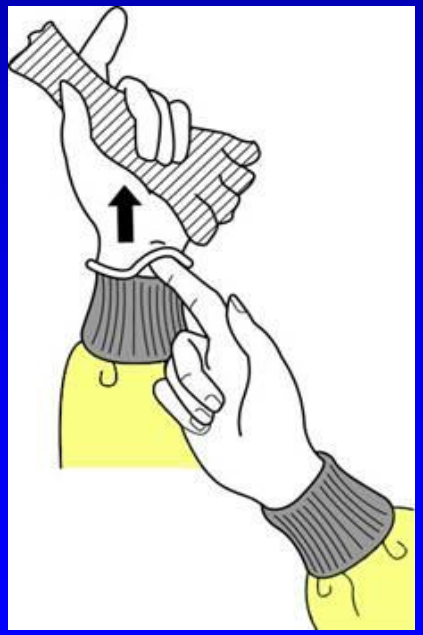
- Wearing: gown , mask, then gloves
- Removing: gloves gown mask

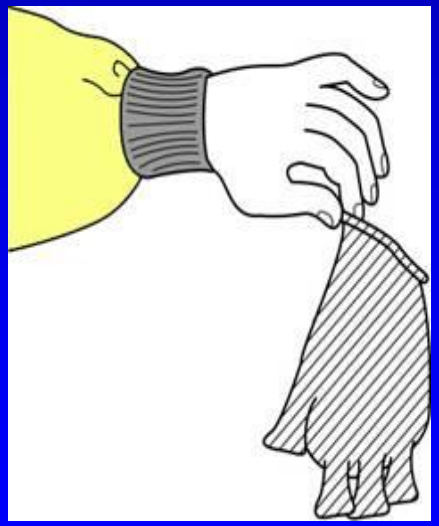


personal protection equipments PPE

- Removing: gloves gown mask
  - WHERE:
- At doorway, before leaving patient room or in anteroom
- Remove respirator outside room, after door has been closed
- HOW (Gloves)







personal protection equipments PPE

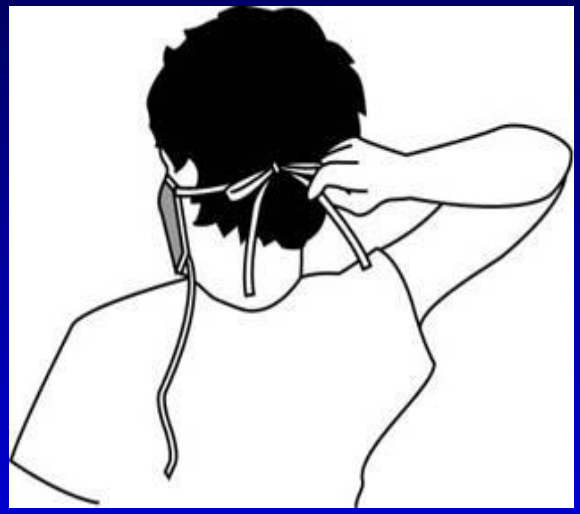
- Removing: gloves gown mask

HOW:

- Unfasten ties
- Peel gown away from neck and shoulder
- Turn contaminated outside toward the inside
- Fold or roll into a bundle
- Discard

personal protection equipments PPE

- Removing: gloves gown mask
  - HOW



- Untie the bottom, then top, tie
- Remove from face
- Discard

- Perform hand hygiene immediately after removing PPE.

- Wash hands with soap and water or use an alcohol-based hand rub

Routes of Transmission
1. Respiratory: A. Droplet

- Large droplets within ~1-1.5 meter :
  - Coughing, sneezing, talking
  - Medical procedures
- Disease Examples:
  - Diphtheria
  - Pertussis (Whooping Cough)
  - Meningococcal meningitis

Routes of Transmission
Respiratory: B.Airborne (droplet nuclei)

- Very small particles of evaporated droplets with infectious agent that can:
  - Remain in air for a long time
  - Travel farther than droplets
  - Become aerosolized during procedures

- Examples:
  - Tuberculosis
  - Measles (Rubeola)

Fate of Droplets

Organisms	Liberated TB
Talking	0-200
Coughing	0-3500
Sneezing	4500-1,000,000

Droplets can remain suspended in the air for hours.

- Use a tissue and dispose properly…or use sleeves…
- Hand washing, alcohol gel, keep a distance
- Gown, goggles, mask
- Limit the patient transport

Masks and Respirators

Respirators rely on an airtight seal and have tiny pores which block droplet nuclei

Respirators n95

Masks have large pores and do not have an airtight seal to around the edge, permitting inflow of droplet nuclei but not large droplets

Face/surgical mask

Do

Be sure your respirator is properly fitted!

[Should fit snugly at nose and chin]

**Image courtesy of: CDC Image Library*

Why Don’t We DO IT in Our Sleeves?

- 2. Fecal-oral: Feces contaminate food, water, environment, or hands
- Transmission usually occurs when these pathogens gain access through the mouth (by eating contaminated food, vegetables, drinking contaminated water… etc)
- Examples:
  - Hepatitis A, E. coli, cholera

    - General hygienic precautions, wash vegetables properly…..

- 3. blood or body fluids.

- Blood transfusions, organ transplants, sex
  - Needle stick injury: never recap after use on blood or body fluids
- Examples:
  - HIV, Hepatitis B, C

X

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ضع المحقنة المستعملة في صندوق السلامة مباشرة بعد الإستعمال

What to do if exposed to blood / body fluids

- Puncture wounds should be washed immediately and the wound should be caused to bleed
- If skin contamination should occur, wash the area immediately
- Splashes to the nose or mouth should be flushed with water
- Eye splashes require irrigation with clean water, saline, or a sterile irritant
- **Most importantly: Complete Employee Incident Report. Report exposure to charge nurse (e.g infection control nurse)**

- Don’t share non-critical equipment (such as thermometers) between patients

- If a piece of equipment is used with a patient in contact isolation, then the equipment must be properly cleaned and disinfected prior to use on another patient

Key Points for infection control and Personal Hygiene

- Restrain hair – hair falling forward may drop organisms.
- Keep nails short – no acrylic nails or chipped nail polish.
- Minimum jewelry (see agency policy)
- Cover open wounds with an occlusive dressing

- Bare above elbow, no ties or coats…?

Waste management in hospital

لون كيس النفايات	نوع النفايات	أمثلة على أنواع النفايات الطبية
اسود	النفايات غير الخطرة	الأوراق، مخلفات الأطعمة، عبوات العصير الفارغة البلاستيكية ، أوراق المكاتب، المخلفات الورقية للمستلزمات الطبية، كيس التغذية الوريدية بعد إفراغه.
وعاء بلاستيكي أصفر مقوى	النفايات الطبية الخطرة الحادة	الإبر، المشارط، الشفرات، وقطع الزجاج المكسور وعبوات الأدوية الزجاجية المكسورة
أصفر	النفايات الطبية الخطرة/المعدية و التشريحية	- نفايات وحدات الجراحة والتشريح. - نفايات وحدات غسيل الكلى من أجهزة وأدوات ومستهلكات - المستهلكات الطبية المستعملة للعناية بالمريض والملوثة بدم و سوائل جسم المريض. - أعضاء مريضة تم استئصالها أو مبتورة. - أجنة ميتة او حيوانات مصابة بأمراض معدية.
احمر	النفايات الطبية الخطرة/شديدة العدوى	- مخلفات مرضى الأمراض المعدية . - الأوساط الزراعية والمواد المستعملة لغاية تحاليل الأمراض المعدية في المختبرات.
ازرق	النفايات السامة للجينات (نفايات العلاج الكيماوي)	- النفايات الناتجة عن عمليات تصنيع، نقل، تحضير أو إعطاء العلاج الكيماوي - المستهلكات الطبية (مثل الحفاضات،الشاش)الملامسة لافرازات المريض الذي يتلقى العلاج الكيماوي كالبول والبراز و القيء .

VACCINES

عمر الطفل عند التطعيم	الجرعة
في الشهر الأول	يعطى الطفل مطعوم BCG
في بداية الشهر الثالث	يعطى الطفل مطعوم الشلل المقتول IPV و مطعوم الخماسي الذي يتكون من DPT HBV+Hib
في بداية الشهرالرابع	يعطى الطفل مطعوم الشلل المقتول IPV و مطعوم الشلل الفموي OPV و مطعوم الخماسي الذي يتكون من DPT HBV+Hib
في بداية الشهر الخامس	يعطى الطفل مطعوم الشلل الفموي OPV و المطعوم الرباعي الذي يتكون من Hib+DPT و مطعوم التهاب الكبد نوع ب HBV
في بداية الشهر العاشر	يعطى الطفل مطعوم الحصبة Measles و مطعوم الشلل الفموي OPV
عند بلوغ الطفل عامه الاول (عمر 12 شهر)	يعطى الطفل الجرعة الاولى من مطعوم MMR
على عمر 18 شهر	يعطى الطفل الجرعة الثانية من مطعوم MMR و الجرعة المدعمة من DPT و الشلل الفموي

The End