

HOSPITAL INFECTION CONTROL

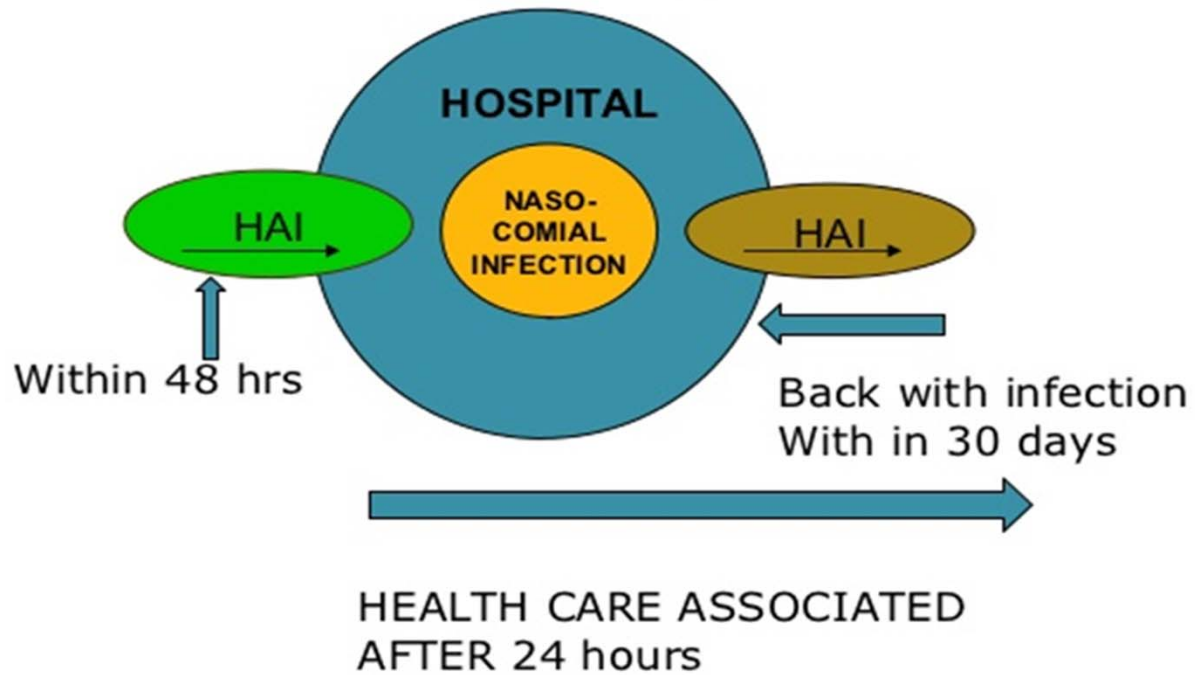
WHAT ? , WHY ? , WHEN & HOW



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DyDG (Labs). DoMS. MoH
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HAI

- HAI - HOSPITAL ASSOCIATED INFECTION
- HAI - HOSPITAL ACQUIRED INFECTION
- HAI - HEALTH CARE ASSOCIATED INFECTION



HOSPITAL ASSOCIATED INFECTION

When an infection manifested within 48 hours of admission.

Patient is incubating from a outside infection.

HOSPITAL ACQUIRED INFECTION

These are infections that are a result of treatment in a hospital or a healthcare service unit.

Infections are considered nosocomial if they first appear 48 hours or more after hospital admission or within 30 days after discharge.

Nosocomial comes from the Greek word '**nasokomeio**'.

noses= disease, komeo= to take care of

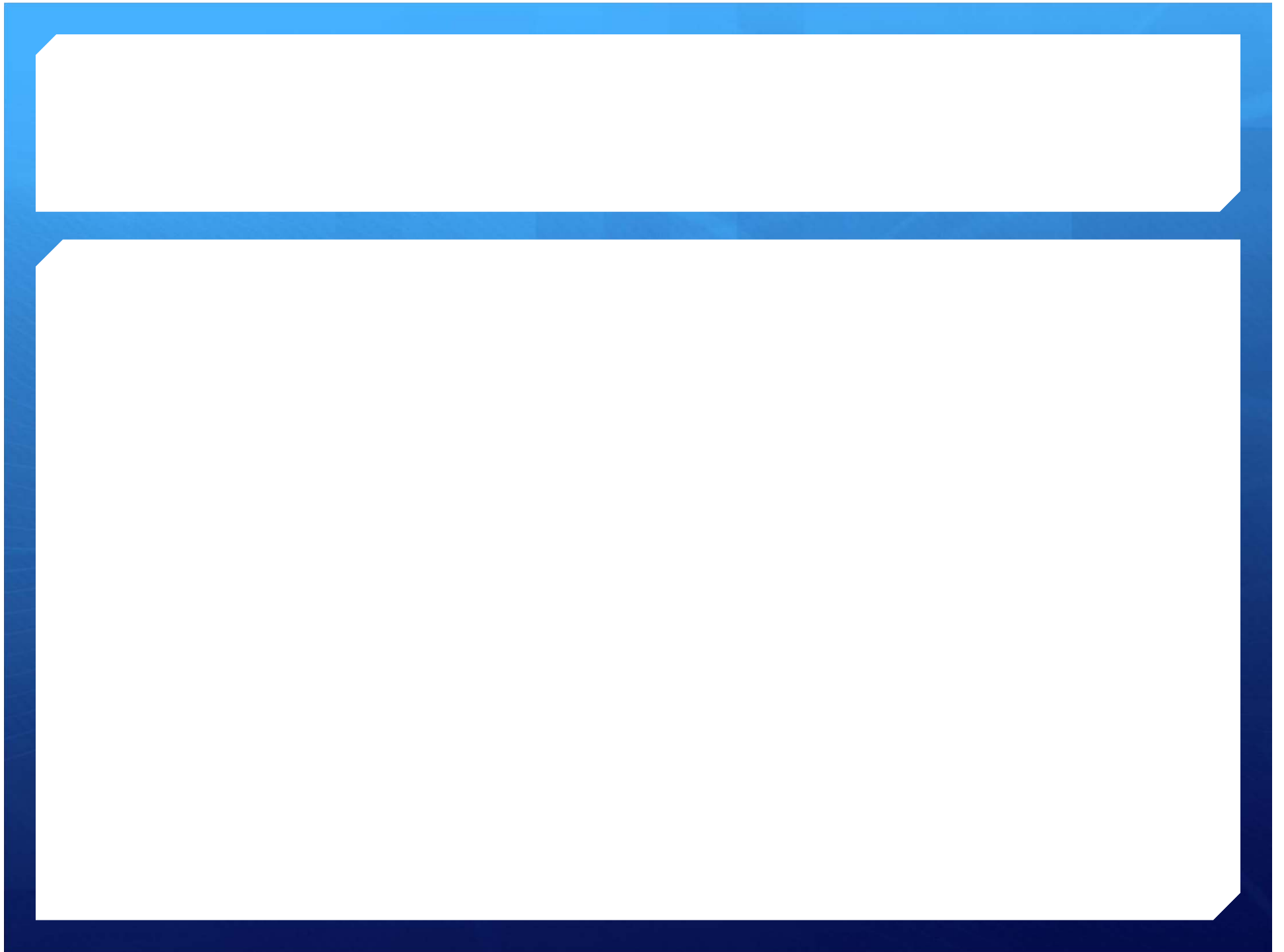
HEALTH CARE ASSOCIATED INFECTION

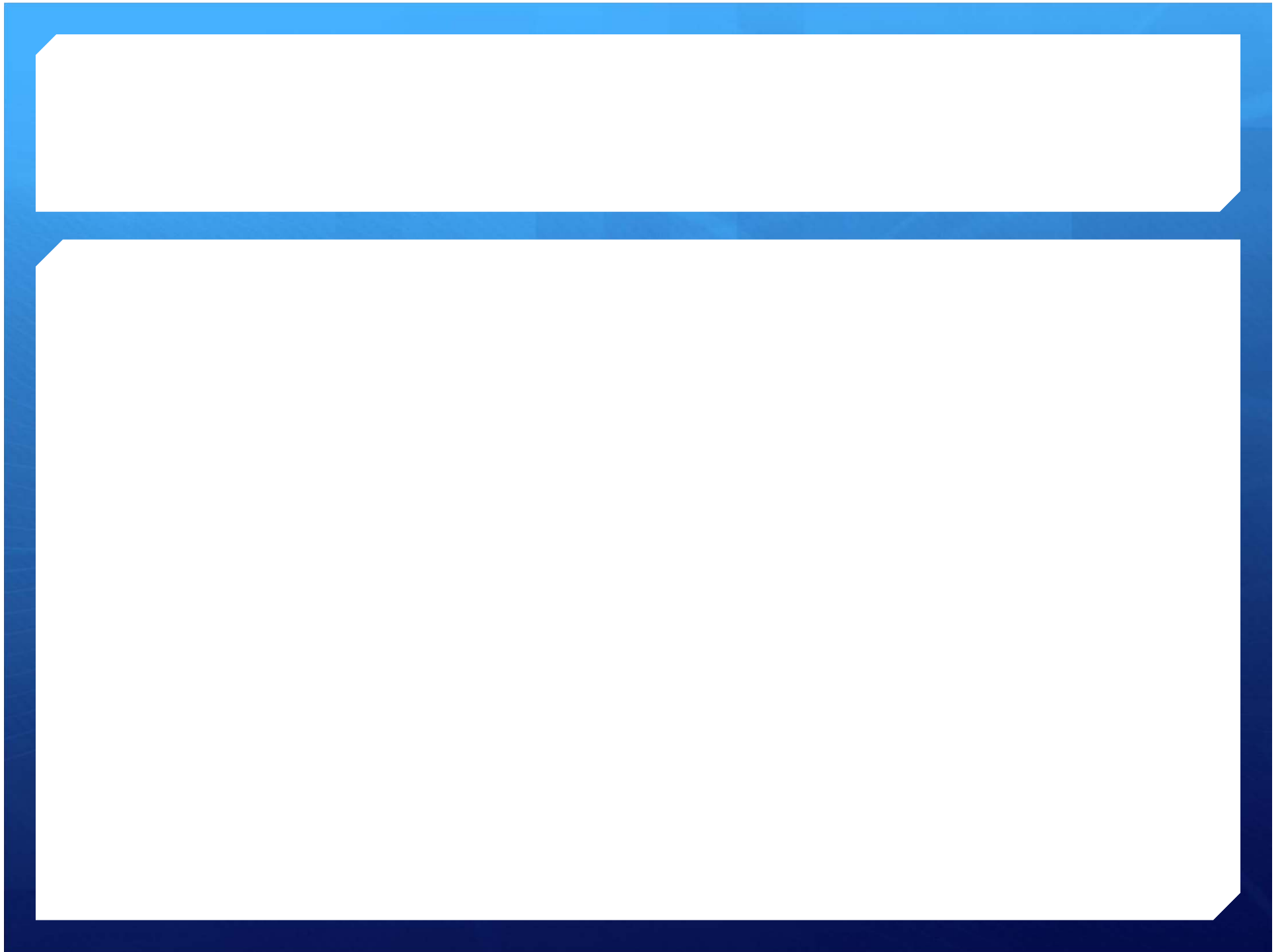
The modern CDC definition of hospital acquired infection is

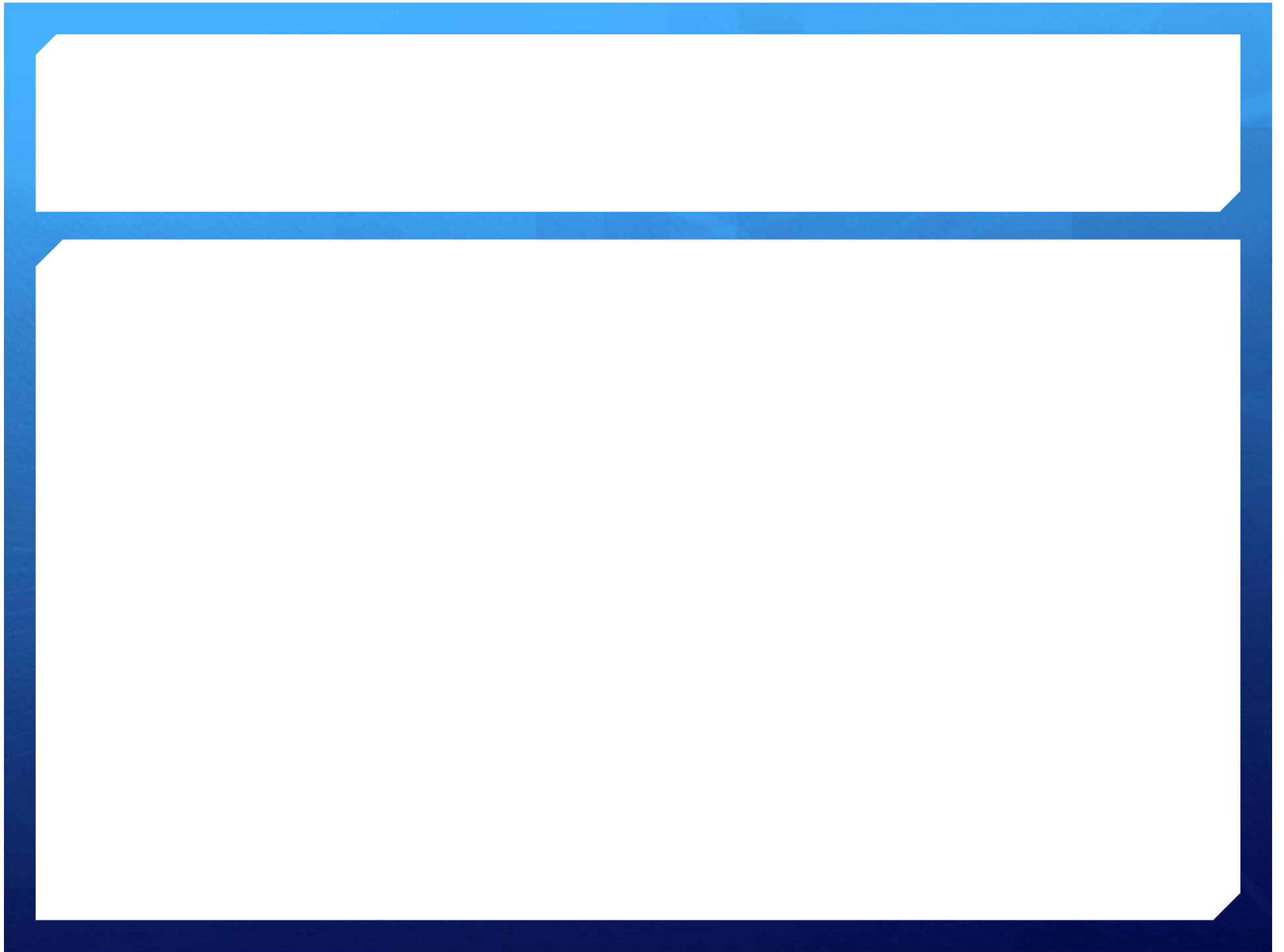
Healthcare associated infection.

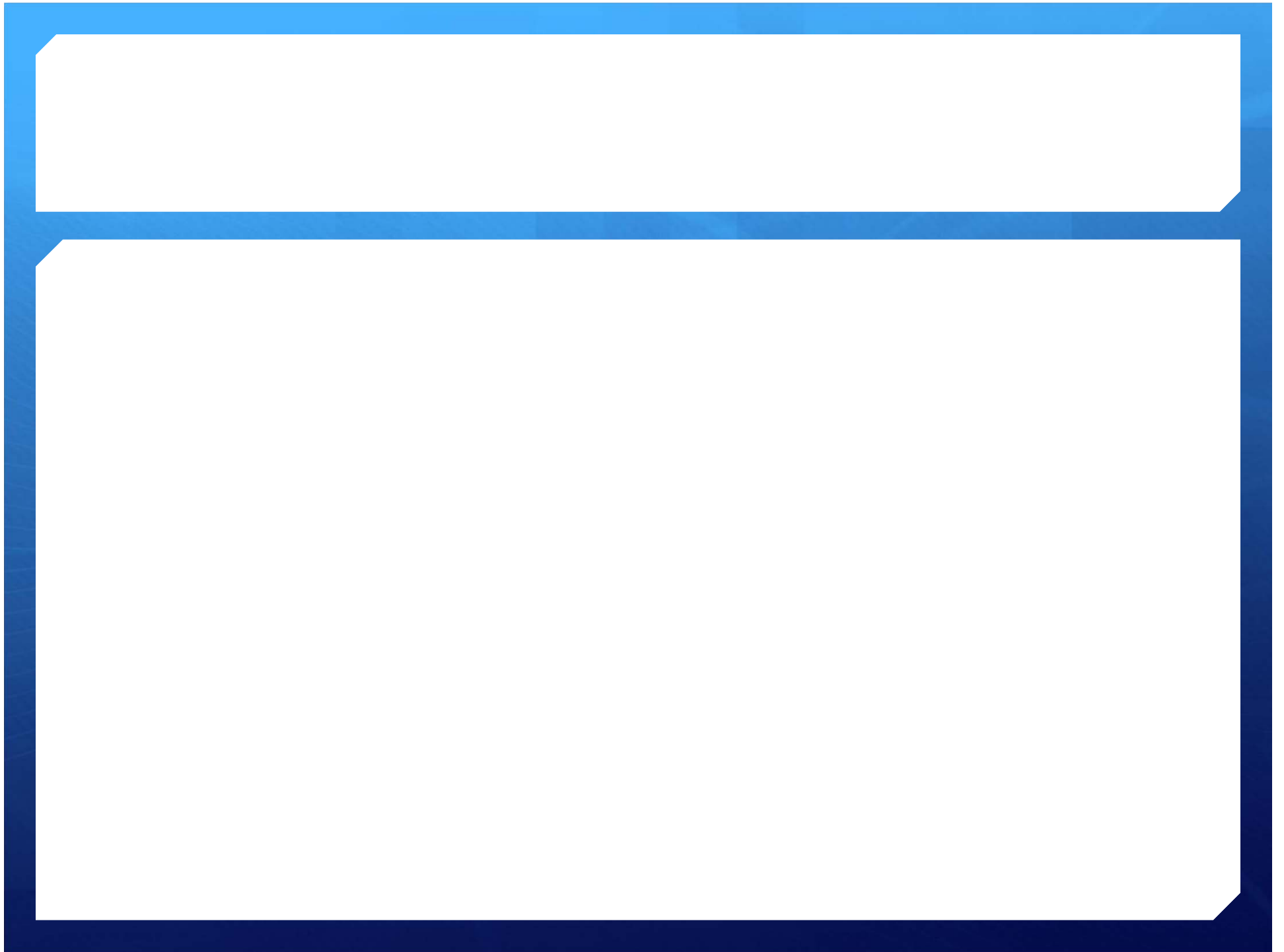
Healthcare-associated infections are infections that patients

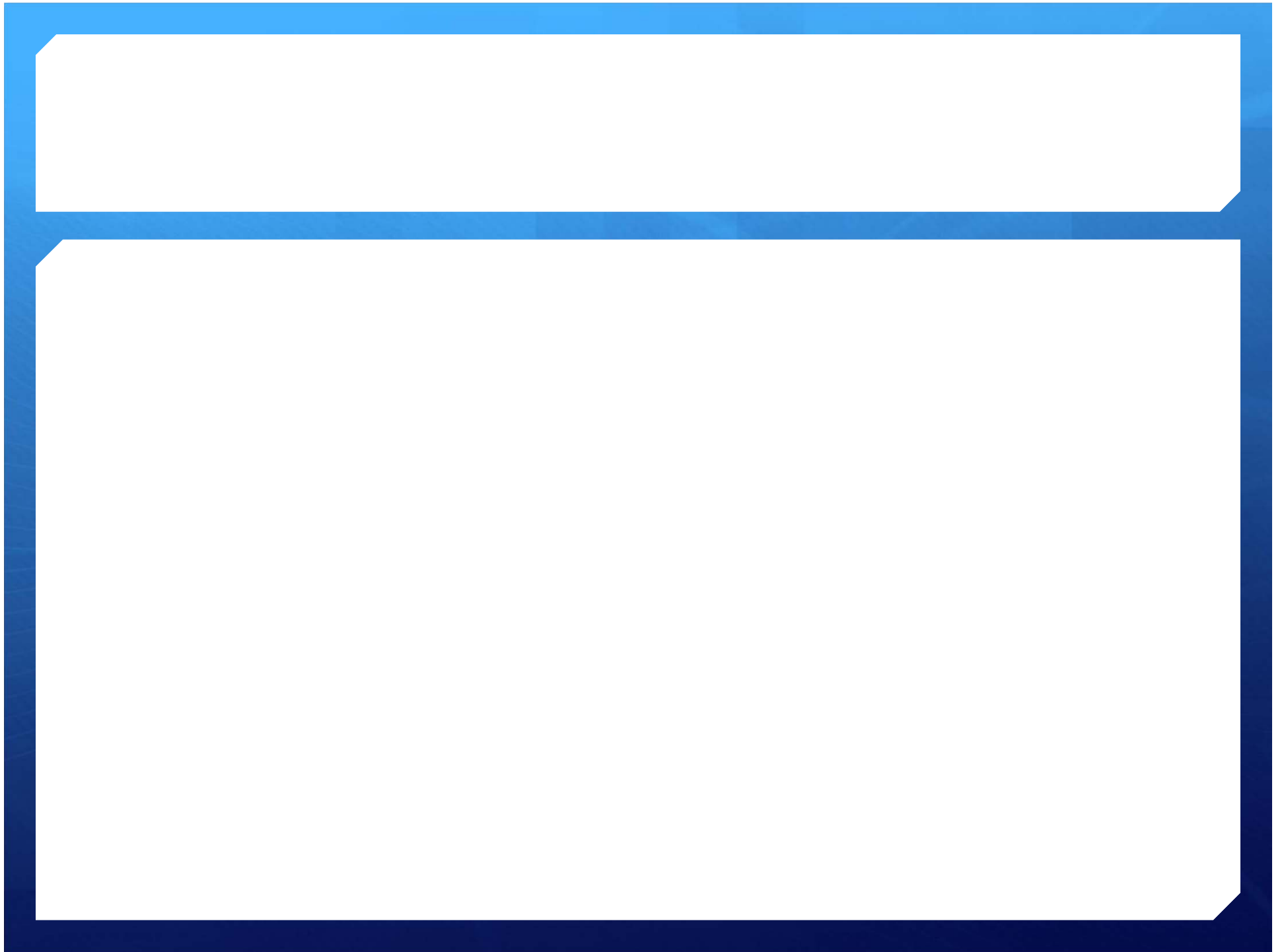
Acquire during the course of receiving healthcare treatment for other conditions











Key Definitions (1)

- **Infection Control**—The process by which health care facilities develop and implement specific policies and procedures to prevent the spread of infections among health care staff and patients
- **Nosocomial Infection**—An infection contracted by a patient or staff member while in a hospital or health care facility (and not present or incubating on admission)

Introduction—Why Infection Control? (1)

- Hospital acquired infections are a common problem—prevalence about 9%
- Hospital acquired infections contribute to AMR
 - Overuse of antimicrobials (development)
 - Poor infection control practices (spread)

Introduction—Why Infection Control? (2)

- Hospital-acquired infections increase the cost of health care
 - World Bank studies have shown that two-thirds of developing countries spend more than 50% of their health care budgets on hospitals
- Effective IC programs are beneficial
 - They decrease spread of nosocomial infections, morbidity, mortality, and health care costs



PREVALANCE OF HAI

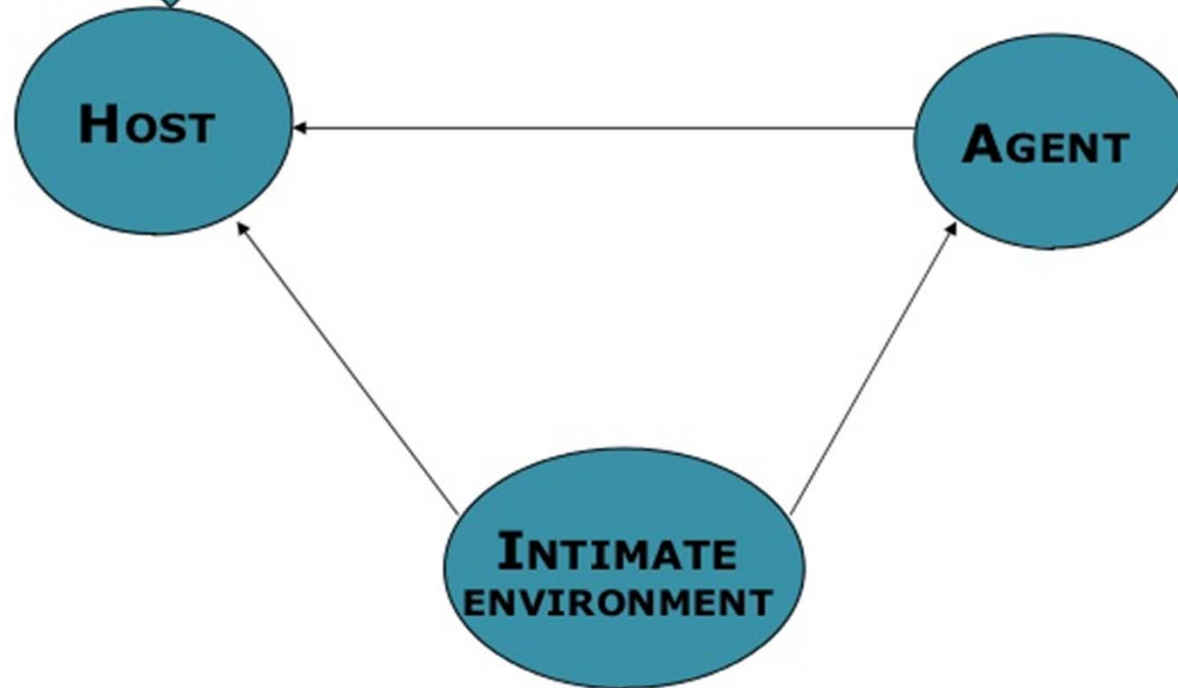
- USA: Up to 2 million healthcare-associated infections per year, of which 80,000 are lethal or may contribute to death (3)
- Europe: 5 million HAI per year, of which 50,000 (1%) are lethal and contribute to death in 135,000 cases (2.7%) (4)
- Japan: Resistance Isolation Rate of MRSA (methicillin-resistant Staphylococcus aureus): 40-80%
- India: An estimated 10 to 30% of patients admitted to hospitals and nursing homes acquire a nosocomial infection (5)
- Up to 70% of organisms causing HAI are resistant to at least one antibiotic (6)

(www.biomerieux-diagnostics.com/upload/HAI_KeyFigures.pdf)

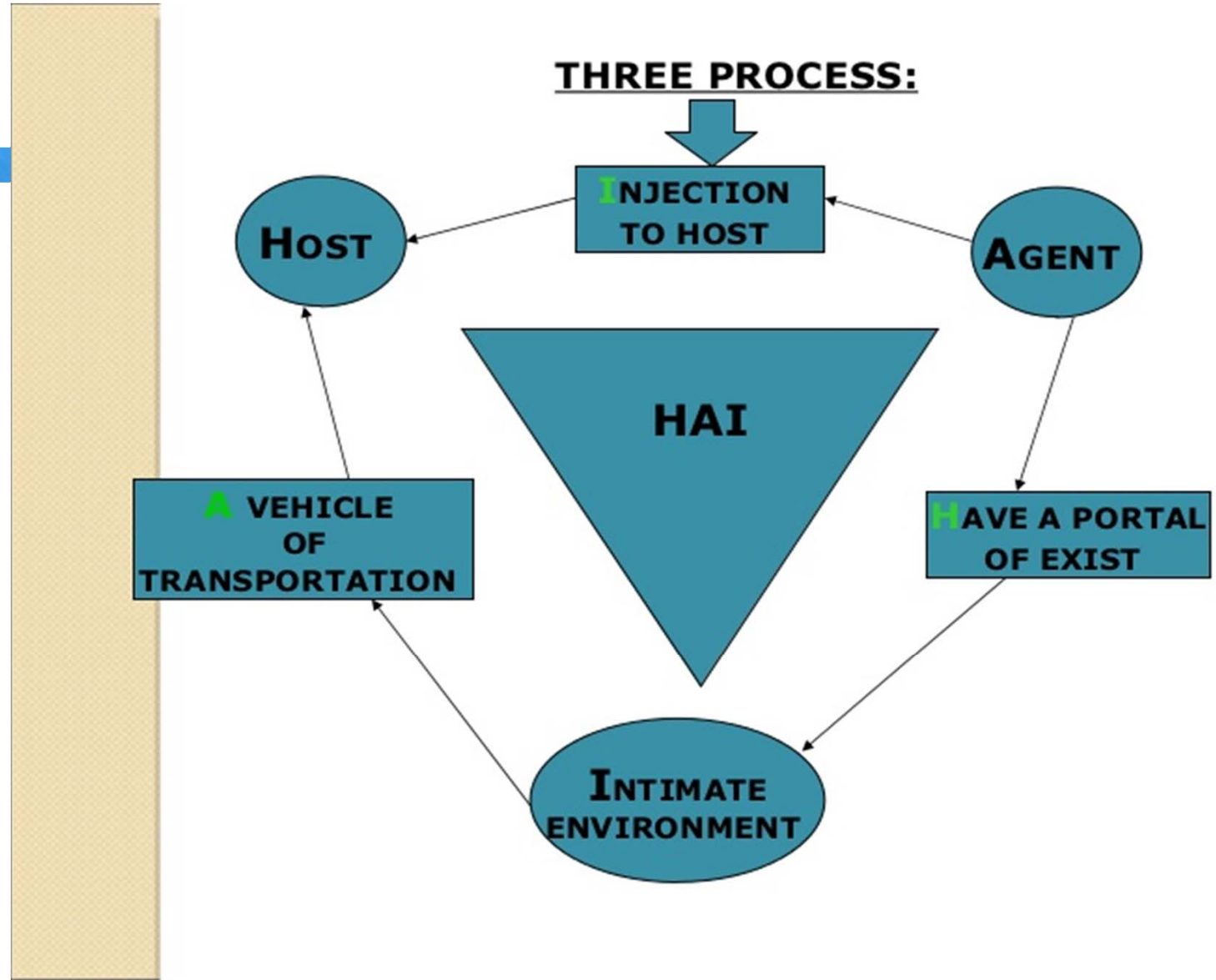
DYNAMICS OF HOSPITAL INFECTION

THREE FACTORS:

THREE PROCESS



THREE PROCESS:



Introduction—Development of AMR

- Poor or absent IC practices, especially in intensive care units, results in cross-transmission of antibiotic-resistant bacteria.
- Resistant bacteria prompts even greater antibiotic use by physicians.
- Perception of knowledge by physicians of poor sterilization, disinfection, or patient care practices prompts increased antibiotic use (e.g., broad spectrum and prolonged surgical prophylaxis in an effort to prevent infections).

Epidemiology of Nosocomial Infections (1)

- Most common sites for nosocomial infections
 - Surgical incisions
 - Urinary tract (i.e., catheter-related)
 - Lower respiratory tract
 - Bloodstream (i.e., catheter-related)

Epidemiology of Nosocomial Infections (2)

Common microorganisms

- Aerobic gram-positive cocci (*Staphylococcus aureus* [MRSA], enterococci [vancomycin-resistant]),
- Aerobic gram-negative bacilli (*Escherichia coli*, *P. aeruginosa*, *Enterobacter* spp., and *Klebsiella pneumoniae*)

Epidemiology of Nosocomial Infections (3)

Nosocomial transmission of community acquired, multidrug-resistant organisms

- *M. tuberculosis*
- *Salmonella* spp.
- *Shigella* spp.
- *V. cholerae*

Root Causes of Nosocomial Infections (1)

- Lack of training in basic IC
- Lack of an IC infrastructure and poor IC practices (procedures)
- Inadequate facilities and techniques for hand hygiene
- Lack of isolation precautions and procedures

Root Causes of Nosocomial Infections (2)

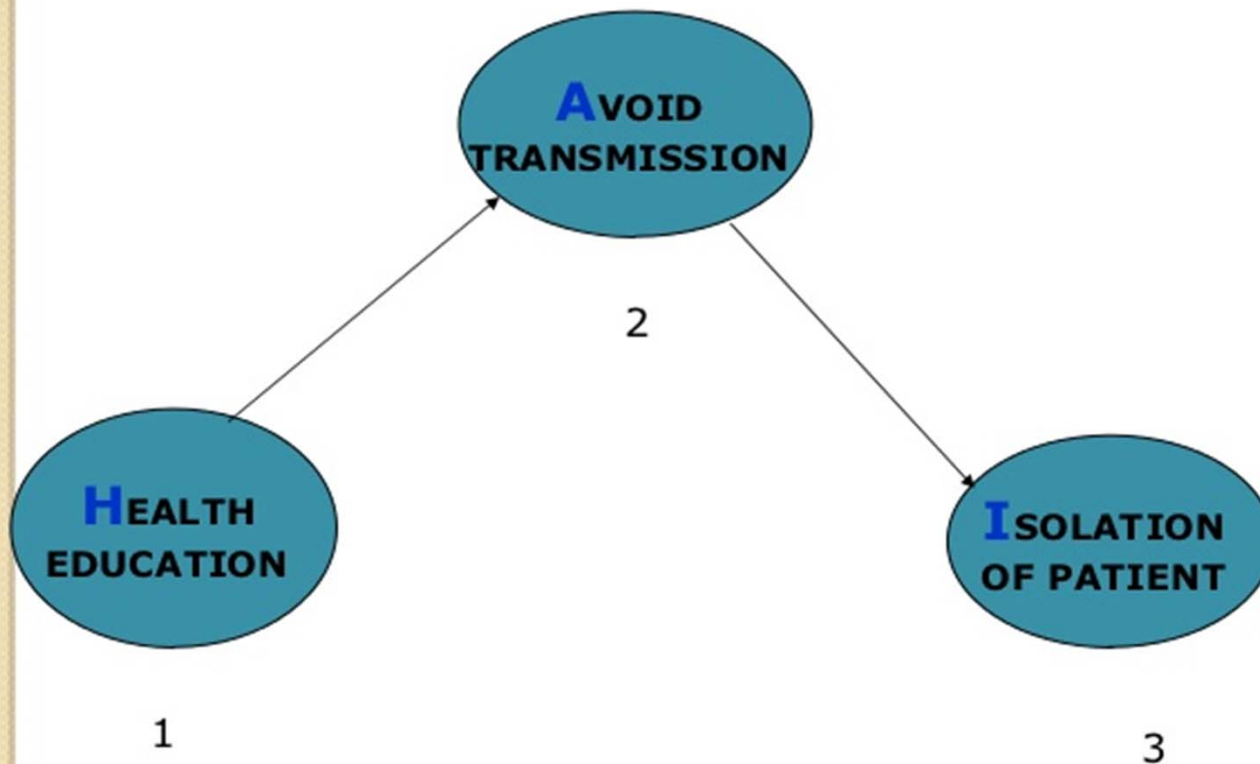
- Use of advanced and complex treatments without adequate training and supporting infrastructure, including—
 - Invasive devices and procedures
 - Complex surgical procedures
 - Interventional obstetric practices
 - Intravenous catheters, fluids, and medications
 - Urinary catheters
 - Mechanical ventilators
- Inadequate sterilization and disinfection practices and inadequate cleaning of hospital

Ensuring a Clean Environment

- Establish policies and procedures to prevent food and water contamination
- Establish a regular schedule of hospital cleaning with appropriate disinfectants in, for example, wards, operating theaters, and laundry
- Dispose of medical waste safely
 - Needles and syringes should be incinerated
 - Other infected waste can be incinerated or autoclaved for landfill disposal
 - Bag and isolate soiled linen from normal

hospital traffic

PREVENTION OF INFECTION

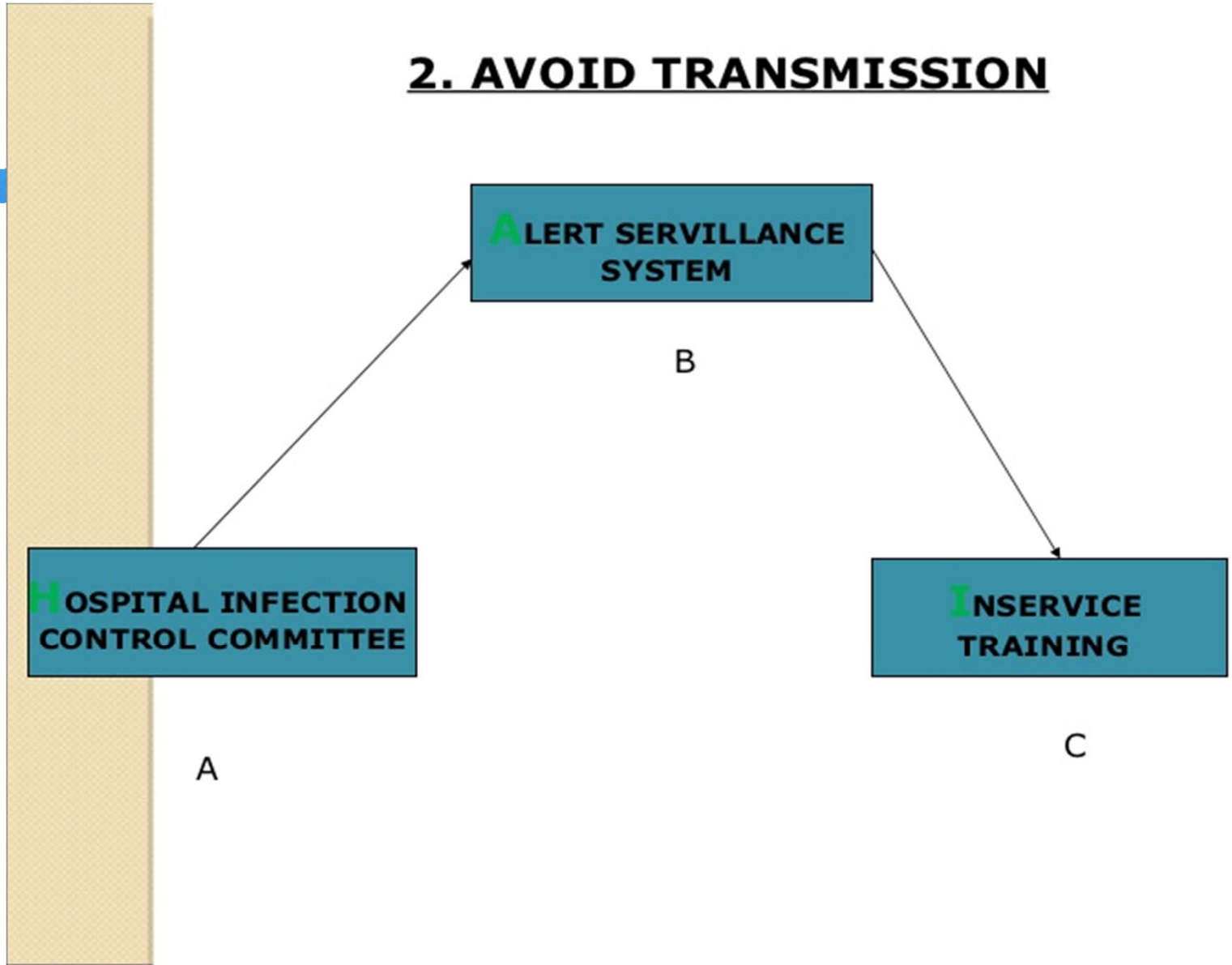


1 HEALTH EDUCATION

HA**V**E **A**LL **I**NFORMED

- a. Inform all about hospital guidelines for infection control.
- b. Give health education to staff, patient, relatives regarding aseptic practices.
- c. Mode of spread and how to prevent it.
- d. Regular Medical Examination.
- e. Proper disposal of fomites.

2. AVOID TRANSMISSION

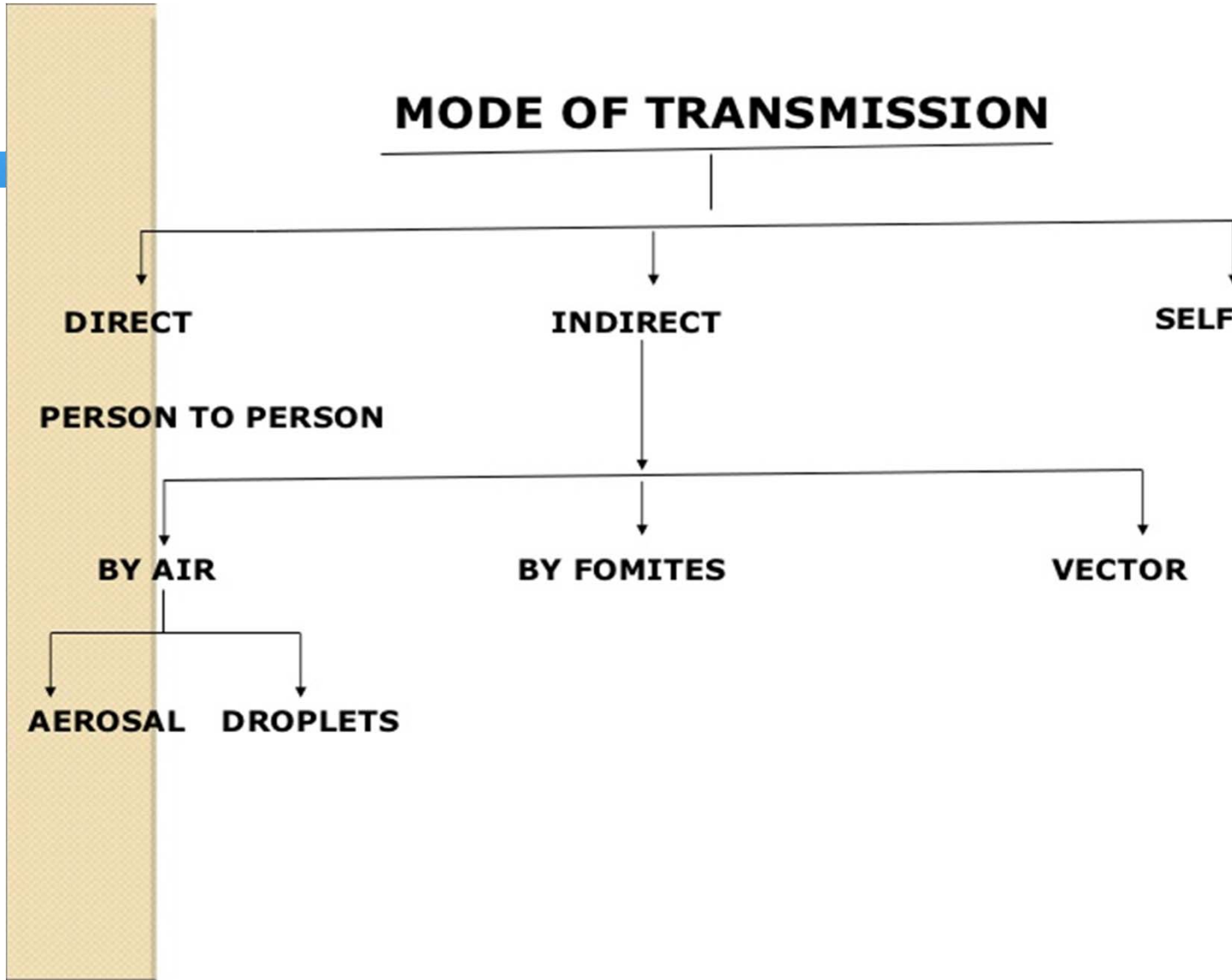


A

B

C

MODE OF TRANSMISSION

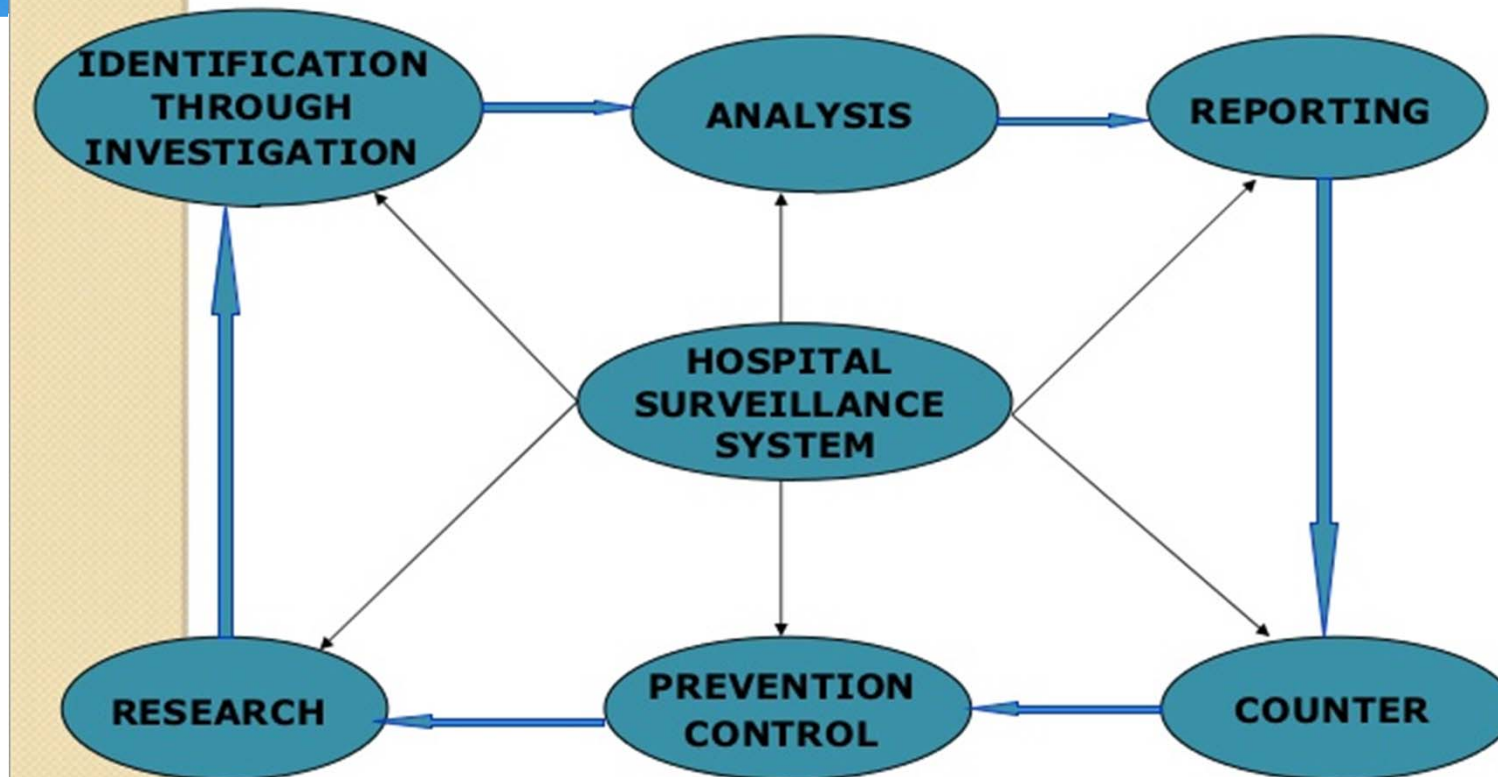


FUNCTIONS

To form policies, rules and guidelines to be followed in all parts of the hospital.

- Methods of sterilization of equipments and dressing.**
- Management of Hospital Waste.**
- Antibiotics Protocol.**
- Periodic Health check up**
- Immunization of Hospital Staff.**
- Pest Control Measures.**
- Visiting times.**

B. ALERT SURVEILLANCE SYSTEM



Infection Control Committee (1)

Membership

Doctors

- General physician
- Infectious disease specialist
- Surgeon
- Clinical microbiologist

- Infection control nurse

- Representatives from other relevant departments
 - Laboratory
 - Housekeeping
 - Pharmacy and central supply
 - Administration

Infection Control Committee (2)

Goal—

- To prevent the spread of infections within the health care facility

Functions—

- Addressing food handling, laundry handling, cleaning procedures, visitation policies, and direct patient care practices
- Obtaining and managing critical bacteriological data and information, including surveillance data

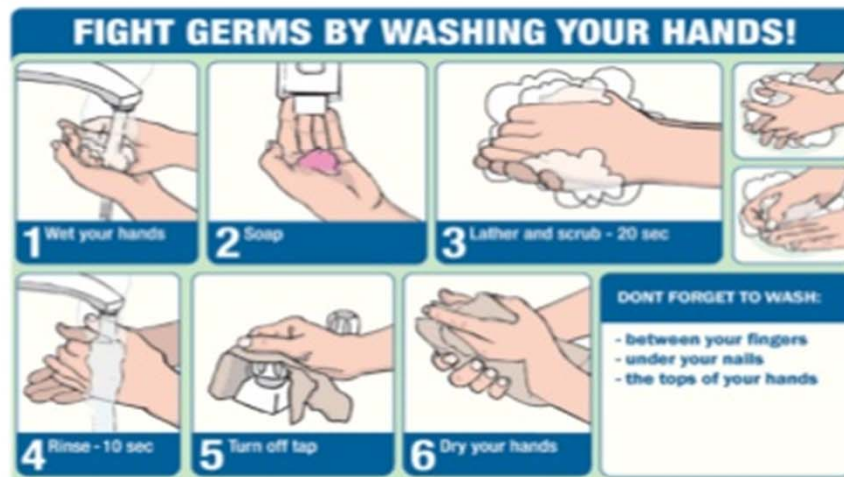
Infection Control Committee (3)

Functions (cont)

- Developing and recommending policies and procedures pertaining to infection control
- Recognizing and investigating outbreaks of infections in the hospital and community
- Intervening directly to prevent infections
- Educating and training health care workers, patients, and nonmedical caregivers

ASEPTIC PROCEDURES & PRACTICES

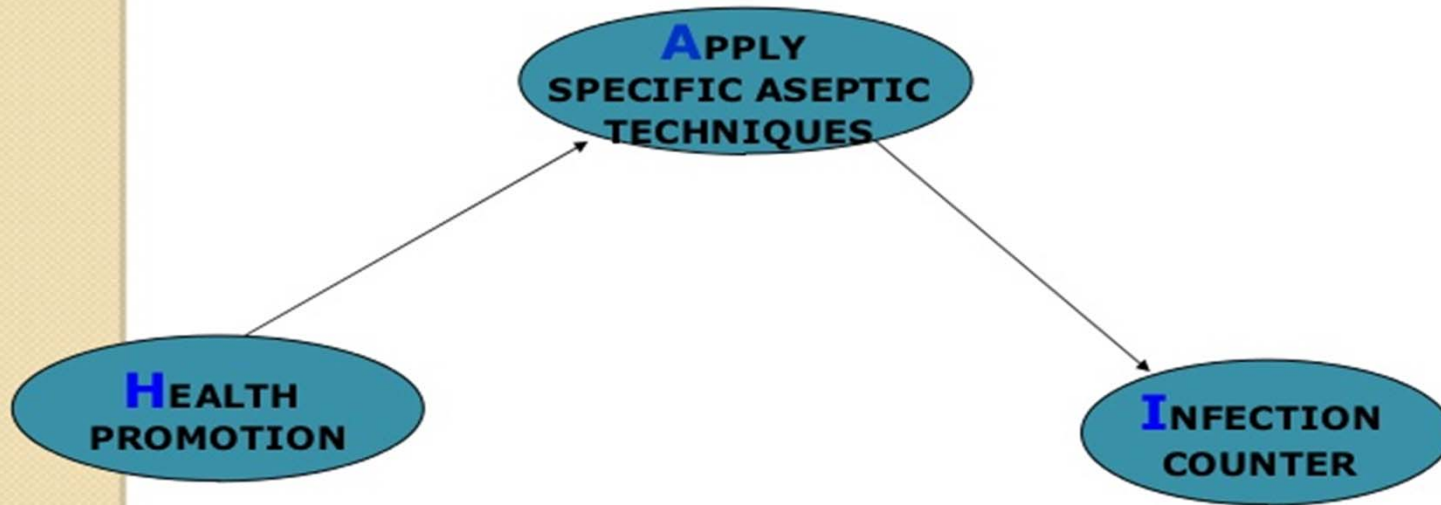
- Hand washing before and after touching the patient.
before and after all procedures.
before and after handling fomites.
- Use of protecting gowns, masks, gloves.
- Use no touch technique.
- Sharps to be handled with care.
- Clean all spill-ups, blood with hypo solution.
- Use sterile gauze, cotton and instruments for dressing.



3. ISOLATION OF PATIENT

- **Patient to be isolated/ separated.**
- **Barrier Nursing**
- **Minimum interfere with the patient.**
- **Restricted Visit**
- **Attending staff must be properly immunized.**
- **Fomites to be treated with hypo solution before disposal.**
- **Use of mask by patient.**

CONTROL OF INFECTION

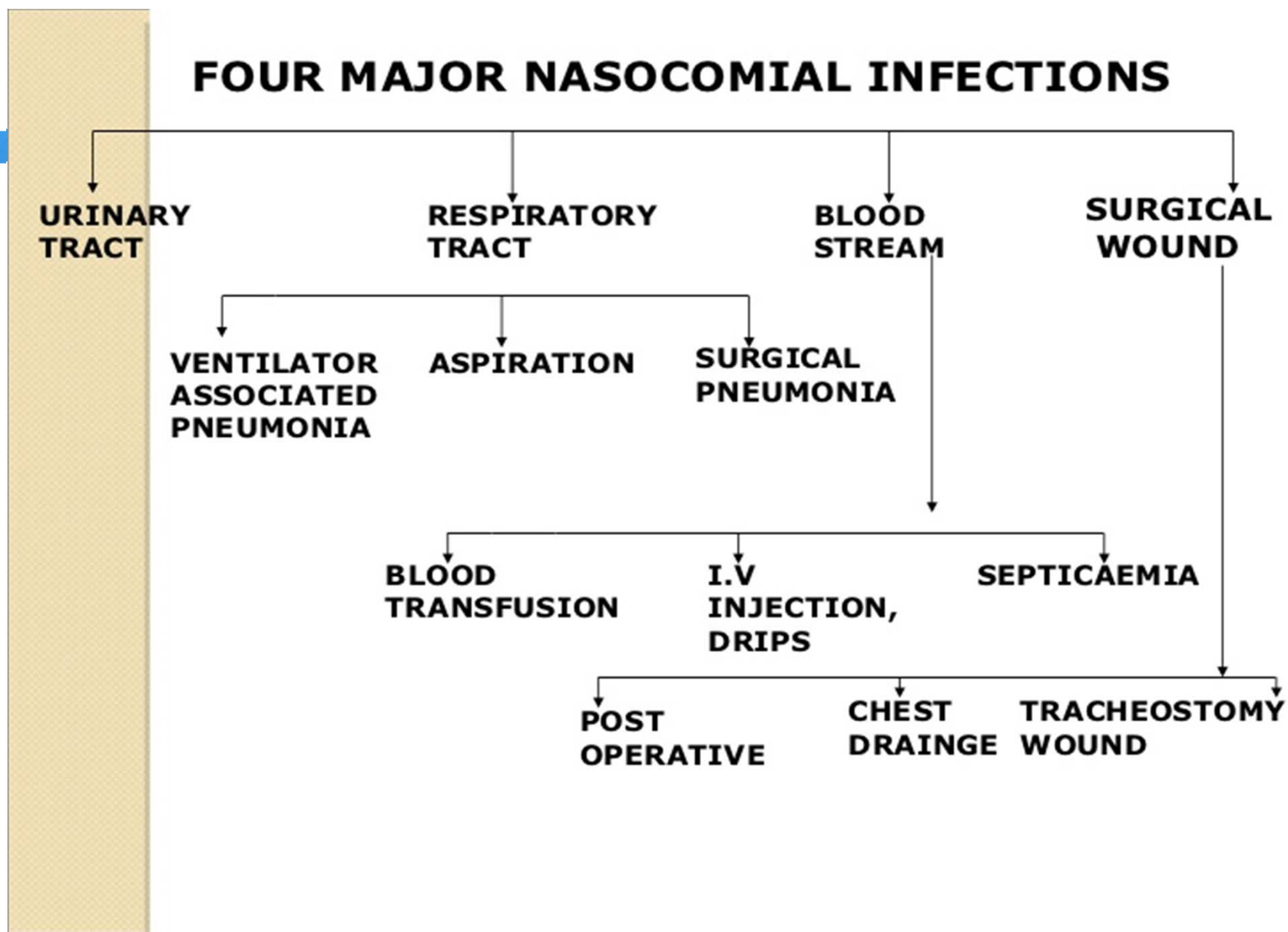




HEALTH PROMOTION

- Increase host resistance and decrease susceptibility.**
- Use of prophylactic therapy and immuno globuline.**
- Immunization against infectious diseases.**
- Nutritious and balance diet.**
- Carrier detection and treatment.**

FOUR MAJOR NASOCOMIAL INFECTIONS



INFECTION COUNTER

- Break the chain of dynamic transmission.**
- Destroy the agent of disease by treatment.**
- Vector Control Measure.**
- Wet Mopping of floor.**
- Proper disposal of BMW.**
- Early diagnosis and prompt treatment.**
- Regular Surveillance and identification of source of infection.**
- Proper sterilization of equipments and dressing materials.**
- Use of protective gowns, mask and gloves.**

UNIVERSAL WORK PRECAUTIONS

The basic principle for preventing infection hazard is the adoption of universal precautions which have been developed to minimize the exposure to patient fomites.

- ❖ Wash hands after patient contact, or with body substance
- ❖ Plan safe handling and disposal before beginning any procedure
- ❖ Dispose of used needles promptly in sharp disposal containers
- ❖ Wear gloves when contamination of hands with body substances is anticipated
- ❖ Protective eyewear and masks should be worn when splashing with body substances/fluids is anticipated
- ❖ Adhere to disinfection and sterilization standards
- ❖ **Regard all waste soiled with blood/body substances as contaminated and dispose of according to BMW rules.**
- ❖ Vaccinate all clinical and laboratory workers against hepatitis B

INFECTION CONTROL EFFORTS

- Use of standard precautions including Implementation of the 6 step Hand wash technique.
- Safety in clinical procedures of an invasive or semi-invasive nature.
- Regular supply of protective material to prevent HAI in staff
- Blood and blood product safety
- Safe injection practices
- Management of blood or blood product spills
- Monitoring the operation room
- Monitoring the Environment
- Sterilization and disinfection practices
- Central Sterile Supply Department

INFECTION CONTROL EFFORTS

- Laundry
- Laboratory Surveillance: monitoring, preventing and control of HAI
- Waste Management
- Protection of Health care worker – post exposure Prophylaxis, Immunization etc.
- Designing of hospital Intensive Care Unit, operation theatre, nurseries etc.
- Ensuring Safe Water supply and sanitation.

Isolation and Standard Precautions

- Whenever possible, avoid crowding wards.
- Implement specific policies and procedures for patients with communicable diseases:
 - Private rooms and wards for patients with specific diseases
 - Visitation policies
 - Hand washing and use of gloves
 - Gowns, when appropriate
 - Masks, eye protection, gowns
 - Precautions with sharp instruments and needles

Ensuring a Clean Environment

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hospital traffic

Cleaning, Disinfection, and Sterilization of Instruments and Supplies

■ Intravascular devices

- Use only when necessary.
- Silicon elastomer or polyurethane catheters have lower infection risk than polyvinyl catheters
- Procure IV solutions and IV devices from quality suppliers when assured GMP.
- Prepare and administer IV medicines and fluids in a sterile manner, in a designated uncontaminated area, using specially trained staff.

■ Urinary catheters

- Avoid in-dwelling urinary catheters whenever possible.
- Use closed drainage systems.

- Written policies and procedures are needed
- All objects to be disinfected or sterilized should first be thoroughly cleaned
- Use steam sterilization whenever possible
- Quality control in reprocessing is essential
 - Monitor and record sterilization parameters (i.e., time, temperature, pressure)
 - Biological indicators should be used to ensure sterilization
 - Chemical indicators are necessary for chemical sterilization
- Sterilized items must be stored in enclosed clean areas
- Items or devices that are manufactured for single use should not be reprocessed (e.g., disposable syringes and needles)

Respiratory Therapy

- **Mechanical ventilation and respiratory equipment**
 - Use only when absolutely necessary.
 - Use suction catheters only once (or reprocess them appropriately).
 - Ensure that all equipment has ethylene oxide sterilization or high-level disinfection before use.
 - Wean patient early from ventilators.
 - Ensure proper handling of inhalation medications and supplies.

Surgery and Surgical Site Care

- Implement comprehensive policies and procedures.
- Minimize preoperative stays in the hospital.
- If necessary to shave the planned operative site, use clippers (not razors) and shave immediately before the procedure.
- Use antibiotic prophylaxis only when indicated and according to established protocols.
- Provide sterile instruments in individually wrapped sterile packages.
- Use an effective antiseptic, such as iodine, to prepare the incision site.
- Include perioperative scrub with antiseptic scrub for hand and forearm antisepsis for surgical teams.

Employee Health and Training Program

- Treat work-related illnesses
- Provide vaccinations to decrease infections
 - Routine vaccinations (e.g., diphtheria, tetanus, polio, measles, mumps, rubella, varicella, hepatitis A and B, BCG)
 - Vaccinations during epidemics (e.g., meningitis, typhoid, influenza)
- Train health workers in—
 - Appropriate sterile techniques
 - Infection control procedures
 - Use of barrier precautions (e.g., gloves) for certain procedures

Food and Water Precautions

- Contamination of food and water supply frequently occurs in hospitals.
- Inadequate cooking may lead to overgrowth of pathogenic bacteria.
- Food handlers may contract an infectious disease.
- Policies and procedures to prevent food and water contamination are necessary.

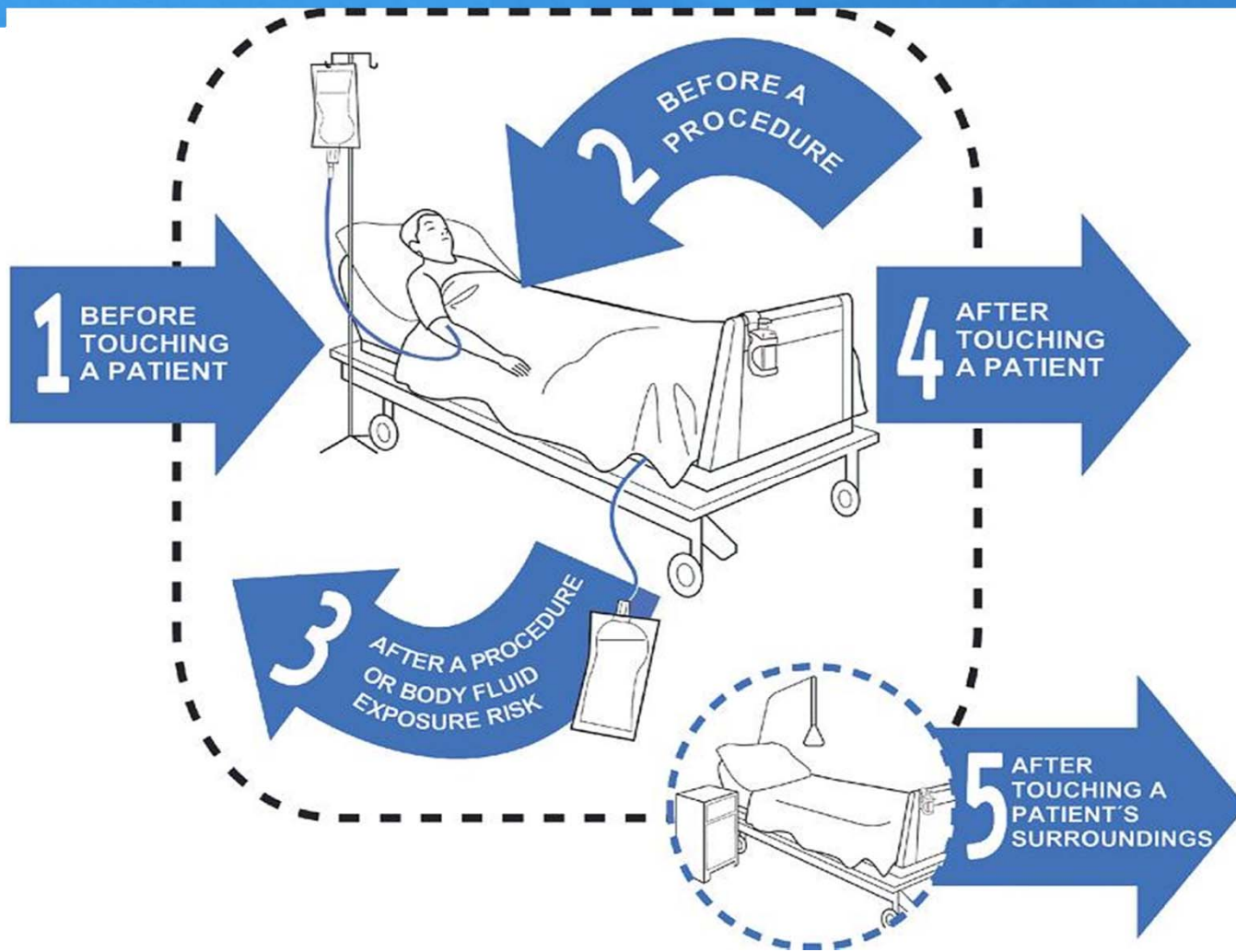
Antimicrobial Use and Monitoring (DTC and Infection Control Committee Collaboration)

- Establish protocols recommending use of the most cost-effective agents when treatment is indicated
 - Therapeutic guidelines
 - Prophylactic guidelines
 - Guidelines for surgical prophylaxis
- Measure antimicrobial use to identify misuse
 - Aggregate methods
 - Indicator studies in primary health care
 - Drug use evaluations (DUEs) in hospitals

Implement interventions to improve antimicrobials

5 moments of hand hygiene

ForYOU & YOUR PATIENTS



Fate of Droplets



Droplets can remain suspended in the air for hours.

Organisms Liberated

Talking 0-200

Coughing 0-3500

Sneezing 4500-1,000,000



Summary (1)

- IC procedures are vital to preventing nosocomial infections and for controlling hospital costs.
- Simple, inexpensive strategies can prevent many infections.
- DTC can support many IC activities.
 - Hand washing and use of appropriate antiseptics and disinfectants
 - Monitoring IV and injection preparation and administration
- DTC should actively promote better use of antimicrobials.
 - Guidelines for treatment and surgical prophylaxis
 - Selection of appropriate antimicrobials for the formulary

Summary (2)

- Infection Control Committees or programs, when functioning effectively, will—
 - Reduce the spread of infectious diseases
 - Decrease morbidity and mortality due to nosocomial infections
 - Maintain employee health and morale
 - Decrease the incidence of AMR
 - Decrease health care costs

THANK YOU VERY MUCH FOR YOUR KIND ATTENTION