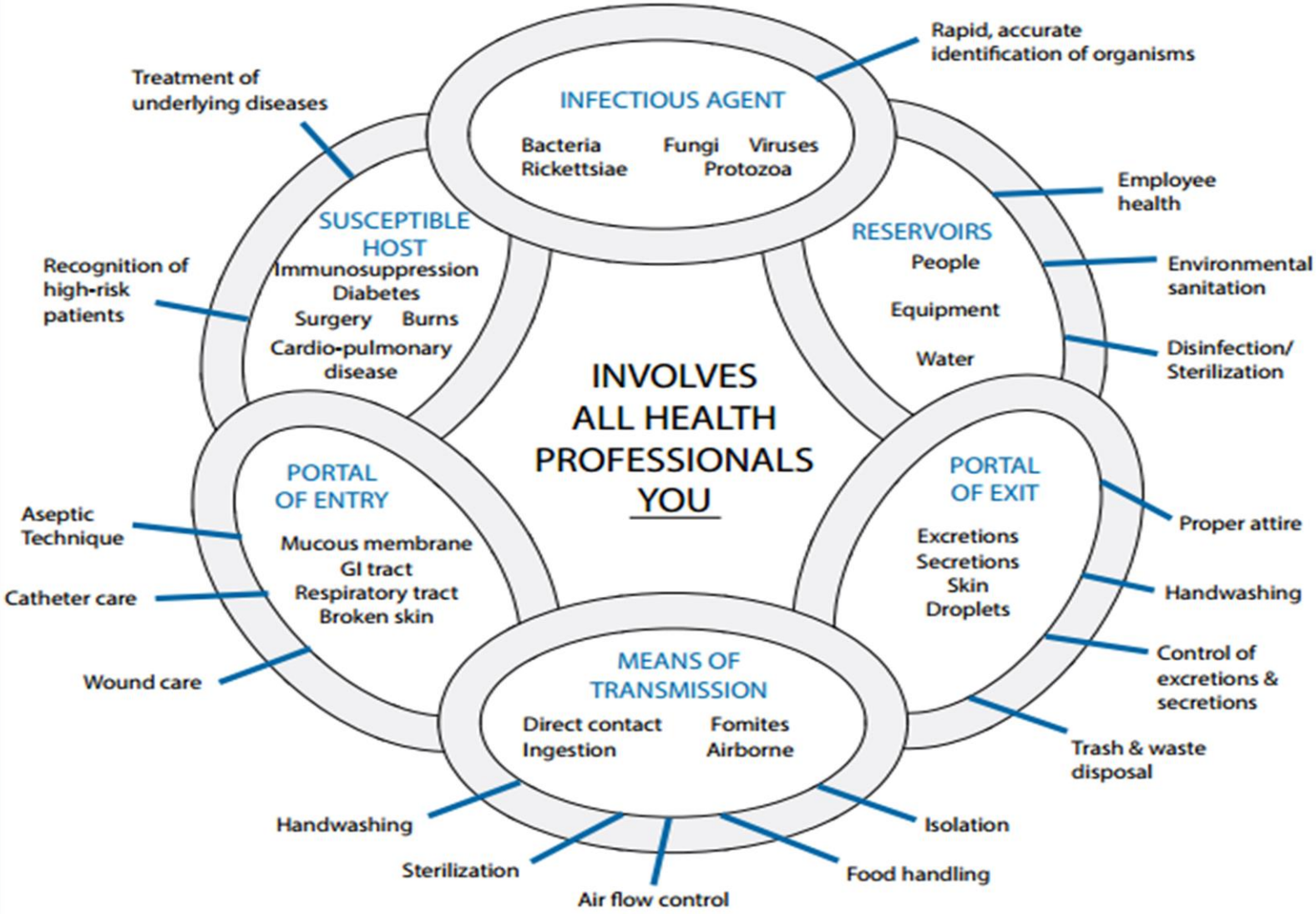
*How to interrupt the chain of infection

* PREVENTION AND CONTROL

* Main aspects of controlling an infectious disease

* 1- Pathogen Identification
* 2- Asepsis & Hygiene
* 3- Control Portals of Exit
* 4- Prevent a Route of Transmission
* 5- Protect Portal of Entry
* 6- Recognition of Susceptible Host


INFECTIOUS AGENT
Bacteria
Fungi
Viruses
Rickettsiae
Protozoa
Rapid, accurate identification of organisms
SUSCEPTIBLE HOST
Immunosuppression
Diabetes
Surgery
Burns
Cardio-pulmonary disease
Treatment of underlying diseases
Recognition of high-risk patients
RESERVOIRS
People
Equipment
Water
Employee health
Environmental sanitation
Disinfection/ Sterilization
INVOLVES ALL HEALTH PROFESSIONALS YOU
PORTAL OF ENTRY
Mucous membrane
GI tract
Respiratory tract
Broken skin
Aseptic Technique
Catheter care
Wound care
PORTAL OF EXIT
Excretions
Secretions
Skin
Droplets
Proper attire
Handwashing
Control of excretions & secretions
Trash & waste disposal
MEANS OF TRANSMISSION
Direct contact
Fomites
Ingestion
Airborne
Handwashing
Sterilization
Air flow control
Isolation
Food handling

- Treating people who are ill
- Vaccinating people
- Handling and disposing of body fluids responsibly
- Drying equipment and materials before storing
- Cleaning all surfaces with appropriate disinfectants
- Monitoring sources of soil and contaminated water

*Control the reservoir

Asepsis

* There are two main types:
  * medical asepsis
  * surgical asepsis
* **Disinfection**
  * **Chemical sterilants**
  * **High-level disinfectants**
  * **Intermediate-level disinfectants**
  * **Low-level disinfectants**

Modes of Escape	Breaking the Link
Respiratory Tract. Microorganisms leave the body of the infected person by means of droplets exhaled as a spray when coughing, sneezing, talking, singing or just breathing. Microorganisms also escape through nose and throat secretions.	• Wear a mask • Do not talk directly into patient's face • Stay home if you are sick • Practice good cough etiquette (cover your coughs and sneezes) • Perform good hand hygiene
Gastrointestinal Tract. Microorganisms that leave the body of the infected person by means of body secretions (e.g. stool and vomit). For example hepatitis A virus is shed in the stool of the infected person.	• Handle and dispose of body secretions properly • Use personal protective equipment • Perform good housekeeping • Perform good hand hygiene
Skin. Microorganisms that leave the body of the infected person by wound drainage or through skin lesions.	• Dispose of wound dressings properly • Use personal protective equipment (PPE) • Perform good hand hygiene
Blood. Infection may occur when someone's blood gets into another person's system.	• Safe handling of sharps • Use gloves for procedures where there is risk of exposure to blood • Use care in obtaining, transporting and processing specimens • Perform good hand hygiene

*Control portal of exit

*Control the mode of transmission

- Hand hygiene
- Wear gloves and discard them after each patient
- Maintain Contact, Droplet and Airborne Precautions
- Clean, disinfect, or sterilize equipment used by more than one patient
- Clean all environmental surfaces, especially high-touch surfaces

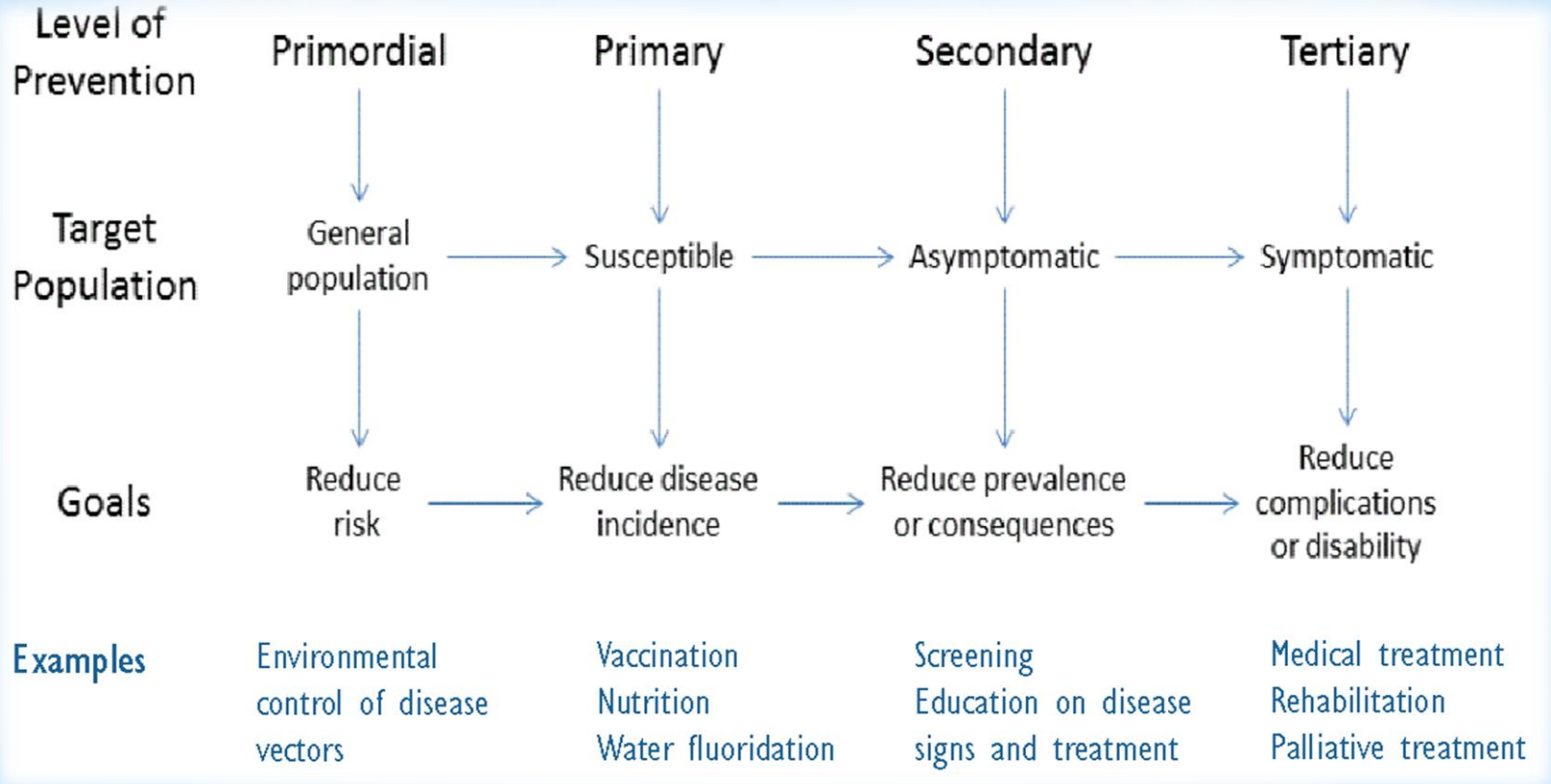
Modes of Entry	Breaking the Link
Respiratory Tract. Small particles that result from evaporation of droplets from the respiratory tract of infected persons remain suspended in the air of poorly ventilated spaces for periods of time. The infectious microorganisms can be inhaled by a well person who may then become infected with the disease.	• Wear a mask/respirator • Maintain good ventilation • Isolate those with respiratory symptoms • Good respiratory hygiene/etiquette practices • Perform good hand hygiene
Gastrointestinal Tract. Pathogenic microorganisms enter the body of a new host when food or water contaminated by feces is ingested (fecal/oral route).	• Dispose of body excretions carefully • Careful food handling • Perform good housekeeping • Wear appropriate personal protective equipment • Perform good hand hygiene
Mucous membranes. Absorption of microorganisms through exposed eyes, nose and mouth.	• Protect eyes, nose and mouth with face shield during procedures likely to generate splashes or sprays • Carry out good housekeeping • Perform good hand hygiene
Skin. Microorganisms enter the body when a person comes into contact with wound drainage or skin secretions.	• Dispose of wound dressings carefully and properly • Wear personal protective equipment • Maintain healthy intact skin • Perform good hand hygiene

*Control portal of entry

Susceptible Hosts	Control
• Children who are very young	• Separate high risk individuals from persons with known or potential infections
• People who are very old	
• People on inadequate diets	• Provide nutritional supplements to persons on inadequate diets
• People who are chronically ill	
• People receiving medical therapy such as chemotherapy or high doses of steroids	• Vaccinate against vaccine preventable diseases
• People who are already ill	• Maintain proper sanitation of air and environment
• People with open wounds	• Diagnose and treat underlying disease

*Control susceptible hosts

Categories of prevention



*Prevention of a disease

*Types of precautions

*CDC (2007):

1. Standard precautions
2. Contact precautions
3. Droplet precautions
4. Airborne precautions

*Standard precautions

Basic infection prevention practices intended to prevent transmission of infectious diseases from one person to another.

Because we do not always know if a person has an infectious disease, standard precautions are applied to *every person every time* to assure that transmission of disease does not occur.

These precautions were formerly known as “universal precautions.”

Standard Precautions (1)

- Group of infection prevention practices that apply to ALL patients
- Based on principle that the following can contain transmissible infectious agents:
  - Blood and body fluids
  - Secretions
  - Excretions (except sweat)
  - Non-intact skin
  - Mucous membranes

Standard Precautions (2)

- Applied during patient care based on nature of healthcare worker-patient interaction
- Dependent on anticipated blood, body fluid, or pathogen exposure
- Intended to protect both healthcare worker and patient

USE STANDARD PRECAUTIONS FOR THE CARE OF ALL PATIENTS

STANDARD PRECAUTIONS APPLY TO: BLOOD•NON-INTACT SKIN•MUCOUS MEMBRANES•ALL BODY FLUIDS, SECRETIONS AND EXCRETIONS EXCEPT SWEAT.

WASH HANDS

Wash hands properly and thoroughly between patient contact and other contact with body fluids or soiled equipment.

WEAR GLOVES

Wear gloves when handling blood, body fluids, nonintact skin or soiled items. Change gloves between patients. Wash hands after removing gloves.

WEAR MASK

Wear a mask and eye protection or face shield to protect mucous membranes of the eyes, nose, and mouth when likely to be splashed.

WEAR GOWN

Wear a gown to protect skin and prevent soiling of clothing when likely to be splashed or sprayed. Wash hands after removing gown.

SHARPS DISPOSAL

Dispose of syringes and other sharps into a designated closed container. **Do not** break or bend needles.

FOLLOW ESTABLISHED POLICIES AND PROCEDURES FOR PATIENT PLACEMENT, ENVIRONMENTAL CONTROLS, PATIENT-CARE EQUIPMENT, AND LINEN

Standard Precautions

- *Vaccinations*
- *Hand Hygiene*
- *Personal Protective Equipment*
- *Patient-Care Equipment*
- *Environmental Control*
- *Linens*
- *Disposal of Sharps*

* Global hand-washing day:

  October 15

* One of the most cost-effectiveness intervention

* (UNICEF) reduce diarrhea incidence by 50% and respiratory infection by 25% among children

* Hand hygiene

Transmission-Based Precautions

* Used when route of transmission is not completely interrupted using standard precautions alone
* Always used in addition to standard precautions
* Categories of precautions
  * Contact
  * Droplet
  * Airborne

Contact Precaution Basics

* Intended to prevent spread of infectious agents transmitted by direct or indirect contact
* Applied when excessive wound drainage, fecal incontinence, or other body discharges increase the potential for environmental contamination

Contact Precautions

- Single-patient rooms are preferred
- For multi-patient rooms, ≥ 3 feet separation is recommended between beds
- Healthcare personnel should wear gown and gloves for ALL patient interactions
- PPE donned upon entry and discarded before exiting room

Droplet Precaution Basics

* Intended to prevent spread of infectious agents transmitted by respiratory secretions or mucous membrane contact
* Droplets do not travel far and do not require special ventilation systems

Droplet Precautions

- Single-patient rooms are preferred
- For multi-patient rooms, ≥ 3 feet separation between beds and drawing the curtain is recommended
- Healthcare personnel should wear mask upon entering room
- Patients should wear mask (if tolerated) when transferred out of room
  - Follow respiratory hygiene/cough etiquette

Airborne Precaution Basics

- Prevent transmission of infectious agents that remain infectious in air over long distances
- An **airborne infection isolation room** (AIIR) for placement of patient
  - Single-patient room
  - Special ventilation system
- Healthcare personnel should don a fit-tested N95 mask before entry

Airborne Precautions

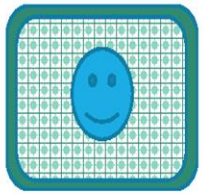
* Until AIIR can be instituted, the following should reduce likelihood of airborne transmission
  * Mask patient
  * Place patient in private room
  * Provide N95 or higher level respirator for staff
* Or **Protective Environments**

- ***Isolation***
  - Separation, for the period of communicability, of infected persons to prevent or limit the direct or indirect transmission of the infectious agent while the infection is active.

- **Quarantine**
  - Restrictions on the activities of healthy people who have been in contact with someone who has an infectious disease to prevent disease transmission during the incubation period if infection should occur.

* Control the spread of communicable diseases

*Types of isolation

	Strict isolation	Contact isolation	Respiratory isolation	Tuberculosis isolation	Enteric precautions	Drainage/secretion precautions
						
	Airborne Direct contact	Droplet Direct contact	Droplet	Airborne	Direct contact Indirect contact	Direct contact Indirect contact
PPE	Masks Gowns Gloves	Masks Gowns Gloves	Masks Gowns (*) Gloves (*)	Respiratory-type masks Gowns Gloves (*)	Masks (*) Gowns Gloves	Masks (*) Gowns Gloves