



HOSPITAL ACQUIRED

Infection

By Oliver D. G.

A man in a dark suit, white shirt, and dark tie is pointing his right index finger towards a red rectangular box with a white border. The box contains the word "Infected" in white, bold, sans-serif font. The background is dark and out of focus.

Infected

Infections that develop within a hospital or are produced by micro-organisms, acquired during hospitalization

Also called as
“**NOSOCOMIAL INFECTIONS.**”

- ‘Nosus’ means disease.
- ‘Kameion’ means to take care of.

INFECTIOUS DISEASES

About 1 in 10 of the people admitted to a hospital will contract a HAI.

They are also associated with significant morbidity, mortality, and hospital costs.

As medical care becomes more complex and antibiotic resistance increases, the cases of HAIs will grow.

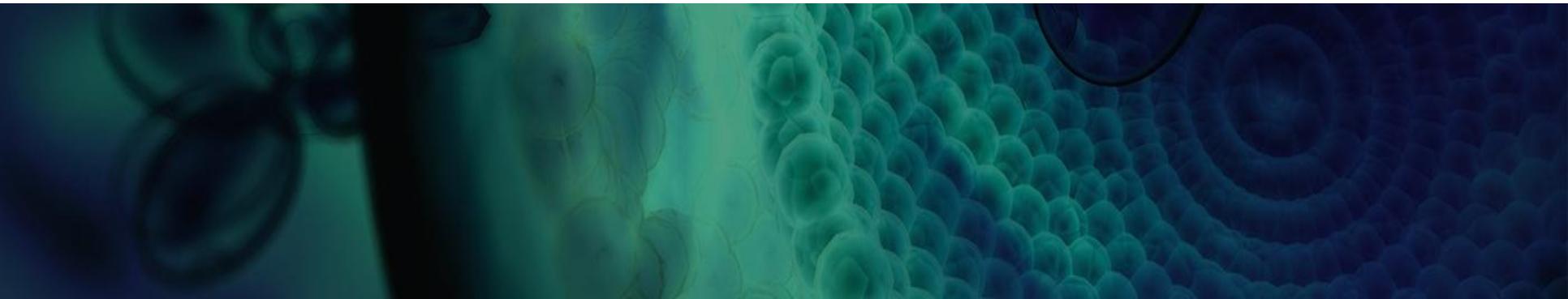
The good news is that HAIs can be prevented in a lot of healthcare situations.

Infections in the hospital

A nosocomial infection is contracted because of an infection or toxin that exists in a certain location, such as a hospital. People now use nosocomial infections interchangeably with the terms health-care associated infections (HAIs) and hospital-acquired infections.



One of the most common AREAS where HAIs occur is the intensive care unit (ICU), where doctors treat serious diseases.



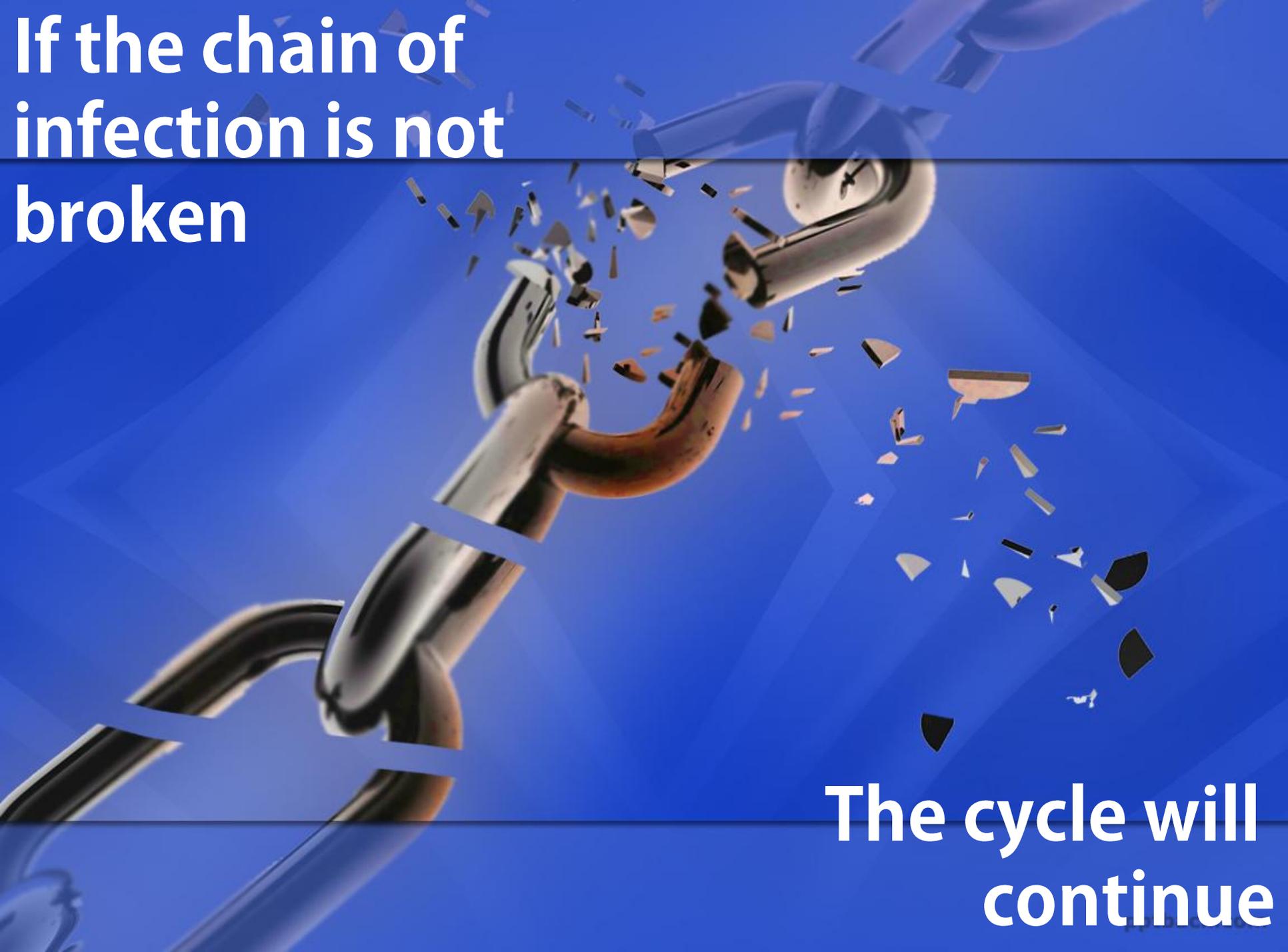
HAIs are a serious risk to patients, doctors, staff and all others who come into any healthcare facility. The infectious agents that cause HAIs in patients also pose a risk of infection to health care professionals and workers. A number of factors contribute to HAIs among patients and other personal in hospitals.



Environmental / atmospheric or surface contaminations in the health care setting is one factor in the transfer of infectious agents that contributes to HAIs in patients and others.



**If the chain of
infection is not
broken**



**The cycle will
continue**

What You Need To Know About

Infectious Disease

BACTERIA, FUNGI, AND VIRUSES SPREAD MAINLY THROUGH PERSON-TO-PERSON CONTACT.

THIS INCLUDES UNCLEAN HANDS, AND MEDICAL INSTRUMENTS SUCH AS CATHETERS, RESPIRATORY MACHINES, AND OTHER HOSPITAL TOOLS.

HAI CASES ALSO INCREASE WHEN THERE IS EXCESSIVE INFECTION IN THE ROOM ATMOSPHERE AS PATIENTS INHALE AND EXHALE THE INFECTION CAUSING MICRO ORGANISMS.

Bacteria, fungi, and viruses can cause HAIs.

Bacteria alone cause about 90 percent of these cases.

Some of the common bacteria that are responsible for HAIs are:

Staphylococcus aureus (S. aureus)

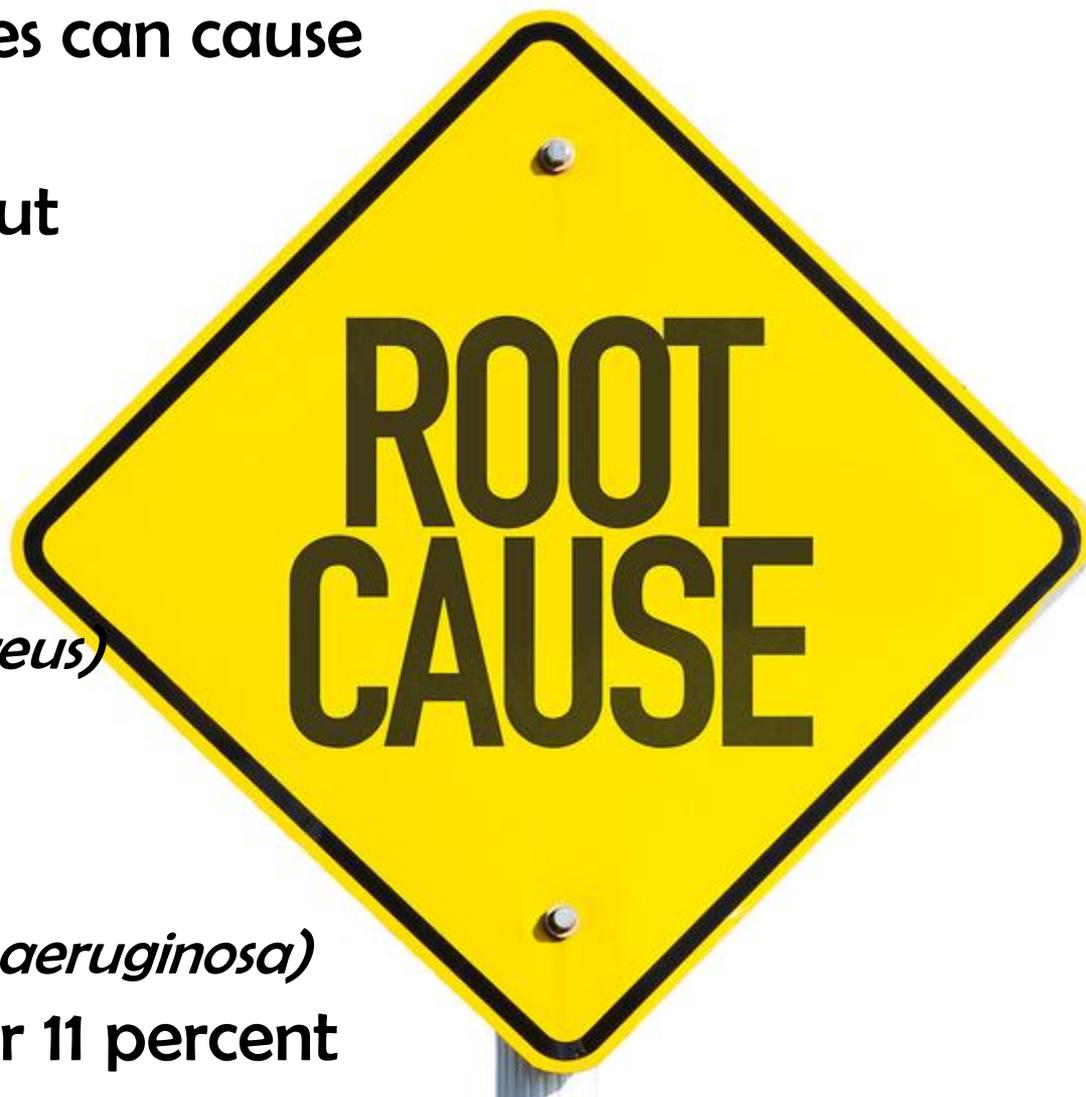
Escherichia coli (E. coli)

Enterococci

Acinetobacter baumannii

Pseudomonas aeruginosa (P. aeruginosa)

P. aeruginosa accounts for 11 percent and has a high mortality and morbidity rate.



**It's 99.9999% deadly.
Just not to you.**



Many patients have compromised immune systems during their hospital stay, so they are more likely to contract an infection.

Also, the doctors, staff and others can contract an infection, as they come in contact while treating a patient.

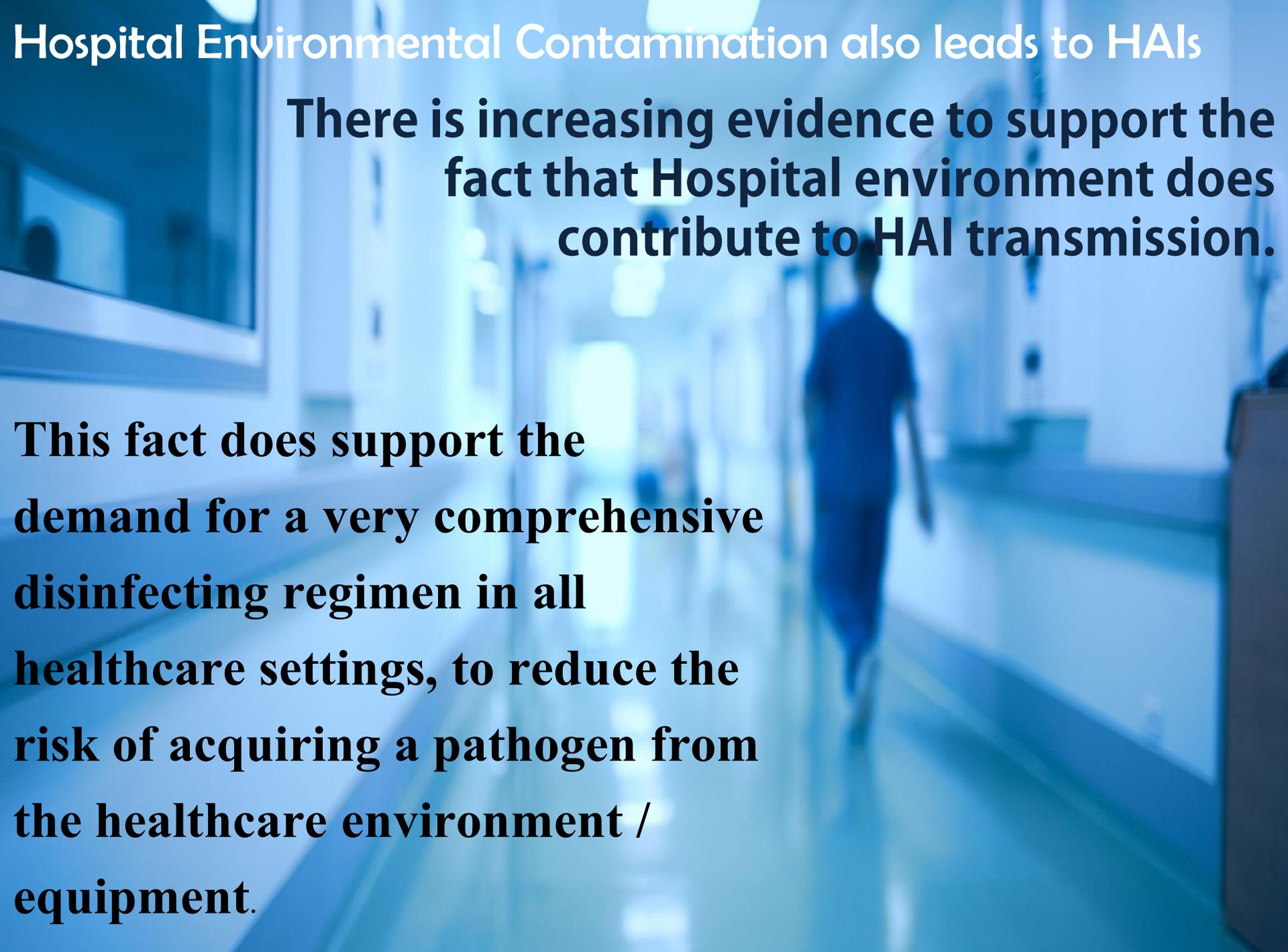


There are various reasons why patients in any hospital can acquire infection.

Patients with infectious diseases are frequently admitted to hospital.

Some of these patients are able to spread their infectious organisms to other patients and they provide one source of infection in hospital patients admitted for other causes.

A variety of measures are needed to control such infections.

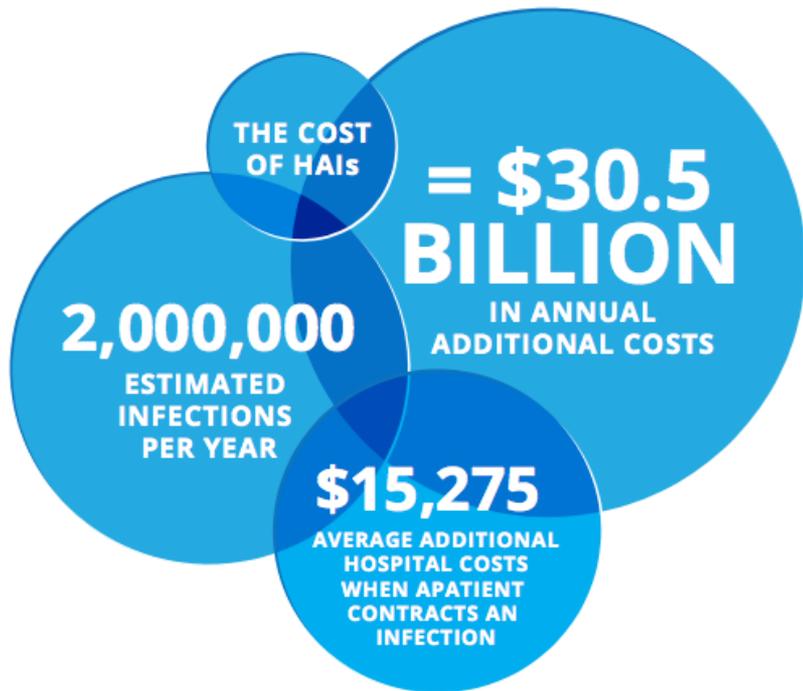
A blurred hospital hallway with a person walking away in the distance. The scene is dimly lit with a blue tint, suggesting an indoor setting like a hospital corridor. The person is in the center-right, walking away from the camera. The background shows doors and lights, but they are out of focus.

Hospital Environmental Contamination also leads to HAIs

There is increasing evidence to support the fact that Hospital environment does contribute to HAI transmission.

This fact does support the demand for a very comprehensive disinfecting regimen in all healthcare settings, to reduce the risk of acquiring a pathogen from the healthcare environment / equipment.

The Impact of HAIs

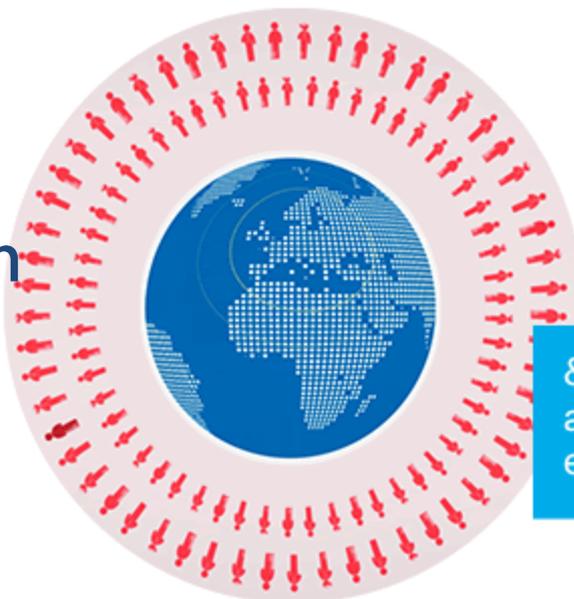


Magnitude of the Problem

These are just a few statistical estimates from developed countries.

Over **4** million patients in Europe

& 1.7 million patients in the USA are estimated to acquire HAI each year¹⁻²



There is no specific study that quantifies the HAIs in India, it is assessed that they may vary from 12 to 30% of the patients admitted to hospitals.

Protecting medical personnel and patients from Healthcare Associated Infections



According to the CDC, steps can be taken to control and prevent HAIs in a variety of settings.

Research shows that when healthcare facilities, care teams, and individual doctors and nurses, are aware of infection problems and take specific steps to prevent them, rates of some targeted HAIs can decrease by more than 70 percent.

How the Hospital Acquired Reduction Program is addressing HAIs

Preventing HAIs is possible, but it will take a conscious effort of everyone, such as clinicians, healthcare facilities and systems, public health, quality improvement groups, and the government, working together toward improving care, protecting patients, and saving lives.

Understanding and Preventing

HOSPITAL ACQUIRED INFECTIONS

Pathogens may be transmitted, from patients or health care workers to the environment / atmosphere or air / surfaces, where they can persist or proliferate if proper disinfection is not performed.

Depending on the organism, microbes can persist in the environment for hours, in case of some enveloped viruses, days or weeks, in case of most vegetative bacteria and fungi, or months, in case of bacterial spores and fungal spores.

Infectious agents can also be transferred to patients and health care workers after contact with a contaminated surface.

One study has also found that environmental surface contamination is a determinant of transmission of MDROs to the protective clothing of health care workers.



Health care facilities - whether hospitals, nursing homes, or outpatient facilities - can be dangerous places for the acquisition of infections.

These infections can be acquired in the hospital, nursing home, rehabilitation centers, as well as extended care facilities.

Healthcare-associated infections are a very important and a wide-ranging concern in the medical field.



Immuno-compromised patients, the elderly and young children are usually more susceptible than others.

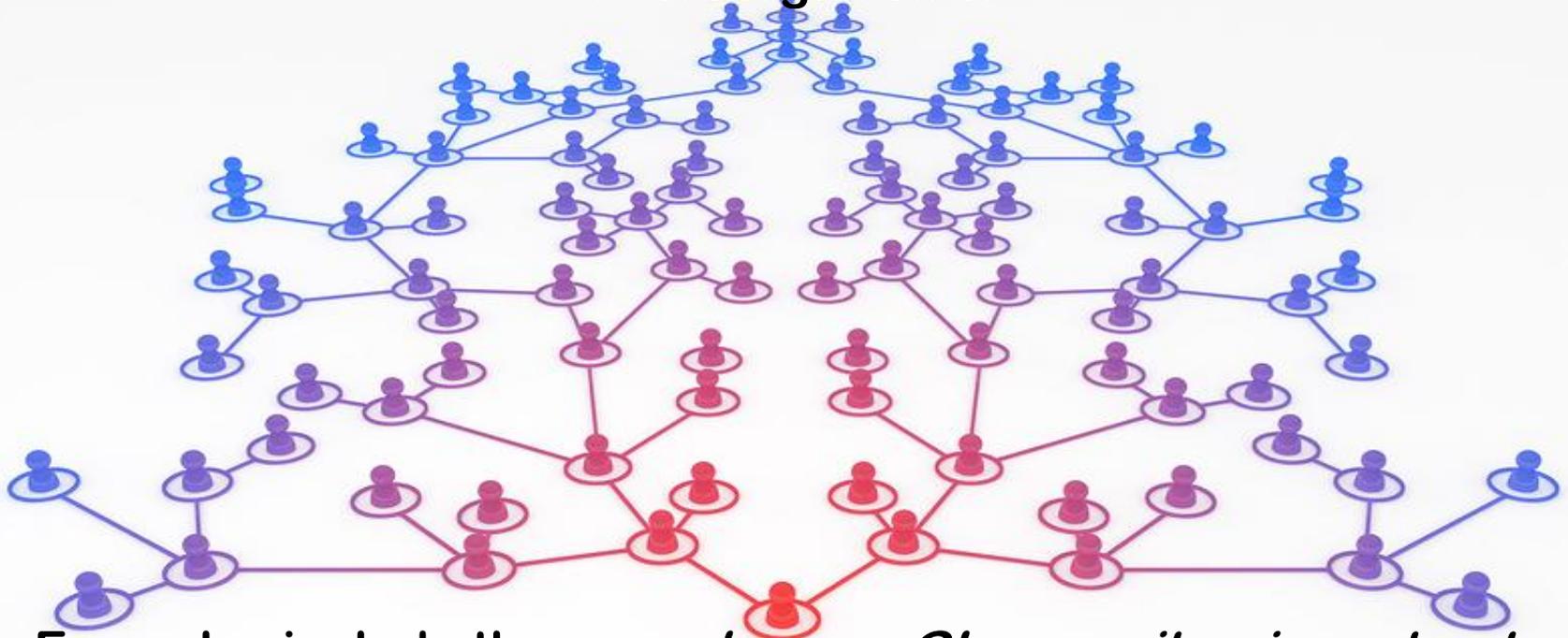
These infections are transmitted through direct contact from the hospital staff, inadequately sterilized instruments, aerosol droplets from other ill patients or even the food or water provided at hospitals.

They can be localized or systemic, can involve any system of the body, be associated with medical devices or blood transfusions.

Pathophysiology

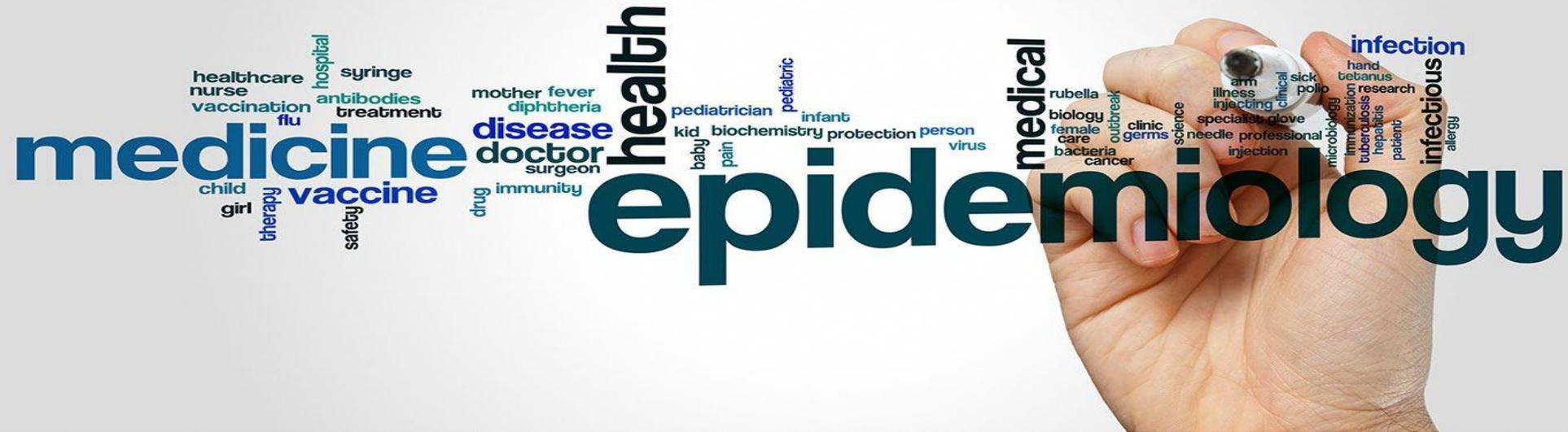
Infectious agents causing healthcare-associated infections may come from endogenous or exogenous sources.

Endogenous sources include body sites normally inhabited by microorganisms.



Examples include the *nasopharynx, GI, or genitourinary tracts*.
Exogenous sources include those that are not part of the patient.
Examples include visitors, medical personnel, equipment and the healthcare environment.

Patient-related risk factors for invasion of colonizing pathogen include severity of illness, underlying immuno-compromised state and/or the length of in-patient stay.

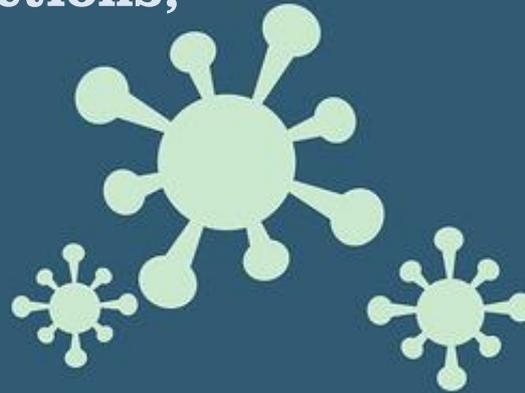


Epidemiology of infection

The development of infection depends on the presence of three conditions, a source of organisms; a mode of transmission; and the susceptibility of the patient. Both developed and resource-poor countries are faced with the burden of healthcare-associated infections.



With increasing global recognition of burden from healthcare-associated infections,



various

INFECTION CONTROL

systems have been developed in various countries; and these have shown that proper protocols and systems are effective in reducing healthcare-associated infections.



Healthcare-associated infections result in excess length of stay, mortality and healthcare costs.

Healthcare-associated infections occur in both adult and pediatric patients.

Children in either the PICU or NICU have higher rates of healthcare-associated infections.

Being a significant cause of illness and death, nosocomial infections need to be prevented from the base line so that their spread can be controlled.



- **DURING HOSPITALIZATION, PATIENT IS EXPOSED TO PATHOGENS THROUGH DIFFERENT SOURCES, SUCH AS ENVIRONMENT, HEALTHCARE STAFF, AND OTHER INFECTED PATIENTS.**
- **TRANSMISSION OF THESE INFECTIONS SHOULD BE RESTRICTED FOR PREVENTION.**
- **HOSPITAL WASTE SERVES AS POTENTIAL SOURCE OF PATHOGENS AND ABOUT 20%–25% OF HOSPITAL WASTE IS TERMED AS HAZARDOUS.**
- **NOSOCOMIAL INFECTIONS CAN BE CONTROLLED BY PRACTICING INFECTION CONTROL PROGRAMS, KEEP CHECK ON ANTIMICROBIAL USE AND ITS RESISTANCE, ADOPTING ANTIBIOTIC CONTROL POLICY.**



Efficient infection prevention and control protocols and systems can play a very vital part at all the levels in the healthcare facility.

Constant efforts are required by all stakeholders to prevent and control nosocomial infections.

Pathogens responsible for nosocomial infections are bacteria, viruses and fungal parasites.

These microorganisms vary depending upon different patient populations, medical facilities and even difference in the environment in which the care is given.

RISK FACTORS DETERMINING NOSOCOMIAL INFECTIONS DEPENDS UPON THE ENVIRONMENT IN WHICH CARE IS DELIVERED, THE SUSCEPTIBILITY AND CONDITION OF THE PATIENT, AND THE LACK OF AWARENESS OF SUCH PREVAILING INFECTIONS AMONG STAFF AND HEALTH CARE PROVIDERS.

RISK FACTOR



Poor hygienic conditions / inadequate & inconsistent disinfection practices / improper waste disposal methods / absence of regular surveillance protocols, etc. are some risk factors for INFECTIONS from health care settings.

Reservoirs and transmission of Infection



➤ Patient and staff

Transmission of pathogens during the treatment through direct contacts with the patients (hands, saliva, other body fluids etc.) and by the staff through direct contact or other environmental sources (water, food, other body fluids).

➤ Microflora of patient
Bacteria belonging to the endogenous flora of the patient can cause infections if they are transferred to tissue wound or surgical site. Gram negative bacteria in the digestive tract cause SSI after abdominal surgery.

➤ Environment

Pathogens living in the healthcare environment i.e. air, water, food, and equipments can be a source of transmission. Transmission to other patient makes one more reservoir for an uninfected patient.



Transmission from environment

- **Unhygienic environment serves as the best source for the pathogenic organism to prevail.**
- **Air, water and food can get contaminated and transmitted to the patients under healthcare delivery.**
- **There must be proper practices to ensure the cleaning and use of cleaning agents on walls, floor, windows, beds, baths, toilets and other medical devices.**

**“A SANITARY ENVIRONMENT
WILL KEEP YOUR STAFF
AND PATIENTS SAFE”**



PROVIDING THE HIGHEST STANDARD OF HOSPITAL CLEANING

- **Proper disinfection protocols for the room air & atmosphere can eliminate airborne pathogenic contamination.**
- **Regular disinfection of general wards, operating theatres and ICUs must be done.**
- **Even improper food handling may cause food borne infections.**

Hospital waste management

Waste from hospitals can act as a potential reservoir for pathogens that needs proper handling.

10–25% of the waste generated by healthcare facility is termed as hazardous.

Infectious healthcare waste should be stored in the area with restricted approach.

Waste containing high content of heavy metals and waste from surgeries, infected individuals, contaminated with blood and sputum and that of diagnostic laboratories must be disposed off separately.





Control of nosocomial infections

Despite of significant efforts made to prevent nosocomial infections, there is more work required to control these infections.

In a day, one out of 25 hospital patients can acquire at least a single type of nosocomial infection.

Healthcare facilities have to devise infection control programs against these infections.

Administration, doctors, staff, workers patients and individuals admitted or visiting hospital must take into account such programs to play their role in prevention of infections.

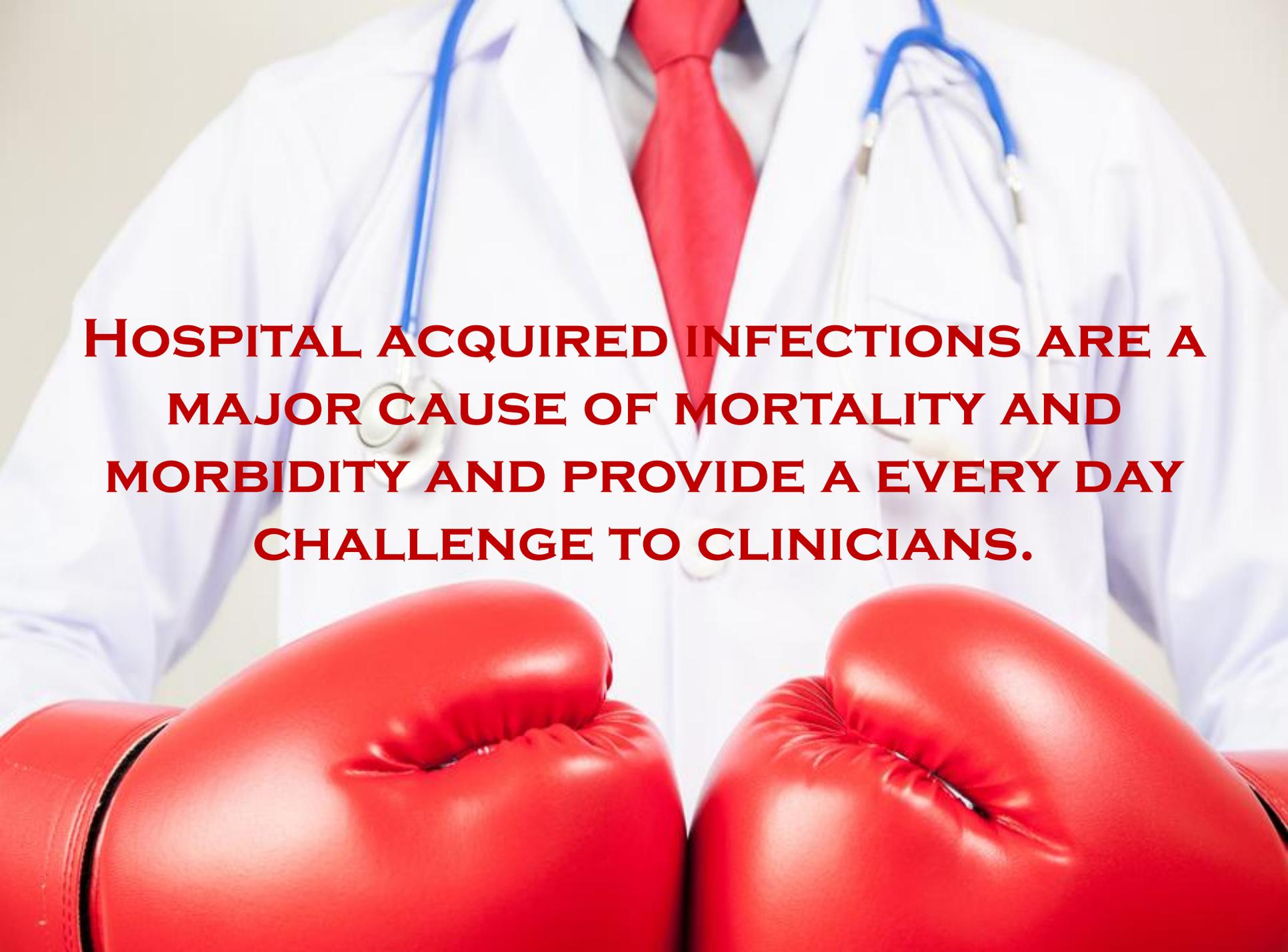


CHALLENGES

HEALTHCARE

With increased burden of nosocomial infections and antimicrobial resistance, it has become difficult for healthcare administrations and infection control committees to reach the goal for elimination of infections.

However, by practicing sound and healthy ways for care delivery designed by the right infection control techniques, controlling the transmission of infections and by using appropriate methods for antimicrobial use, the resistance in emerging pathogens against antimicrobials can be reduced easily.

A photograph of a doctor in a white lab coat, a red tie, and a blue stethoscope. The doctor is standing with their hands in their pockets. In the foreground, two red boxing gloves are visible, suggesting a fight or challenge. The text is overlaid in the center of the image.

**HOSPITAL ACQUIRED INFECTIONS ARE A
MAJOR CAUSE OF MORTALITY AND
MORBIDITY AND PROVIDE A EVERY DAY
CHALLENGE TO CLINICIANS.**



An efficient method to control and prevent infections can help healthcare facilities to devise infection control policies and programs.

Proper training of hospital staff for bio-safety, proper disinfection protocols, proper waste management and healthcare reforms and making general public aware of these endemic infections can also help in reduction of nosocomial infections.

HOSPITAL INFECTION PREVENTION

Aspects of infection, such as pain, discomfort, embarrassment and worry, cannot be expressed in

monetary terms,

Therefore any control measures that are successful in reducing infection must be worthwhile as well as being effective with long term benefits.

but can be very distressing for the relatives, doctors and nurses.



Cross infections

Cross infections can complicate a condition or procedure. The best way to avoid getting one is to prevent it from transferring.

Many institutions do not have strict rules to help reduce cross infection.

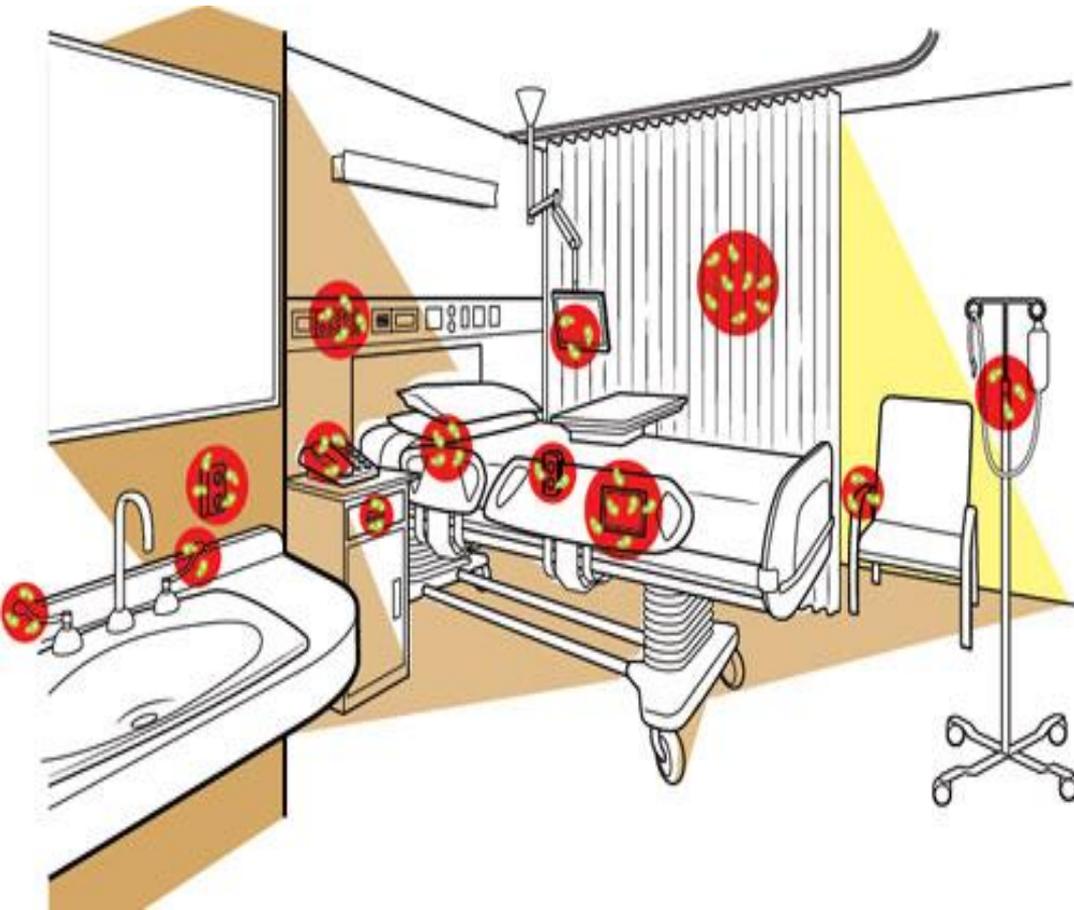
Unfortunately, the development and presentation of an infection is not a new or unusual occurrence, Mason (1992) suggested that cross infection cost hospitals up to millions in extra care each year.

A cross infection is the transfer of harmful microorganisms, usually bacteria and viruses. The spread of infections can occur between people, from the air, pieces of equipment, or within the body.

These infections can cause many complications.

So, medical professionals have to ensure patient safety and a clean environment.

The symptoms of a cross infection depend on the source of the infection. Over time, bacteria can adapt and become resistant to medications. This leads to the evolution of “superbugs.” These are strains of bacteria immune to multiple antibiotics. This can make them more difficult to kill, and can increase complications.



**Protect yourself.
Protect your patients.**



Wash hands often.

Keep vaccinations current.



Each day at a hospital or clinic, people everywhere are spread infectious diseases. Frequent hand washing (before and after every patient) stops the chain of infection. Frequent hand hygiene and updated vaccinations provide the best ways to protect yourself and your patients.

**THERE IS NO MAGIC FORMULA
IN PREVENTING THE SPREAD OF
INFECTION, PROPER
PRECAUTIONS NEED TO BE
IMPLEMENTED.
THESE SHOULD ELABORATELY
INCLUDE POLICIES AND
PROTOCOLS ON PATIENT CARE
AND DISINFECTION PROTOCOLS.
INFECTION CONTROL REQUIRES
CONSISTENCY OF
INTERVENTION THAT IN TURN
REDUCES THE COMPROMISES
ABOUT STANDARDS OF CARE,
THEREBY MINIMIZING THE
POTENTIAL FOR SPREAD OF
INFECTION.**

Infection Control is Everyone's Business

Family/Visitors

Physicians

Administrators

Hospital

Ambulatory Care Center



Therapists

CNA/PCA/CMA

Environmental Services

Nurses

Clerks

Patients



Infectious diseases may be an unavoidable fact of life, but there are many strategies available to help us protect ourselves and others from infection.



With proper precautions, all can avoid infectious diseases and avoid spreading them.

Proper Preventive protocols and measures are recommended such as:

- Use of safe non chemical Disinfectants or Antimicrobial Agents**
- Sterilization**
- Cleanliness**
- Use of antibiotics sensibly**

Infection control is the discipline concerned with preventing nosocomial or healthcare-associated infection, a practical sub-discipline of epidemiology. It is an essential, though often under recognized and under supported, part of the infrastructure of health care.



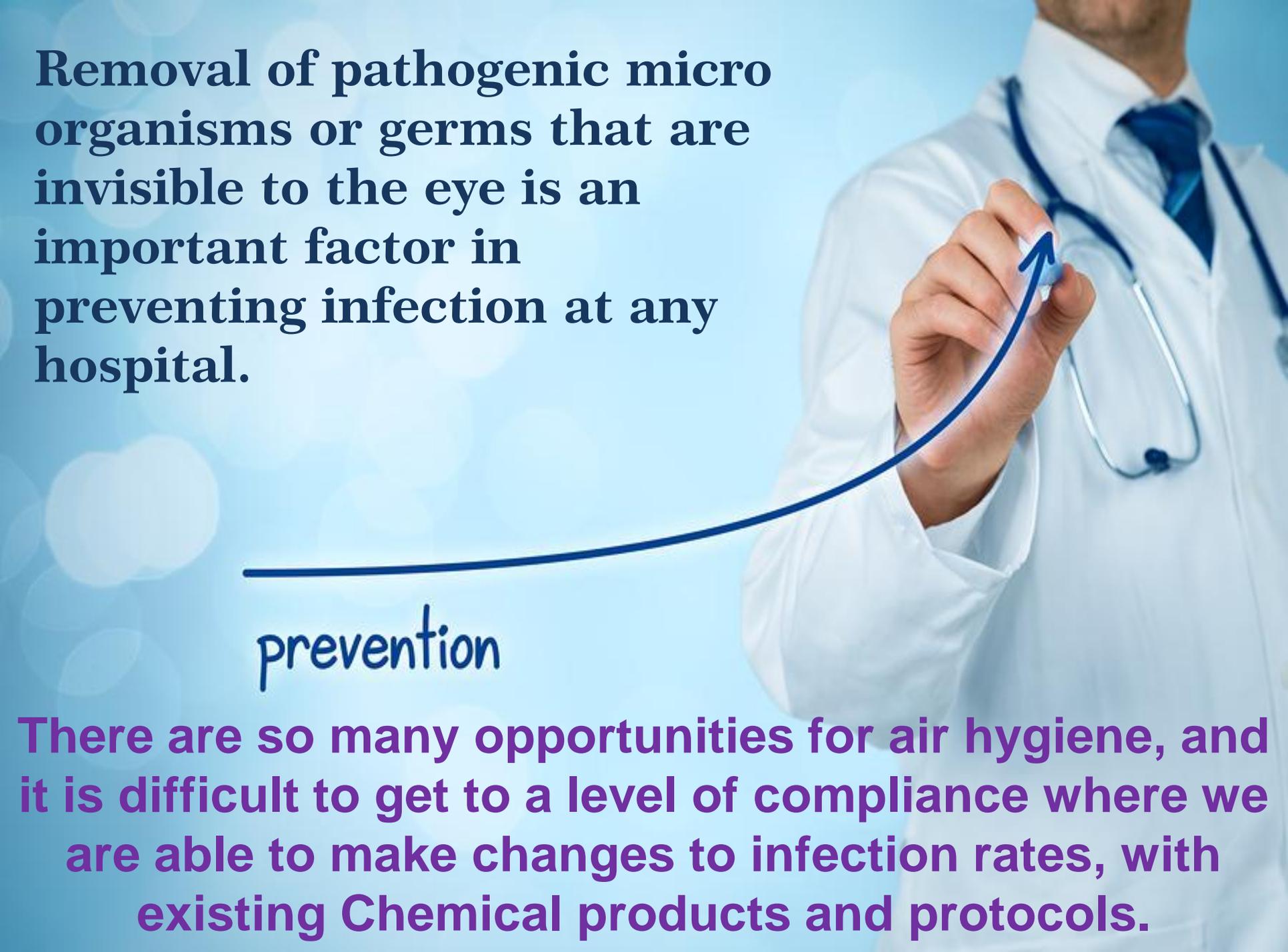
ALL ARE AT RISK



INFECTIOUS DISEASES AND ITS UNCONTROLLABLE SPREAD IS RELEVANT TO EVERYONE INSIDE ANY HEALTHCARE FACILITY INCLUDING PATIENTS, ATTENDANTS, VISITORS, DOCTORS, NURSES, OTHER CLINICAL OR NON CLINICAL PROFESSIONALS AND SUPPORT STAFF.

ALSO TO ALL THOSE WITH WHOM THEY COME IN CONTACT WITH INCLUDING THEIR FAMILIES AND FRIENDS OR OTHER TYPES OF CONTACTS IN ANY KIND OF SETTINGS OR FACILITIES.

Removal of pathogenic microorganisms or germs that are invisible to the eye is an important factor in preventing infection at any hospital.



prevention

There are so many opportunities for air hygiene, and it is difficult to get to a level of compliance where we are able to make changes to infection rates, with existing Chemical products and protocols.

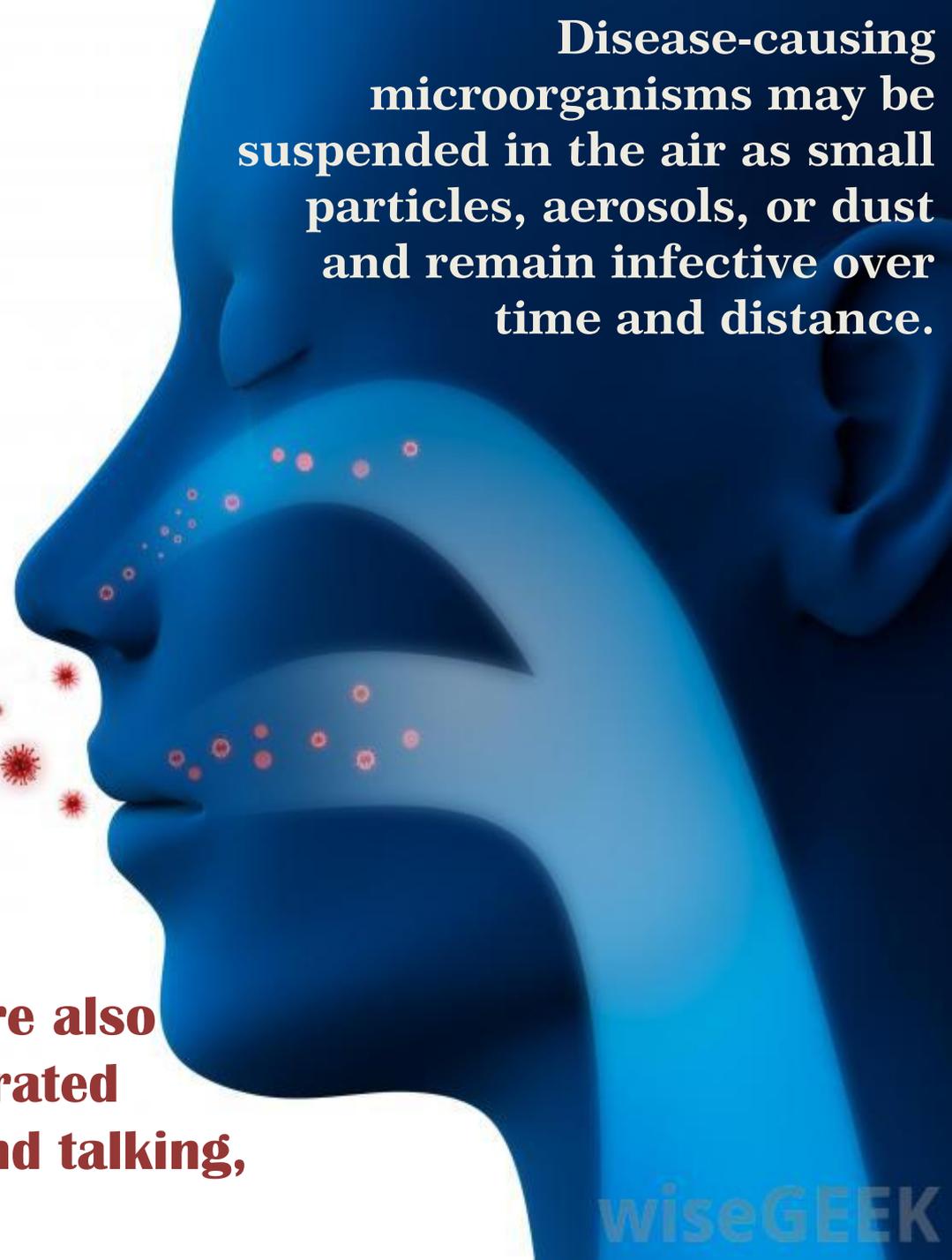
Infection Prevention and You



When we look at all of the things that we can do to prevent infections in the hospital, one of the most important thing is about air hygiene, that it causes the spread of so many different types of organisms.

AIRBORNE INFECTIONS

Disease-causing microorganisms may be suspended in the air as small particles, aerosols, or dust and remain infective over time and distance.

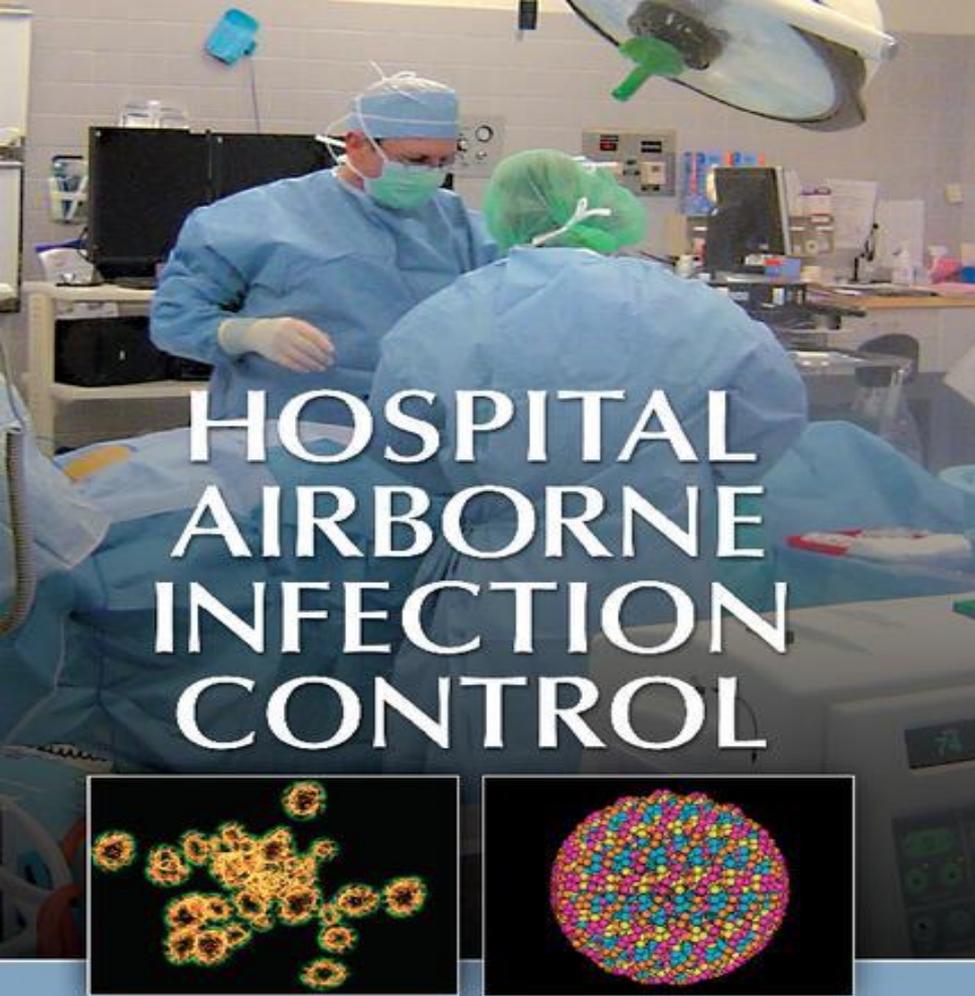


Infectious Microorganisms are also transmitted by droplets generated during coughing, sneezing and talking, etc.



A VERY SAFE AND EFFECTIVE CLEANING AND DISINFECTION OF ALL PATIENT CARE AREAS IS IMPORTANT, ESPECIALLY SURFACES CLOSE TO THE PATIENT.

Some pathogens can survive for long periods in the environment, particularly Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin resistant *Enterococcus* (VRE), *Acinetobacter* species, *Clostridium difficile* and *norovirus*.



HOSPITAL AIRBORNE INFECTION CONTROL

Taking all necessary steps to prevent HAIs can decrease the risk of contracting them by 80 percent or more.

However, in all healthcare facilities, it is possible to eliminate 100 percent of nosocomial infections.

Nosocomial infections, or healthcare associated infections occur when a person develops an infection during their time at a healthcare facility.

Infections that appear after your hospital stay must meet certain criteria in order for it to qualify as a HAI.

The patient environment can play an important role in the acquisition of hospital-acquired infections.

Environmental **GREEN** Disinfection



Environmental / Air disinfection is recommended in particular to reduce the risk associated with atmospheric contamination.

This can be successfully achieved by application of natural disinfectants, which can be diluted depending on the level of microbial load, in the area of use, to decontaminate areas within a hospital to prevent and control nosocomial pathogens.

The Disinfection Connection

The new fumigation process based on our innovative ingredient has been found to be effective in significantly reducing atmospheric / air microbial contamination levels in typical hospital areas. This process could be safely and effectively applied during routine environmental disinfection practices within healthcare facilities and in particular during outbreak situations.

Infection occurs through direct contact between the source of infection and the recipient or indirectly through contaminated objects.

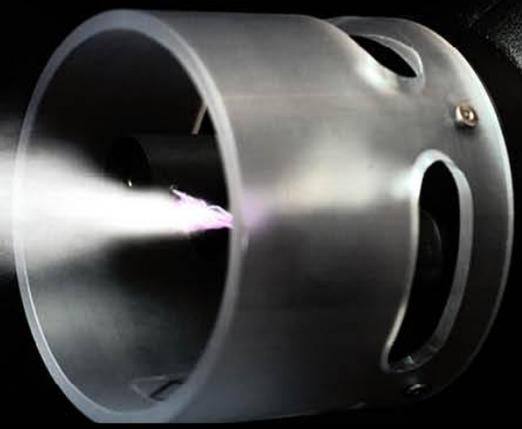
Healthcare Workers' Risks and Handling Exposures



Microorganisms in the air are transmitted by three main routes: Contact / Air inhalation / Droplet . In nosocomial infections, transmission by contact, droplet, and air plays a major role.

A collage of various microscopic organisms, including what appears to be a virus, a bacterium, and a cell, rendered in a glowing green and yellow color scheme.

SCHEDULE YOUR ROUTINE **DISINFECTION**

A close-up of a white plastic disinfectant sprayer nozzle, angled downwards and to the left, with a fine mist of white liquid being emitted from its opening.

Disinfection is a process where almost all microbes are removed from a defined atmosphere or object or surface.

Facilities should establish policies and procedures for routine cleaning and disinfection of the environment and other surfaces as part of their infection prevention plan.

All concerned services staff should be trained and responsible for routine disinfection of the environment and other surfaces. Such procedures can be periodically monitored or assessed to ensure that they are consistently and correctly performed.



Certain areas of the hospital are identified as high-risk areas for acquisition and transmission of pathogenic microorganisms.

Nosocomial Infection rates in the intensive care units are higher than in the general areas of any hospital. This is related to severity of illness and greater susceptibility to acquiring microorganisms related to the ICU.

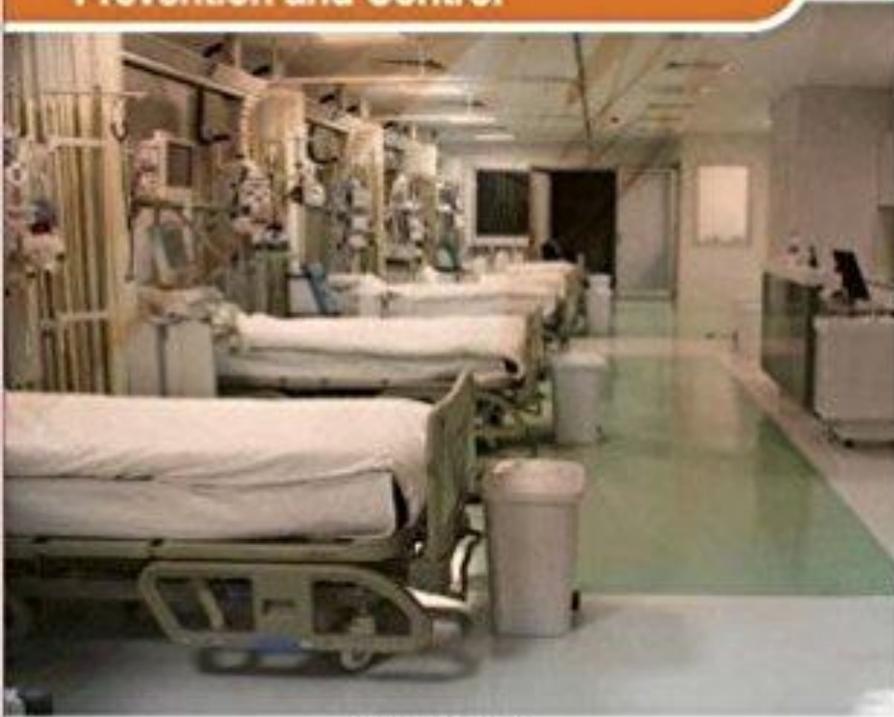


ICUs have higher rates of invasive procedures, patients on ventilators for prolonged periods, and a large category of health workers.

The risk of transmission of Potentially Pathogenic Microorganisms (PPMs) is very high in the ICUs

Hospital Acquired Infections

Prevention and Control



**INFECTION CONTROL
PRECAUTIONS
SHOULD BE
MAINTAINED TO
MINIMIZE THE RISK
OF TRANSMISSION OF
MICRO-ORGANISMS
TO OTHER PATIENTS
AND CONTAMINATION
OF THE
ENVIRONMENT,
OTHER SURFACES OR
EQUIPMENT.**

Lack of adequate systems, infrastructure leading to hospital-associated infections

Health ministry says lack of adequate systems and infrastructure for prevention and control in many healthcare facilities is leading to hospital-associated infections and spread of drugs resistant bacteria

- Neetu Chandra Sharma



A latest study published in the Indian Journal of Critical Care Medicine found that hospital-acquired infections remain a potentially serious complication in infants.

Photo: HT

New Delhi: Lack of adequate systems and infrastructure for prevention and control in many healthcare facilities in India is leading to hospital-associated infections and spread of drugs resistant bacteria putting millions at risk, the Union government has admitted in a study published in British Medical Journal (BMJ).

+75,000

US citizens die from healthcare-associated infections a year.

*www.cdc.org/HAI



CENTERS FOR DISEASE
CONTROL AND PREVENTION

Healthcare

An alternative disinfectant for protecting against the invisible threat of infection...

It is time that all Healthcare facilities start using safer and better Disinfectants

THANKYOU &
STAY
HEALTHY