# BREAKING DOWN THE SILOS

Midwest Healthcare Engineering Conference

November 9, 2021

Loie Couch, RN, BS, CIC, FAPIC

# LEARNING OUTCOMES

- Examine the history of healthcare
- Discuss the benefits of a collaborative relationship between Infection Prevention and Facilities
- Review the precautions applied to protect patients, but allow for project completion
- Facilitate effective communication with other departments

# DISCLOSURES

- I have nothing to disclose

# LOIE COUCH, RN, BS, CIC, FAPIC

- RN – 1985
- BS – Health Care Leadership
- Infection Prevention – 2003
  - CIC certified infection control – 2005, 2010, 2015, 2020
  - FAPIC – Fellow of Association of Professionals in Infection Control - 2016

# BARNES-JEWISH HOSPITAL

1305 beds

Tertiary medical center

Affiliated with Washington University School of Medicine

# HISTORY OF HOSPITALS

- Early modern era (1500-1800)
- A few good men (and women) early to mid 1800s
- Progressive era – (1890-1920)
- Post World war II era (1940-1950)
- Modern era 1950s to present

# MEDIEVAL ERA

- 5th to 15th centuries
- Hospitals called "spittle houses"
  - Cared for sick, insane and destitute
  - Plague
    - Bodies left in streets, placed in mass graves out of town
    - 1/3 of Europe's population killed
    - People from infected areas were hanged
  - Smallpox
    - 20%-60% mortality rate
  - Influenza
  - Dysentery
  - Typhus (louse borne)

American Journal of Infection Control 40 (2012) 35-42

# MEDIEVAL ERA

- Hospitals were small and had large burial grounds
- Isolated Leprosy patients "pest houses"
- Built over sewers
- Surgery had 60%-80% mortality rates
- Vermin running rampant in hospitals
- Corpses remained >24 in a bed, with other patients

American Journal of Infection Control 40 (2012) 35-42

# EARLY MODERN ERA (1500-

- Plague no longer an issue
- Infectious diseases remained the leading cause of death
  - Yellow fever
  - Smallpox
  - Measles
  - Cholera
- Treatments included purges, emetics, opium, quinine and blood letting

American Journal of Infection Control 40 (2012) 35-42

# EARLY MODERN ERA (1500-1800)

- 1796 – Edward Jenner deliberately inoculated an 8 year old boy with cow pox
- First "clinical trial" for smallpox vaccination
- The boy successfully withstood a smallpox challenge, demonstrating immunity

American Journal of Infection Control 40 (2012) 35-42

# EARLY MODERN ERA (1500-1800)

- Medications not tested for efficacy and safety
  - Mercury poisoning common
- Hospitals crowded, dirty, poorly ventilated, multiple patients in one bed
- Wealthier families cared for at home
- Frequent epidemics
  - Tetanus
  - Erysipelas
  - Septicemia
  - Gangrene
  - Louise borne typhus (hospital fever)
  - Tuberculosis
  - Cholera

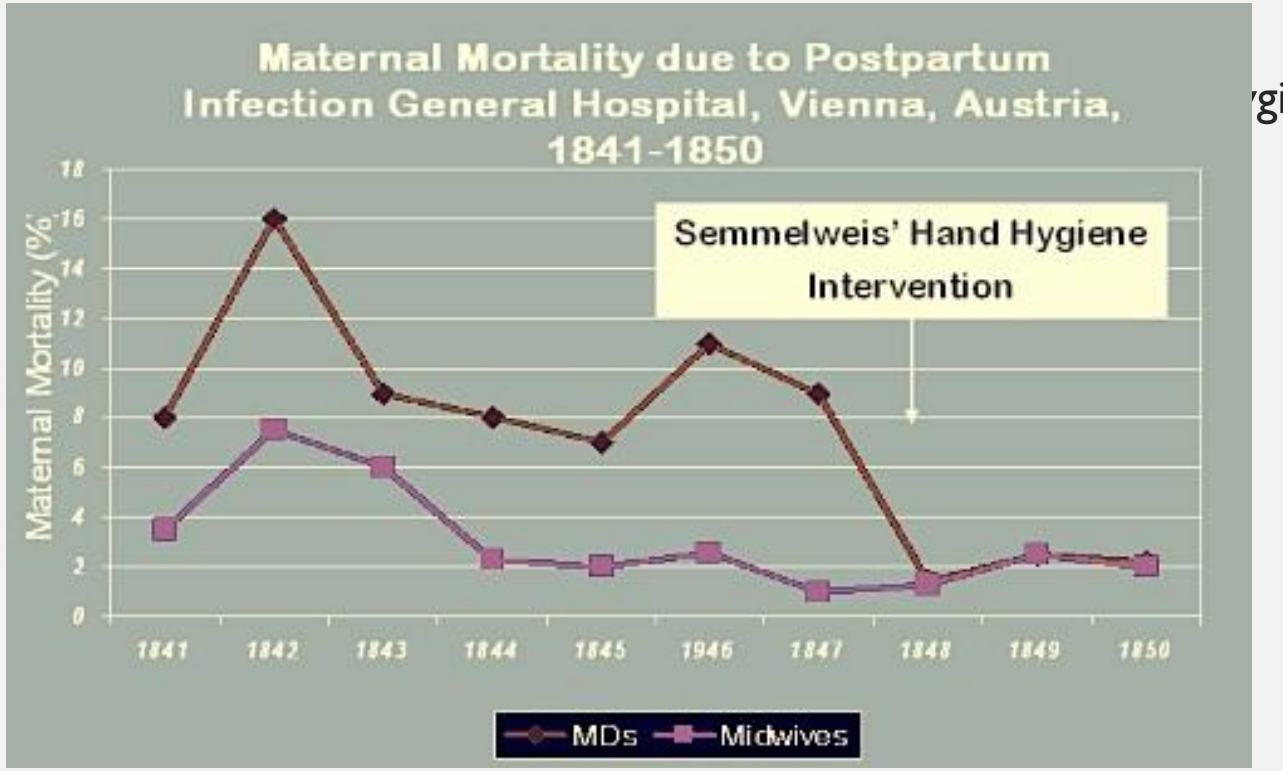
American Journal of Infection Control 40 (2012) 35-42

# EARLY MODERN ERA (1500-1800)

- Hospital mortality 25%
- Surgeries very deadly
- Women rarely survived C-sections
- Strolling barbers/surgeons performed most surgeries (between shaves and haircuts)
- Overcoats worn to protect their clothing (contaminated with blood and pus)
- Instruments and probes not cleaned in between patients (even if dropped on the floor
- Wounds not cleansed or closed, surgeons (barbers) didn't wear gloves

American Journal of Infection Control 40 (2012) 35-42

# MID TO LATE 1800S




American Journal of Infection Control 40 (2012) 35-42

# MID TO LATE 1800S

- Early 1850 - Florence Nightingale – Improved hygiene practices in hospitals, significantly decreased death rate
- 1850 – Louis Pasteur – theorized living microscopic organic matter in air
- 1886 – Louis Pasteur immunized a boy bitten by rabid dog
- 1854 - John Snow – Father of Epidemiology
  - Broad street pump
  - Anesthesia – chloroform
  - Hygiene practices
  - Performed anesthesia on Queen Victoria for the births of her 8$^{th}$ and 9$^{th}$ children – 1853 and 1857

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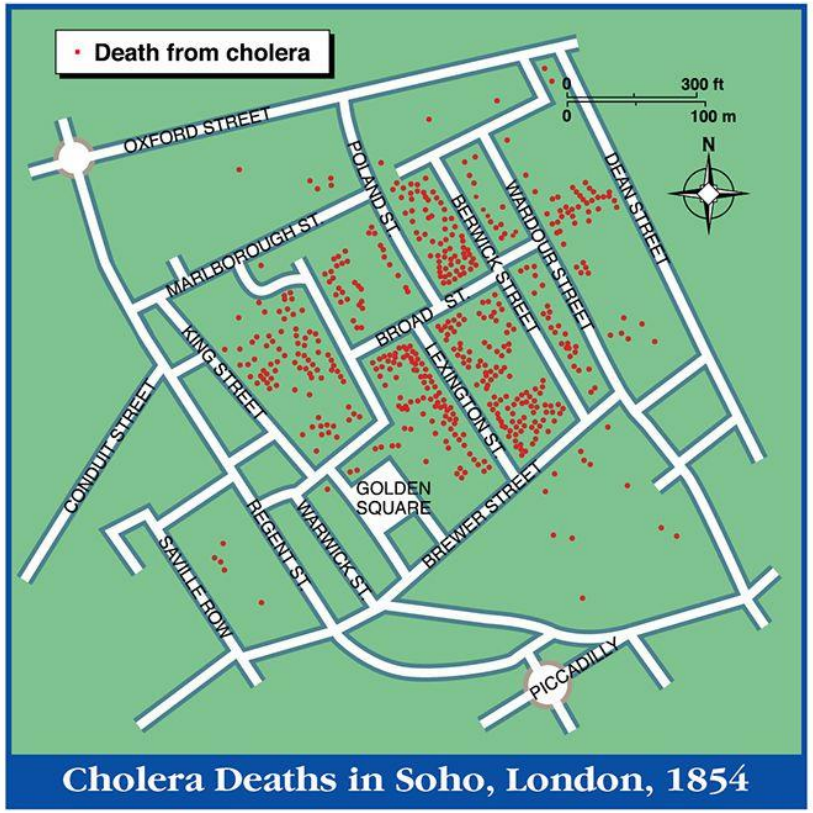
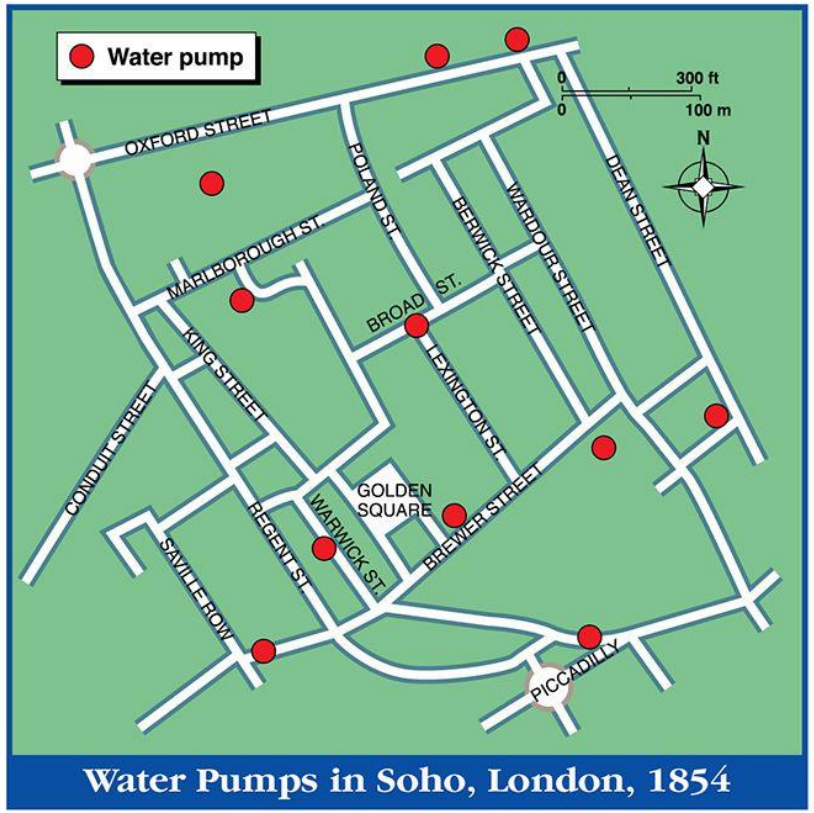
# BROAD STREET PUMP




https://www.nationalgeographic.org/activity/mapping-london-epidemic/

# MID TO LATE 1800S

- Joseph Lister – 1860
  - Reviewed Pasteur's work
  - Infections caused by living organisms
  - Destroyed by boiling
  - Disinfectant soaked dressings
  - Handwashing
  - Covering wounds
- Using chemicals
  - German creosote (5% Carbolic acid)
  - Between 1865 and 1867 treated 11 compound fractures, 9 did not get infected
  - 1890 – Microbes causing sepsis identified

# MID TO LATE 1800S

- 1876 Kock conclusively proved specific bacteria can cause disease (anthrax)
- 1891 – First patient received diphtheria anti-toxin
- Use of soap increased
- Milk pasteurization
- Water treatment systems
- Sewer systems
- By 1900 40/45 states had established health departments, public drinking water chlorination had begun

American Journal of Infection Control 40 (2012) 35-42

# PROGRESSIVE ERA

- By 1900 there were 4,000 hospitals in the US
- No longer seen as "last resort"
- Electricity
- X-ray units
- Intravenous fluid therapy and clinical thermometry
- Lister's surgical asepsis decreased post amputation mortality from 45% to 15%
- Rubber gloves introduced in 1890

American Journal of Infection Control 40 (2012) 35-42

# PROGRESSIVE ERA

- Infection rates lower than 1800s
  - Dysentery
  - Puerperal (childbirth) fever
  - TB
  - Pneumonia
  - Gangrene
  - Influenza
  - Erysipelas
- Hospital mortality rate 10%

American Journal of Infection Control 40 (2012) 35-42

# PROGRESSIVE ERA

- Hospital floors and walls lined with glazed tile
- Surgical dressings packaged and placed on perforated boiler trays
- Operating rooms mopped between cases
- Lighting was good
- Hot and cold water available
- Surgeons began wearing gowns instead of street clothes to operate in
- Patients bathed on admission

American Journal of Infection Control 40 (2012) 35-42

# POST WW II ERA

- Public health efforts increased
- TB, diphtheria, pertussis, measles, puerperal sepsis declined
- Alexander Flemming noted inhibitory effect of contaminating mold on Staphylococcus aureus colonies (Penicillium)
- Sulfanilamide and Penicillin were now potent drugs
- 1942 – First injection of Penicillin given at Yale Hospital
- Streptomycin discovered, TB treatment

American Journal of Infection Control 40 (2012) 35-42

# POST WW II ERA

- 1938 – 105 people died from ethylene glycol, used to dilute sulfanilamide
  - Federal Food, Drug and Cosmetic Act
  - Required proof of safety before new drug approval
- 1946 – CDC founded
  - First weekly disease report
    - 161 cases of poliomyelitis
    - 4 cases of smallpox
    - 229 cases if diphtheria
    - 25,041 cases of measles

American Journal of Infection Control 40 (2012) 35-42

# POST WW II ERA

- Mobile X-ray units screened for TB
  - Mortality rate decreasing
  - 500/100,000 in 1850
  - 50/100,000 in 1945
- Hospital building boom
  - Hill-Burton Act 1946
  - Hospitals much safer
  - ORs cleaned after each procedure
  - Standard surgical attire
  - Supplies boiled and reused
  - Gauze ironed and reused

American Journal of Infection Control 40 (2012) 35-42

# POST WW II ERA

- Following the introduction of antibiotics, Streptococcal disease declined
- Staphylococcus aureus emerged as predominant pathogen in the 1950s
  - Related to antibiotic resistance
- Epidemics occurred in hospitals
- Hospital employees at risk for TB
- Nurses and med students became positive for TB

American Journal of Infection Control 40 (2012) 35-42

# AND THEN

- 1960s – Infectious patients on general wards
  - CDC offers course on surveillance and control of nosocomial infections
  - JCAHO (TJC) mandates standards for Infection Control
- 1970s -
  - CDC publishes isolation techniques for use in hospitals
  - CDC Study Efficacy of Nosocomial Infections (SENIC) demonstrated importance of infection control programs

American Journal of Infection Control 40 (2012) 35-42

# AND THEN

- June 6, 2003 – CDC publishes Guidelines for Environmental Infection Control in Health Care facilities
  - Infection control impact of ventilation systems and water system performance
  - Establish a multidisciplinary team to conduct infection control risk assessments
  - Use of dust control procedures and barriers during construction, repair, renovation, demolition and maintenance
  - Guidance for recovering from water system disruptions, water leaks and natural disasters

American Journal of Infection Control 40 (2012) 35-42

# AMI ENVIRONMENTAL – CDC - ASHE

- ICRA – sinks, types, location, HH placement
  - Automatic faucet use questionable
- Hand hygiene
- Reprocessing
- Environmental surface cleaning
- Water
- Patient, personnel, equipment and waste transport

# 2015

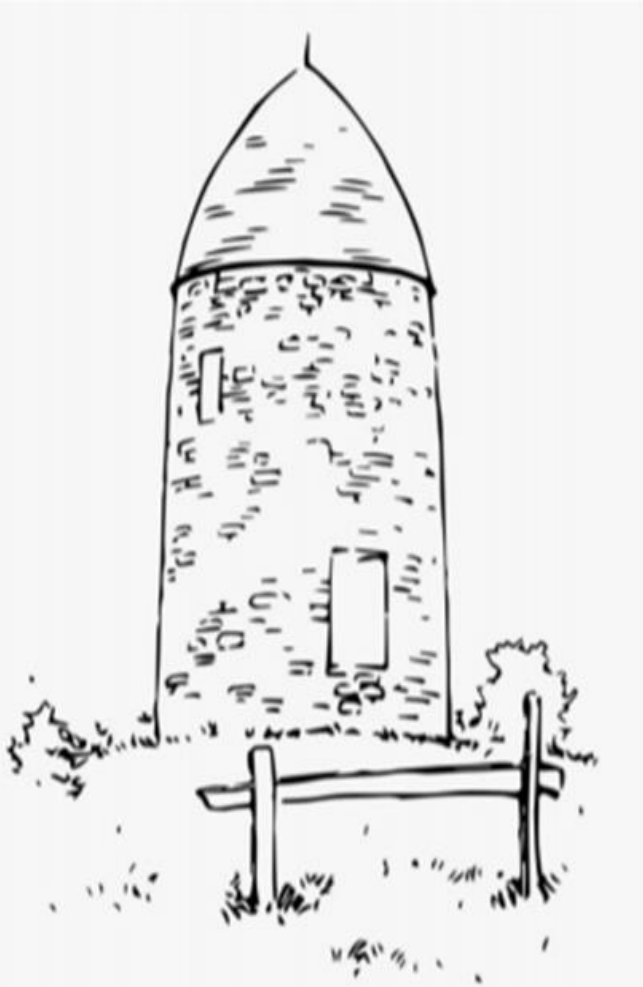
- ASHRAE 188
  - Prevent the growth and spread of Legionella
    - Testing
    - Frequency
    - Locations
    - Plans for response

# AUTHORITIES HAVING JURISDICTION

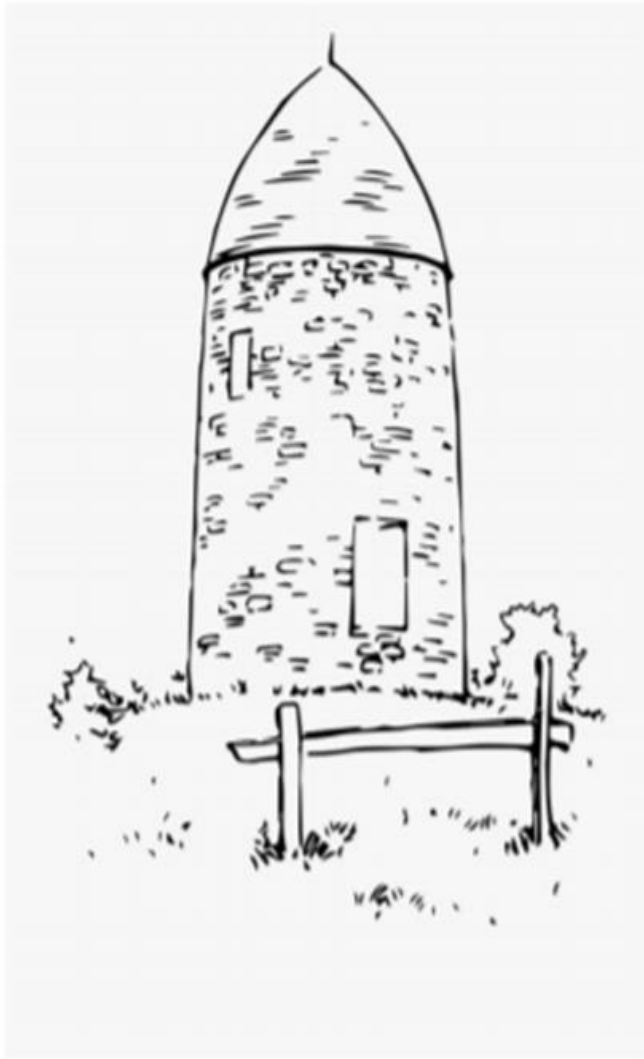
- Recommend IP involvement
  - JCAHO (TJC)
  - AIA
  - ASHRAE
  - ASHE
  - CDC
  - APIC

# How It Started

Facilities



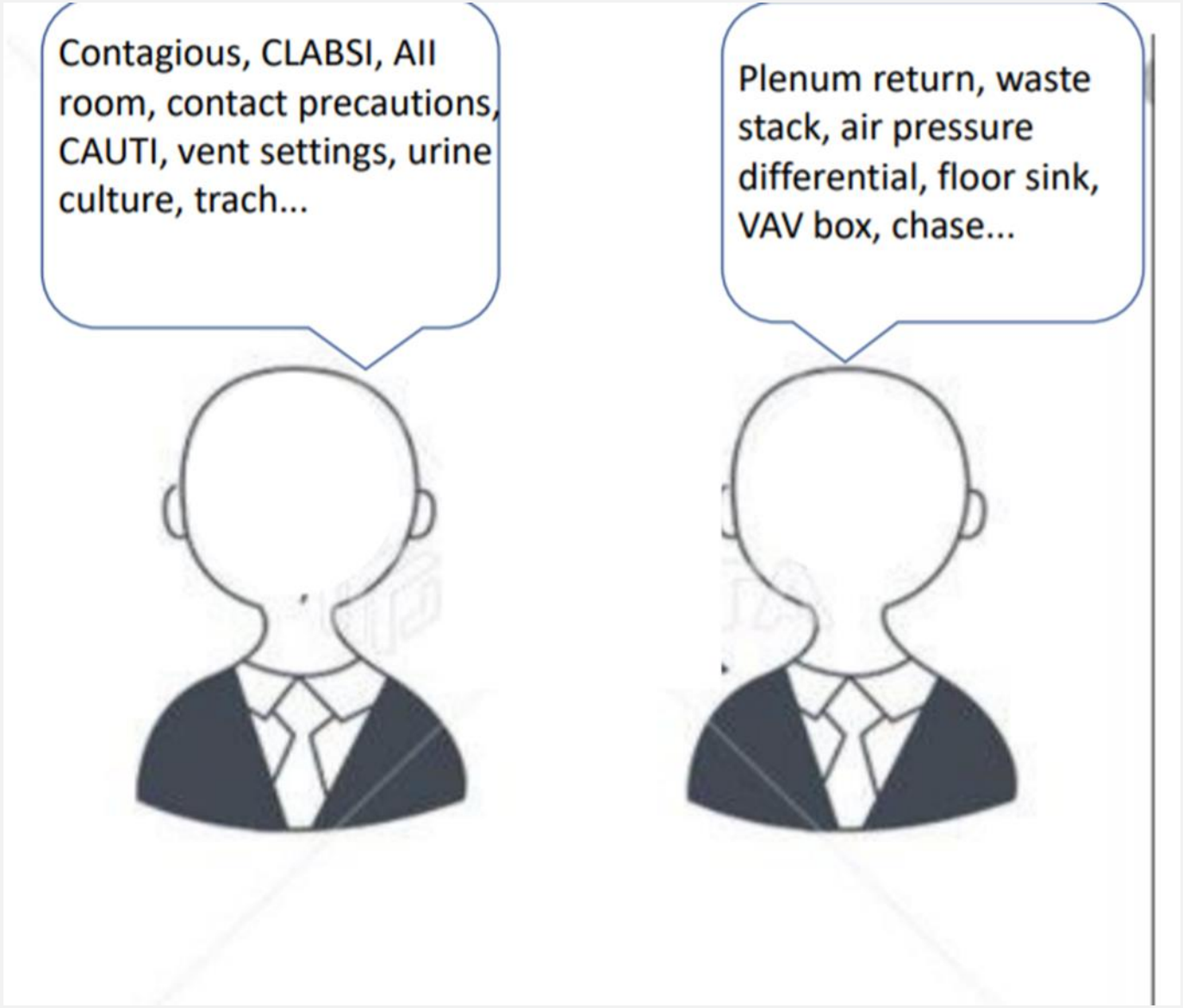
Infection Prevention



# IP TRIES TO WORK WITH FACILITIES

# AND THE PROBLEMS STARTED

- Most IPs have a clinical background, not construction or maintenance
- Most facility personnel have construction and maintenance background, not clinical
- Many IPs wear multiple hats, maintenance and construction are not on the front burner


Contagious, CLABSI, AII room, contact precautions, CAUTI, vent settings, urine culture, trach...
Plenum return, waste stack, air pressure differential, floor sink, VAV box, chase...

# THINGS I HAVE BEEN TOLD

- You can’t tell me what to do
- You’re just a nurse, what do you know
- We have never done it like this before
- If you let me do it my way, I would be done by now
- Whatever (and continues on the way they were doing it)
- You’re not my boss
    - And in my head I think your are a jerk

# WHAT YOU HEAR

- Blah, blah, blah
- You have to do what the ICRA says
- Because I said so, that's why
  - And you think – you are an idiot

# WHAT WE HAVE HERE IS A FAILURE TO COMMUNICATE

- I don't want you to think that I am stupid
- I don't want you to know that I have no clue what you are talking about
- When you start being condescending, I will talk louder
- When I talk louder, you listen less
- When you talk louder, the less I hear you say
  - I am too busy thinking what my comeback line will be
- I will be right no matter what
- I can't be wrong
- I MUST WIN


THERE CAN BE
ONLY ONE
MEMEY.

# SO HOW CAN WE FIX THIS?

- It is a two-way street
- Language barrier
- IPs – learn some key concepts
  - Ask questions
  - Find a resource, a "go to"
- Facilities "dumb it down" a little for lay people
  - Explain
  - Draw pictures
  - Be patient

# FACILITIES LINGO

- HVAC causes the most confusion
  - Heating
  - Ventilation
  - Air Conditioning
- Airborne transmission of disease has been a problem since mankind has lived indoors.
  - UV radiation (sunlight) kills most microbes that cause disease in humans
  - Many respiratory pathogens have adapted to our comfortable indoor environments – escaping deadly sunlight

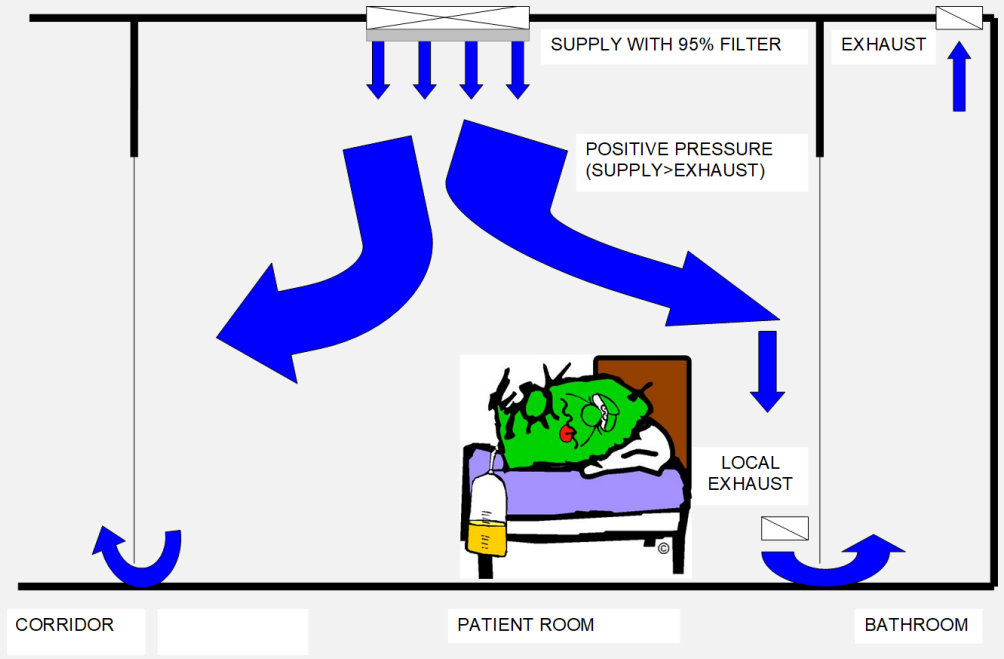
# IN HEALTHCARE

- Dilution ventilation
- Contaminant exhaust
- Directional airflow control
- Filtration
- Environmental temperature control
- Relative humidity control

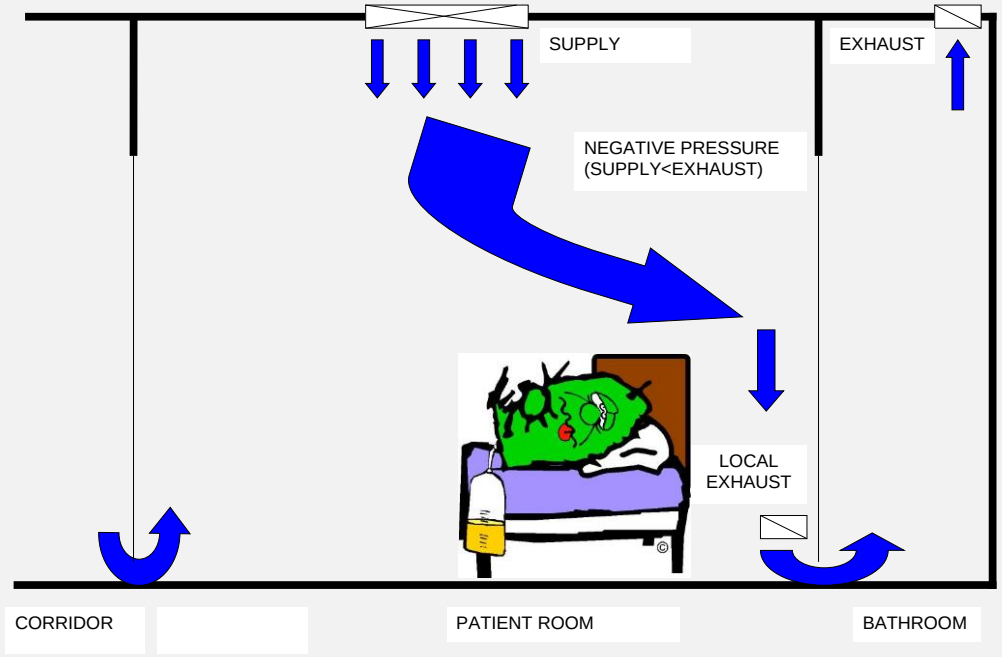
# AIR DIFFERENTIALS

- Air pressure differentials  between supply and exhaust air – measurable amount
- CFM – cubic feet per minute passing a stationary point
- Supply > return – pushes air out of the room – positive pressure
  - ORs
  - Protective environment
  - Clean rooms
- Supply <return – pulls air into room – negative pressure
  - Dirty utility rooms
  - Airborne infectious isolation rooms
  - Bronchoscopy suites

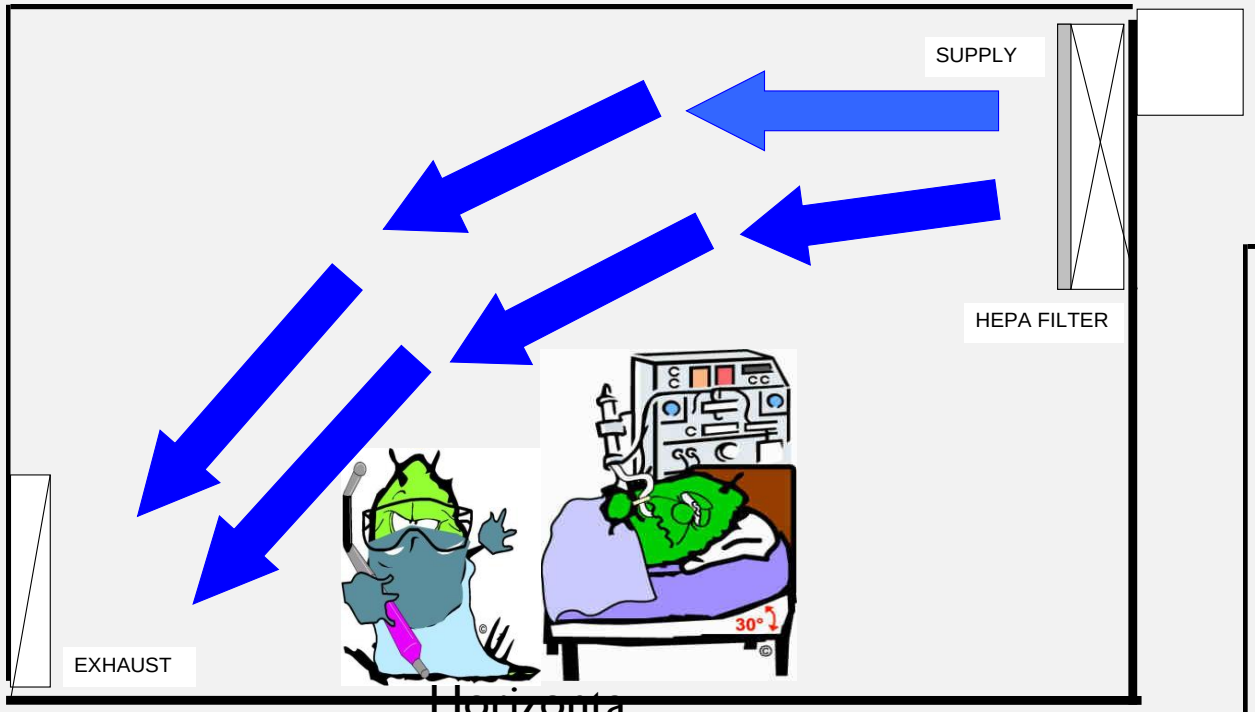
# POSITIVE PRESSURE



# NEGATIVE PRESSURE

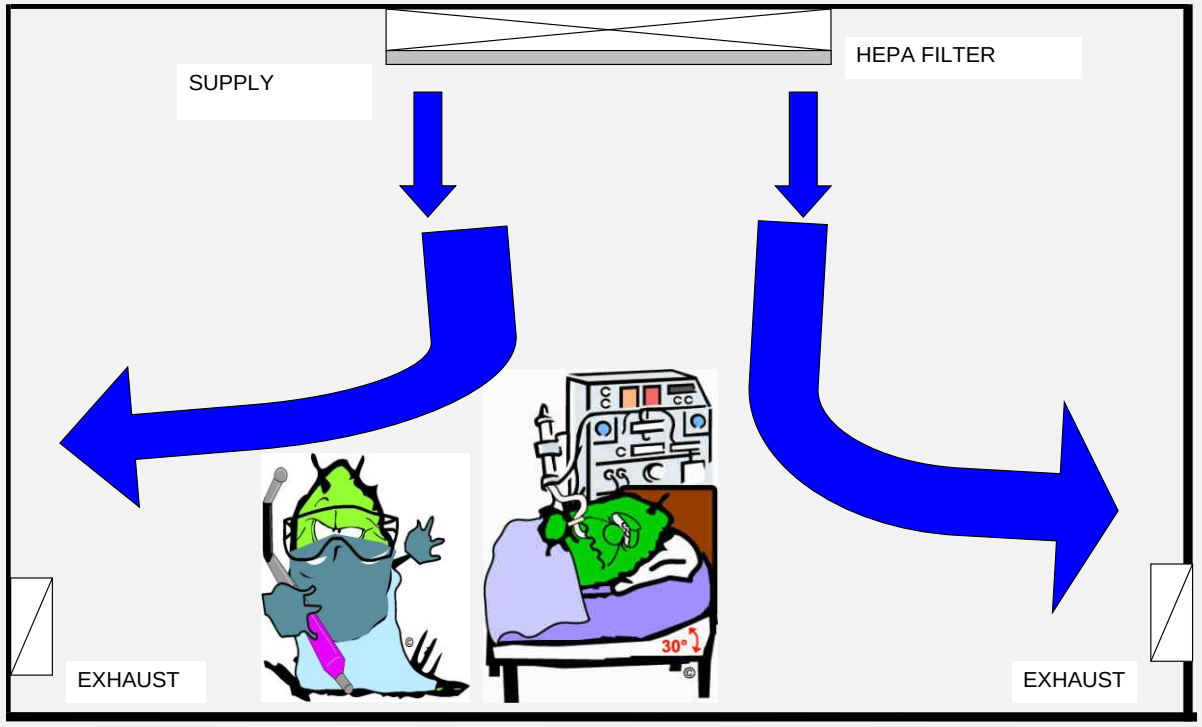


# LAMINAR FLOW




Horizontal

Vertical



# FROM THE IP SIDE

- Why does it matter?
  - Increased costs
  - Increased length of stay
  - Increased sickness
  - Increased death

# THE SPECTRUM OF FUNGI THAT INFECT HUMANS

- 1.5 – 5 million fungal species in the world
- Several hundred cause disease in humans
- Very few affect healthy people
- Few have four conditions necessary to infect humans
  - High temperature tolerance
  - Ability to invade human host (penetrate skin)
  - Digestion and absorption of human tissue
  - Resistance to human immune system
- In healthy creatures, fungal infection is rare
  - Animal sophisticated immune system evolved in constant response to fungal exposures
- Fungal disease occurs frequently in immunocompromised patients

(Cold Spring Harb Perspect Med 2015;5:a019273)

# FUNGAL INFECTIONS IN HUMANS

- Fungal infections in humans are some of the most difficult infections to manage in humans
- Some fungi cause disease in healthy people
- Most fungal infections occur in people already experiencing serious illness

# INFECTIOUS FUNGI

- Fusarium spp.
  - Plant pathogen
- Candida spp.
  - Most common cause of fungal infection worldwide
  - Found in gut flora
  - C. krusei used to ferment cacao in chocolate production
- Cryptococcus spp.
  - Found in soil
  - Most species not harmful to humans

# INFECTIOUS FUNGI

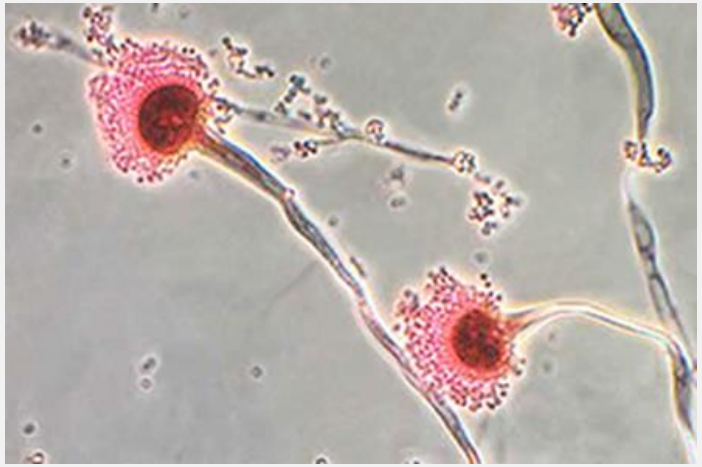
- Histoplasma spp.
  - Soil enriched with bird and bat droppings
  - Disruption of soil from excavation or construction can release infectious elements
- Blastomyces spp.
  - Lives in moist soil and decomposing wood and leaves

# HISTORICAL PERSPECTIVE

- Lung infections with aspergillus first described in 1842
- In the 1930's and 1940's much research into mold and how the lungs react
- In the 1940's it was noticed that antibiotics don't really help fungal infections
- In the 1950's it was noted that patients on steroids or children with leukemia were prone to invasive aspergillosis
- In 1954 the first anti-fungal drugs were developed, Nystatin and Amphotericin B, however mass production of Amphotericin took a while to develop
- First tried on a 61 y/o woman in 1959, however supplies ran out before she was cured

# INFECTIOUS FUNGI

- Aspergillus
  - Common Mold (fungus)
  - Lives indoors and outdoors
  - Most people breathe it in every day
  - Second most common cause of fungal infections worldwide

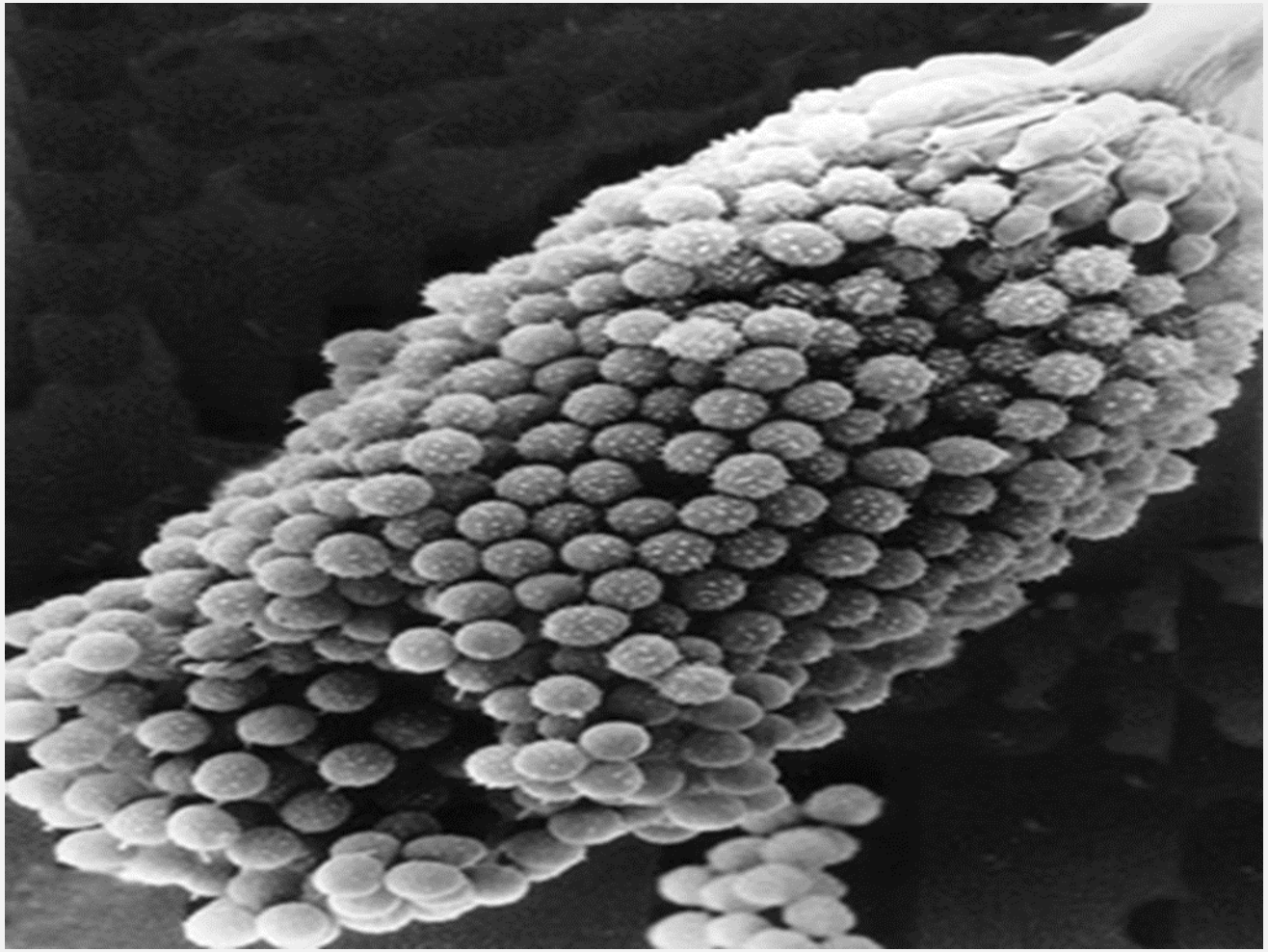


Hospenthal, et al. 1998

# ASPERGILLUM

# WHY DOES IT MATTER?

- Mold spores, particularly aspergillus are ubiquitous
- Attaches to dust molecules in the atmosphere
- Many, many outbreaks of invasive aspergillosis reported in the literature
  - Construction projects
  - Ductwork issues
  - Water leaks



# WHY DOES IT MATTER?

- Aspergillosis can occur in an immuno-competent person – (someone with no known suppression of their immune system) where previous tissue damage has occurred – usually in the lungs
- Risk factors for invasive aspergillosis also include patients on steroids, chemotherapy, stem cell and solid organ transplant, AIDS …

# WHY DOES IT MATTER?

- 1996 – Montreal – Risk of  patient acquiring Aspergillus went from 3.18/1000 patient days prior to construction to 9.88/1000 patient days.  Subsequent implementation of infection control measures decreased risk to 2.91/1000 patient days **

** Loo, et. al (ICHE June 1996)

# Infection Control Risk Assessment (ICRA)

☐ Not Required for Project

| | | | | | |
|---|---|---|---|---|---|
| **Name of Project:** | | | | **Project #:** | |
| **Location of Construction:** | | | | **Project Start Date:** | |
| **Phasing?** | Yes | No | **How Many?** | **Estimated Duration / Project End Date:** | |
| **Patient Relocation?** | Yes | No | | **Contractor:** | |
| **Relocation area:** | | | | **IP Representative:** | |
| **Facility EH&S Representative** | | | | **Facility Representative:** | |

**CONSTRUCTION ACTIVITY TYPES: Mark "X" in box under type**

| | |
|---|---|
| ***Work Type A*** | ***Inspection and non-invasive activities, involving no dust, including but is not limited to:*** |
| | · Painting (but not sanding) |
| | · Electrical trim work, , and activities which do not generate dust or require cutting of walls or access to ceiling other then for visual inspection |
| ***Work Type B*** | ***Small scale, short duration activities which create minimal dust, including but not limited to:*** |
| | · Minor plumbing |
| | · Removal of ceiling tiles for visual inspection |
| | · Installation of telephone and computer cabling using existing "J" hooks or wire trays |
| | · Removal of < or = to 5 floor tiles or carpet squares |
| | · Access to chase spaces |
| | · Cutting a small area of a wall where dust migration can be controlled such as within a closed chase space or use of a hepavac while cutting |
| ***Work Type C*** | ***Typically large scale, longer duration activity (e.g.> one work shift) that generates a moderate to high level of dust, requires demolition or removal of any fixed building components or assemblies, including but not limited to:*** |
| | · Sanding walls |
| | · Removal > 5 floor tiles or carpet squares or removal of casework |
| | · Any work above ceilings including J Hook or wire tray installation |
| | · Major cabling activities |
| | · Major demolition |
| | · Wall covering or cove base removal |
| | · New construction |

**INFECTION CONTROL RISK GROUPS: Mark "X" in box next to group number. Using the following table, identify the patient risk group that will be affected. Consider impact on areas immediatley above, below and or adjacent to the area where the active work is being performed.**

| **Patient/Location Group 1-** | | **Patient/Location Group 2-** | |
|---|---|---|---|
| · Cardiology | · All inpatient areas EXCEPT adult & pediatric oncology, and bone marrow transplant | · Transplant units, including Bone Marrow Transplant | · All laboratory areas |
| · Echocardiography | | · Intensive Care Units | · Special Care Nurseries (level 2 or >) |
| · Endoscopy suites | · Emergency Department | · Interventional Radiology (Special Procedures) | · Dialysis Units |
| · Nuclear Medicine | · Labor and Delivery | · Central Sterile Processing | · Inpatient Oncology area |
| · Outpatient clinics, excluding cancer clinics, transplant clinincs and chemo infusion centers | · Well baby nurseries | · Operating Room (including C-section rooms) | · Pharmacy, main and all satelites |
| · Pulmonary function transplant clinics | · Pediatrics | · Cancer clinics, including chemo centers, transplant | · Cardiac Cath Lab/Hybrid Ors |
| · Kitchen, cafeteria | · Pre and post op areas | · Radiation oncology/Gamma knife/Linear accelerator/Proton therapy | |
| · Radiology/MRI, CT | · Pain Management Clinic | | |
| · Respiratory Therapy | · Therapy Services | | |
| · Wound center | · Ultrasound | | |
| · Admitting | · Main lobby areas and/or common hallways | | |
| · Offices (e.g. no patients present) | · Medical Office Building/Doctors' offices | | |

Instructions: Match the Infection Control Risk Group with the Construction Activity Type to determine the Project Class and highlight the box in yellow.

☐ Not Required for Project

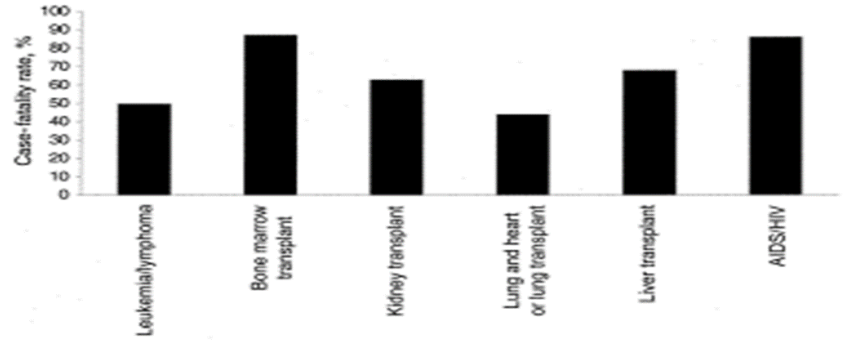
| | Construction Activity | | | |
|---|---|---|---|---|
| Risk Level | Type A (no dust) | Type B (minimal dust) | Type C (mod/maj dust) | |
| Group 1 - | Green | Yellow | Red | |
| Group 2 - highest group for risk | Green | Red | Red | |

| Job Class | Check if applicable | DURING Construction Project | Additional Notes |
|---|---|---|---|
| Green | | Interventions | |
| No dust | | Close doors to patient rooms or offices near work | |
| Noninvasive | | Doors closed to supply areas or cover clean supplies tightly; store supplies away from where work is performed | |
| Inspection activities | | Linen carts covered or moved away from where work is performed | |
| | | Cover office furniture, counters and equipment with plastic; protect personal belongings as appropriate | |
| | | Additional requirements not already documented: | |
| | | | |
| Yellow (in addition to GREEN above) | | Interventions | |
| Small amount of dust in controlled environment | | Infection Prevention Specialist consulted at least 3 business days 72 prior to start of project. | |
| | | Post signage at beginning of project if project to last > 24 hours; Responsible persons: _____ | |
| | | Project superintendant or HSO specific Facilities worker to check in with department manager or designee (e.g. charge nurse) at the beginning of each shift : _____Charge nurse _____Department / Office manager _____Other (specify) | |
| | | Use methods to minimize migration of dust, other contaminants and or aerosolization of water, such as working within a cube, misting of ceiling surface with water (with or without bleach), appropriate plastic barrier, use of hepavac while cutting, etc. | |
| | | Mist carpet tiles before removal | |
| | | No patients present in active work area | |
| | | Materials being brought to project site should be covered/wrapped | |
| | | Debris removed in covered containers | |
| | | Designate an elevator or route for debris removal when necessary | |
| | | Open penetrations must be covered if unattended (e.g. plastic, dry wall, etc) | |
| | | Access panels without barriers must be closed if unattended | |
| | | Ceiling tiles replaced ASAP and must be closed if unattended | |
| | | Walk off sticky mats | |
| | | Clean work site at end of workday. | |
| | | HEPA machine in area as air scrubber. Designate location of machine: _____ | |
| | | Additional requirements not already documented: | |
| | | | |
| Red (in addition to Green and Yellow above) | | Interventions: | |
| | | **Patients to wear masks when entering or leaving HSO. Notification responsibility person: ____IP _____Other (Specify)** | |
| | | Barriers constructed and inspected by IP prior to beginning work | |
| | | Barrier type: ____Air tight soft (plastic) wall (acceptable if work lasts 72-96 hrs or less per discretion of IP/Safety); ____ Airtight hard wall partition (floor to deck); _____Airtight hard wall partition (floor to ceiling) | |
| | | Ceiling plastic curtain required | |
| | | Barrier seams taped | |
| | | Maintain negative air flow within constuction site (Note: cap off air supply if necessary to achieve negative pressure) | |
| | | Check pre filters on fans or units used to maintain negative airflow (commonly HEPA) at least daily or more frequently if major demolition | |
| | | Use visual monitor/aide for negative air pressure. | |
| | | Contractor to document at least daily that negative pressure is being maintained. | |
| | | Return air vents blocked or sealed before beginning work if applicable. | |
| | | Monitor and change return vent filters as needed and document. | |
| | | Workers to remove dust from clothing prior to entering any hospital areas; e.g. sticky mats, vacuum clothing, apply clean clothing or remove coveralls and shoe coverings | |
| | | When going thru sensitive areas, protective attire (PA) must be worn to access anteroom and work area. PA must be removed before entering the work area because it will be used again to exit through the sensitive area. | |
| | | Keep work area clean e.g. wet mop or HEPA vac frequently _____X per day to decrease risk of tracking dust through clean areas | |
| | | Wet mat (may consider 10% bleach solution); If using both sticky mas and wet mats, order should be wet mat, dry mat, sticky mat) | |
| | | Create an ante room (ORs, hemonc/BMT units, large areas where negative pressure difficult to achieve, etc) | |
| | | Mist outdoor construction site frequently and as needed to prevent dust aerosolization | |
| | | Wet cut cement | |
| | | Assess location of air intakes for outdoor projects and/or projects where work is being done < 75 ft from intakes- additional or higher filtration may be requried to avoid entry of contamination (e.g. dust and debris) of air intakes | |
| | | Partner with EH&S to determine if air sampling (e.g. particle counts) is required during the project. | |
| | | Additional requirements not already documented: | |

# INFECTION PREVENTION PRECAUTIONS

- Protect patients
- Protect staff
- Maintain safe environment
- Still allow work to be accomplished

# PATIENT RISK




From: Aspergillosis Case-Fatality Rate: Systematic Review of the Literature
Clin Infect Dis. 2001;32(3):358-366. doi:10.1086/318483

# INFECTION PREVENTION

- Bleach
- Barriers
  - Dust minimization and control
- Stagnant Water
- Utility interruptions
- Open penetrations
  - Including ceiling tiles

# BLEACH???

- Hospital disinfectants don't kill spores
- Bleach will kill spores
- Misting with bleach has 2 purposes
  - Dampening the area to prevent dust from migrating
  - Bleaching the spores so that should they disperse they are killed

# CEILING TILE BLEACH PROTOCOL

PURPOSE: Movement of ceiling tiles can cause "showers" of dust particles. These dust particles carry airborne Aspergillis spores, which can cause a life-threatening infection in high-risk patients or visitors whose immune status is compromised. In order to reduce the disruption of dust particles, the air above the ceiling tile should be sprayed with bleach solution before displacing ceiling tiles.

**APPROPRIATE BARRIERS SHOULD BE IN PLACE BEFORE CEILING WORK IS STARTED. INFECTION CONTROL SHOULD BE CONSULTED FOR ALL CEILING WORK DONE IN PATIENT CARE AREAS.**

1) Remove only those tiles that are necessary to accomplish the job. Replace ceiling tiles as soon as work in that area is completed. Do **NOT** leave ceiling exposed for more than **4 hours**, unless you are actively working in that area.

2) Make up the appropriate amount of bleach solution for the job at hand (mix only enough for one day's work) and transfer the solution to a spray bottle **OR** if using an automatic mixing sprayer, empty and rinse the water bottle daily before filling.

3) Fresh bleach solution should be made up daily.

**BLEACH SOLUTION**: one part bleach to nine parts water.

Examples: 1 gallon of bleach to 9 gallons of water
½ gallon of bleach to 4 ½ gallons of water
1 qt. of bleach to 9 qt. water

3) Slowly lift one corner of ceiling tile to allow your other hand with the spray bottle to gain access to the space above the tile.

4) Thoroughly mist the air above the ceiling tile in a **360-degree** fashion.

5) Replace the ceiling tile and allow the mist to settle for **at least 5-10 seconds** before removing tile.

**If you have questions, please contact Infection Control 454-7560.**

BARNES-JEWISH HOSPITAL
Infection Prevention


# CLOROX GERMICIDAL CLEANER

- Available from Grainger
- 10% premix
- Stable in bottle until expiration date on bottle
  - CLOROX HEALTHCARE
  - Item # 45MY94
  - Mfr. Model #686974

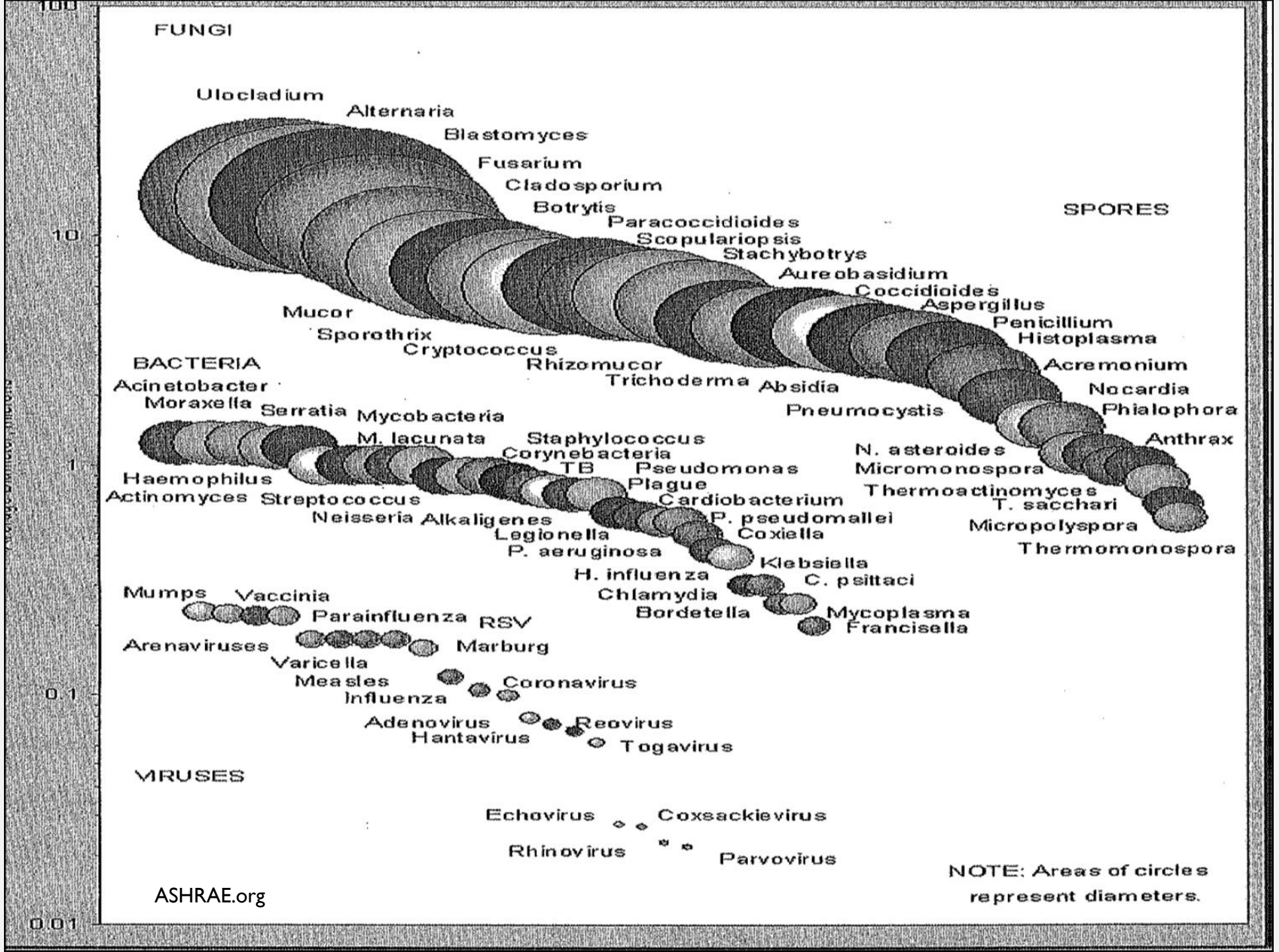
# BLEACH

- A. fumigatis grown on 3 common building materials and in "petri dish" – OSB, plywood, drywall
- Contaminated materials sprayed with 10% bleach mixtures – compared to untreated
- A. fumigatis killed on sprayed items

Martyny JW, et al. J Allergy Clin Immunol. 2005 Sep; 116(3):630-5

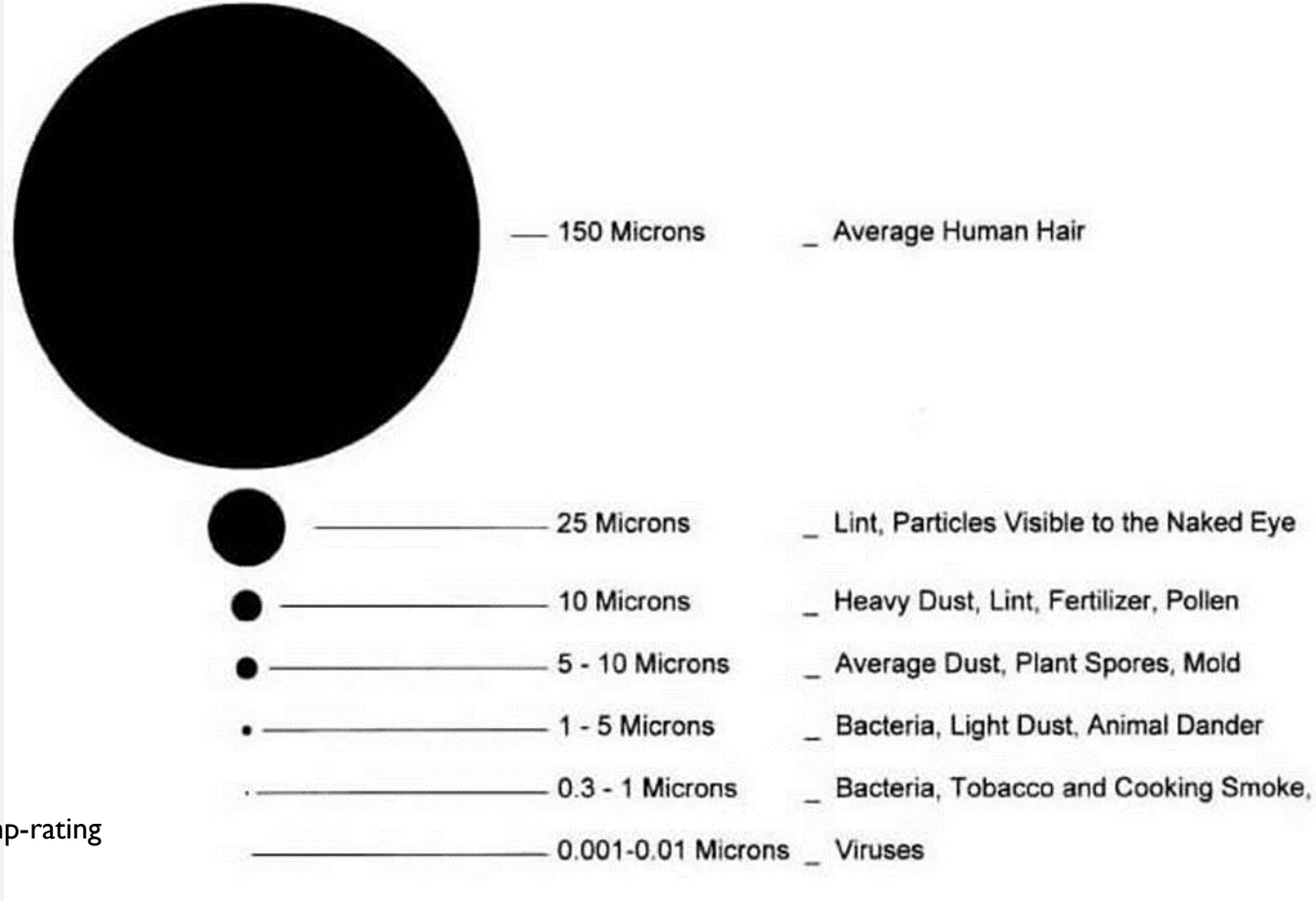
# BARRIERS

- Hard or soft
  - Type of work
  - Location
  - Duration


FUNGI
Ulocladium
Alternaria
Blastomyces
Fusarium
Cladosporium
Botrytis
Paracoccidioides
Scopulariopsis
Stachybotrys
Aureobasidium
Coccidioides
Aspergillus
Penicillium
Histoplasma
Acremonium
Nocardia
Phialophora
Anthrax
Mucor
Sporothrix
Cryptococcus
Rhizomucor
Trichoderma
Absidia
Pneumocystis
SPORES
BACTERIA
Acinetobacter
Moraxella
Serratia
Mycobacteria
M. lacunata
Staphylococcus
Corynebacteria
TB
Pseudomonas
Plague
Cardiobacterium
P. pseudomallei
Coxiella
Klebsiella
C. psittaci
Chlamydia
Bordetella
Mycoplasma
Francisella
N. asteroides
Micromonospora
Thermoactinomyces
T. sacchari
Micropolyspora
Thermomonospora
Haemophilus
Actinomyces
Streptococcus
Neisseria
Alkaligenes
Legionella
P. aeruginosa
H. influenza
Mumps
Vaccinia
Parainfluenza
RSV
Arenaviruses
Marburg
Varicella
Measles
Influenza
Coronavirus
Adenovirus
Reovirus
Hantavirus
Togavirus
VIRUSES
Echovirus
Coxsackievirus
Rhinovirus
Parvovirus
100
10
1
0.1
0.01
NOTE: Areas of circles represent diameters.
ASHRAE.org

# HEPA (HIGH EFFICIENCY PARTICULATE AIR FILTER

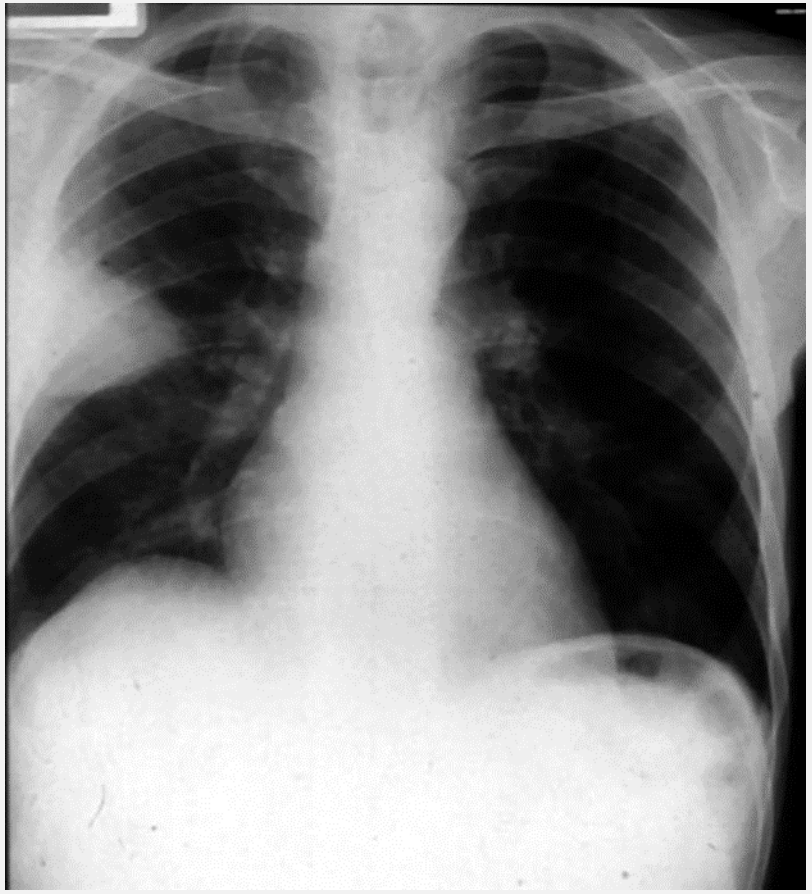
- 99.97 % anything greater than .3 microns



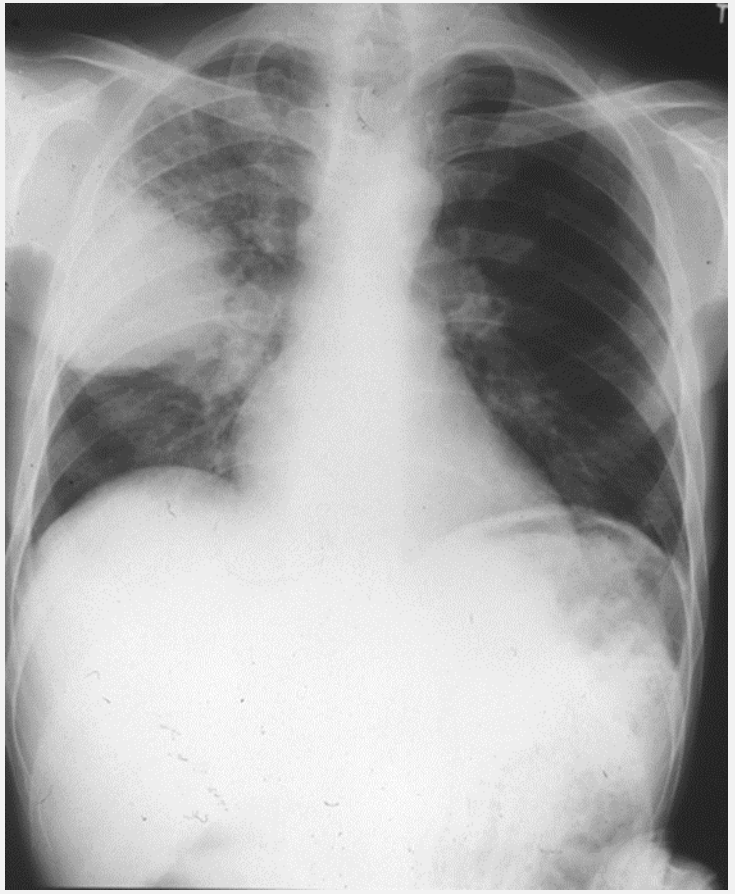

Pickcomfort.com/water-quality/micronp-rating

# WHY DOES IT MATTER?

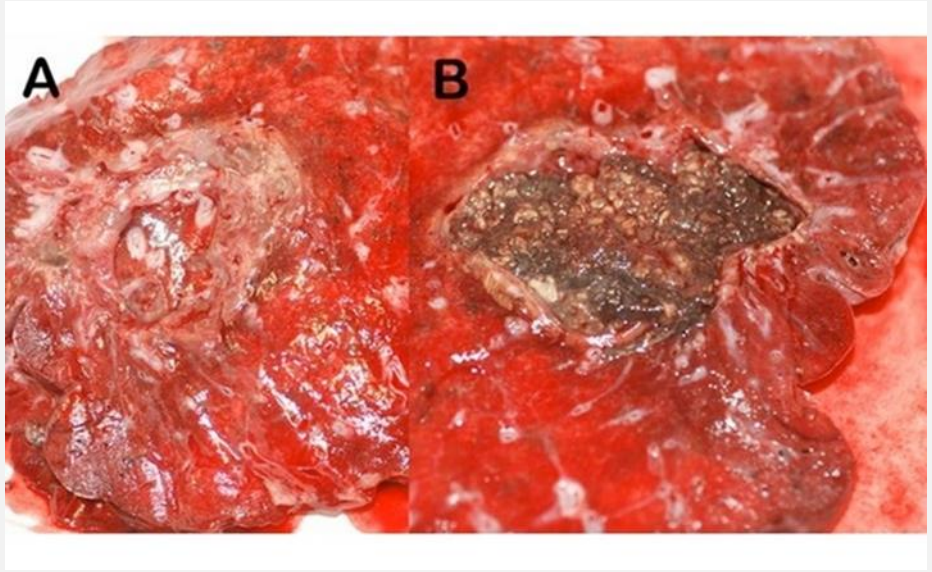
- Patient on the Leukemia Lymphoma:
  - Admitted 6/1
  - Diagnosed 6/23
  - Expired 6/30
- Renovation, including demolition, on 6900 started May—ongoing at time of diagnosis



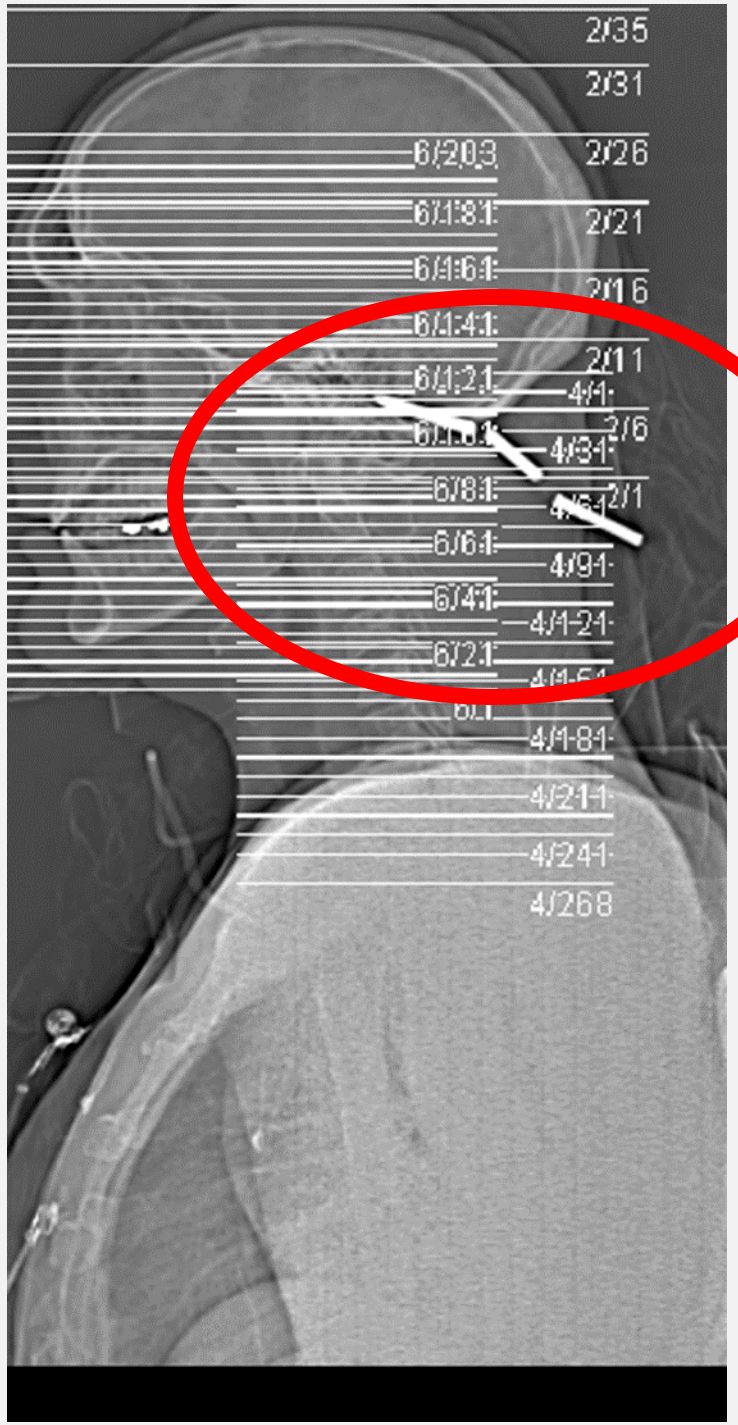
Chest X ray after 4 days, prior to treatment, showing massive increase in volume of lesion. He started amphotericin B and flucytosineb that day and responded over 10 weeks.



•42 y/o farm worker in Italy
•77 lb weight loss over previous year
•Antibiotics for several months
•Condition worsened
•7 cm x 6.5 cm "vegetative" mass to left upper lobe of lung
•CT had suggestive halo around lesion, signature of fungus




Ghose, T., Live Science, November 7, 2013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4/31
6/81
2/1
6/61
4/91
6/41
4/1-24
6/21
4/1-84
4/211
4/241
4/268

**Aspergillus skin lesions at armboard tape sites**
**Photo: Dr. Nancy Khardori, SIUE**

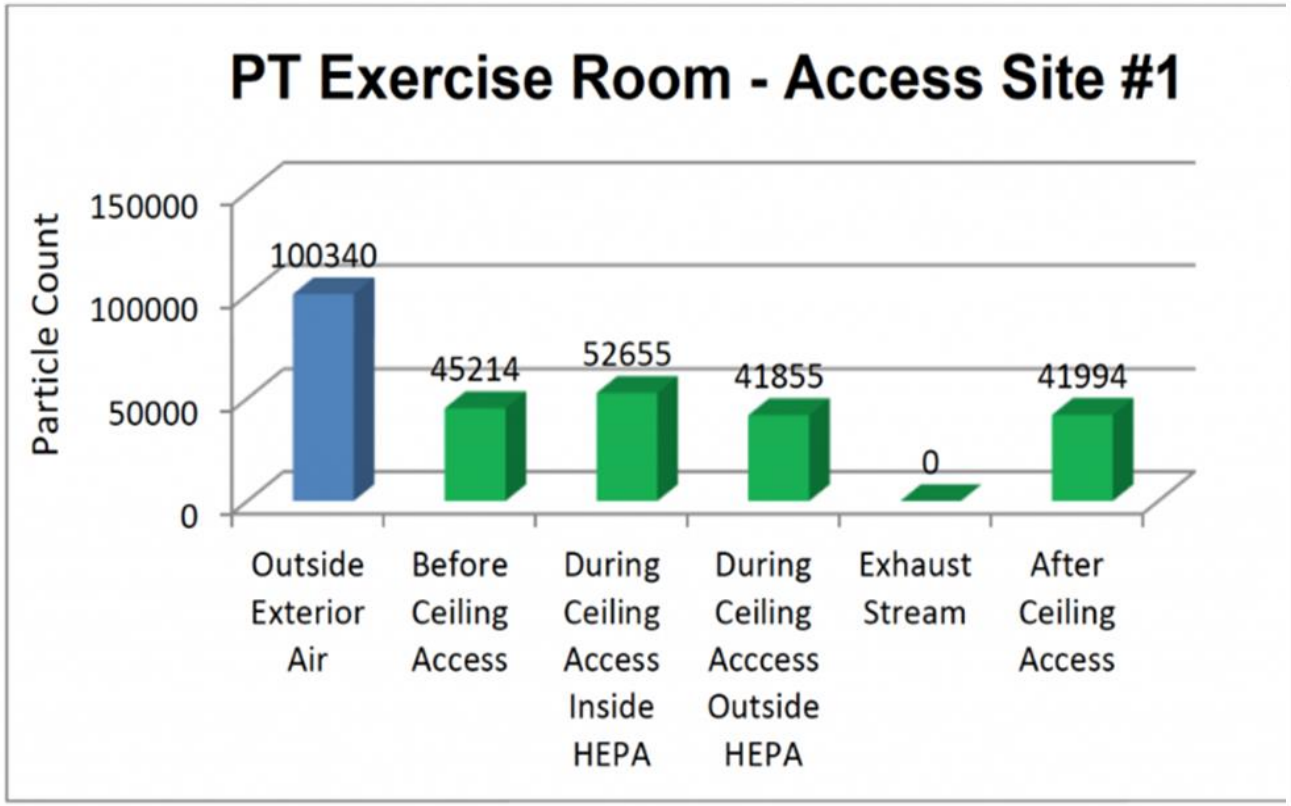

THE SOLUTION
Ceiling Access System
by
PREVENT

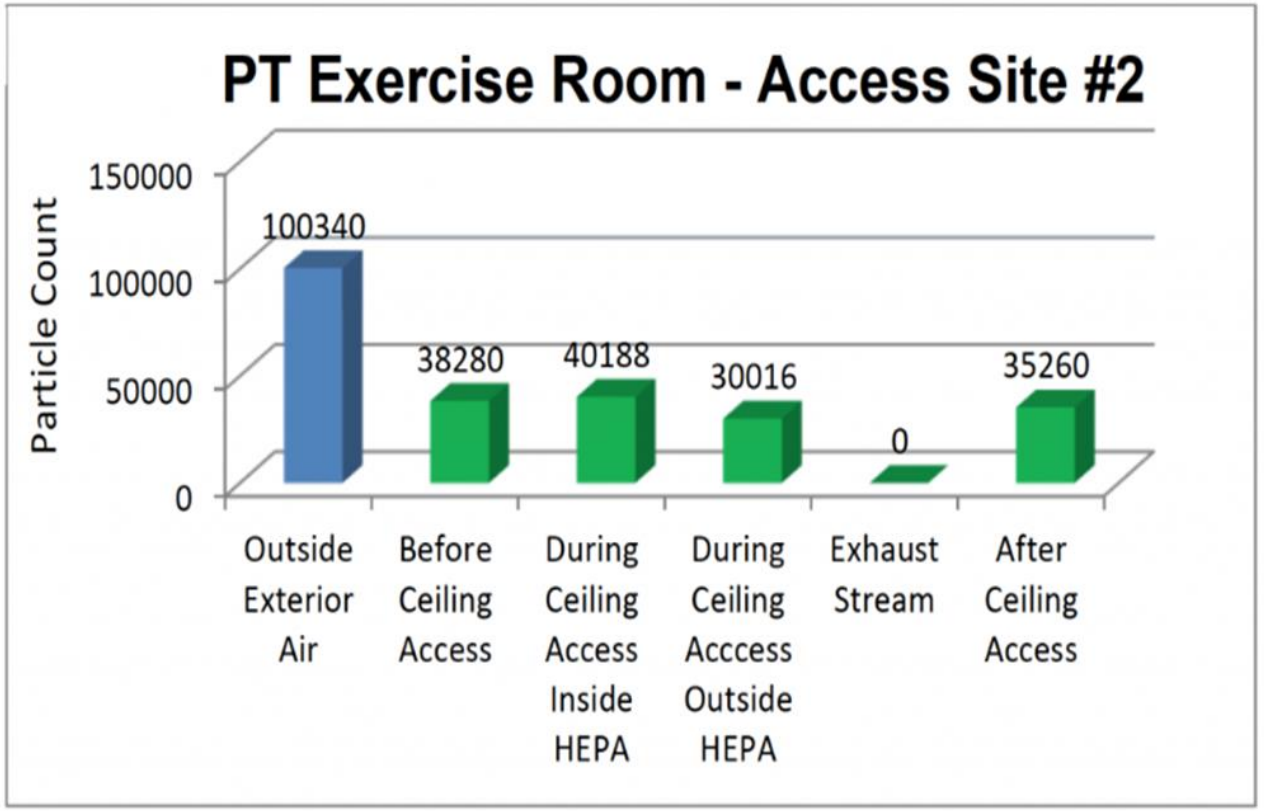

IN USE
Bio Cart

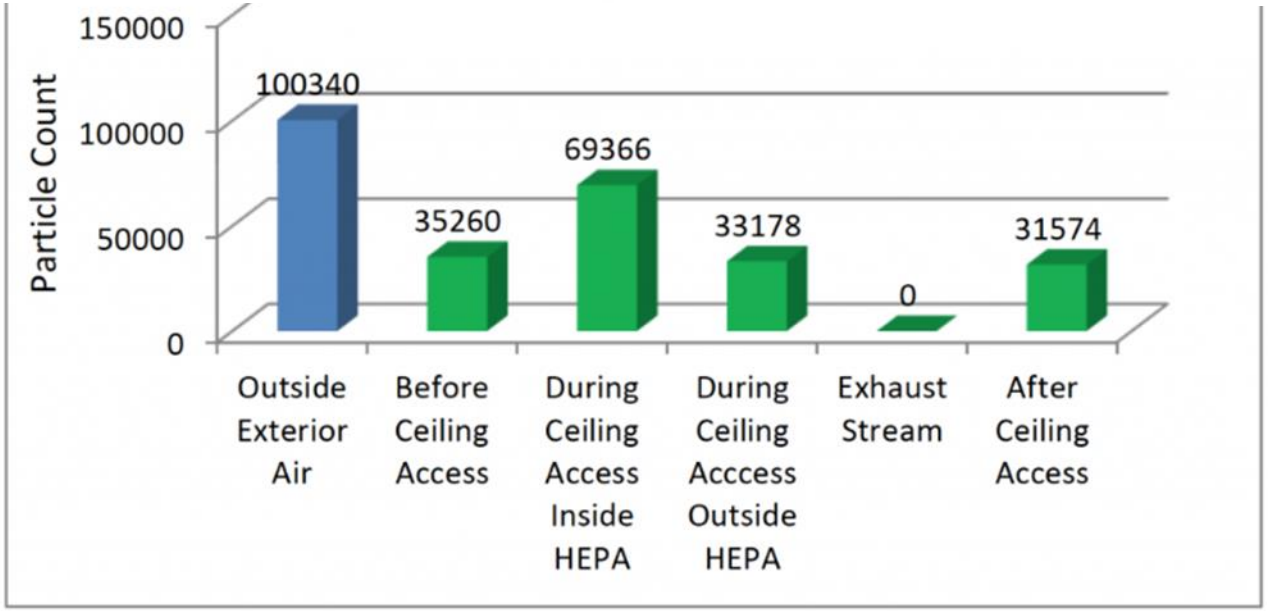

HEPACART
www.hepacart.com
Shawnee, Kansas
Phone 913-789-9590
Fax 913-677-5772
NE
National Electrical
CONTRACTING COMPANY
St. Louis, MO
314-241-0960


Wire Safety
GUARANTEE
HEPACART


HEPACART

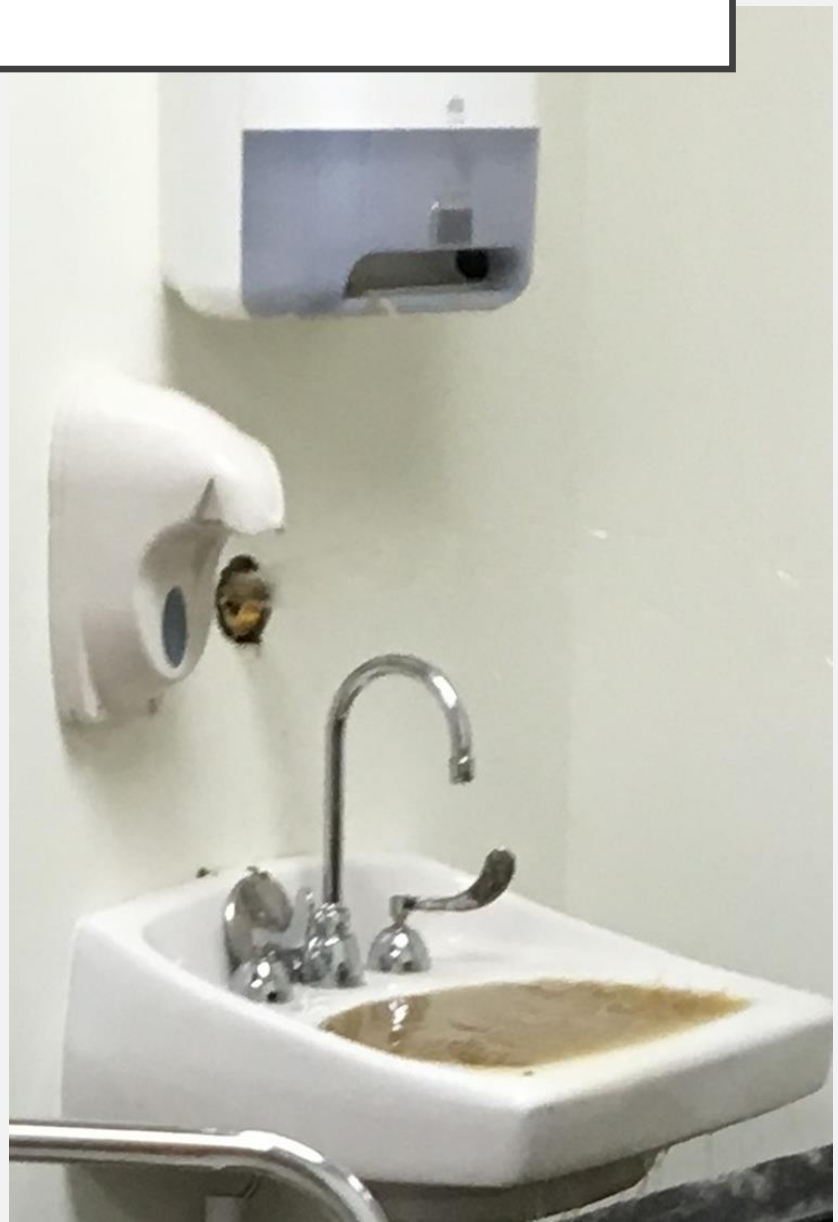



Taylor, D., AMI Environmental 2017

# NOT ALWAYS WATER



# BOTTOM LINE

- Everyone in this hospital is someone's family
- It could be your family
- Shouldn't we do everything we can to keep them safe?
- If there were no patients here, none of us would be working
- If you took a shortcut that killed someone……?

# REMEMBER

- Hospitals are a much better place now
- Infection Prevention and Facilities must work together
  - Has COVID-19 not made that apparent?
- Patients need to be protected
  - Sometimes staff as well
- Even though we may not speak the same language, we can work together to communicate





BARNES JEWISH Hospital


PLUMBING SHOP


MAJOR MECHANICAL


HVAC NORTH
BARNES JEWISH
Hospital


HVAC SOUTH


MICHAEL D. McATEE

# QUESTIONS?

Thank you!

Loie Couch, RN, BS, CIC, FAPIC

Barnes-Jewish Hospital

St. Louis Missouri

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