Outbreaks During Design & Construction of Health Care Facilities

Hospital Authority/Infection Control Branch, Centre for Health Protection

Linda L. Dickey, RN, MPH, CIC
January 15, 2014

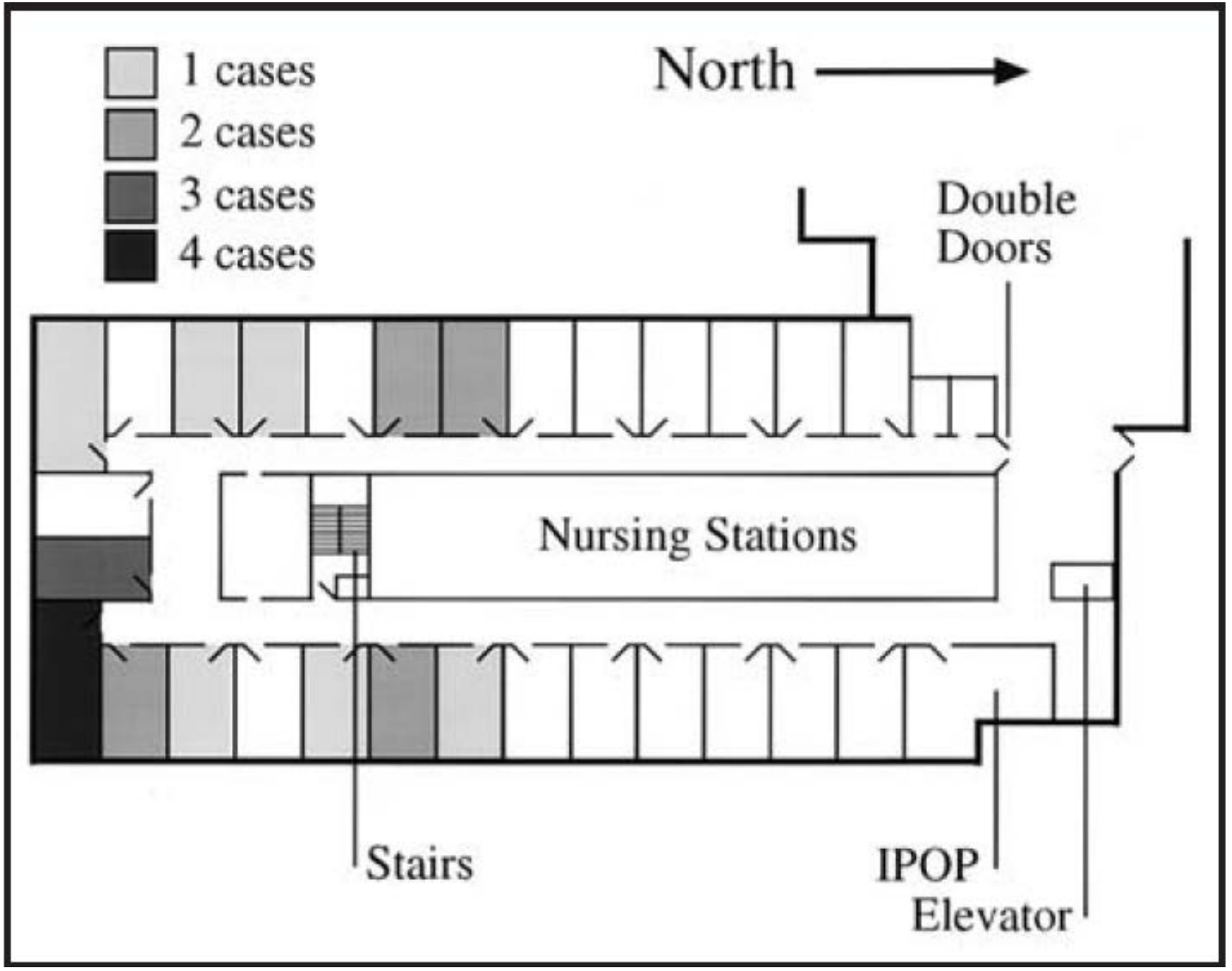
UC Irvine Health

Example of Construction-related Infection Transmission

Refinements of Environmental Assessment During an Outbreak Investigation of Aspergillosis Leukemia & BMT Unit. Thio, C. et al, Infection Control and Hospital Epidemiology. Vol 21, No 1 (Jan 2000) pp 18-23.

Tertiary care university hospital w/37 bed bone marrow transplant & leukemia ward

- **21 cases of invasive aspergillosis, including 6 deaths**
- **Construction determined to be the source due to:**
  - Depressurized oncology rooms
  - Doors, poorly sealed windows
- **Lessons learned:**
  - Evaluating pressure relationships is critical prior to and during construction
  - Need good seal for windows, HEPA filtration at doors of high risk units

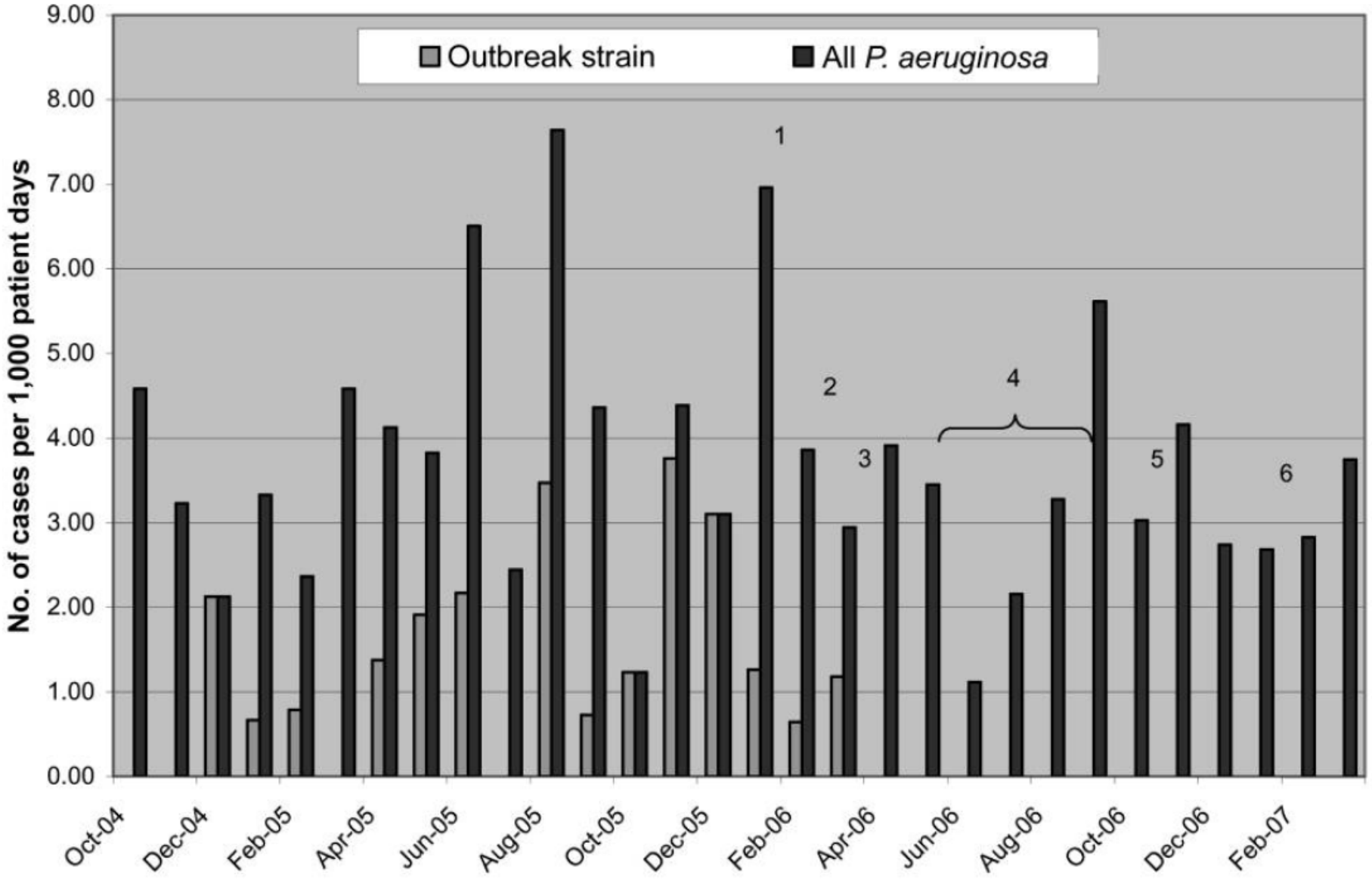

1 cases
2 cases
3 cases
4 cases
North
Double
Doors
Nursing Stations
Stairs
IPOP
Elevator

Example of Design-related Infection Transmission

Outbreak of Multidrug-Resistant Pseudomonas aeruginosa Colonization and Infection Secondary to Imperfect Intensive Care Unit Room Design. S. Hota et al. Infection Control and Hospital Epidemiology, Vol 30, No 1 (Jan 2009), pp 25-33.

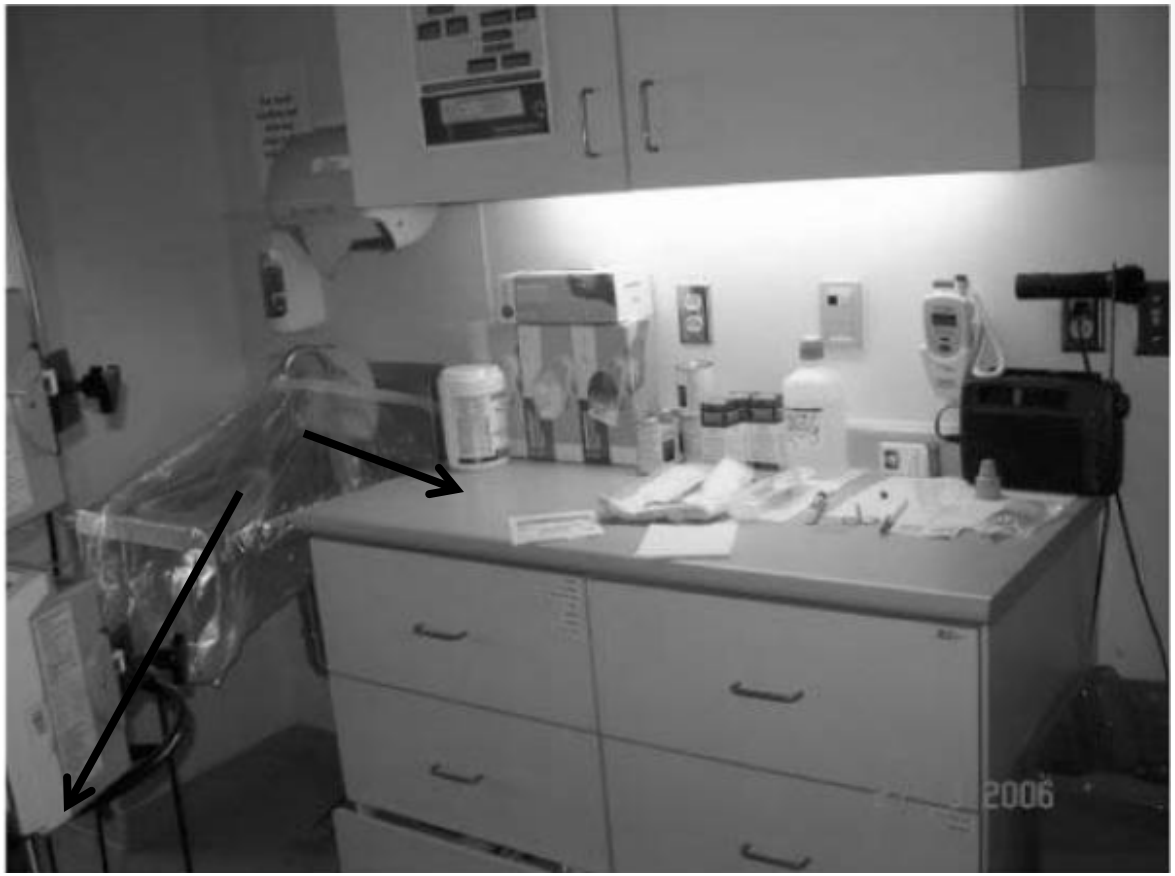
Outbreak occurring over two-year period in intensive care of a tertiary care hospital

- **36 cases of infection, including 17 deaths**
- **Outbreak strain of P aeruginosa found in sink drains; sink placement and design contributed to transmission**
  - Splashes from sink drain found 1 m from sink
  - Contaminated medication and sterile dressing area
- **Lessons learned:**
  - Sink design matters—sufficient depth and drain to spout offset
  - Need sufficient space between sink and clinical adjacencies



UC Irvine Health

Sink design with spout directly over drain and shallow basin facilitates splashing



Proximity of sink to counter space and patient allowed for contamination

UC Irvine Health

Example of design & maintenance-related Infection Transmission

A Cluster of Cases of Nosocomial Legionnaires Disease Linked to a Contaminated Hospital Decorative Water Fountain. T. Palmore et al. Infection Control and Hospital Epidemiology, Vol 30, No 8 (Aug 2009), pp 764-768.

Outbreak involving two patients hospitalized with leukemia and receiving care in the Radiation Oncology Suite

- **Both patients had contact with a decorative water fountain in the Radiation Oncology Suite**
- **L. pneumophilia serogroup 1 recovered from both patients & fountain water**

  Both patients reported observing the fountain at close range
- **Lessons learned:**

  Water in pipes to fountain allowed to sit stagnant 4 months before restarting

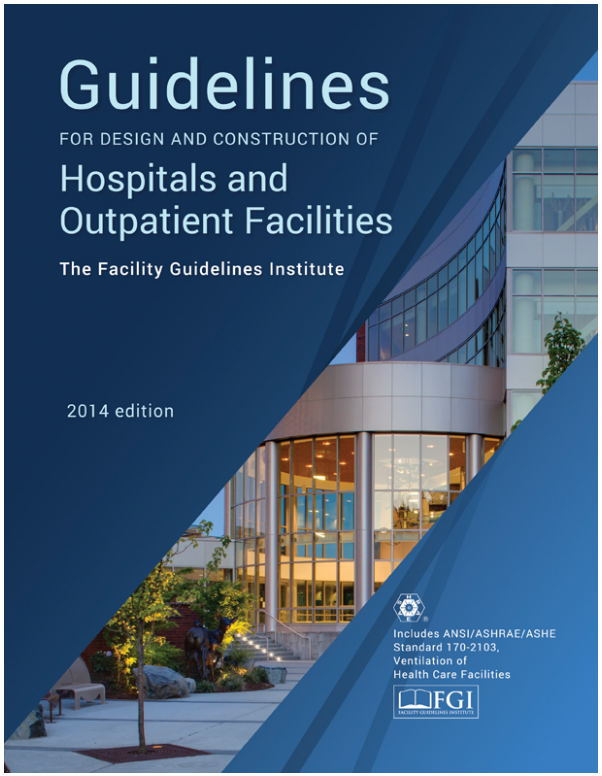
  Design combined filtered water with municipal water

UC Irvine Health

Requirements & Best Practice

- **The Joint Commission: Requires ICRA and ICRMRs**
- **CDC Environmental Guideline**

- **2014 FGI Guidelines**
  - Multidisciplinary development
  - Building code for 40+ U.S. states
  - Referenced by U.S. regulators (e.g. CMS, TJC)
  - Provides minimum standards, best practice
  - **Prohibits indoor, open water features in inpatient & outpatient health care facilities**



UC Irvine Health

QUESTIONS?