



International Perspective on Hospital Design, Construction and Renovation: Infection Control Strategies and Standard

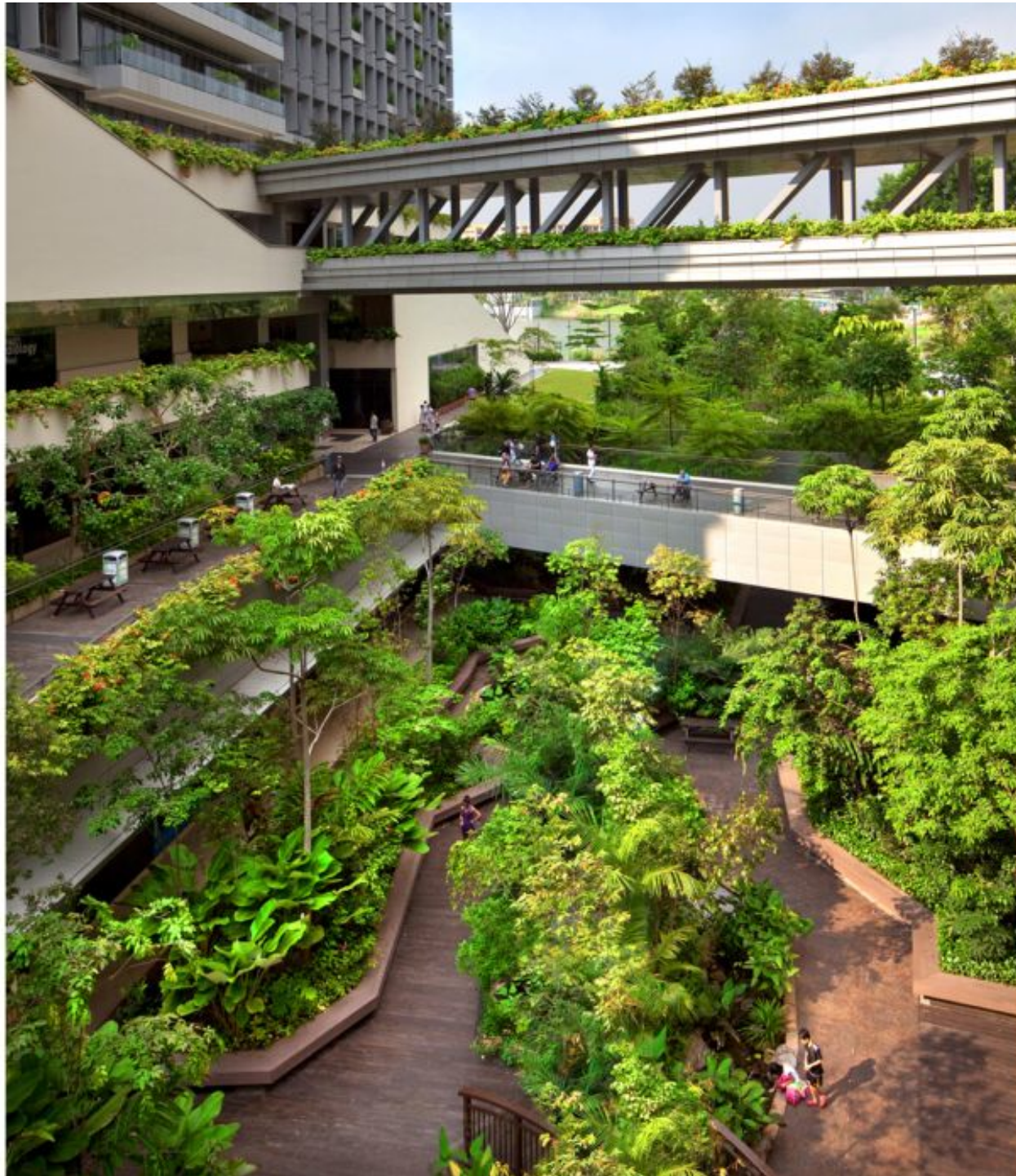
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Considerations for building healthcare facilities

- Safety and satisfaction of patients and staff
 - Layout, air quality, hand washing facilities, lighting to reduce errors
 - Move towards healing design
 - Natural light, noise reduction, access to nature
- Needs of the community
 - Changing demographics
- Incorporate technology
- Environmental issues
 - Building green, lower energy costs



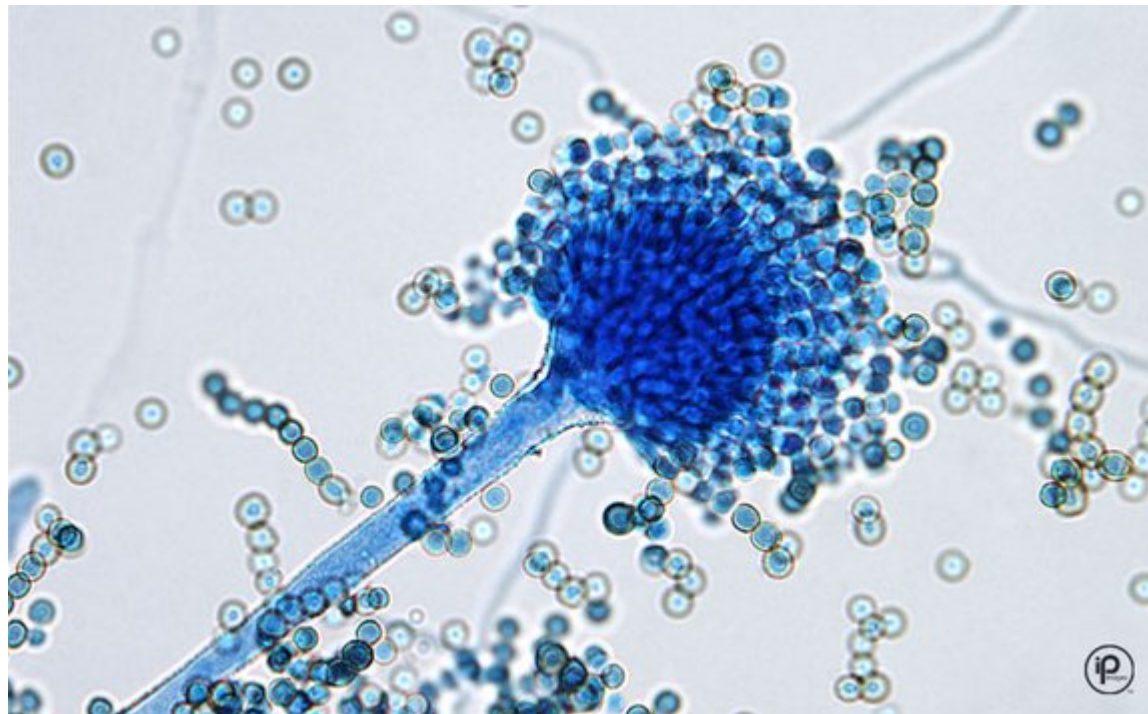
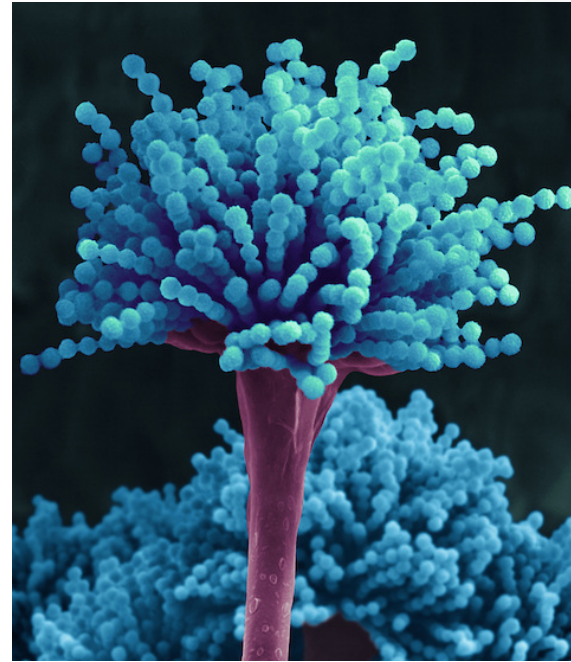


Hospital renovation: the problems

- Construction, renovation or demolition generates vast quantities of dust which contains huge numbers of aerosolized filamentous fungi, such as *Aspergillus*, and sometimes as other potential pathogens, such as *Legionella*
- Moreover, construction can impair air handling systems or contaminate potable water with these pathogens

Hospital renovation: the problem

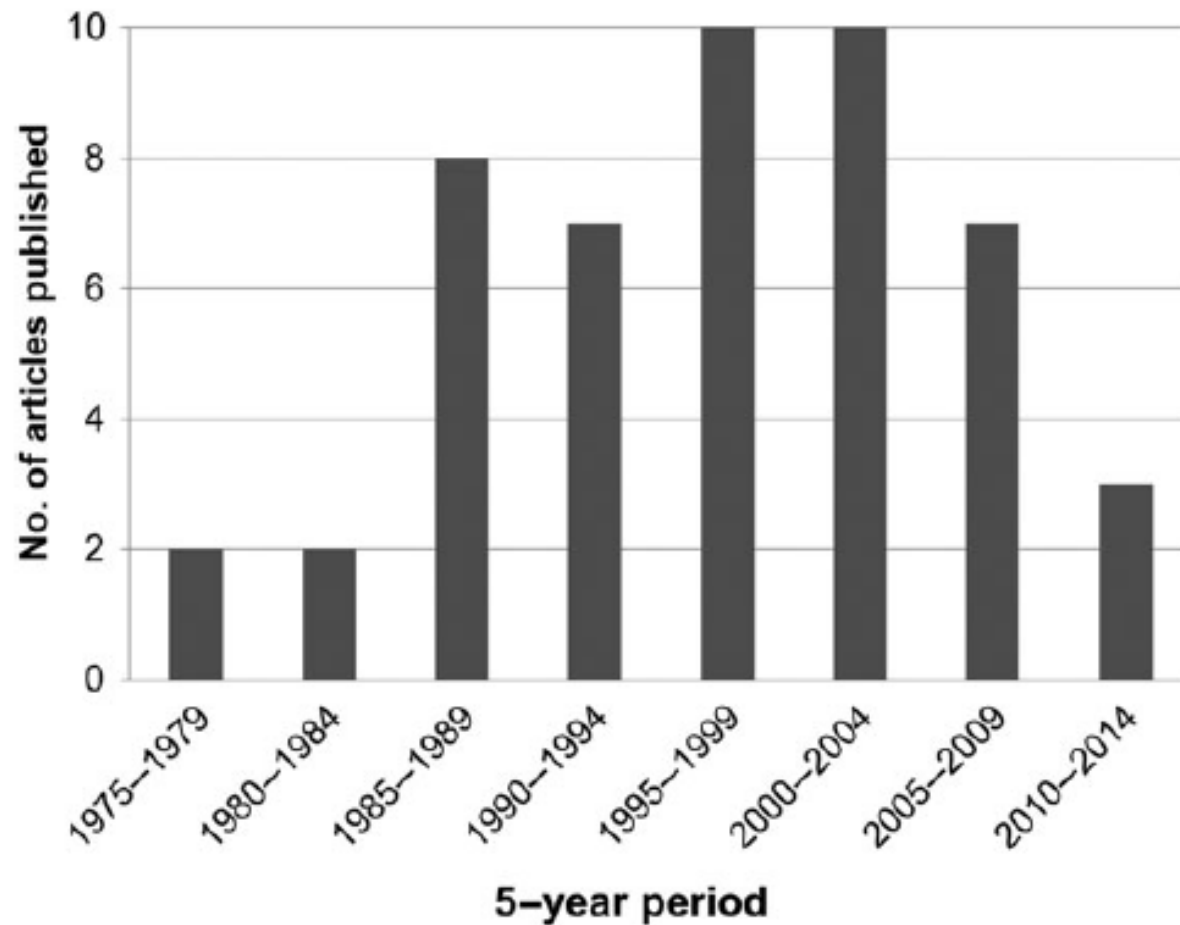
- Hospitals and clinics are filled with patients who are immunocompromised and highly vulnerable to devastating invasive infection with these newly unleashed pathogens



Aspergillus SSI



Are we seeing less fungal outbreaks associated with construction, renovation and demolition?



Survivor of mold outbreak sues UPMC claiming negligence

January 4, 2016 7:48 PM



Joint Commission

International standards

- Facility and Management and Safety (FMS) standards
 - Facility compliance
 - Risk management
 - Safety and security
 - Hazardous materials
 - Emergency management
- Fire safety
- Equipment safety
- Water and utilities
- Systems testing
- Infection prevention and control
 - International Patient Safety Goal 5 is to reduce healthcare associated infections

CDC guidelines (2003)

Box 4. Suggested members and functions of a multi-disciplinary coordination team for construction, renovation, repair, and demolition projects

Members

Infection-control personnel, including hospital epidemiologists
Laboratory personnel
Facility administrators or their designated representatives, facility managers
Director of engineering
Risk-management personnel
Directors of specialized programs (e.g., transplantation, oncology and ICU* programs)
Employee safety personnel, industrial hygienists, and regulatory affairs personnel
Environmental services personnel
Information systems personnel
Construction administrators or their designated representatives
Architects, design engineers, project managers, and contractors

Use of ICRA matrix and plan barrier control measures

Construction bundle


1. Hospital epidemiology (infection control) should be notified by plant engineering prior to any renovation/construction activities in the healthcare facility.
2. Conduct an ICRA for all renovation/construction activities: implement recommended prevention strategies as guided by the ICRA.
3. Focus prevention efforts on control of airborne dissemination of fungal spores (eg, barriers, containment, air handling, portable HEPA filters).
4. Consider impact of renovation/construction on the involved hospital unit plus adjacent units on the same floor, and hospital units on floors above and below the renovation/construction activities.
5. Maintain surveillance for healthcare-associated filamentous fungal infections during renovation/construction. Investigate any cases to see if they are related to renovation/construction and determine if prevention efforts need to be revised.
6. Visit renovation/construction sites regularly to assure compliance with recommended prevention activities.

Australian guidelines (June 2015)

- Risk management strategy
 - Risk identification
 - Risk assessment
 - Risk control
 - Monitoring



Ireland National Guidelines (2002)

	
<p>National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis During Construction/Renovation Activities</p>	<p>DEVELOPED BY A SUB-COMMITTEE OF THE SCIENTIFIC ADVISORY COMMITTEE OF THE NATIONAL DISEASE SURVEILLANCE CENTRE</p>

CONSTRUCTION PERMIT		
Permit No:	<input type="text"/>	Permit Expiration Date: <input type="text"/> Project Start Date: <input type="text"/>
Location of Construction:	<input type="text"/>	Estimated Duration: <input type="text"/>
Contractor:	<input type="text"/>	Contact Person: <input type="text"/> Tel: <input type="text"/>
CEO Approval:		
Name	<input type="text"/>	Signed: <input type="text"/> Tel: <input type="text"/>
Hospital Technical Services Manager Approval:		
Name:	<input type="text"/>	Signed: <input type="text"/> Tel: <input type="text"/>
Infection Control Personnel Approval:		
Name:	<input type="text"/>	Signed: <input type="text"/> Tel: <input type="text"/>

UK Guidance (2013)



Health Building Note 00-09: Infection control in the built environment

“... the infection prevention and control (IPC) team should be consulted throughout every stage of a capital project and their views taken into account...”

Canadian Standards Association (CSA)

- Z8000 Canadian Health Care Facilities
- Z8001 Commissioning of Health Care Facilities
- Z317.1 Special Requirements for Plumbing Installations in Health Care Facilities
- Z317.2 Special Requirements for Heating, Ventilation, and Air-Conditioning (HVAC) Systems in Health Care Facilities
- Z317.11 Area Measurement for Health Care Facilities
- Z317.13 - *Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities*

CSA standard

- Plan a proactive approach
- Build multi-skilled Infection Control Team
- Assess and manage the risks

“A well-managed site MDT with site knowledge and appropriate expertise shall be involved throughout a construction project beginning at the initiation stage” Clause 6.2.1.1

Singapore Technical Reference (TR 42:2015)

- Not a standard yet
 - After 2 years, document will be reviewed to determine suitability as a Singapore standard
- Clause 4.3
 - *“The hospital’s Infection Prevention and Control (IPC) team should be consulted throughout the project and their advice and recommendations be taken account of and documented. The participation of the IPC Team in all phases of planning, construction and renovation of the unit is essential.”*

Going beyond guidelines

- Not an option
- Expected actions to be taken to protect our patients
- What does it take to establish it as a standard?

Nevertheless, incorporate it into IC program

- Role of IC professional
 - Leadership
 - Communication link with program administrators, architects, and engineers
 - Consultant
 - Design specifications
 - Operational and maintenance input
 - Facilitator between senior management and stakeholders

To minimize risk of HAIs

- Active contribution by IC professionals
- Proactive risk assessment before construction
 - Infection control risk assessment (ICRA) matrix
- Control measures implemented
- Monitoring to assess efficacy of control measures

Challenges

- Implementation of program
 - IC to be involved
 - Professionalism and expertise
 - Engaging staffs to perform risk assessment with IC
 - Effective barrier measures
 - Successful outcome – zero healthcare associated *Aspergillus* infection

Building expertise within the IC Team

- Who should be trained?
 - All?
 - Specialist in team?
- Mentoring ICNs
- Bringing them to meetings to shadow and learn
 - Most things are best learnt through experience
 - Every renovation project is an opportunity to learn

Reaching out

- Create awareness and understanding
- Gain their respect
 - Know your stuff
 - Be humble
- Engaging them as partners in project / team member



Conclusion

- Building / renovation in healthcare IS DIFFERENT from that at other places
- Difference is we have immunocompromised patients in the facility
 - They need good indoor air quality
- IC is responsible for prevention of healthcare associated infections related to construction and building – WE NEED TO BE INVOLVED!

THANK YOU

