

Infection Prevention: The Clinical Environment of Care

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Objectives

- Explore the clinical environment of care and its impact on patients and healthcare personnel.



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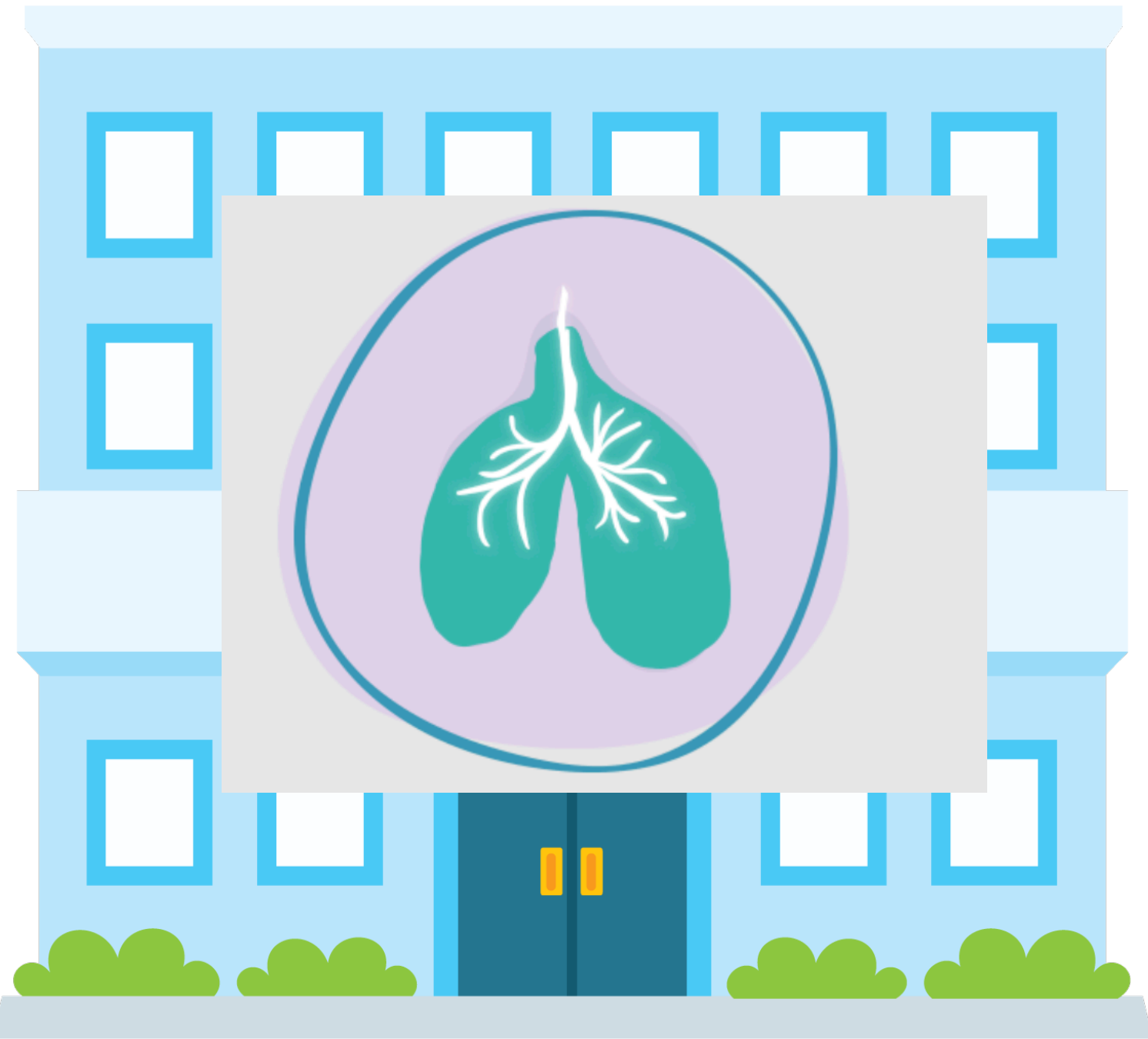
Clinical Environment of Care

- Living environment
- Multiple components acting in concert and interdependent
- Each has specific and unique components but with a distinct relationship to other components
- Difficult to study, improve, or “take up the slack” for other components if there is failure or inadequacy
- Successful approaches begin with a look at the collective clinical environment of care



The "Patient"



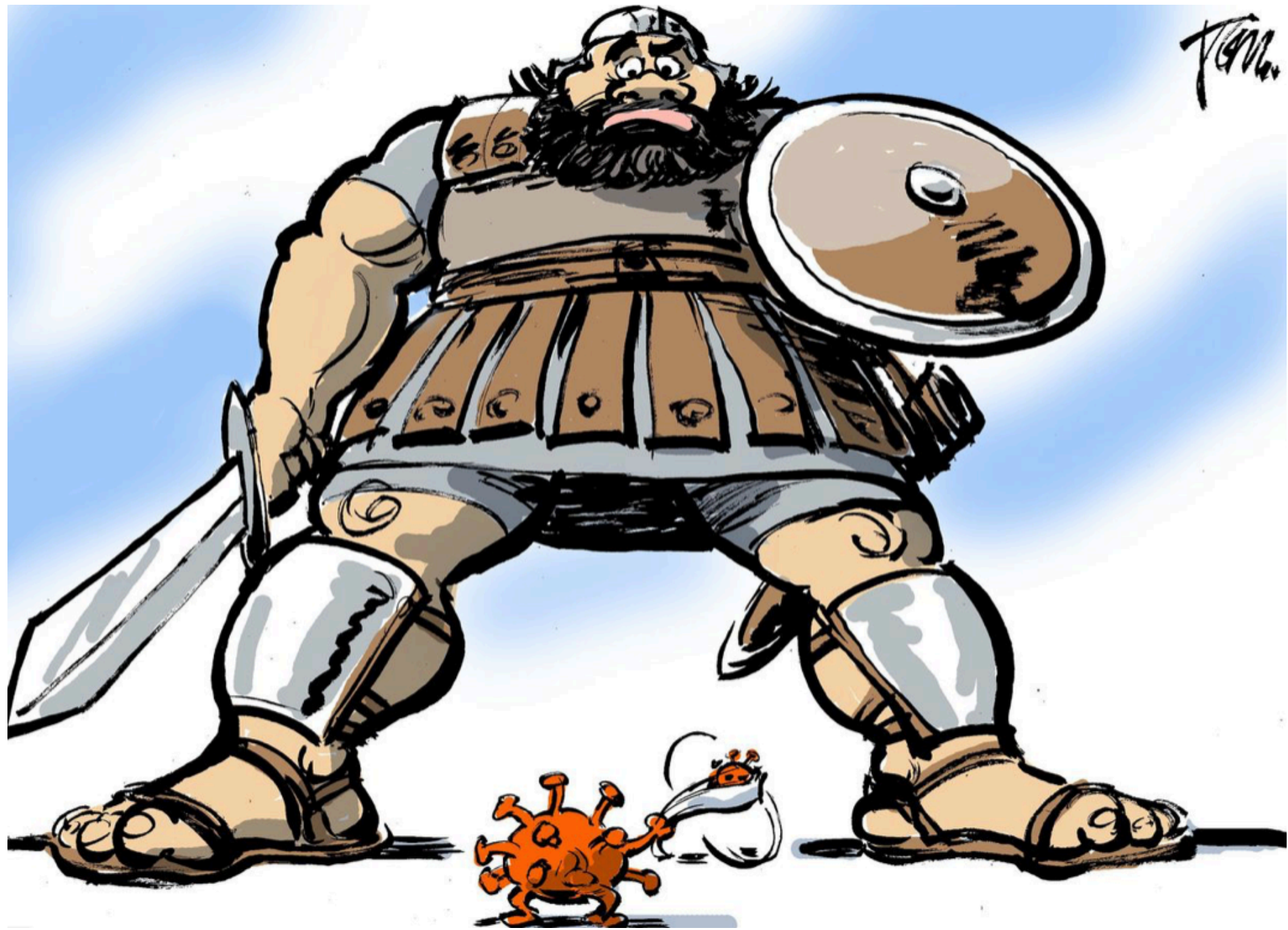


Respiratory System of the Facility:

- Prefilters
- Air handlers
- Ducts (supply and exhaust)
- HEPA filters (point of care)
- Diffusers

Care of the “Patient’s” Respiratory System

- Understanding the architecture of the system
 - Cleanliness
 - Filtration
 - Balance
- Identifying threats
 - Waiting rooms
 - Immunocompromised patient environments
 - Airborne isolation environments
 - Operative environments



Brief Report | Published: 24 March 2020

COVID-19 may transmit through aerosol

[Juan Wang](#) & [Guoqiang Du](#) 

[Irish Journal of Medical Science \(1971 -\)](#) (2020) | [Cite this article](#)

8860 Accesses | **5** Citations | **48** Altmetric | [Metrics](#)

Dear Editor,

On Feb 18, the National Health Commission of the People's Republic of China published the guidelines for the diagnosis and treatment of COVID-19 infection (trial version 6) [[1](#)]. With the awareness and understanding of the disease, the guidelines show that the droplets and close contact transmission are the main routes of transmission, and aerosol transmission is possible under the condition of long exposure to high concentrations of aerosols in a relatively closed environment [[1](#)].



Journal of Hospital Infection

Volume 105, Issue 2, June 2020, Pages 119-127



Risk of nosocomial transmission of coronavirus disease 2019: an experience in a general ward setting in Hong Kong

S.C.Y. Wong ^{a, 1}, R.T-S. Kwong ^{b, 1}, T.C. Wu ^b, J.W.M. Chan ^b, M.Y. Chu ^b, S.Y. Lee ^c, H.Y. Wong ^c, D.C. Lung ^{a, c}  

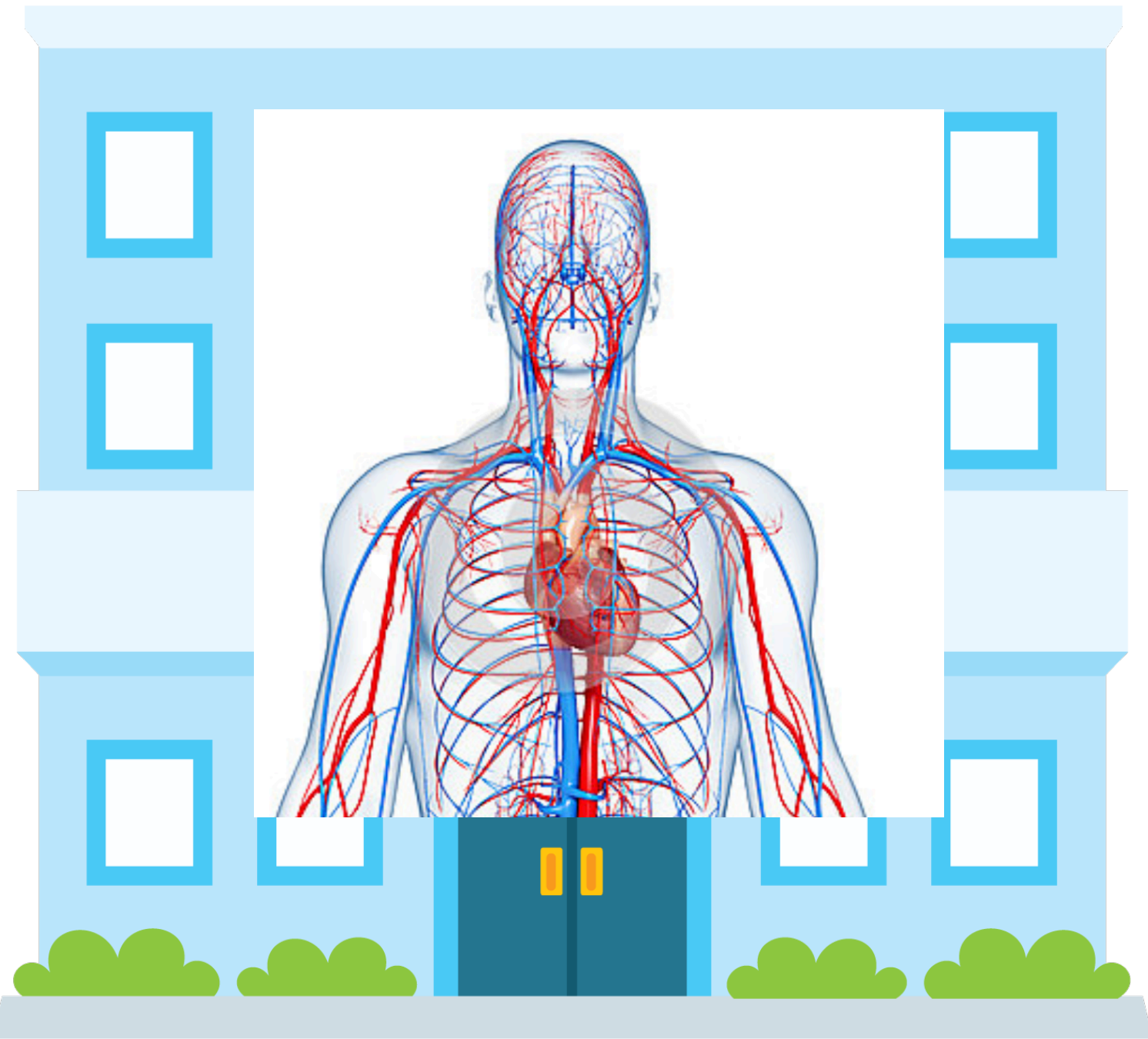
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<https://doi.org/10.1016/j.jhin.2020.03.036>

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Innovative Approaches

- New approaches to air filtration
 - Filter placement in patient care environments
 - UV lights
 - Physical plant renovation to separate plumbing from air filters
 - Air scrubbers
 - Patient protection
 - Healthcare worker protection



Circulatory System of the Facility:

- Water is the “blood” of the facility
 - handwashing
 - laboratory
 - food preparation
 - showering/bathing
 - drinking
 - ice

Care of the “Patient’s” Circulatory System

- Understanding the architecture of the system
 - Condition of the plumbing
 - Configuration of the sink structures and locations
 - Biofilm
- Identifying threats
 - Aging facilities
 - Products exposing the architecture
 - Impact of how the ‘circulatory system’ moves organisms, organic matter, and biofilm

Innovative Approaches

- New approaches to water management
 - Broader water management plans
 - Identifying low use areas
 - Fountains, faucets, ice machines and their routine care and enhanced care are performed




Intestines of the Facility:

- Waste from:
 - Toilets
 - Sinks
 - Laboratory
 - Pathology
 - Food services

Care of the “Patient’s” Gastrointestinal System

- Understanding the architecture of the system
 - Configuration and access
 - Changing needs of the physical plant
 - What is going down the drains
 - Backflow
 - Flood/backup episodes
- Identifying threats
 - Age of the system
 - Capacity of the system

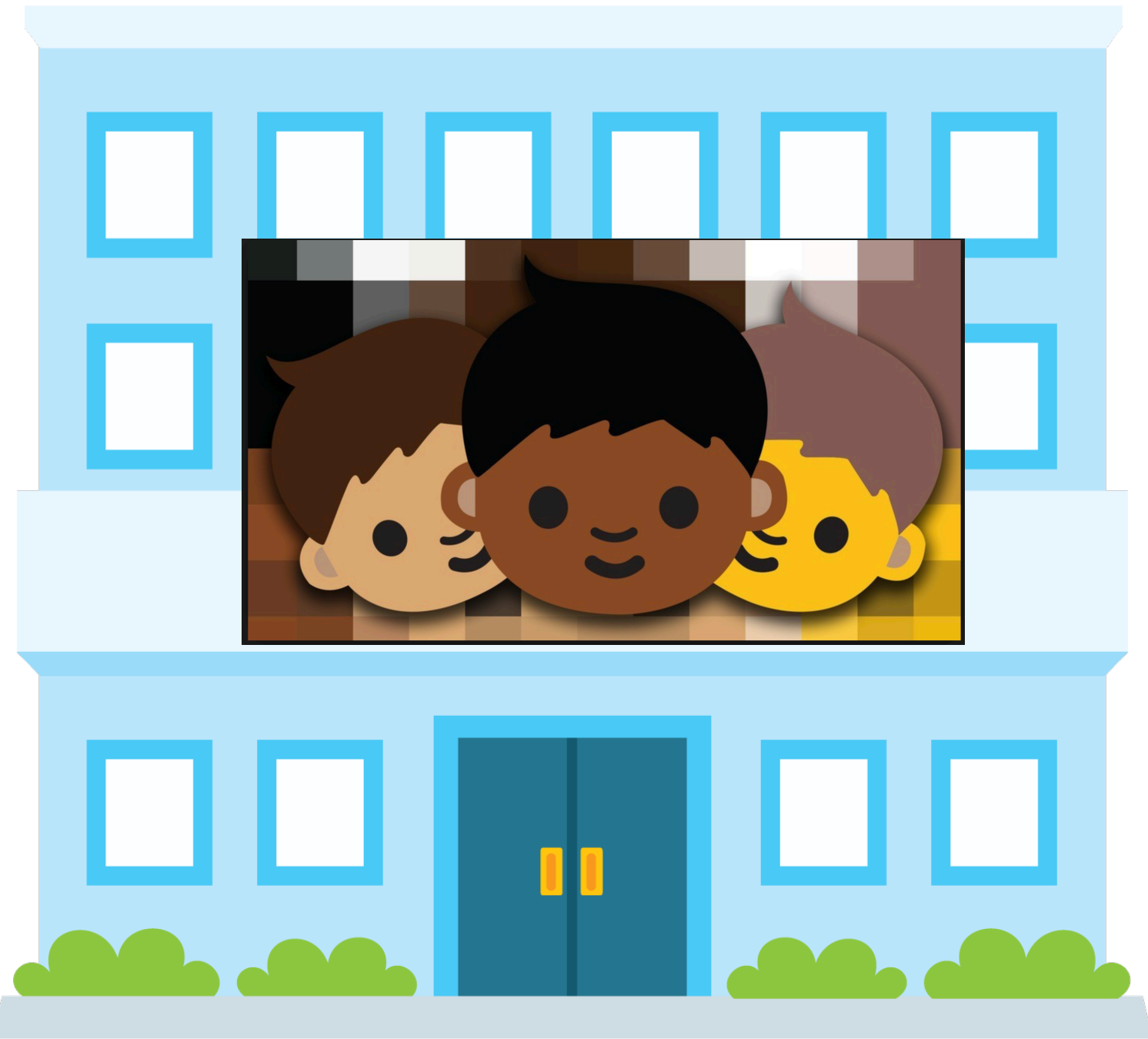


UQ and CSIRO researchers developed surveillance system to identify presence of the coronavirus gene in raw sewage. Credit: The University of Queensland.

UQ and CSIRO researchers developed surveillance system to identify presence of the coronavirus gene in raw sewage. Credit: The University of Queensland.

Innovative Approaches

- New approaches to waste systems
 - Few innovations
 - Increased monitoring of waste streams



Integument of the Facility:

- Surfaces, coverings
 - Types of surfaces
 - Interruptions in surfaces (cracks, seams)
 - Location of surfaces
 - Types of contact between surfaces and chemicals

Care of the “Patient’s” Skin

- Understanding the architecture of the system
 - Surfaces and composition of surface materials
 - Remaining tension between facility appearance, patient satisfaction, surfaces and furnishings, and germicide capabilities
 - Flexed needs of the physical environment
- Identifying threats
 - Few new germicide options
 - Conflicts between manufacturer instructions for use and disinfection needs
 - Surface biofilms
 - Emergence of new MDROs with abilities to communicate and share resistance information
 - Concerns about resistance to current germicides
 - Movement of care and procedures to alternate care settings



Disclaimer: Early release articles are not considered as final versions. Any changes will be reflected in the online version in the month the article is officially released.

Volume 26, Number 7—July 2020

Dispatch

Aerosol and Surface Distribution of Severe Acute Respiratory Syndrome Coronavirus 2 in Hospital Wards, Wuhan, China, 2020

Zhen-Dong Guo¹, Zhong-Yi Wang¹, Shou-Feng Zhang¹, Xiao Li, Lin Li, Chao Li, Yan Cui, Rui-Bin Fu, Yun-Zhu Dong, Xiang-Yang Chi, Meng-Yao Zhang, Kun Liu, Cheng Cao, Bin Liu, Ke Zhang, Yu-Wei Gao✉, Bing Lu✉, and Wei Chen✉

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[Suggested citation for this article](#)

Abstract

To determine distribution of severe acute respiratory syndrome coronavirus 2 in hospital wards in Wuhan, China, we tested air and surface samples. Contamination was greater in intensive care units than general wards. Virus was widely distributed on floors, computer mice, trash cans, and sickbed handrails and was detected in air \approx 4 m from patients.

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Tables

The Clinical Environment of Care: Antimicrobial Stewardship

- Physician, Nurse Practitioner, Physician Assistants: responsible for selecting right drug (pathogen specific), right duration, right route, right dose, for the right human patient
- Environmental Services: responsible for selecting the right germicide (pathogen specific), right duration (contact/dwell time), right route (application methods), right dose (dilution), right patient environment

Innovative Approaches

- New approaches to care of the integument (surfaces)
 - Self-disinfecting surfaces
 - Germicides and delivery methods
 - New applications of existing technologies (UV)
 - New applications of monitoring processes (ATP, fluorescent powders)

The New Clinical Environment of Care

- Healthcare's new patient
- Ongoing care across its lifespan
- Team approach
- What does this new team look like?

