

GAMA GLOBAL WEBINAR SERIES

Prevention and control of respiratory pathogens: a focus on influenza

gama healthcare

DECEMBER 2022

1

GLOBAL WEBINAR SERIES

Objective:
To provide our partners and healthcare workers the best support in IPC knowledge and our innovations.

Format:
1 global webinar per month, 30 minutes + Q&A in English.

Possible contact sessions:
Due to different time zones, the webinars will be recorded and shared. Live Q&A sessions with the speakers can be arranged for those who cannot attend the webinar. Please contact your sales rep/channel marketeers if needed.


GAMA GLOBAL WEBINAR SERIES

9

2

BEFORE WE BEGIN

- You will be **on mute** and your **camera is off** for the duration of the webinar.
- Please place any questions in the **Q&A** section for answering at the end of the webinar.




- Feel free to introduce yourself and where you are joining from in the **chat box!**
- Due to the intellectual property of the presenter, please **refrain from recording or taking screen shots** during the webinar.
- Contact your salesperson for the webinar content & certificate.

GAMA GLOBAL WEBINAR SERIES

9

3

OUR SPEAKER



Professor Brett Mitchell

Professor Brett Mitchell is Editor-in-Chief of Infection, Disease in Health. He is a Professor of Nursing at Avondale University and has over 150 peer reviewed publications and conference presentations. Professor Mitchell is a Fellow of ACIPIC and the Australian College of Nursing. Brett has worked in the area of infection control for many years, including leading infection control programs in hospitals and at a state level. His research interests in the area of infection control include environmental cleaning, pneumonia, surveillance and urinary tract infections.

GAMA GLOBAL WEBINAR SERIES

9

4

AGENDA

1. Focus on influenza – applies to other respiratory pathogens
2. Epidemiology
3. Causes and types of influenza
4. Transmission
5. Prevention and control

GAMA GLOBAL WEBINAR SERIES

9

5

Prevention and control of respiratory pathogens: a focus on influenza

Professor Brett Mitchell
brett.mitchell@avondale.edu.au
 Twitter: @1heathau

Professor of Health Services Research and Nursing, Avondale University
 Adjunct Professor of Nursing, Monash University
 Honorary Professor, University of Newcastle
 Conjoint, Central Coast Local Health District
 Infection Research Program Co-Lead, Hunter Medical Research Institute



6

Background

- Professor Brett Mitchell
- brett.mitchell@avondale.edu.au
- Twitter: @1healthau

7

Disclosures

NHMRC Investigator (GNT2008392)

Received competitive research funding from government funding agencies
(NHMRC, Commonwealth government, Office Teaching & Learning)

Received competitive research grants from non-government funding agencies
(HCF Foundation, ACIPC, Cardinal Health, Australian College Nursing)

Consultancy
(Department of Foreign Affairs and Trade, MSD)

Industry research grants

None relevant to this presentation

8

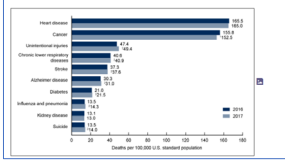
Background

- Focus on influenza – applies to others respiratory pathogens
- Epidemiology
- Causes and types of influenza
- Transmission
- Prevention and control

9

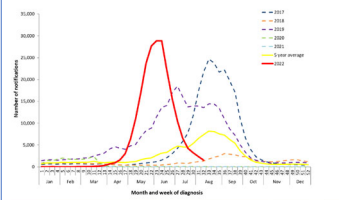
Leading cause of death

Figure 4. Age-adjusted death rates for the 10 leading causes of death: United States, 2016 and 2017



Credit: CDC

Figure 4. Notifications of laboratory-confirmed influenza, Australia, 01 January 2017 to 14 August 2022, by month and week of diagnosis*



National Notifiable Diseases Surveillance System (Australia)
(August 2022)

10

Influenza

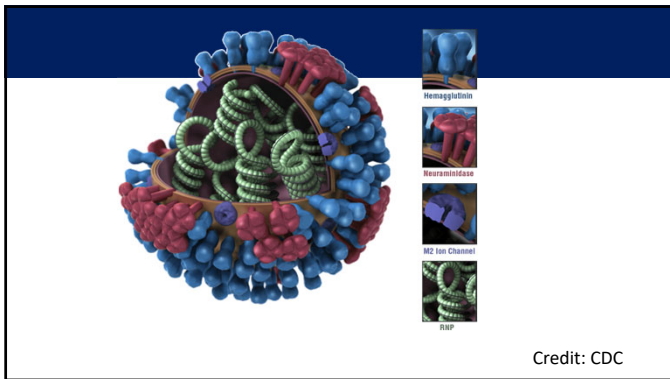
- Influenza (flu) is a contagious respiratory illness
- Caused by influenza viruses
- Influenza virus is an Orthomyxovirus
- Spread by tiny particles made while coughing, sneezing, or talking or by touching surfaces that have flu virus on them
- About 8% of U.S. gets sick from flu annually

11

Types

- Types A, B, C
- Diameter 80 - 120 nm
- Pleomorphic, spherical, filamentous particles
- Single-stranded RNA
- Hemagglutinin and Neuraminidase on surface of virion

12



13

Classification

- Classified on the basis of hemagglutinin (HA) and neuraminidase (NA)
- 15 subtypes of HA and 9 subtypes of NA are known to exist in animals (HA 1-15, NA 1-9)
- 3 subtypes of HA (1-3) and 2 subtypes of NA (1-2) are human influenza viruses. HA 5, 7, 9 and NA 7 can also infect humans

14

Pandemic influenza

INFLUENZA MILESTONES 1917 - 2009

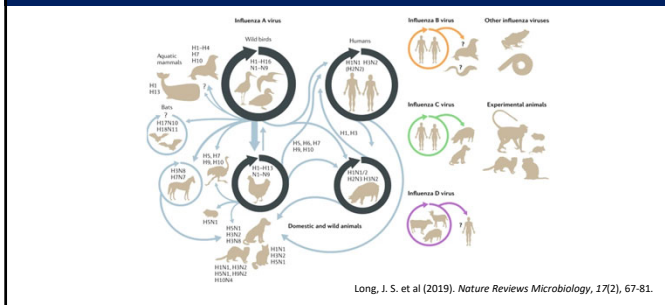
The infographic lists several key events in influenza history:

- 1917:** First recorded influenza pandemic in the United States.
- 1918-1919:** The 1918 influenza pandemic, also known as the Spanish flu, which caused an estimated 40 million deaths worldwide.
- 1957:** The 1957 influenza pandemic, also known as the Hong Kong flu, which caused an estimated 2 million deaths worldwide.
- 1968:** The 1968 influenza pandemic, also known as the Hong Kong flu, which caused an estimated 775,000 deaths worldwide.
- 1997:** The first recorded case of avian influenza (H5N1) in humans.
- 2009:** The 2009 influenza pandemic, also known as the swine flu, which caused an estimated 151,000 deaths worldwide.

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

15

Reservoirs



16

Surveillance

• Global influenza surveillance, both epidemiologic and virologic, is the foundation of influenza preparedness and response for influenza viruses.

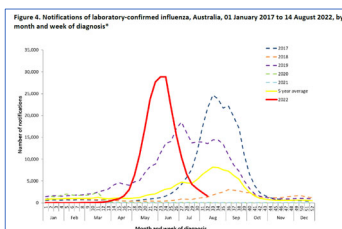
- Allow
 - monitor trends
 - detect report and respond to outbreaks
 - measure impact
 - detect novel viruses



17

Surveillance and recent Australian experience

- Difficulties with data interpretation due to COVID-19
- Since April 2022, 1,666 hospital admissions due to influenza, 6.4% admitted directly to ICU
- Impact – low to moderate
- 82% were influenza A
- 0.1% were influenza B

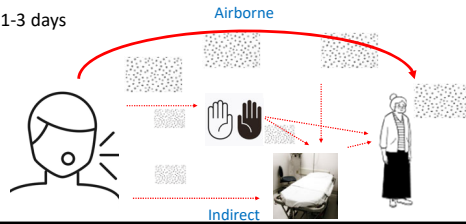


National Notifiable Diseases Surveillance System (Australia)
(August 2022)

18

Mode of transmission

- The virus is spread from person- to- person through respiratory secretions and aerosols
- Incubation period 1-3 days



19

Airborne transmission of respiratory viruses

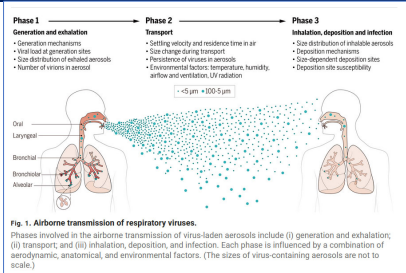


Fig. 1. Airborne transmission of respiratory viruses. Phases involved in the airborne transmission of virus-laden aerosols include (i) generation and exhalation; (ii) transport; and (iii) inhalation, deposition, and infection. Each phase is influenced by a combination of aerodynamic, anatomical, and environmental factors. (The sizes of virus-containing aerosols are not to scale.)

Wang, C. C., et al (2021). Airborne transmission of respiratory viruses. Science, 373(6558).

20

Clinical

- Influenza is an acute respiratory illness characterized by fever, headache, myalgia, coryza, sore throat and cough. Cough is frequently severe and protracted.
- Duration of illness is usually 2-7 days.
- Since the clinical picture of influenza is nonspecific, its specific diagnosis must be confirmed by laboratory tests.
- This is usually made by virus isolation, identification of specific antigens or antibody rise

21

Prevention and treatment

- Vaccination

- Anti-viral
 - Treatment and prophylaxis

22

Prevention: non drug

Public health level

- Good indoor air quality
- Avoid contact with those who are sick
- Avoid touching eyes, mouth, nose
- Clean and disinfect surfaces
- Clean hands

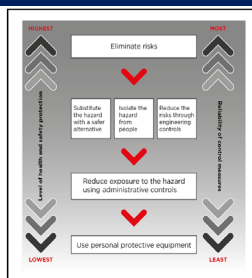
23

Prevention: non-drug

Healthcare setting

(much the same as previous + more!)

- Consider hierarchy of controls

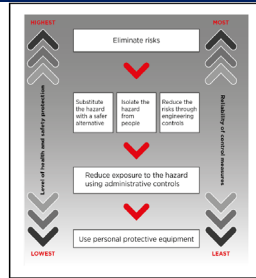


Source: Safe Work Australia

24

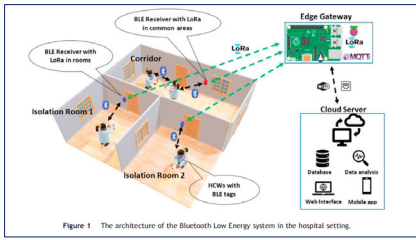
Hierarchy of controls - example

- Eliminate risk
 - Stay at home if sick
 - Rapid detection / isolation
 - Vaccination
 - Proximity tracking
- Substitute risk
 - Air purifiers / air quality / air filtration
 - Increase ventilation / natural air
 - Worker cohorts/bubble rostering
 - High risk procedures in most suitable location
 - Cleaning



25

Proximity tracking



Research paper
Feasibility of Bluetooth Low Energy wearable tags quantify healthcare worker proximity networks and patient close contact: A pilot study
Stephanie J. Curtis^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000}

26

Air purifiers

Original Article
Use of portable air cleaners to reduce aerosol transmission on a hospital coronavirus disease 2019 (COVID-19) ward

Kirsty L. Bealing MSc¹, Robyn Schofield PhD¹, Louis Irving MBBS², Melissa Keywood PhD³, Ashley Stevens⁴, Nick Knight⁵, Grant Skelmore PhD⁶, Imogen Wallrow PhD⁷, Kevin Keenan PhD⁸, Richard Ramanach PhD⁹, Amanda J. Wilson PhD¹⁰, Paul S. Thompson PhD¹¹, Marlene Kuster MPH¹², Jason Hoang PhD¹³, Forbes McClean PhD¹⁴ and Catherine Marshall PhD¹⁵



- Transmission of aerosols from single patient room into corridors & nurses station
- Rate of clearance measured
- Aerosol travelled from patient room
- Cleaners effective in increasing the clearance of aerosols
- 99% aerosols cleared within 5 minutes

27

Air purifiers in classrooms

Physics of Fluids

Transmission and reduction of aerosols in classrooms using air purifier systems

Cite as: Phys. Fluids 33, 033321 (2021); <https://doi.org/10.1063/5.0044046>
 Submitted: 13 January 2021 • Accepted: 24 February 2021 • Published Online: 23 March 2021

Sebastian Burgmann and Uwe Janoske

COLLECTIONS

Paper published as part of the special topic on [Flow and the Virus](#)



28

Ventilation and air purifiers

Physics of Fluids

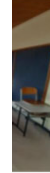
Transmission and reduction of aerosols in classrooms using air purifier systems

Cite as: Phys. Fluids 33, 033321 (2021); <https://doi.org/10.1063/5.0044046>
 Submitted: 13 January 2021 • Accepted: 24 February 2021 • Published Online: 23 March 2021

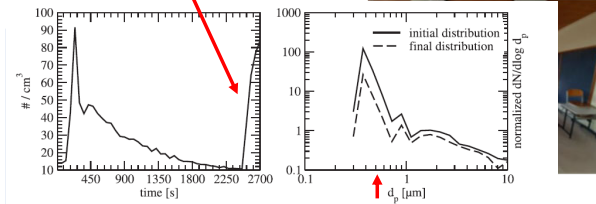
Sebastian Burgmann and Uwe Janoske

COLLECTIONS

Paper published as part of the special topic on [Flow and the Virus](#)



Typical example of particle concentration of time



Reduction 80%, particles <1μm, no ventilation, just purifier

29

Ventilation and air purifiers

Physics of Fluids

Transmission and reduction of aerosols in classrooms using air purifier systems

Cite as: Phys. Fluids 33, 033321 (2021); <https://doi.org/10.1063/5.0044046>
 Submitted: 13 January 2021 • Accepted: 24 February 2021 • Published Online: 23 March 2021

Sebastian Burgmann and Uwe Janoske

COLLECTIONS

Paper published as part of the special topic on [Flow and the Virus](#)



Simulated different scenarios

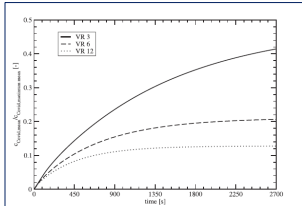


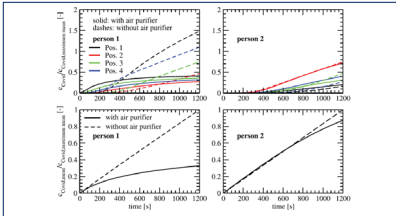
FIG. 13. Temporal development of the mean aerosol concentration for different ventilation rates, infected person at position 1.

30

Ventilation and air purifiers

Physics of Fluids
 Transmission and reduction of aerosols in classrooms using air purifier systems
 K.A.A. Thompson, A.M. Bennett
 Available online at www.cambridge.org/core
 Published online by Cambridge University Press
 Article begins on 27th October
 Downloaded from https://www.cambridge.org/core
 This content downloaded from 128.112.1.104 on 16 Dec 2022 at 14:54:43, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/jfm.2022.111

Simulated different scenarios

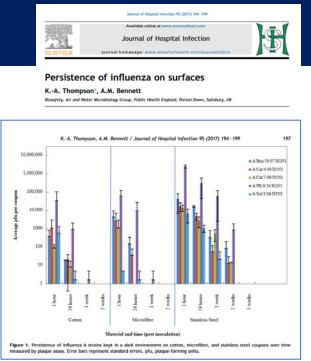


- Increase in VR = reduces aerosol
- Position of infective person influences concentration
- Air purifier may lead to low aerosols
- Useful addition to window ventilation

31

Cleaning

- ~~Fomite vs Air~~
- Lets do both
- Quantifying fomite risk is always difficult – just look at healthcare



32

Survival of respiratory virus (not COVID-19)

Epidemiol. Infect. (2015), 143, 1110–1118. © Cambridge University Press 2014
 doi:10.1017/S0950268814002702

REVIEW ARTICLE
 Humidity and respiratory virus transmission in tropical and temperate settings

S. PAYNTER*
 School of Population Health, University of Queensland, Brisbane, Australia

RH	RSV survival over the period*		
	0–5 h	5–24 h	24–72 h
32%	1	1	1
52%	10	0·1	0·4
77%	18	0·3	0·2

* Relative to survival at 32% RH.

- Humidity a factor, may prolong survival.

33

Survival of respiratory virus (not COVID-19)

RESEARCH ARTICLE

Contamination by respiratory viruses on outer surface of medical masks used by hospital healthcare workers

Alvin Ahmed Ouyang¹, Sacha Sotoca-Rosa², William Rasmussen³, Susana Fomuniv⁴, Quanyu Wang⁵, Yong Fan¹, Dabao Zhang¹, Yi Zhang¹, Li Li¹ and C. Ramo Mouton^{6*}

COMMENTARY

During the COVID-19 pandemic where has respiratory syncytial virus gone?

Greta Di Matteo MD¹ | Raffaella Nemes PhD¹ | Erika Maclean MD¹ | Valentina Bizzo MD¹ | Alessandra Piaraggi PhD² | Alberto Villad PhD³ | Fabio Molitrua PhD²

Pediatric Pulmonology

- RSV decreased during COVID-19, what did we do?
- Isolate, source protection etc.
- Effect of these on contamination?

34

Cleaning

REVIEW

An environmental cleaning bundle and health-care associated infections in hospitals (REACH) a multicentre, randomised trial

Practical recommendations for routine cleaning and disinfection procedures in healthcare institutions: a narrative review

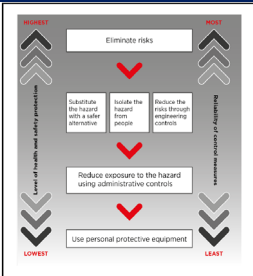
O. Assafian^{1,2,3*}, S. Harberth¹, M. Vos⁴, J.K. Knobloch⁵, A. Astenio⁶, J.A.F. Wilderer⁷

- Assess risk
- Product that is effective against the target organism
- Technique is important
- Training, audit and feedback critical

35

Hierarchy of controls - example

- Isolate risk
 - Isolation / segregation / cohorting
 - Source control masking
- Engineering
 - HVAC and air cleaning
- Administrative
 - Policies/procedures
 - PPE spotters
 - Education, training
 - Audit

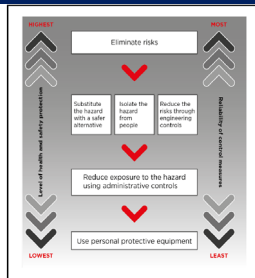


Source: Safe Work Australia

36

Hierarchy of controls - example

- Personal protective equipment
 - P2 / N95 respirator
 - Numerous reviews and articles
 - Eye protection
 - Byambasuren, O et al; (2021). Antimicrobial Resistance & Infection Control, 10(1), 1-7.
 - Gown/gloves where appropriate



Source: Safe Work Australia

37

Prevention and control of respiratory pathogens: a focus on influenza

Professor Brett Mitchell
brett.mitchell@avondale.edu.au
 Twitter: @1heathau

Professor of Health Services Research and Nursing, Avondale University
 Adjunct Professor of Nursing, Monash University
 Honorary Professor, University of Newcastle
 Conjoint, Central Coast Local Health District
 Infection Research Program Co-Lead, Hunter Medical Research Institute



38

Q&A



Professor Brett Mitchell
 Nursing
 Avondale University



Dr Phillip Norville
 Clinical & Scientific Director
 GAMA Healthcare



Dr Maria Rubiano
 Microbiology Sciences
 Team Leader
 GAMA Healthcare


GAMA GLOBAL WEBINAR SERIES



39

Thank you!

Give us feedback!
Survey will show up in the browser when you end this webinar or click the link on the follow-up email tomorrow



gpm
healthcare
