SOURCE CONTROL KEY TO CONTROL SPREAD

Kevin T. Kavanagh, MD, MS
Health Watch USA

University of Louisville Presentation
February 27, 2024

AGENDA

Exposure and Dosage

Aerosolization

Ventilation

Masking

Isolation

-- COVID

-- MRSA

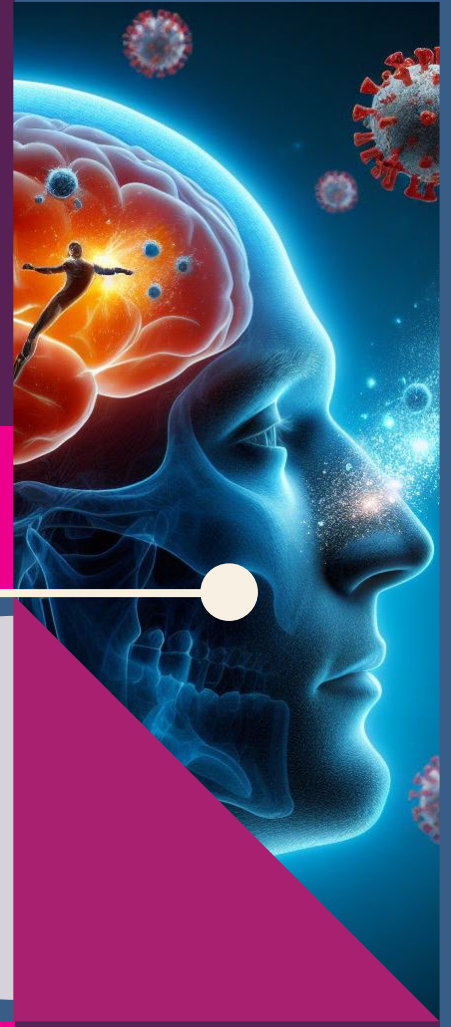
-- Measles

Enhanced Barrier Precautions

Chlorhexidine Bathing

EXPOSURE AND DOSAGE

CDC plans to drop five-day covid isolation guidelines (msn.com)



EXPOSURE AND DOSAGE

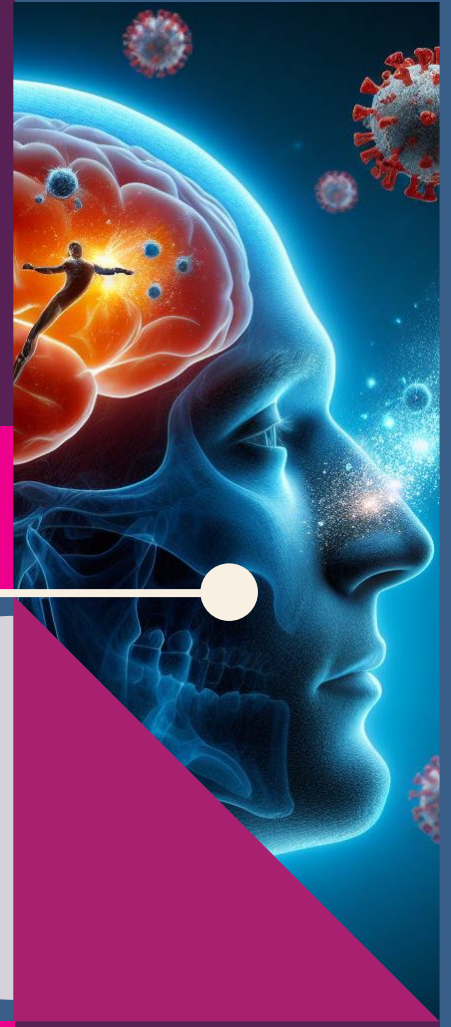
Bacteria may cause an infection with exposure to a small number of organisms -- Tuberculosis:

"*M. tuberculosis* has a very low infectious dose. The ID_{50} is estimated to be <10 bacilli in humans." https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/mycobacterium-

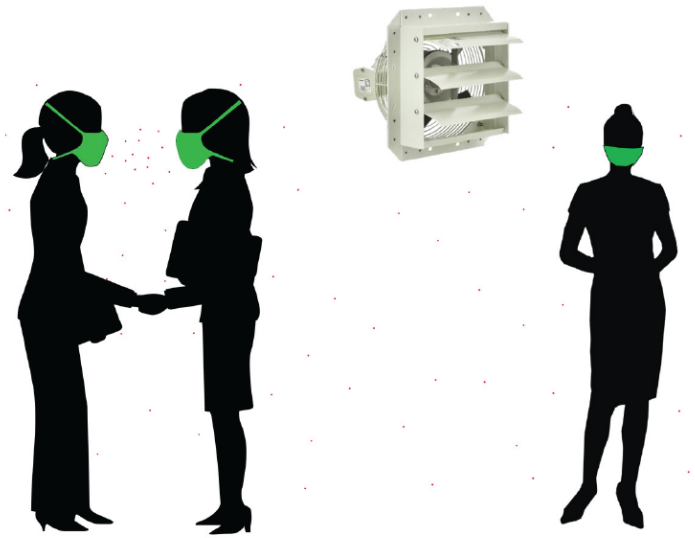
Viruses usually require exposure to a larger infective dosage. They are less stable than a bacteria and must drift next to a receptor by chance.

"An accurate quantitative estimate of the infective dose of SARS-CoV-2 in humans is not currently feasible and needs further research. Our review suggests that it is small, perhaps about 100 particles.

Karimzadeh S, Bhopal R, Nguyen Tien H. Review of infective dose, routes of transmission and outcome of COVID-19 caused by the SARS-COV-2: comparison with other respiratory viruses. Epidemiol Infect. 2021 Apr 14;149:e96. doi: 10.1017/S0950268821000790.. PMID: 33849679; PMCID: PMC8082124.



EXPOSURE AND DOSAGE



- **Source control:** Source control can greatly reduce, if not completely eliminate, the number of aerosols released into the air
- **Ventilation/filtration:** With effective ventilation/filtration, the number of viral aerosols can be greatly reduced
- **Distance and personal protective equipment:** These interventions can offer some protection by reducing a person's exposure
- **Hygiene:** Research indicates that the highest viral loads or positive samples can be found on the floor. Cleaning the floor can reduce the possibility of resuspension

FIGURE 2 Interventions to reduce the spread of SARS-CoV-2. Four basic categories of interventions, described by Marr (2020), can result in a significant reduction in the risk of airborne transmission of SARS-CoV-2.

Airborne Transmission of SARS-CoV-2: Proceedings of a Workshop—in Brief | The National Academies Press https://nap.nationalacademies.org/catalog/25958/airborne-transmission-of-sars-cov-2-proceedings-of-a-workshop

ARTICLES - DOSAGE EFFECTS OF SARS-COV-2

Lind, M.L., Dorion, M., Houde, A.J. et al. Evidence of leaky protection following COVID-19 vaccination and SARS-CoV-2 infection in an incarcerated population. Nat Commun 14, 5055 (2023). https://doi.org/10.1038/s41467-023-40750-8

During the Omicron period, prior infection, vaccination, and hybrid immunity reduced the infection risk of resident:

Chances of an infection:
without a documented exposure (HR: 0.36; 0.57; 0.24)
with cellblock exposures (0.61; 0.69; 0.41 ;respectively)
with cell exposures (0.89; 0.96; 0.80;respectively).

USA Health Watch

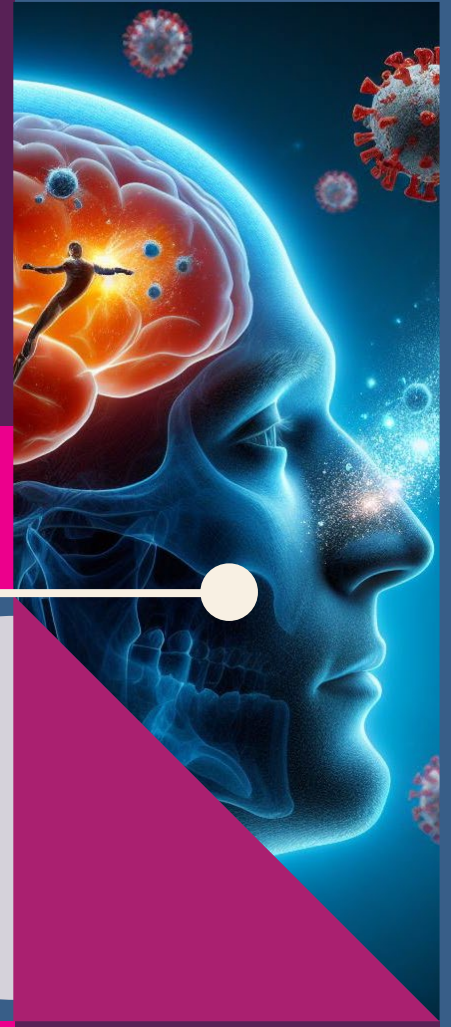
ARTICLES - DOSAGE EFFECTS OF SARS-COV-2

Ferretti, L., Wymant, C., Petrie, J. et al. Digital measurement of SARS-CoV-2 transmission risk from 7 million contacts. Nature 626, 145–150 (2024). https://doi.org/10.1038/s41586-023-06952-2

Cell Phone Tracking Data: Longer exposures at greater distances had risk similar to that of shorter exposures at closer distances. The probability of transmission confirmed by a reported positive test increased initially linearly with duration of exposure (1.1% per hour) and continued increasing over several days.

USA Health Watch

AEROSOLIZATION



AEROSOLIZATION

TABLE 1 Terminology for Particles Involved in Airborne Diseases

Terms	Traditional Thinking (based on longstanding misconceptions, *not* informed by aerosol science)	Updated Descriptions (informed by aerosol science and exposure pathways)		
		Definition and Typical Size	Behavior in Air	Exposure Pathways
Aerosol[a]	Particle <5 μm	Stable suspension of solid and/or liquid particles in air, smaller than about 100 μm	Can remain airborne for extended time. Concentration is highest near source. Concentration decreases with distance from source but can travel farther than about 2 meters or 6 feet and build up in a room	Inhaled into respiratory system
Droplet	Particle >5 μm	Liquid particle, larger than about 100 μm	Settles quickly to the ground or on to a surface. Travels less than about 2 meters or 6 feet, except when propelled (e.g., sneezes and coughs)	Exposure via eyes, nose, or mouth at close range

Airborne Transmission of SARS-CoV-2: Proceedings of a Workshop—in Brief | The National Academies Press https://nap.nationalacademies.org/catalog/25958/airborne-transmission-of-sars-cov-2-proceedings-of-a-workshop

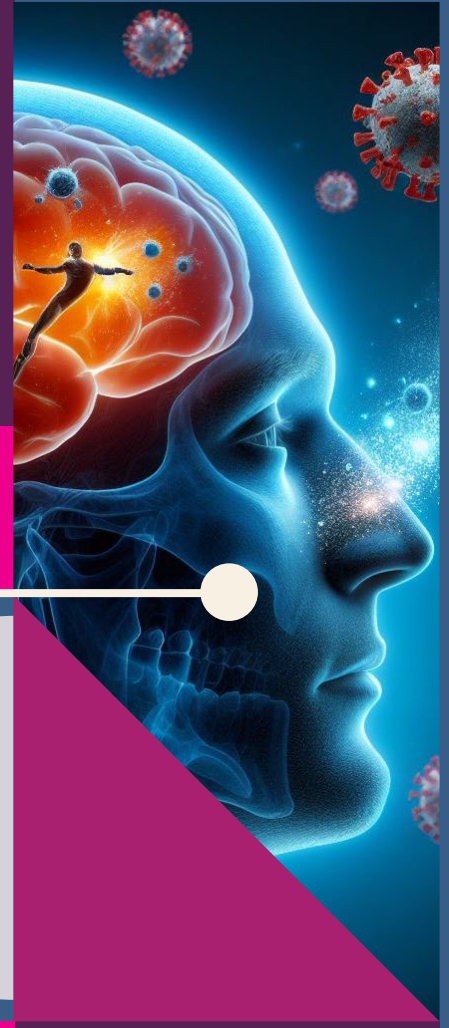
AEROSOLIZATION – SARS-COV-2

Viral half-life in aerosol is approximately 1.1 hours, said Emmie de Wit, Rocky Mountain Laboratories. She described research on the impact of environmental conditions on the infectivity of SARS-CoV-2 in aerosols. The Goldberg drum is used to keep artificially generated aerosols in suspension and to measure infectious virus stability. With this approach, her laboratory found the half-life of SARS-CoV-2 was a little over an hour (van Doremalen et al. 2020). Others have also found infectious aerosols after 16 hours in the Goldberg drum, demonstrating virus stability (Fear et al. 2020).

UV light greatly decreases virus stability, and lower temperatures and humidity may increase stability, de Wit said (Schuit et al. 2020). With high humidity, the half-life of the virus decreased to 55 minutes in one study; other studies have also shown half-life decreases with increasing humidity (Morris et al. 2020). Studies show that the virus loses infectivity faster in warmer temperatures. The effect of sunlight on the virus was examined using simulated UV light to mimic spring, fall, and summer sunlight. These studies showed the half-life of SARS-CoV-2 decreased to less than 6 minutes, or 10% of what is seen in dark environments.

Airborne Transmission of SARS-CoV-2: Proceedings of a Workshop—in Brief | The National Academies Press https://nap.nationalacademies.org/catalog/25958/airborne-transmission-of-sars-cov-2-proceedings-of-a-workshop

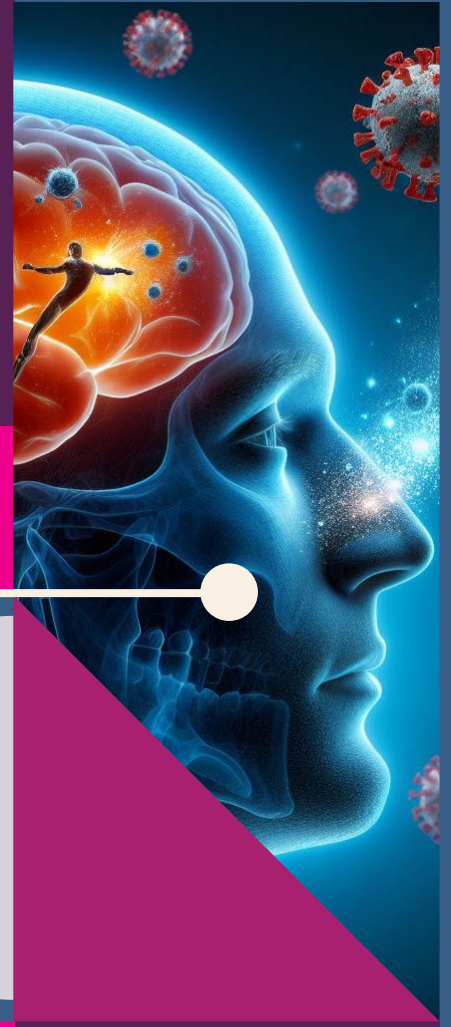
USA Health Watch



AEROSOLIZATION – SARS-COV-2

Thus, a warm humid climate may decrease viral stability and help prevent spread.

In poor countries without air-conditioning, windows are open which increases ventilation and further decreases spread.



AEROSOLIZATION – SARS-COV-2

The New York Times

By Apoorva Mandavilli

Published July 4, 2020 Updated Oct. 1, 2021

239 Experts With One Big Claim: The Coronavirus Is Airborne

The W.H.O. has resisted mounting evidence that viral particles floating indoors are infectious, some scientists say. The agency maintains the research is still inconclusive.

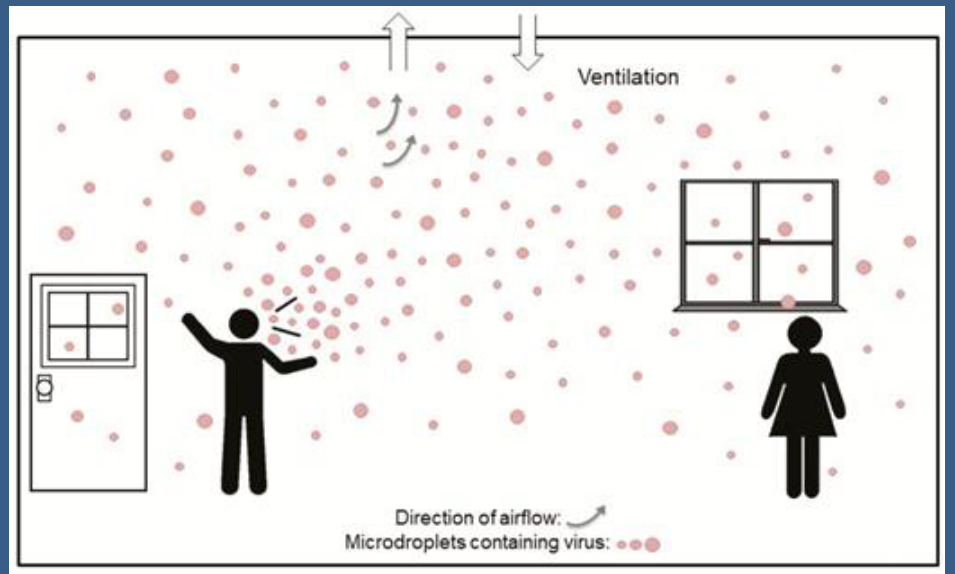
https://www.nytimes.com/2020/07/04/health/239-experts-with-one-big-claim-the-coronavirus-is-airborne.html

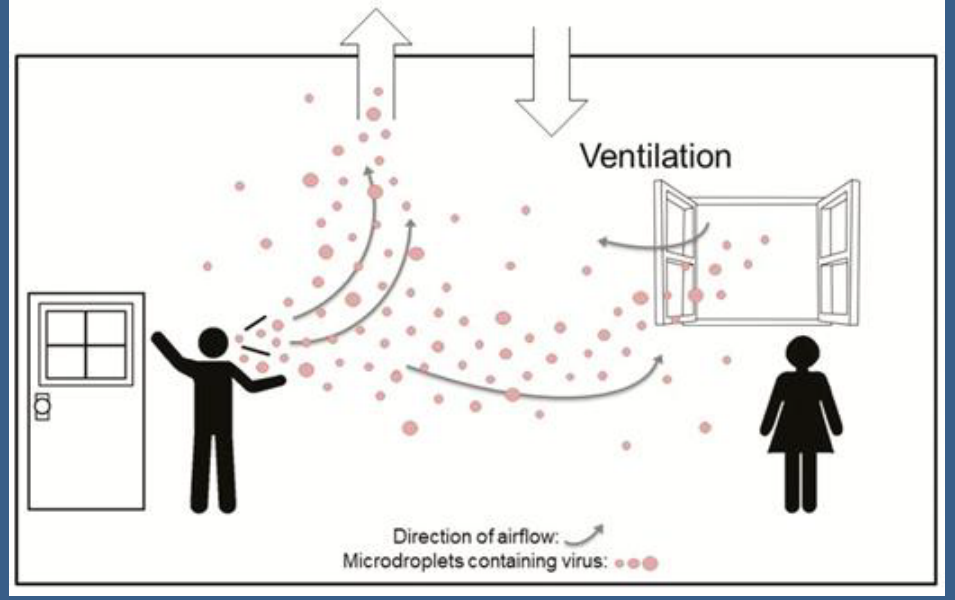
USA Health Watch

It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19)

"We appeal to the medical community and to the relevant national and international bodies to recognize the potential for airborne spread of coronavirus disease 2019 (COVID-19). There is significant potential for inhalation exposure to viruses in microscopic respiratory droplets (microdroplets) at short to medium distances (up to several meters, or room scale), and we are advocating for the use of preventive measures to mitigate this route of airborne transmission."

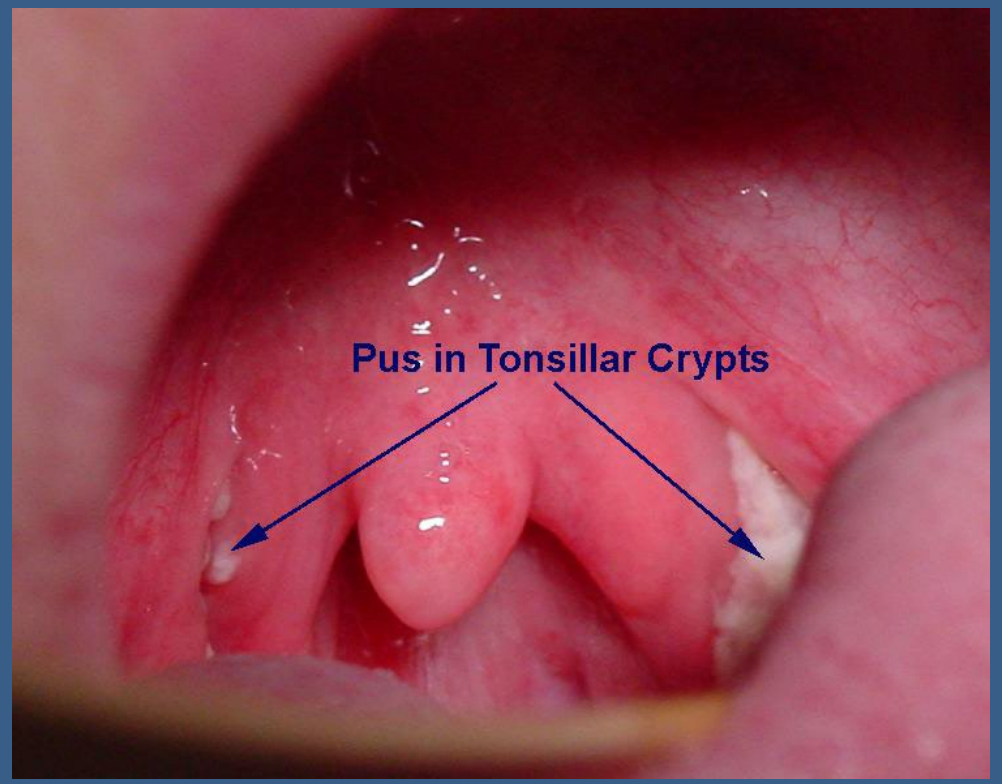
Lidia Morawska, Donald K Milton, It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19), *Clinical Infectious Diseases*, Volume 71, Issue 9, 1 November 2020, Pages 2311–2313, https://doi.org/10.1093/cid/ciaa939





USA Health Watch

AEROSOLIZATION
– COUGHING & ACUTE TONSILITIS



USA
Health Watch

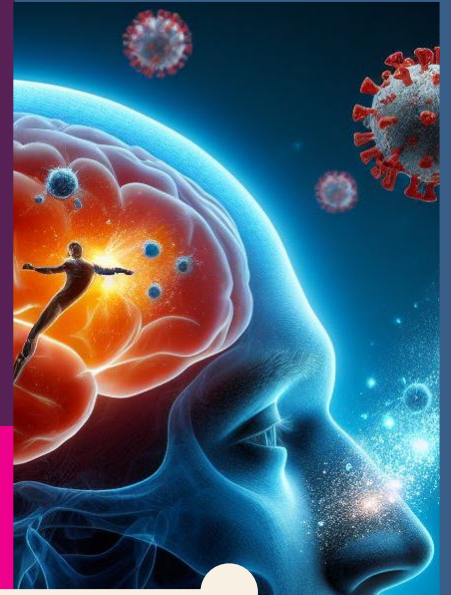
VENTILATION

USA Health Watch

VENTILATION

Raymenants, et al. found that for every 100 ppm increase in pCO2 there was a 9% increase in the detection of an airborne pathogen.

Raymenants, J., Geenen, C., Budts, L. *et al.* Indoor air surveillance and factors associated with respiratory pathogen detection in community settings in Belgium. *Nat Commun* **14**, 1332 (2023). https://doi.org/10.1038/s41467-023-36986-z



VENTILATION

How Much Ventilation Is Enough?

Aim for 5 Air Changes per Hour (ACH)

When possible, aim for 5 or more air changes per hour (ACH) of clean air to help reduce the number of germs in the air.

Improving Air Cleanliness

1. Upgrade central HVAC filter efficiency to a Minimum Efficiency Reporting Value (MERV)-13 or better. When compatible with your HVAC system, increased filtration efficiency is especially helpful when enhanced outdoor air delivery options are limited.
2. Inspect HVAC systems.
3. Use portable or built-in high-efficiency particulate air (HEPA) fan/filtration systems (also called air cleaners or air purifiers).
4. Use UVGI (also called GUV) as a supplemental treatment to inactivate airborne viruses, such as SARS-CoV-2. UVGI can be effective in many spaces, but it is especially useful as an additional layer of protection to reduce infectious particles in indoor spaces that host large gatherings or where the risk of disease transmission is high. It is also helpful when options for increasing room ventilation and filtration beyond code requirements are limited.**
   - Upper-room UVGI systems can be used to provide air treatment within occupied spaces.
   - In-duct UVGI systems can help enhance air cleaning inside central ventilation systems.
   - See detailed discussion in FAQs #6 and #7.

https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html

USA Health Watch

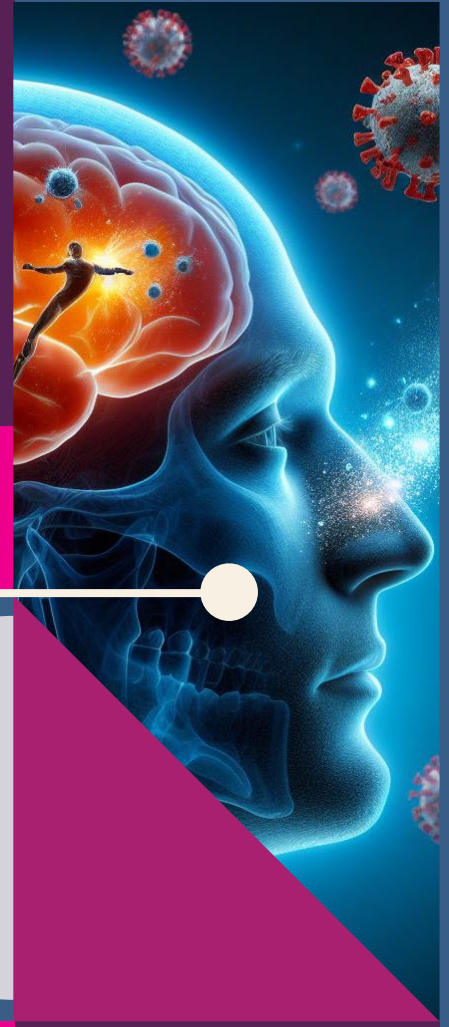
VENTILATION

According to the American Society of Heating, Refrigerating and Air-Conditioning Engineers, central heating and air systems MERV 15 HEPA filter is required to remove 85% of airborne pathogens.

Prior to the pandemic, the society recommended an indoor CO2 level of 870 ppm or below.

https://www.postandcourier.com/opinion/commentary/commentary-charleston-airport-needs-to-improve-its-air-quality/article_efafa202-74b6-11ee-8b7c-cb511e38e4fc.html

https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating



VENTILATION

MERV 14 is too strong for most home HVAC systems.

“Most residential HVAC systems aren’t rated to handle the amount of strain MERV 14 puts on them. Because MERV 14 has a tighter filter, it requires more force from your HVAC unit.”

Merv 14 Filters: Is It The Right Rating for You (filterking.com)

VENTILATION

Italian study shows ventilation can cut school COVID cases by 82%

"With applications guaranteeing a complete replacement of the air in a classroom 2.4 times in an hour, infections were reduced by 40%. They were lowered by 66.8% with four air replacements per hour and by 82.5% with six air replacements, the study showed."

https://www.reuters.com/world/europe/italian-study-shows-ventilation-can-cut-school-covid-cases-by-82-2022-03-22/

Frontiers | Increasing ventilation reduces SARS-CoV-2 airborne transmission in schools: A retrospective cohort study in Italy's Marche region (frontiersin.org)

SARS-COV-2 IS AIRBORNE

- Means it is spread by shouting, singing and talking.
- Indoors, no safe distance. Even 60 feet is unsafe.
- Outdoor, the aerosols dissipate so that large particle spread in crowded conditions are the main concern.

SARS-COV-2 IS AIRBORNE

- An aerosolizing procedure is not required to spread an airborne pathogen.
- Almost all pathogens are spread by and aerosolizing procedure.

MASKING


N95 Masks and PAPRs Provide
Protection Against Airborne Diseases


Surgical Masks Do NOT Provide Adequate
Protection Against Airborne Diseases

MASK EFFECTIVENESS

Figure 1

Time to infectious dose for an uninfected person (receiver)*

Receiver Is Wearing (% inward leakage)

Source Is Wearing (% outward leakage)		Nothing	Typical cloth mask	Typical surgical mask	Non-fit-tested N95 FFR†	Fit-tested N95 FFR
		100%	75%	50%	20%	10%
Nothing	100%	15 min.	20 min.	30 min.	1.25 hours	2.5 hours
Typical cloth mask	75%	20 min.	26 min.	40 min.	1.7 hours	3.3 hours
Typical surgical mask	50%	30 min.	40 min.	1 hour	2.5 hours	5 hours
Non-fit-tested N95 FFR†	20%	1.25 hours	1.7 hours	2.5 hours	6.25 hours	12.5 hours
Fit-tested N95 FFR	10%	2.5 hours	3.3 hours	5 hours	12.5 hours	25 hours

†FFR = filtering facepiece respirator; N95 = not oil-proof, 95% efficient at NIOSH filter test conditions

Getting to and Sustaining the Next Normal A Roadmap for Living with COVID

The Rockefeller Foundation. March 2022

UPenn_NextNormal_030822_sm.pdf (rockefellerfoundation.org)

MASK EFFECTIVENESS

THE LANCET

ARTICLES | VOLUME 395, ISSUE 10242, P1973-1987, JUNE 27, 2020

PDF [1022 KB]

Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis

Derek K Chu, MD • Prof Elie A Akl, MD • Stephanie Duda, MSc • Karla Solo, MSc • Sally Yaacoub, MPH • Prof Holger J Schünemann, MD • et al. Show all authors • Show footnotes

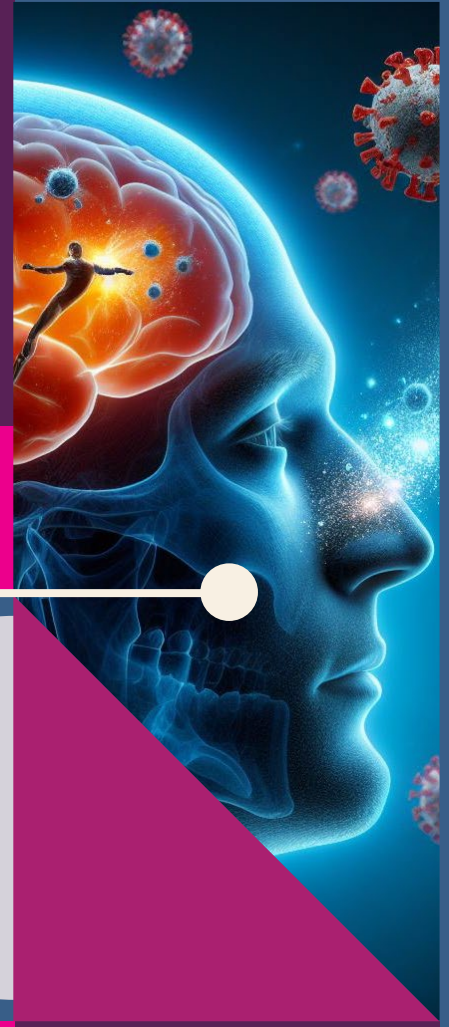
- **Physical distancing:** The chance of transmission:
  At less than 1 meter (3.3 feet) was 12.8%,
  At more than 1 meter (3.3 feet) was 2.6% (1·3% to 5·3%).
- **Face masks:** The chance of transmission without a mask was 17.4%, which fell to 3.1% (1.5% to 6.7%) with a mask or N95 respirator.
- **Eye protection:** The chance of transmission without eye protection was 16%, which fell to 5.5% (3.6% to 8.5%) with eye protection (face shield or goggles).

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31142-9/fulltext

MASKING

Surgical masks are not designed or intended to protect the wearer from respiratory pathogens.

ISOLATION – COVID-19



ISOLATION – COVID-19

The Washington Post

330.5K Followers

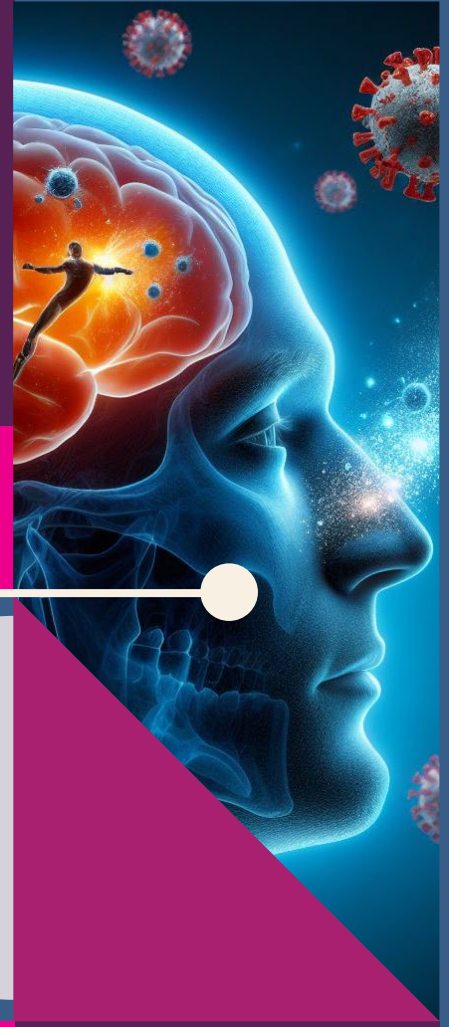
CDC plans to drop five-day covid isolation guidelines

Story by Lena H. Sun • 1w

"Americans who test positive for the coronavirus no longer need to routinely stay home from work and school for five days under new guidance planned by the Centers for Disease Control and Prevention. The agency is loosening its covid isolation recommendations for the first time since 2021 to align it with guidance on how to avoid transmitting flu and RSV, according to four agency officials and an expert familiar with the discussions." – February 2024

https://www.msn.com/en-us/health/other/cdc-plans-to-drop-five-day-covid-isolation-guidelines/ar-BB1icG15

USA Health Watch

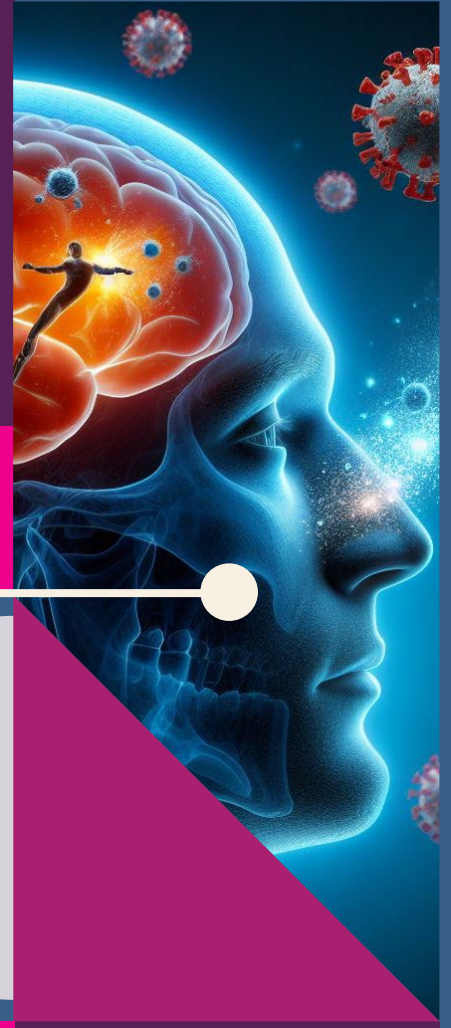


ISOLATION – COVID-19

Dr. Amesh Adalja, in a MedPage Today's commentary entitled "When It Comes to Isolation, COVID Shouldn't Be Singled Out From the Pack" supports the new CDC relaxed guidelines for COVID-19 isolation.

COVID-19 should be managed in "line with how other common respiratory viruses are managed." "*Today, in 2024, there are more tools for monitoring and managing COVID-19 than for any other respiratory virus: spanning from home tests, to wastewater monitoring, to potent antivirals, to highly effective vaccines, to a wealth of clinical guidance to manage cases and mitigate complications.*"

Adalja A. When It Comes to Isolation, COVID Shouldn't Be Singled Out From the Pack. MedPage Today. 2024 Feb. 20, 2024. https://www.medpagetoday.com/opinion/second-opinions/108817



ISOLATION – COVID-19

USA TODAY

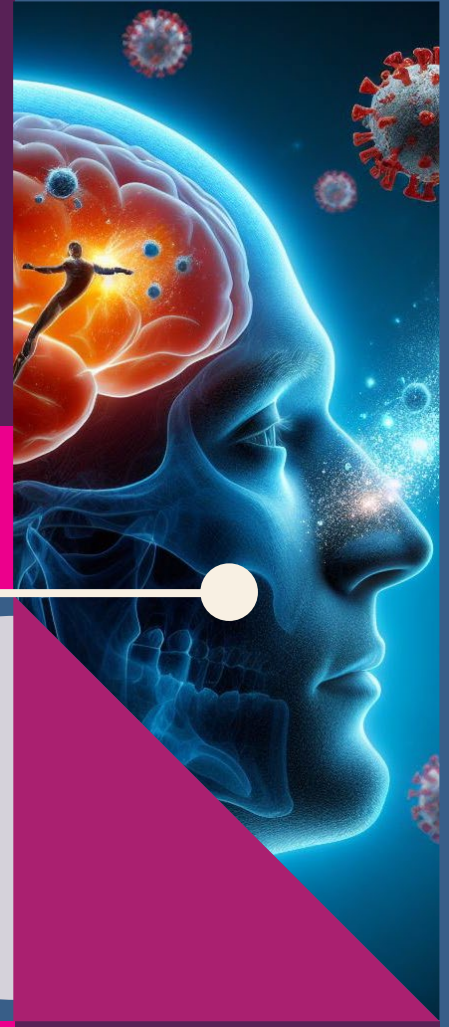
Long COVID: More than 1 in 4 Floridians with COVID developed lasting symptoms, survey says

C. A. Bridges
USA TODAY NETWORK - Florida

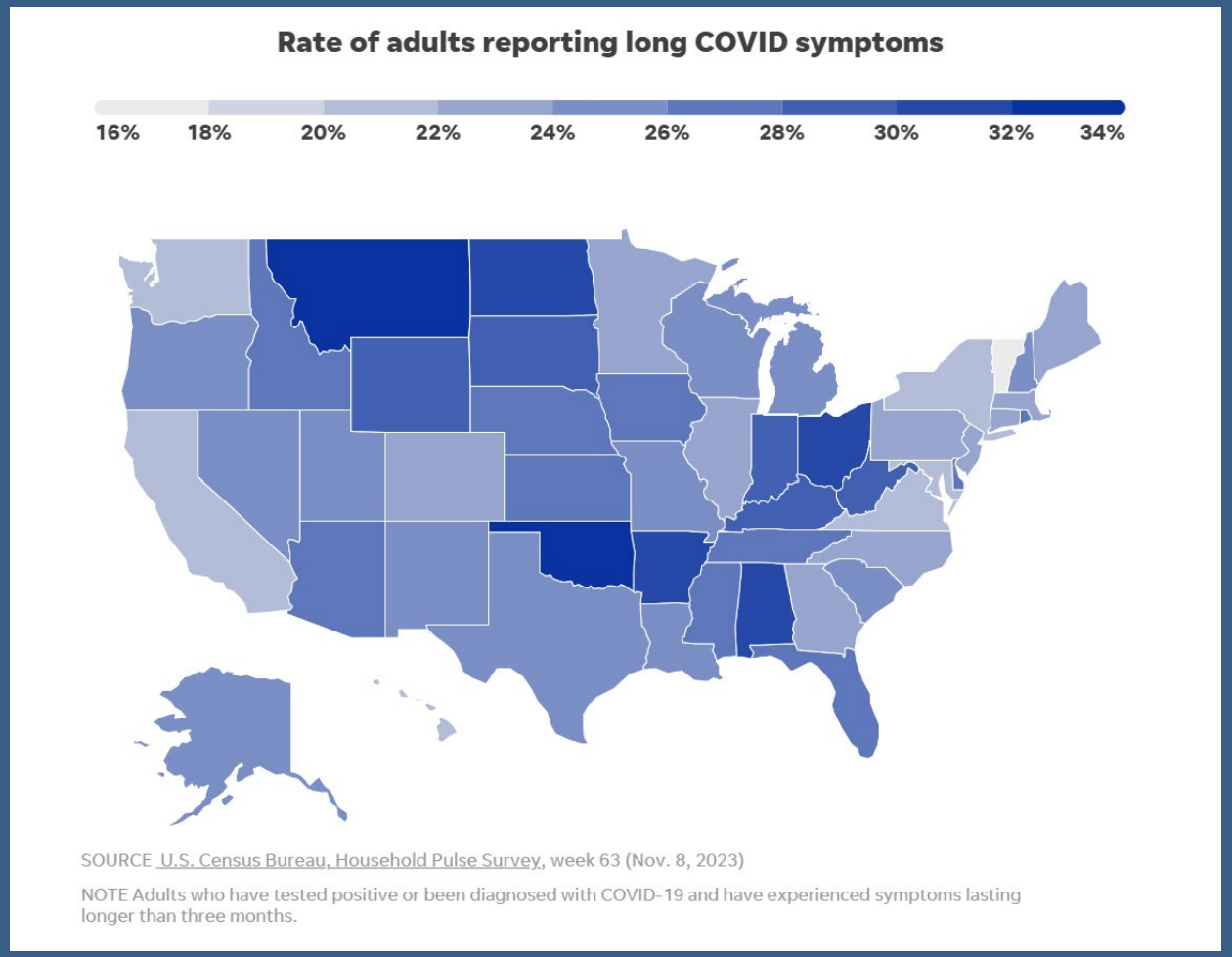
Published 11:21 a.m. ET Feb. 16, 2024 | **Updated 11:39 a.m. ET Feb. 16, 2024**

https://www.usatoday.com/story/news/2024/02/16/long-covid-census-survey-shows-1-in-4-cases-florida-had-lasting-symptoms/72625729007/

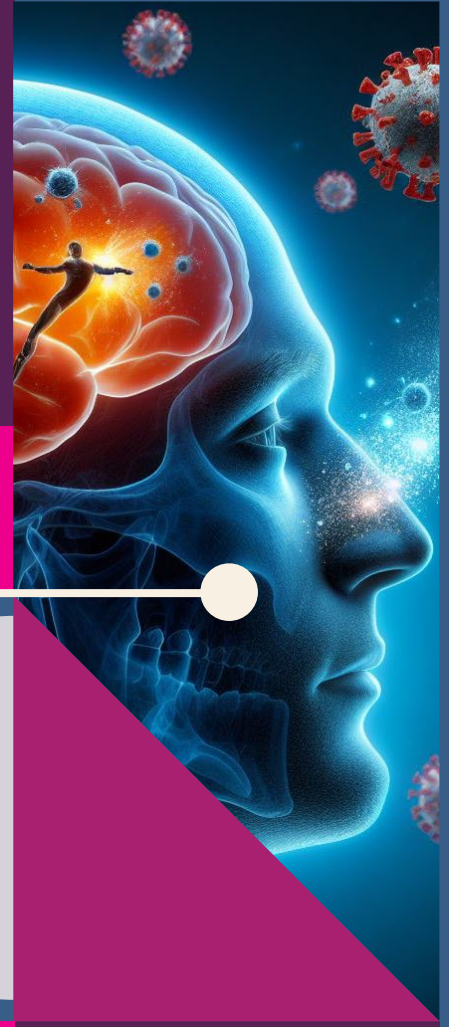
USA Health Watch



ISOLATION – COVID-19



USA Health Watch

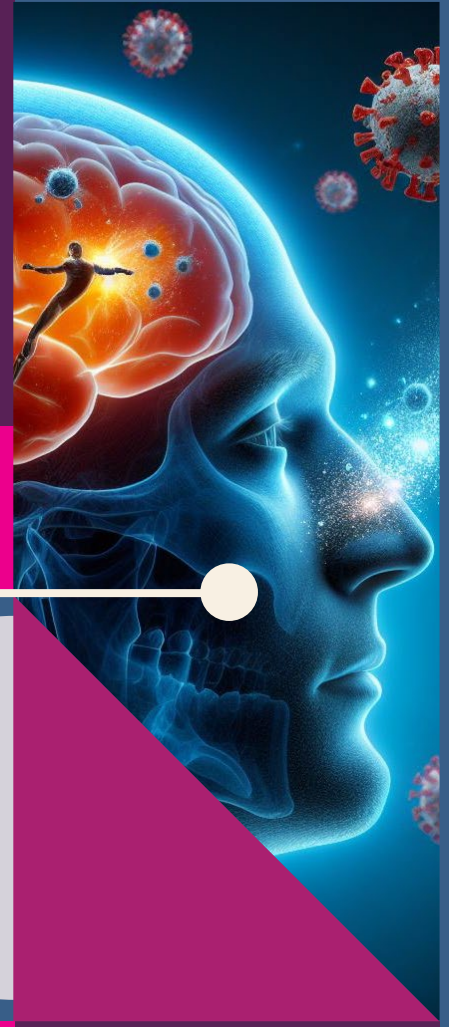


ISOLATION – COVID-19

In Sweden, Many young people suffer from brain fog after the pandemic

Translated: “A fifth of respondents are worried about suffering from exhaustion due to brain fog (18 percent among men and 23 percent among women). In the 18-24 age group, this figure is 31 percent. The insurance company If has commissioned Syno International to investigate the extent to which different groups have been affected by brain fog. The survey shows that many, especially younger people between the ages of 18 and 24, are experiencing brain fog after the pandemic. In this age group, 32 percent experience brain fog. A total of 14 percent experience brain fog.”

Många unga lider av hjärndimma efter pandemin | If Skadeförsäkring (tt.se)



ISOLATION - COVID-19

The United Kingdom's workforce has been crippled with chronic illnesses. 2.8 million residents are inactive due to chronic illness. This is an increase of 700,000 since the pandemic first started. There is also a corresponding decrease of 700,000 UK workers during the pandemic.(1)

In 2022, the Brookings Institute estimated that up to 4 million people in the United States were not working because of long COVID.(2)

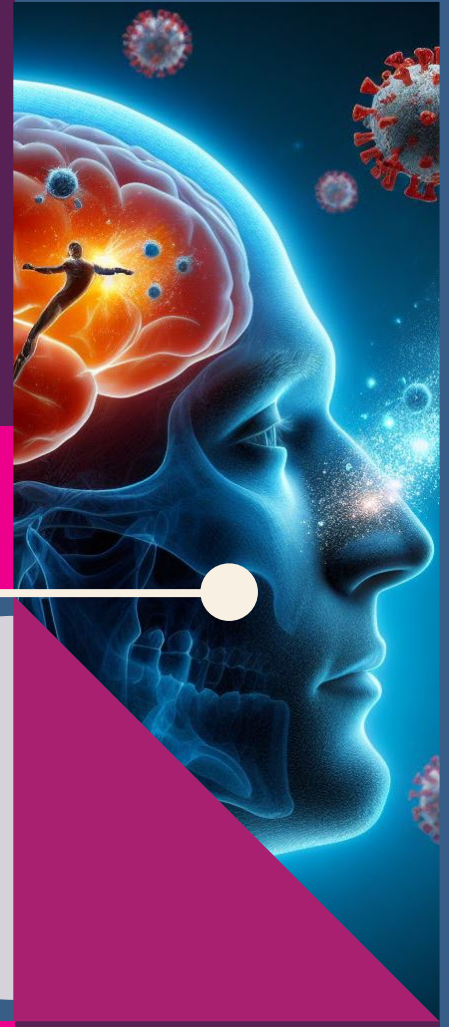
1. Elliott L. Record long-term sickness bodes ill for UK economic growth. The Guardian. 2024. https://www.theguardian.com/business/2024/feb/17/record-long-term-sickness-bodes-ill-for-uk-economic-growth
2. New data shows long Covid is keeping as many as 4 million people out of work [Internet]. 2022. Available from: https://www.brookings.edu/articles/new-data-shows-long-covid-is-keeping-as-many-as-4-million-people-out-of-work/

ISOLATION – COVID-19

“The CDC needs to be giving an unambiguous message for the urgent need of COVID-19 vaccinations and not one minimizing the disease by green lighting the safety of asymptomatic spreaders mingling in our community.”
-- Kevin T. Kavanagh, MD, MS

USA Health Watch

ISOLATION - MRSA

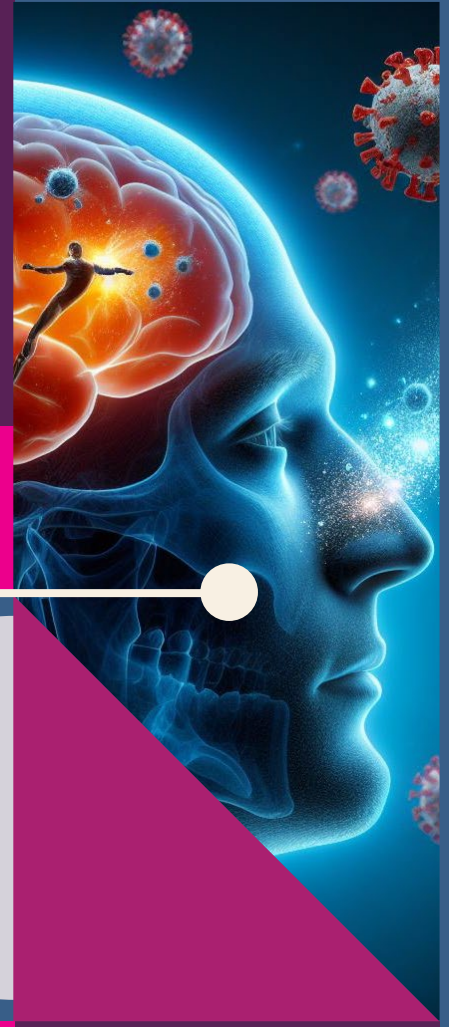


ISOLATION - MRSA

Normalization of Deviance for MRSA infections. A recent statement by SHEA/IDSA and APIC has stated:

"Although contact precautions remain an essential practice, considerations have been provided for hospitals that have strong horizontal prevention measures and neither ongoing MRSA outbreaks nor high or increasing rates of MRSA infection or hospital-onset MRSA-positive cultures and that choose to modify the use of contact precautions for some or all MRSA-colonized or MRSA-infected patients."

Popovich KJ, Aureden K, Ham DC, Harris AD, Hessels AJ, Huang SS, et al. SHEA/IDSA/APIC Practice Recommendation: Strategies to prevent methicillin-resistant Staphylococcus aureus transmission and infection in acute-care hospitals: 2022 Update. Infect Control Hosp Epidemiol. 2023;44(7):1039-67.

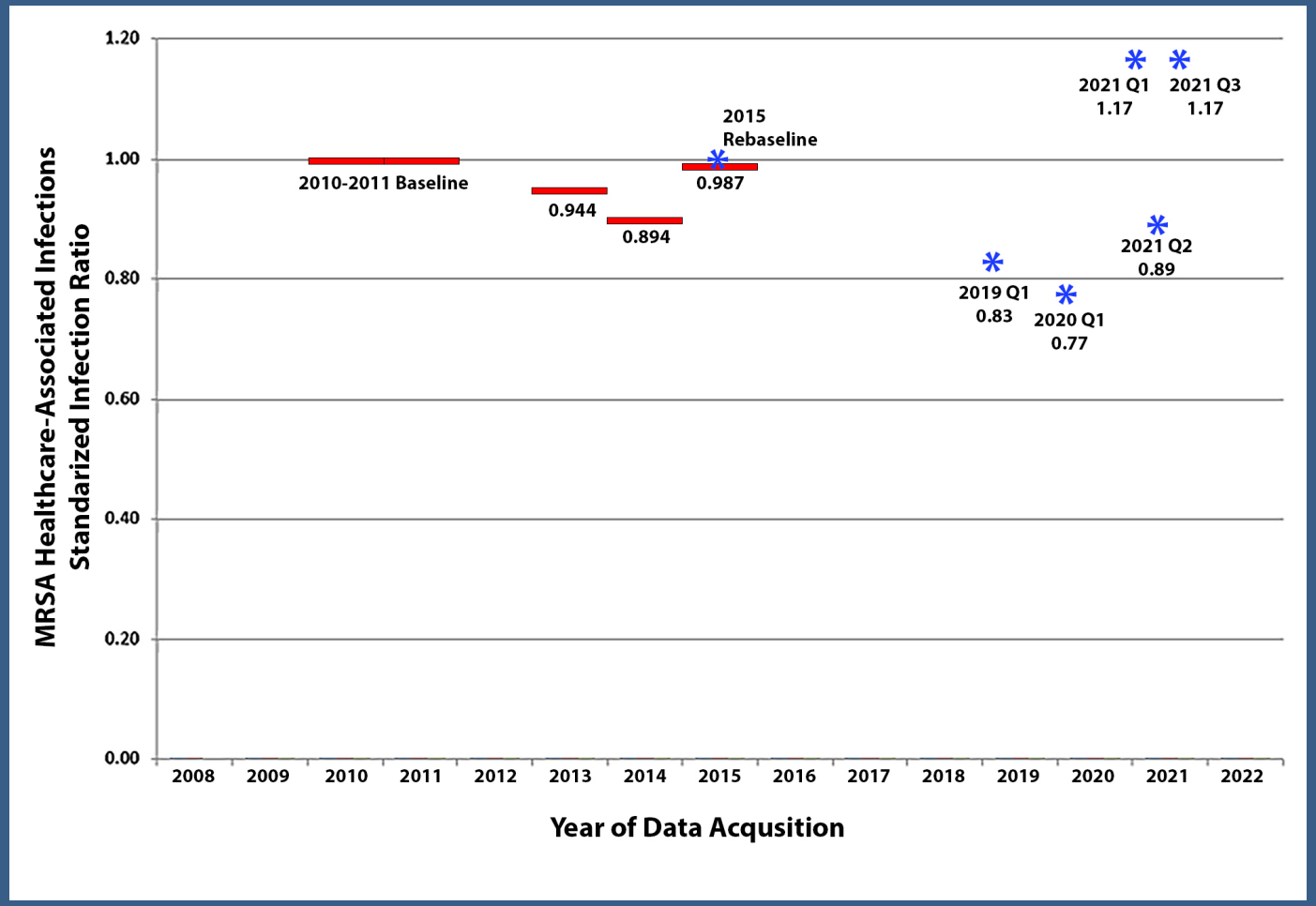


ISOLATION - MRSA

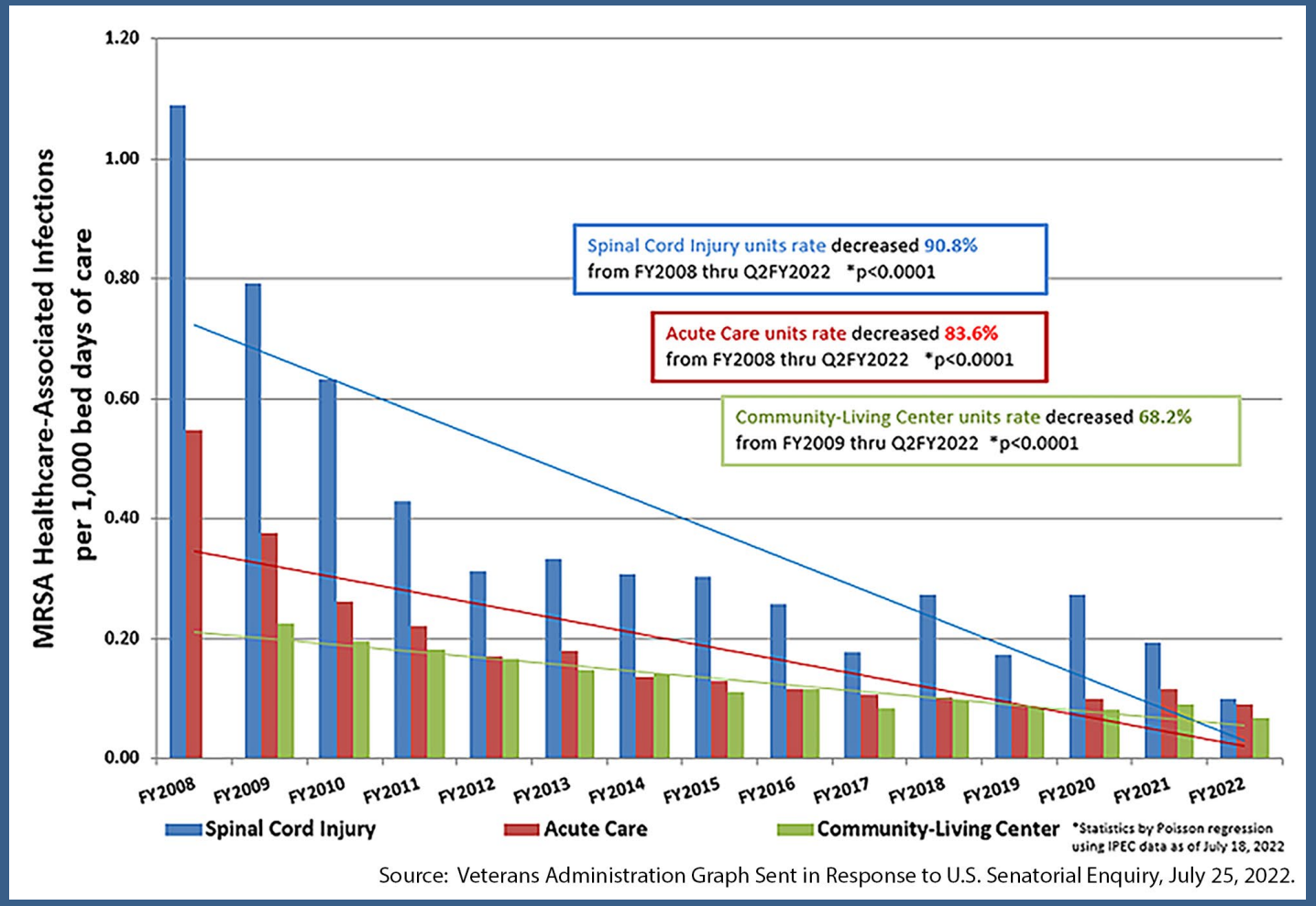
Normalization of Deviance for MRSA infections.)\ A recent statement by SHEA/IDSA and APIC has stated:

What difference does the number of MRSA infected patients in a hospital make for the healthcare worker taking care of an MRSA patient? The risk for the worker does not change with the number of infected patients in the hospital, nor does it for visitors or other staff who may contact this patient in hallways.

ISOLATION – MRSA
-- PRIVATE SECTOR

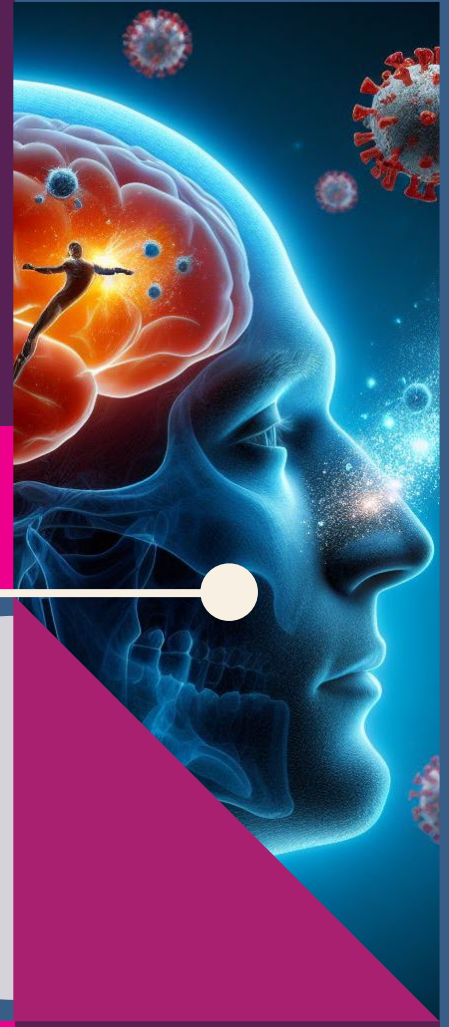


ISOLATION – MRSA
-- VETERANS HEALTH ADMINISTRATION



Source: Veterans Administration Graph Sent in Response to U.S. Senatorial Enquiry, July 25, 2022.

USA Health Watch



ISOLATION - MRSA

Some have made the case this is due to hand-hygiene programs implemented by the Veterans Health Administration.

"Thus, (VA Practices) represented a combination of 1 "vertical" intervention (vertical interventions being those focused on a single pathogen, in this case MRSA) and several "horizontal" interventions (horizontal interventions being those such as hand hygiene that impact all potential pathogens)

Diekema DJ, Nori P, Stevens MP, Smith MW, Coffey KC, Morgan DJ. Are contact precautions "essential" for the prevention of healthcare-associated methicillin-resistant Staphylococcus aureus? Clin Infect Dis. 2023. https://www.ncbi.nlm.nih.gov/pubmed/37738565

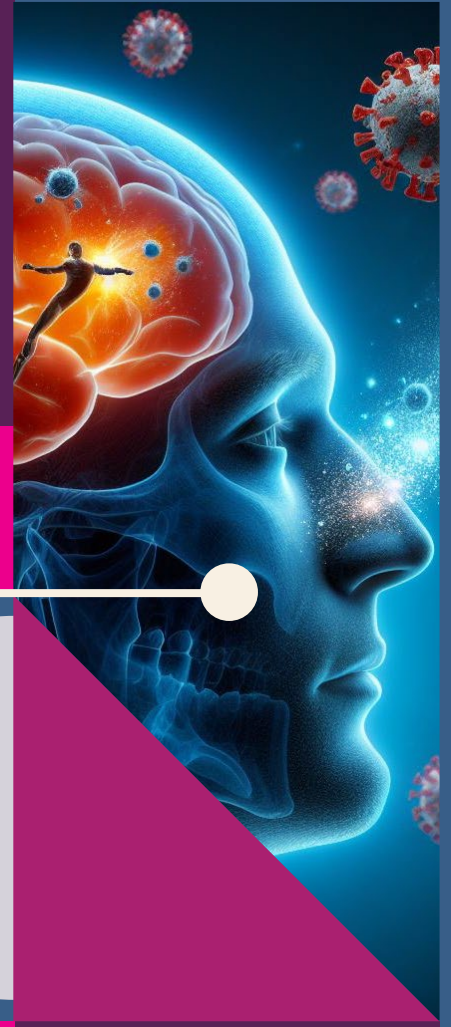
ISOLATION - MRSA

The decrease was seen in MRSA but not MSSA

"...included admission screening for nasal MRSA carriage and use of contact precautions for MRSA-colonized patients, VAMCs across the United States experienced a sharp decline in S. aureus infections among hospitalized patients. Most of the reductions were explained by decreases in MRSA; reductions in MSSA rates were more modest." -- Jones and Colleagues (1)

The United Kingdom' NHS has reported similar results during the implementation of MRSA admission screening for MRSA.(2) MRSA bloodstream infections decreased approximately 75%, without a reduction in MSSA infections. (2)

1. Jones M, Jernigan JA, Evans ME, Roselle GA, Hatfield KM, Samore MH. Vital Signs: Trends in Staphylococcus aureus Infections in Veterans Affairs Medical Centers - United States, 2005-2017. MMWR Morb Mortal Wkly Rep. 2019;68(9):220-4.
2. Otter J. 2015. [cited December 10, 2023]. Available from: https://reflectionsipc.com/2015/03/03/the-english-mrsa-miracle/



ISOLATION - MEASLES

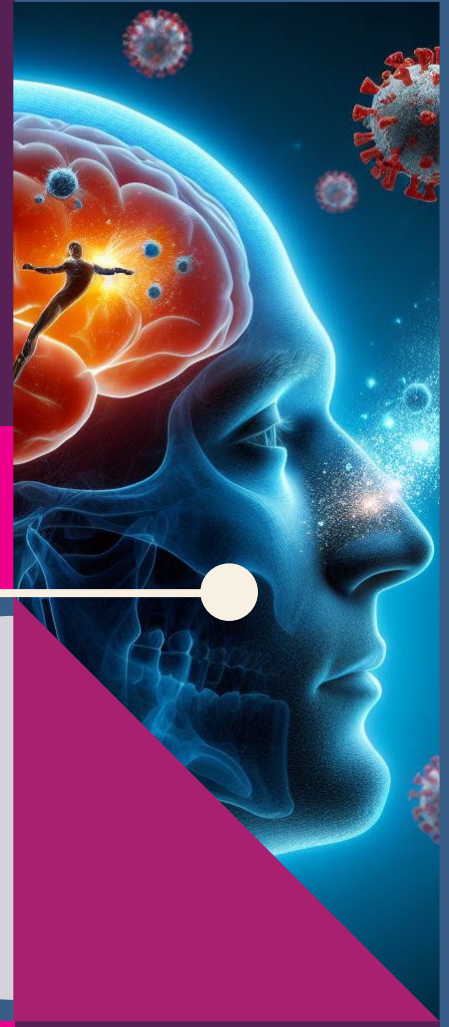
The Washington Post

Florida surgeon general defies science amid measles outbreak

By Lena H. Sun and Lauren Weber

February 22, 2024 at 8:02 p.m. EST

USA Health Watch



ISOLATION - MEASLES

The Washington Post

Florida surgeon general Joseph A. Ladapo failed to urge parents to vaccinate their children or keep unvaccinated students home from school as a precaution in a letter to parents at the Fort Lauderdale-area school this week following six confirmed measles cases.

Instead of following what he acknowledged was the “normal” recommendation that parents keep unvaccinated children home for up to 21 days — the incubation period for measles — Ladapo said the state health department “is deferring to parents or guardians to make decisions about school attendance.”

USA Health Watch

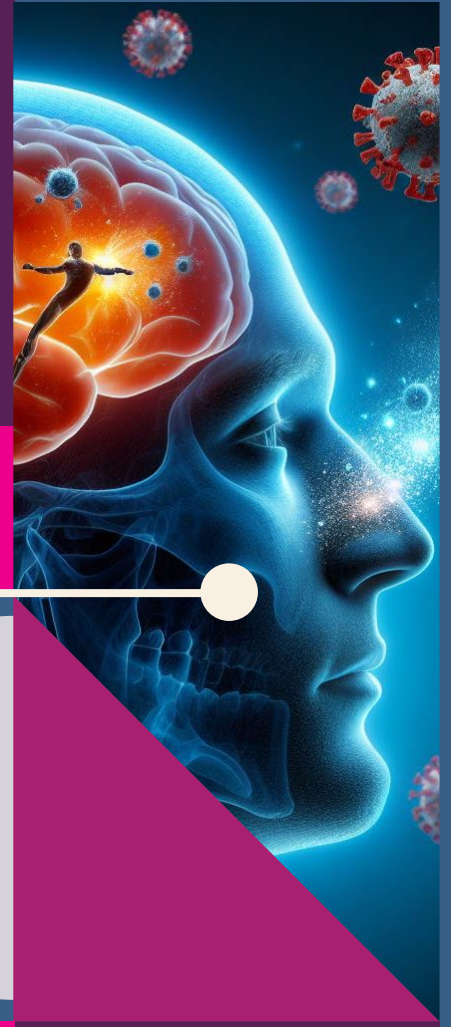
ENHANCED BARRIER PRECAUTIONS

ENHANCED BARRIER PRECAUTIONS

- Contact Precautions
  -- Gloves, Gowns, (N95 Masks if airborne)
  -- Isolation

- Enhanced Barrier Precautions

  -- Watered Down Contact Precautions



ENHANCED BARRIER PRECAUTIONS

In the proposed recommendation narrative, it states:

433 Enhanced Barrier Precautions may be prioritized by public health and through local risk assessment. Enhanced
434 Barrier Precautions may be considered for other congregate settings in healthcare facilities other than skilled
435 nursing facilities (e.g., congregate behavioral health units in acute care hospitals).

DRAFT 2024 Guideline to Prevent Transmission of Pathogens in Healthcare Settings
https://www.cdc.gov/hicpac/pdf/DRAFT-2024-Guideline-to-Prevent-Transmission-of-Pathogens-2023-10-23-508.pdf

ENHANCED BARRIER PRECAUTIONS

d. Residents are not restricted to their rooms or limited from participation in group activities. Because Enhanced Barrier Precautions do not impose the same activity and room placement restrictions as Contact Precautions, they are intended to be in place for the duration of a resident's stay in the facility or until the indication for Enhanced Barrier Precaution is resolved (e.g., resolution of wound or discontinuation of the indwelling medical device). (*Expert Opinion*)

Residents with many different types of MDROs are not restricted in their facilities.

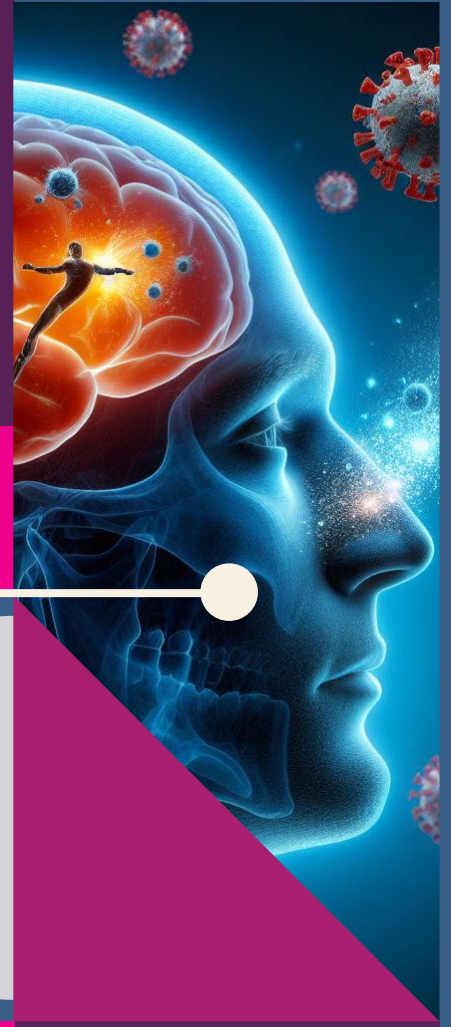
DRAFT 2024 Guideline to Prevent Transmission of Pathogens in Healthcare Settings
https://www.cdc.gov/hicpac/pdf/DRAFT-2024-Guideline-to-Prevent-Transmission-of-Pathogens-2023-10-23-508.pdf

ENHANCED BARRIER PRECAUTIONS

c. Use a gown and gloves for high-contact resident care activities including dressing, bathing/showering, transferring, providing hygiene, changing linens, changing briefs or assisting with toileting, device care or use (e.g., central venous catheter, urinary catheter, feeding tube, tracheostomy/ventilator management), and wound care.[15,17,38,39] In general, gown and gloves would not be required for resident care activities other than those listed above, unless indicated per Standard Precautions. (*Expert Opinion*)

Enhanced Barrier Precautions would not be required for the administration of medications which can occur three times a day for many residents.

DRAFT 2024 Guideline to Prevent Transmission of Pathogens in Healthcare Settings
https://www.cdc.gov/hicpac/pdf/DRAFT-2024-Guideline-to-Prevent-Transmission-of-Pathogens-2023-10-23-508.pdf



ENHANCED BARRIER PRECAUTIONS

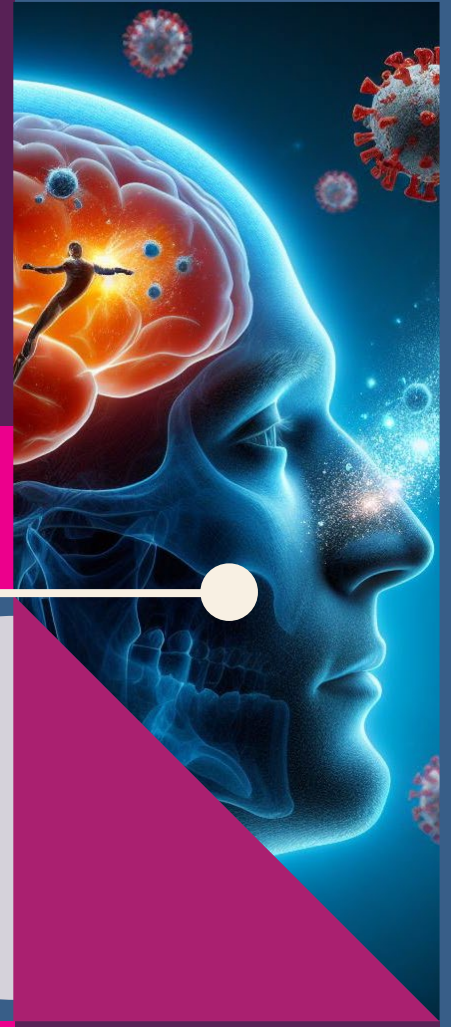
2. **Enhanced Barrier Precautions** (applies to Skilled Nursing Facilities):
   a. Enhanced Barrier Precautions are indicated, when Contact Precautions do not otherwise apply, for nursing home residents with multidrug-resistant organism (MDRO) infection or colonization.[34] (*Expert Opinion*)

DRAFT 2024 Guideline to Prevent Transmission of Pathogens in Healthcare Settings
https://www.cdc.gov/hicpac/pdf/DRAFT-2024-Guideline-to-Prevent-Transmission-of-Pathogens-2023-10-23-508.pdf

4. **When should nursing home staff use Contact Precautions versus Enhanced Barrier Precautions for a resident with a MDRO?**
   Contact Precautions are recommended if the resident has acute diarrhea, draining wounds, or other sites of secretions or excretions that are unable to be covered or contained or for a limited period of time during a suspected or confirmed MDRO outbreak investigation. If neither criteria are met and the resident does not have another indication for Contact Precautions (See Question 5), then Enhanced Barrier Precautions could be used, unless otherwise directed by public health authorities.

Frequently Asked Questions (FAQs) about Enhanced Barrier Precautions in Nursing Homes | HAI | CDC https://www.cdc.gov/hai/containment/faqs.html

USA Health Watch



ENHANCED BARRIER PRECAUTIONS

2. **Enhanced Barrier Precautions** (applies to Skilled Nursing Facilities):
   a. Enhanced Barrier Precautions are indicated, when Contact Precautions do not otherwise apply, for nursing home residents with multidrug-resistant organism (MDRO) infection or colonization.[34] (*Expert Opinion*)

DRAFT 2024 Guideline to Prevent Transmission of Pathogens in Healthcare Settings
https://www.cdc.gov/hicpac/pdf/DRAFT-2024-Guideline-to-Prevent-Transmission-of-Pathogens-2023-10-23-508.pdf

5. **Are Enhanced Barrier Precautions recommended for residents with *Clostridioides difficile* infection or scabies?**
   No. Enhanced Barrier Precautions are intended for MDROs (other than *Clostridioides difficile) and* do not replace existing guidance regarding use of Contact Precautions for other pathogens (e.g., *Clostridioides difficile*, scabies, norovirus) and conditions in nursing homes. Refer to

Frequently Asked Questions (FAQs) about Enhanced Barrier Precautions in Nursing Homes | HAI | CDC https://www.cdc.gov/hai/containment/faqs.html

USA Health Watch

ENHANCED BARRIER PRECAUTIONS

Examples of MDROs targeted by CDC include:

- Pan-resistant organisms,
- Carbapenemase-producing carbapenem-resistant Enterobacterales,
- Carbapenemase-producing carbapenem-resistant *Pseudomonas*,
- Carbapenemase-producing carbapenem-resistant *Acinetobacter baumannii*, and
- *Candida auris*

Additional epidemiologically important MDROs may include, but are not limited to:

- Methicillin-resistant *Staphylococcus aureus (MRSA)*,
- ESBL-producing Enterobacterales,
- Vancomycin-resistant *Enterococci (VRE)*,
- Multidrug-resistant *Pseudomonas aeruginosa*,
- Drug-resistant *Streptococcus pneumoniae*

https://www.cdc.gov/hai/containment/PPE-Nursing-Homes.html

ENHANCED BARRIER PRECAUTIONS - *C. AURIS*

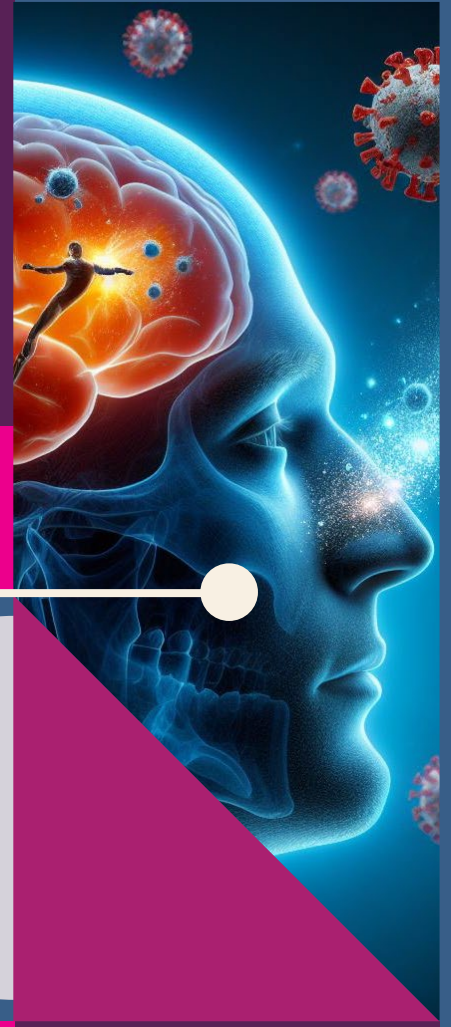
- **Here is what the CDC says.** https://www.cdc.gov/fungal/candida-auris/c-auris-drug-resistant.html

Why is *Candida auris* a problem?

Download PDF
[2 - pages]

- **It causes serious infections.** *C. auris* can cause bloodstream infections and even death, particularly in hospital and nursing home patients with serious medical problems. More than 1 in 3 patients with invasive *C. auris* infection (for example, an infection that affects the blood, heart, or brain) die.
- **It's often resistant to medicines.** Antifungal medicines commonly used to treat *Candida* infections often don't work for *Candida auris*. Some *C. auris* infections have been resistant to all three types of antifungal medicines.
- **It's becoming more common.** Although *C. auris* was just discovered in 2009, it has spread quickly and caused infections in more than a dozen countries.
- **It's difficult to identify.** *C. auris* can be misidentified as other types of fungi unless specialized laboratory technology is used. This misidentification might lead to a patient getting the wrong treatment.
- **It can spread in hospitals and nursing homes.** *C. auris* has caused outbreaks in healthcare facilities and can spread through contact with affected patients and contaminated surfaces or equipment. Good hand hygiene and cleaning in healthcare facilities is important because *C. auris* can live on surfaces for several weeks.

USA Health Watch



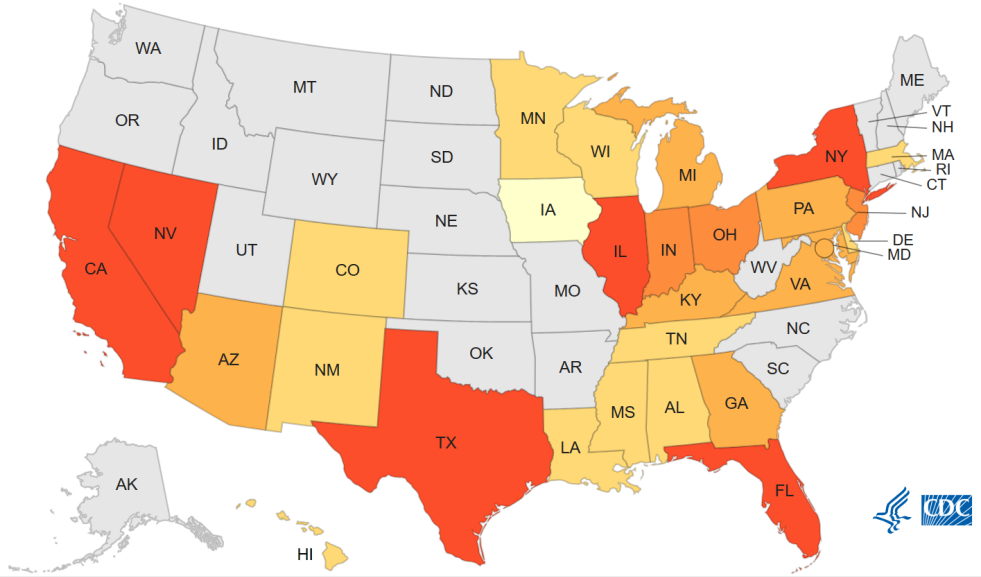
ENHANCED BARRIER PRECAUTIONS - *C. AURIS*

Similar to COVID-19 infections data is lacking. The last data posted by the CDC is on Dec. 31. 2022.

C. auris tracking data

Make a selection from the filters to change the visualization information.

Most Recent 12 Months



Number of *C. auris* clinical cases through December 31, 2022

In the most recent 12 months, there were 2,377 clinical cases and 5,754 screening cases (January 2022 - December 2022).

USA Health Watch

ENHANCED BARRIER PRECAUTIONS - *C. AURIS*

October 24, 2023 – Outbreak at the University of Kentucky Hospital

Five cases of highly contagious fungus reported at UK HealthCare

By TOM LATEK, Kentucky Today Oct 24, 2023 Updated Oct 25, 2023

UK HealthCare has reported five cases of a highly contagious fungus. (UK HealthCare photo)

ENHANCED BARRIER PRECAUTIONS - *MRSA*

- Initially these recommendations were evidenced based (Roghmann, et al. and Blanco, et al.) but the predicate data did not support their enactment.
- The Evidenced Based were replaced with “Expert Opinion”. But published data by Roghmann, et al. regarding the Spread of MRSA, along with Blanco, et al contradicts the recommendations.

Roghmann MC, Johnson JK, Sorkin et al. Transmission of Methicillin-Resistant Staphylococcus aureus (MRSA) to Healthcare Worker Gowns and Gloves During Care of Nursing Home Residents. Infect Control Hosp Epidemiol. 2015 Sep;36(9):1050-7. doi: 10.1017/ice.2015.119. Epub 2015 May 26. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4900177/

Blanco N, Johnson JK, Sorkin JD, et al. Transmission of resistant Gram-negative bacteria to healthcare personnel gowns and gloves during care of residents in community-based nursing facilities. Infect Control Hosp Epidemiol. 2018 Dec;39(12):1425-1430. doi: 10.1017/ice.2018.247. Epub 2018 Oct 8. https://pubmed.ncbi.nlm.nih.gov/30293533/

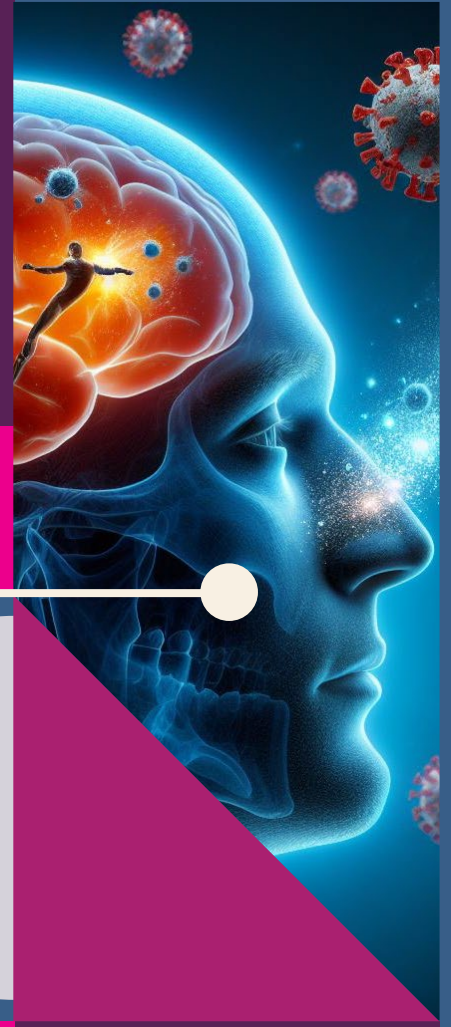
ENHANCED BARRIER PRECAUTIONS - *MRSA*

In Nursing Homes

- Rodmann reported a 28% rate of MRSA colonization.
- Mody et al. reported a 29% rate of MRSA colonization.

Roghmann MC, Johnson JK, Sorkin et al. Transmission of Methicillin-Resistant Staphylococcus aureus (MRSA) to Healthcare Worker Gowns and Gloves During Care of Nursing Home Residents. Infect Control Hosp Epidemiol. 2015 Sep;36(9):1050-7. doi: 10.1017/ice.2015.119. Epub 2015 May 26. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4900177/

Mody L, Kauffman CA, Donabedian S, Zervos M, Bradley SF. Epidemiology of Staphylococcus aureus colonization in nursing home residents. Clin Infect Dis. 2008; 46(9):1368–1373. [PubMed: 18419438] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3319393/



ENHANCED BARRIER PRECAUTIONS - *MRSA*

For MRSA there is an 8% chance of contamination of health hear worker gowns each time medications are passed to a colonized nursing home resident.

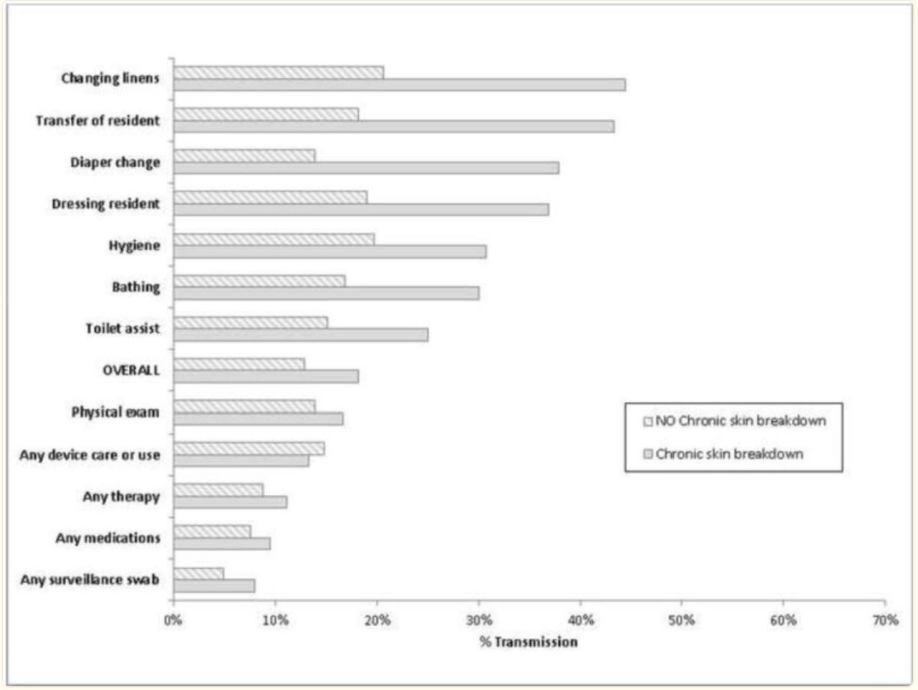
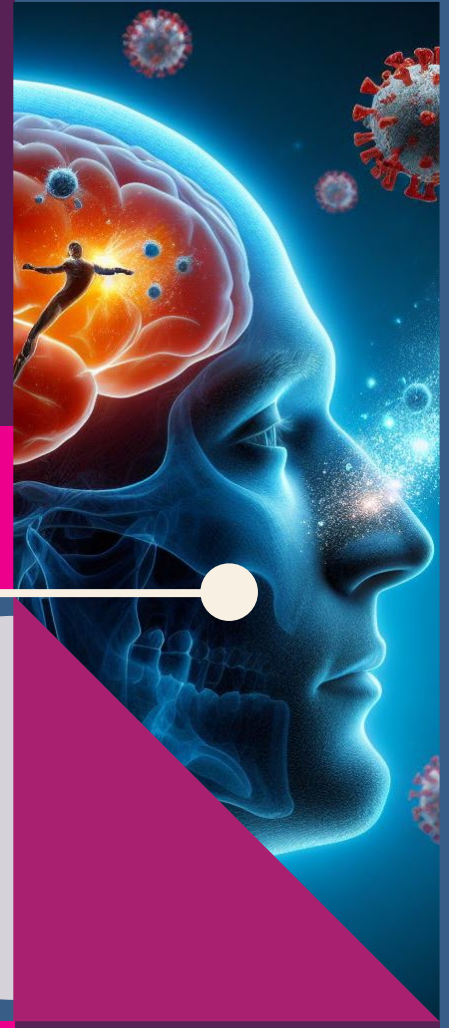


Figure 2

MRSA Transmission to Gowns of Healthcare Personnel during care of MRSA colonized residents (n=113) by Type of Care provided and presence of chronic skin breakdown (e.g. pressure ulcers) during 952 interactions

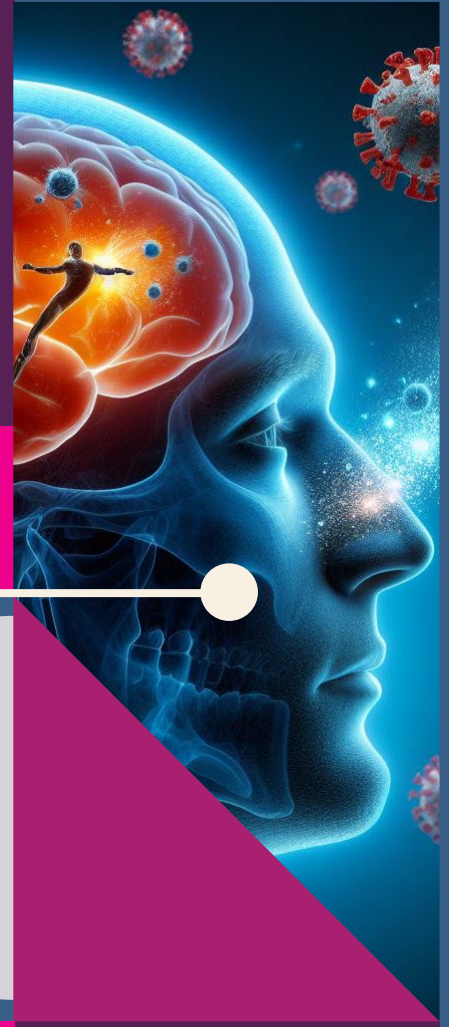
Roghmann MC, Johnson JK, Sorkin et al. Transmission of Methicillin-Resistant Staphylococcus aureus (MRSA) to Healthcare Worker Gowns and Gloves During Care of Nursing Home Residents. Infect Control Hosp Epidemiol. 2015 Sep;36(9):1050-7. doi: 10.1017/ice.2015.119. Epub 2015 May 26.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4900177/

USA
Health Watch



ENHANCED BARRIER PRECAUTIONS - *MRSA*

If a typical healthcare worker who passes meds is taking care of 25 residents and the average patient receives medications three times a day, and 7 of these residents will be colonized, then there will be 147 interactions per week with colonized residents. At an 8% transmission rate to gowns per interaction, one would expect over 11 transfers of MRSA to the clothes of a non-gowned healthcare worker each week with enhanced barrier precautions.



ENHANCED BARRIER PRECAUTIONS - *GRAM NEG.*

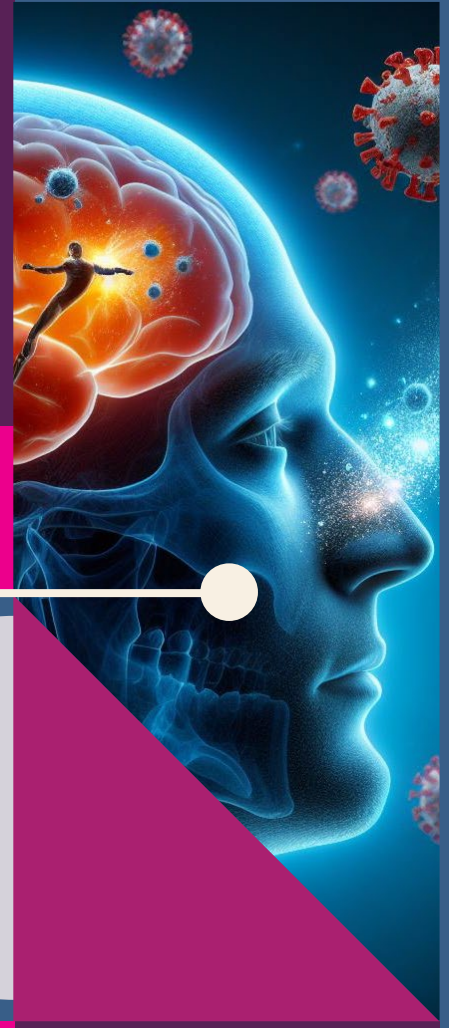
The same calculation for gram negative bacteria (Blanco, et al.) would be one transmission per week.

According to Blanco, et al., the risk of Nursing home resident GNB colonization is 22.8% (74/325). Overall, there was an 11% transmission with each interaction.

Passing medications “any medication” had a detected transmission to gloves with an odds ratio for transmission of 0.15 and to gowns with an odds ratio of 0.3

Or: There was a 1.6% chance of contaminating gloves and a 3.3% chance of contaminating gowns with the passing of “any medication”. (If medications are passed three times a day in a colonized patient, **then one would expect a 69% chance of transmission each week.**)

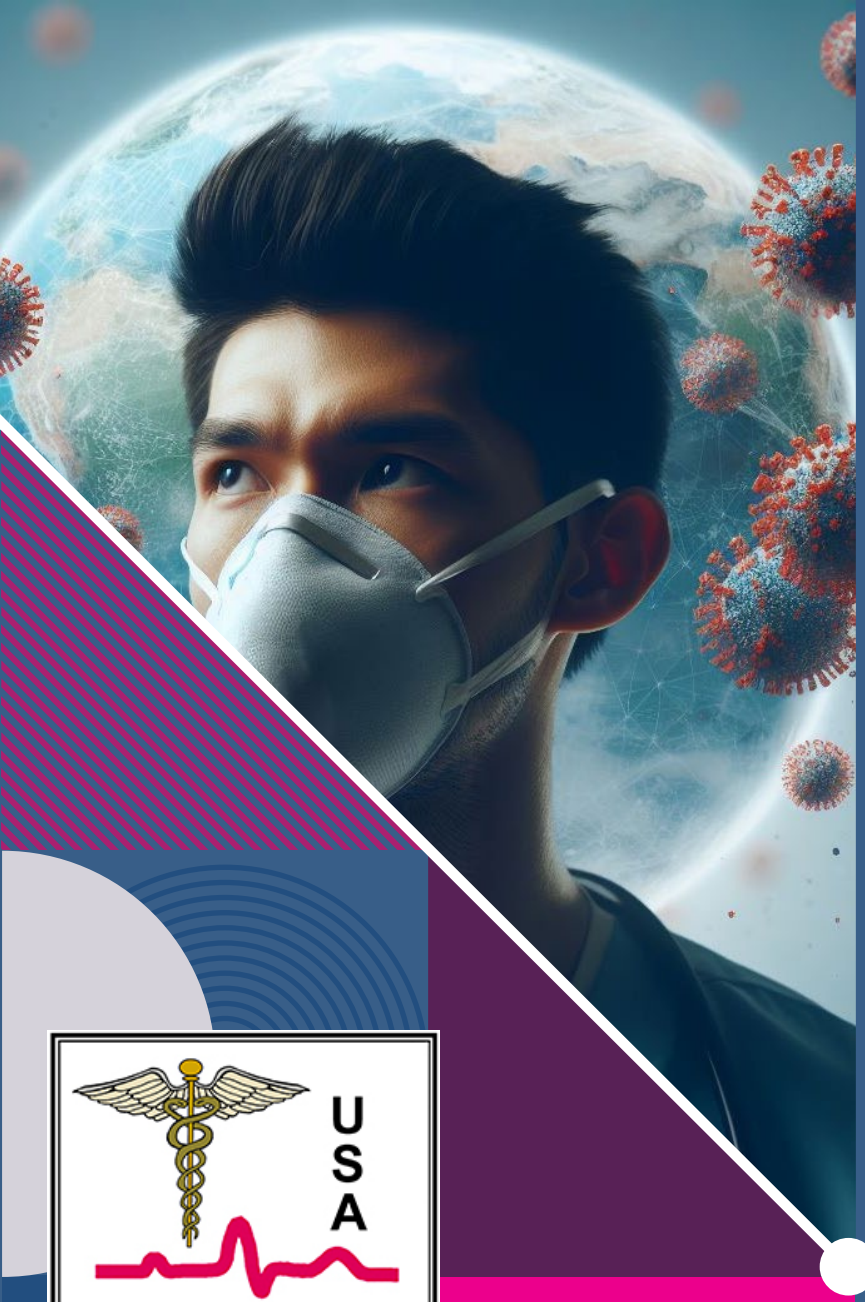
Blanco N, Johnson JK, Sorkin JD, et al. Transmission of resistant Gram-negative bacteria to healthcare personnel gowns and gloves during care of residents in community-based nursing facilities. Infect Control Hosp Epidemiol. 2018 Dec;39(12):1425-1430. doi: 10.1017/ice.2018.247. Epub 2018 Oct 8. https://pubmed.ncbi.nlm.nih.gov/30293533/



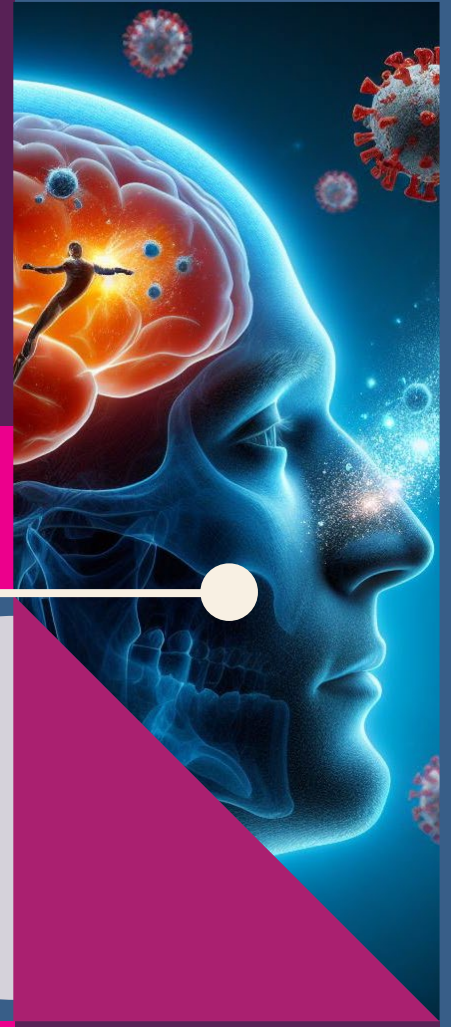
ENHANCED BARRIER PRECAUTIONS

Based on Expert Opinion

- The Underlying Problem is that even “low risk” interactions occur so frequently in nursing homes that transmission can occur.



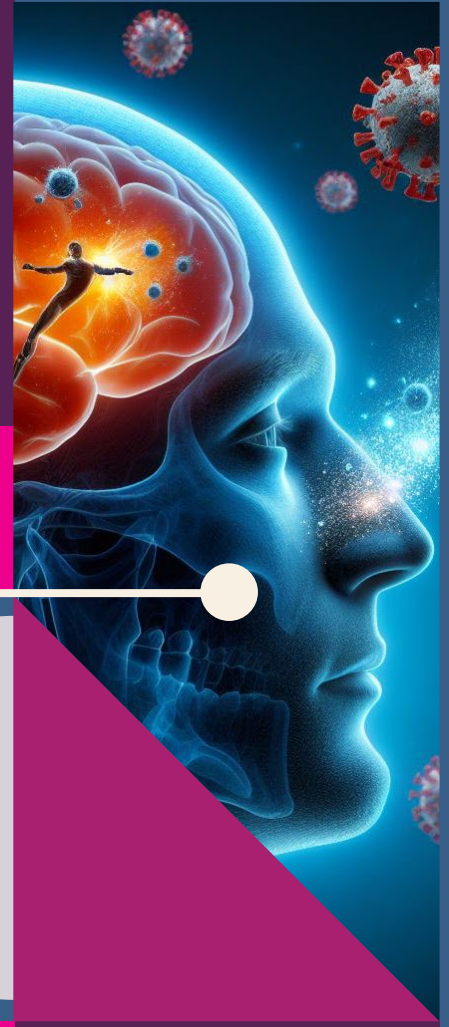
USA Health Watch



CHLORHEXIDINE BATHING

The study by Miller and colleagues(1) has a potential confounding bias in that "in-person training sessions, coaching calls, and a toolkit of protocols, training materials…" were provided for the intervention, but not the control arm. The authors stated that their findings were supported by those of the ABATE(2) and REDUCE MRSA(3) studies. The ABATE study observed in medical device patients a reduction in MDRO positive clinical cultures and all-pathogen bloodstream infections. What was not mentioned was that this was a post-hoc analysis and that the authors were not able to achieve ABATE's primary outcome of a reduction of MRSA or VRE clinical cultures and the secondary outcome of reduction of all-pathogen bloodstream infections. The ABATE trial's authors themselves speculated that the negative results may have arisen because the control hospitals were "allow(ed) and expect(ed)"…"to organize campaigns to improve adherence to existing best practices." Similarly, in the REDUCE MRSA study, the all-cause bloodstream infection metric was added after the trial completion date, and a significant reduction in MRSA bloodstream infections was not observed.

-- Kevin T. Kavanagh, MD, MS & Matthias Maiwald, MD



CHLORHEXIDINE BATHING

1. Miller LG, McKinnell JA, Singh RD, Gussin GM, Kleinman K, Saavedra R, et al. Decolonization in Nursing Homes to Prevent Infection and Hospitalization. N Engl J Med. 2023;389(19):1766-77.

2. Huang SS, Septimus E, Kleinman K, Moody J, Hickok J, Heim L, et al. Chlorhexidine versus routine bathing to prevent multidrug-resistant organisms and all-cause bloodstream infections in general medical and surgical units (ABATE Infection trial): a cluster-randomised trial. Lancet. 2019;393(10177):1205-15.

3. Huang SS, Septimus E, Kleinman K, Moody J, Hickok J, Avery TR, et al. Targeted versus universal decolonization to prevent ICU infection. N Engl J Med. 2013;368(24):2255-65.

USA Health Watch

THANK YOU

- Kevin Kavanagh, MD, MS
- 606-875-3642
- kavanagh.ent@gmail.com
  https://healthwatchusa.org