
Christopher Hurt, MD, FIDSA

28 June 2023



Disclosures

- This program is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U1OHA30535 as part of an award totaling \$4.2m. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government. For more information, please visit: <https://www.hrsa.gov>
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AETC Program National Centers and HIV Curriculum

- **National Coordinating Resource Center** – serves as the central web-based repository for AETC Program training and capacity building resources; its website includes a free virtual library with training and technical assistance materials, a program director, and a calendar of trainings and other events. Learn more: <https://aidsetc.org/>
- **National Clinician Consultation Center** – provides free, peer-to-peer, expert advice for health professionals on HIV prevention, care, and treatment and related topics. Learn more: <https://nccc.ucsf.edu>
- **National HIV Curriculum** – provides ongoing, up-to-date HIV training and information for health professionals through a free, web-based curriculum; also provides free CME credits, CNE contact hours, CE contact hours, and maintenance of certification credits. Learn more: www.hiv.uw.edu



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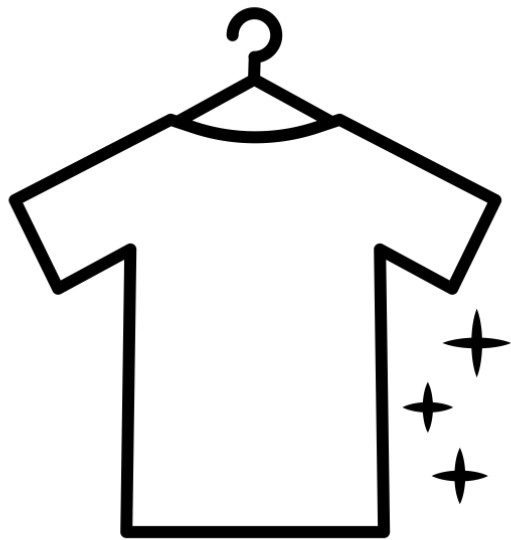
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University of North Carolina at Chapel Hill
School of Medicine

Dr. Hurt is supported by the Health Resources and Services Administration (HRSA-17-039, U1OHA30535) and the National Institute of Allergy and Infectious Diseases (P30AI50410, R61AI174285, UM1AI069423, UM1AI068619).

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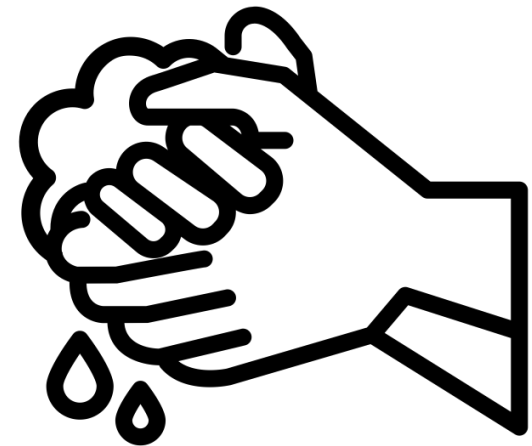
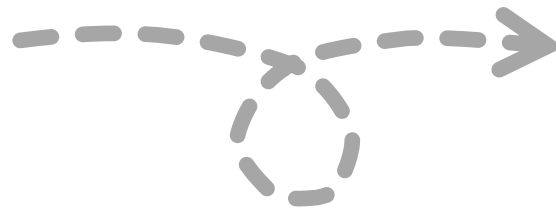
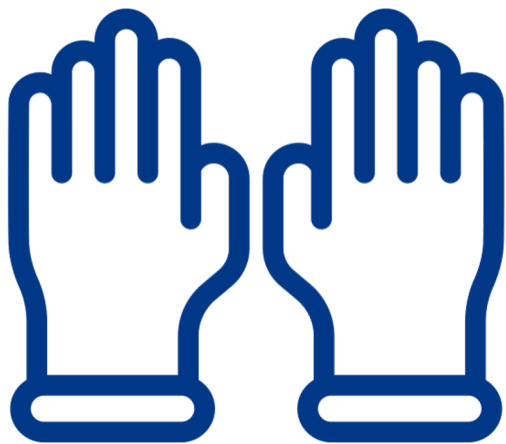
- Name and briefly describe four infectious diseases that are more common among justice-involved individuals.
- List at least three different activities common in correctional settings that could result in the transmission of an infectious disease from one person to another.
- Define “standard precautions,” “contact precautions,” and “airborne precautions” and describe the personal protective equipment that is appropriate for each.
- Outline the steps to take if you are exposed to blood or visibly bloody body fluids in the workplace.

Keep clean and dirty items separated

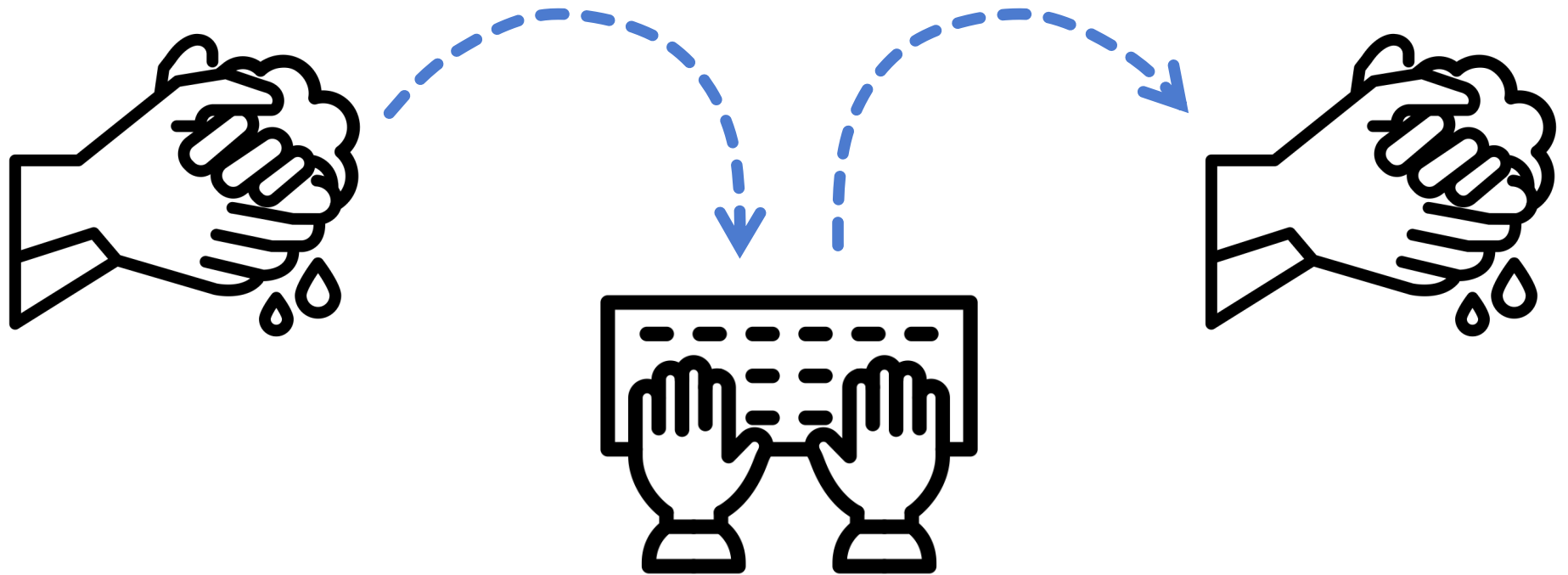


Is it **red**, **wet**, or **dirty**?

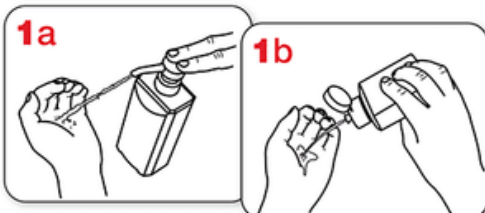
Wear gloves and then
perform hand hygiene.



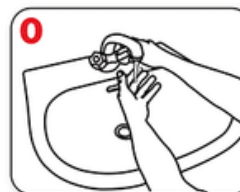
Clean in & clean out



Alcohol-based hand sanitizer



Apply a palmful of the product in a cupped hand and cover all surfaces.



Wet hands with water

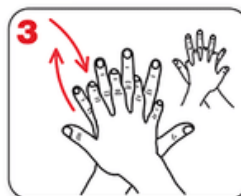


apply enough soap to cover all hand surfaces.

Soap & water



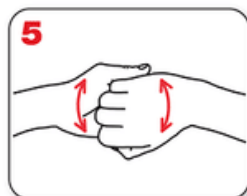
Rub hands palm to palm



right palm over left dorsum with interlaced fingers and vice versa



palm to palm with fingers interlaced



backs of fingers to opposing palms with fingers interlocked



rotational rubbing of left thumb clasped in right palm and vice versa



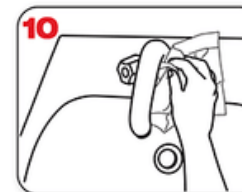
rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



rinse hands with water

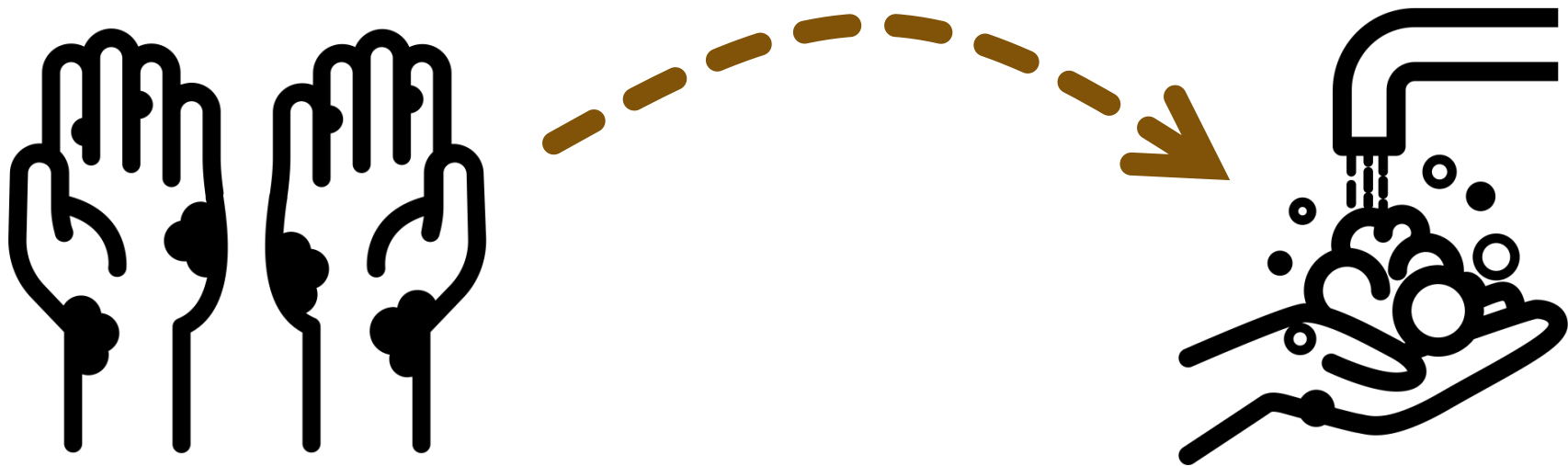


dry thoroughly with a single use towel



use towel to turn off faucet

Use soap if it's soiled

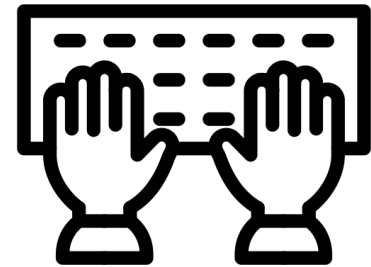




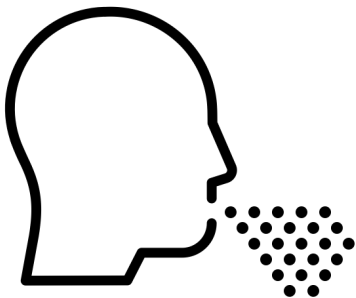
Airborne



Body contact



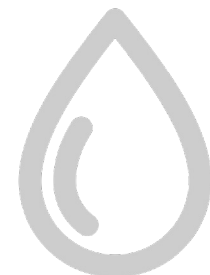
Surfaces



Droplets
(sprays & splashes)

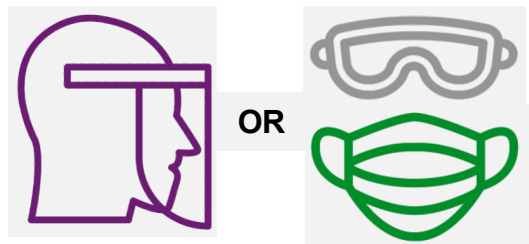


Blood
(wet or dried)



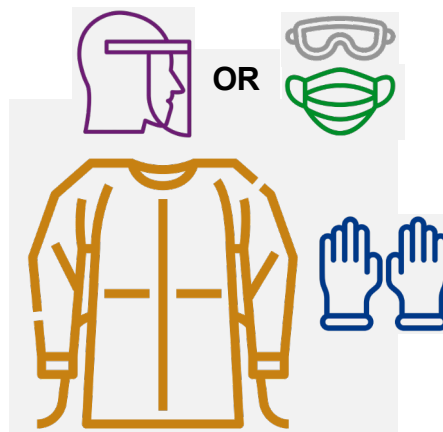
Body fluids

Airborne

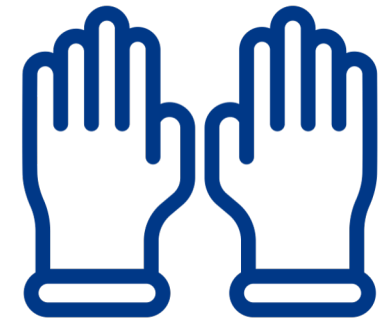


Droplets
(sprays & splashes)

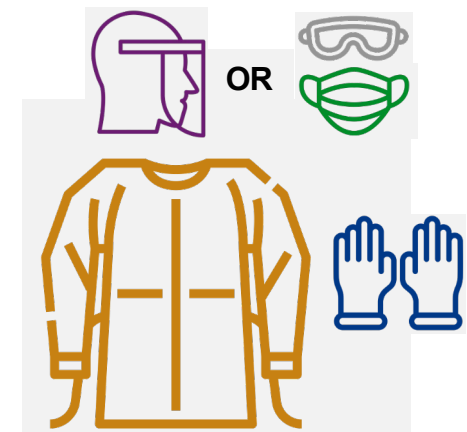
Body contact



Blood
(wet or dried)



Surfaces



Body fluids



CONTACT PRECAUTIONS EVERYONE MUST:



Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:



Put on gloves before room entry.
Discard gloves before room exit.



Put on gown before room entry.
Discard gown before room exit.

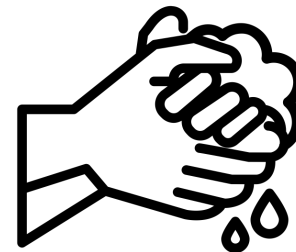
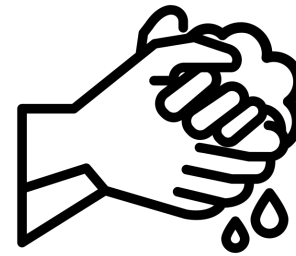
Do not wear the same gown and gloves for the care of more than one person.



Use dedicated or disposable equipment.
Clean and disinfect reusable equipment before use on another person.



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Control and Prevention





DROPLET PRECAUTIONS



EVERYONE MUST:

Clean their hands, including before
entering and when leaving the room.



Make sure their eyes, nose and mouth are
fully covered before room entry.



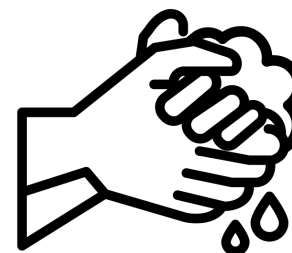
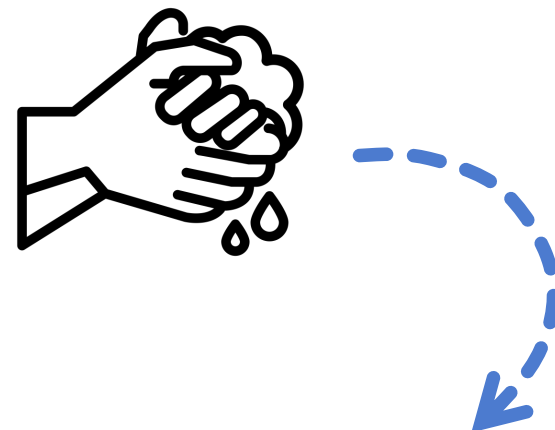
or



Remove face protection before room exit.



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Health and Human Services
Centers for Disease
Control and Prevention





AIRBORNE PRECAUTIONS



EVERYONE MUST:



Clean their hands, including before entering and when leaving the room.



Put on a fit-tested N-95 or higher level respirator before room entry.

Remove respirator after exiting the room and closing the door.



Door to room must remain closed.



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Health and Human Services
Centers for Disease
Control and Prevention



Caused by	Transmitted by	Burden	Curable?
Hepadnavirus (a DNA virus) 	Barrier-free contact with blood or body fluids (vaginal fluid, semen) May remain infectious on surfaces for up to 7 days	0.2% of Americans had hepatitis B in 2020 1.2% of persons in state and federal prisons had hepatitis B in 2016	No But HBV can be controlled with daily medication Highly effective vaccines are available for people at risk of infection

Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/6111645/>

US prevalence in 2020 (660,000 of 329.5M) → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10069827/>
Prison prevalence (16,367 of 1,421,700) → <https://bjs.ojp.gov/library/publications/medical-problems-reported-prisoners-survey-prison-inmates-2016>

Caused by

Hepadnavirus
(a DNA virus)



Transmitted by

Barrier-free
contact with
blood or
body fluids

(vaginal fluid,
semen)

May remain
infectious on
surfaces for
up to 7 days

Burden

0.2%
of Americans
had hepatitis B
in 2020

1.2%
of persons in
state and federal
prisons had
hepatitis B
in 2016

Precautions

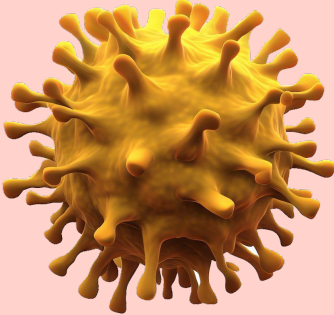
Standard

**If blood or
bloody fluid
anticipated:**



Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/6111645/>

US prevalence in 2020 (660,000 of 329.5M) → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10069827/>
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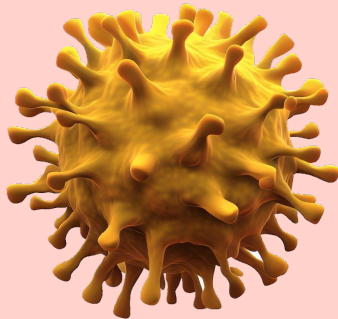
Caused by	Transmitted by	Burden	Curable?
Hepacivirus (an RNA virus) 	Barrier-free contact with blood Sexual transmission is very rare May remain infectious on surfaces for up to 6 weeks	0.7% of Americans had hepatitis C in 2016 8.8% of persons in state and federal prisons had hepatitis B in 2016	Yes After 8-12 weeks of once-daily oral medication There is no vaccine against HCV

Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/24273176/>

US prevalence in 2016 (2.4M of 323.1M) → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10069827/>
Prison prevalence (125,698 of 1,421,700) → <https://bjs.ojp.gov/library/publications/medical-problems-reported-prisoners-survey-prison-inmates-2016>

Caused by

Hepacivirus
(an RNA virus)



Transmitted by

Barrier-free
contact with
blood

Sexual
transmission
is very rare

May remain
infectious on
surfaces for
up to 6 weeks

Burden

0.7%
of Americans
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in 2016

8.8%
of persons in
state and federal
prisons had
hepatitis B
in 2016

Precautions

Standard

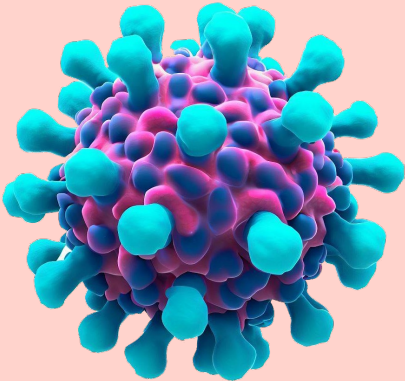
**If blood or
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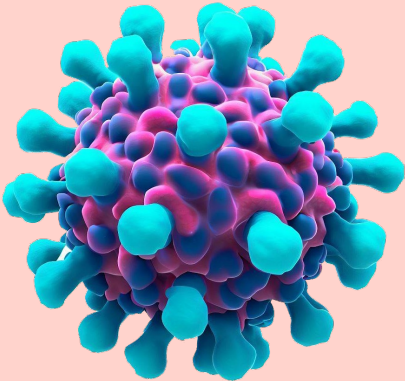
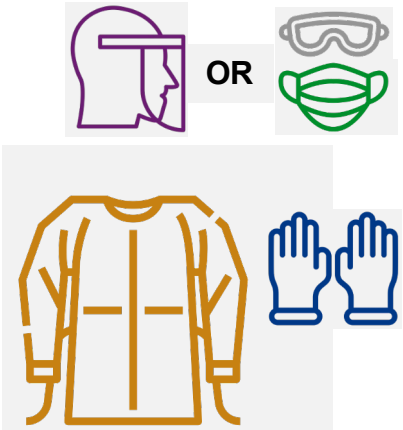
Prison prevalence (125,698 of 1,421,700) → <https://bjs.ojp.gov/library/publications/medical-problems-reported-prisoners-survey-prison-inmates-2016>

Caused by	Transmitted by	Burden	Curable?
A type of retrovirus (an RNA virus) 	Barrier-free contact with blood or body fluids (vaginal fluid, semen, breast milk) May remain infectious on surfaces for at least 7 days	0.4% of Americans had HIV in 2020 1.1% of persons in state and federal prisons had hepatitis B in 2016	No But HIV can be controlled with daily medication There is no vaccine against HIV

Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
Viability outside body → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC263082/>

US prevalence (1.2M of 329.5M) → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10069827/>

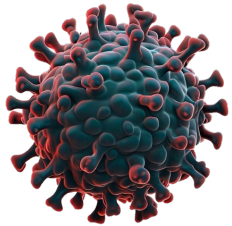
Prison prevalence (15,119 of 1,421,700) → <https://bjs.ojp.gov/library/publications/medical-problems-reported-prisoners-survey-prison-inmates-2016>

Caused by	Transmitted by	Burden	Precautions
A type of retrovirus (an RNA virus) 	Barrier-free contact with blood or body fluids (vaginal fluid, semen, breast milk) May remain infectious on surfaces for at least 7 days	0.4% of Americans had HIV in 2020 1.1% of persons in state and federal prisons had hepatitis B in 2016	Standard If blood or bloody fluid anticipated: 

Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
 Viability outside body → <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC263082/>

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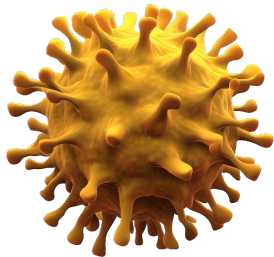


Hepatitis B Virus (HBV)

One in
every

3

needlestick
exposures
results in a new
HBV infection

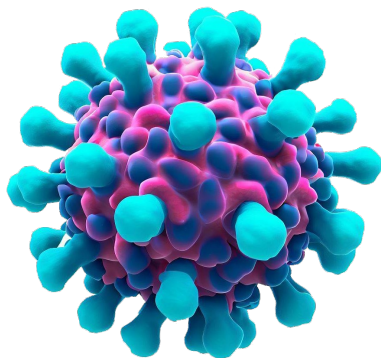


Hepatitis C Virus (HCV)

One in
every

30

needlestick
exposures
results in a new
HCV infection



Human immunodeficiency virus (HIV)

One in
every

300

needlestick
exposures
results in a new
HIV infection



[https://commons.wikimedia.org/wiki/File:Prison_shivs_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Prison_shivs_(cropped).jpg)



https://commons.wikimedia.org/wiki/File:Bleeding_finger.jpg

- Always wear gloves
- Look before you reach
- Never run fingers under surfaces you can't see
- Use common sense and best practices for pat-downs and other inspections

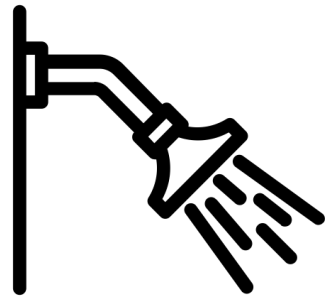
<https://www.ojp.gov/ncjrs/virtual-library/abstracts/correctional-officer-cell-searches>
<https://academic.oup.com/cid/article/45/8/1047/344842>

1



Wash needlesticks and cuts with **soap and water** ASAP.

2

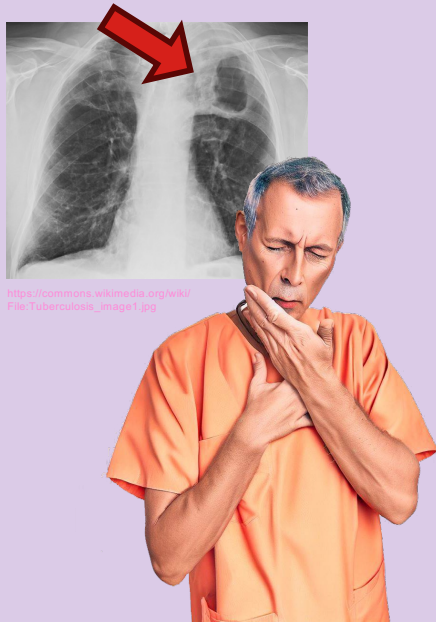


Flush splashes to nose, mouth, or eyes with water ASAP.

3



Report the exposure ASAP to ensure you get appropriate care.

Caused by	Transmitted by	Burden	Curable?
Bacteria (<i>Mycobacterium tuberculosis</i>)  https://iisc.kr/p/6R31Pe	Aerosolized bacteria from people with TB lung disease  https://commons.wikimedia.org/wiki/File:Tuberculosis_image1.jpg	0.002% of Americans had active TB in 2022 3.6% of persons in state and federal prisons had active TB in 2016	Yes After ~ 6 months of treatment with oral medications The BCG vaccine for TB is not used in the United States

Caused by

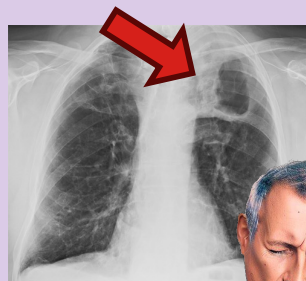
Bacteria
(*Mycobacterium tuberculosis*)



<https://iisc.kr/p/6R31Pe>

Transmitted by

Aerosolized bacteria from people with TB lung disease



https://commons.wikimedia.org/wiki/File:Tuberculosis_image1.jpg



Burden

0.002%
of Americans
had active TB
in 2022

3.6%
of persons in
state and federal
prisons had
active TB
in 2016

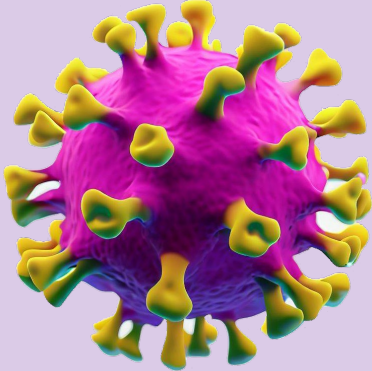
Precautions

Airborne



If blood or bloody
fluid anticipated:

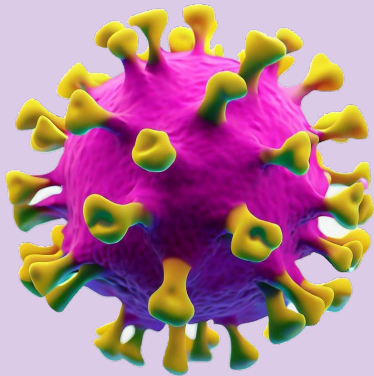


Caused by	Transmitted by	Burden	Curable?
SARS-CoV-2 (an RNA virus) 	Droplets and aerosols generated by sneezing or coughing  https://pmc.cdc.gov/details.aspx?id=111161	30% of Americans have had COVID 53% of persons in state and federal prisons have had COVID	Yes With 5-10 days of medications mRNA-based vaccine effectiveness was 50-80% (lots of variables...)

Virus image created using Microsoft Bing Image Creator (powered by DALL-E)
 Reported US diagnoses through May 2023 (99.4M of 333.3M) → <https://usafacts.org/visualizations/coronavirus-covid-19-spread-map/>
 Prison diagnoses through 2023 (660,000 of 1,256,000) → <https://www.prisonpolicy.org/blog/2023/04/21/pandemic-lessons-learned/>
 COVID vaccine effectiveness → <https://covid.cdc.gov/covid-data-tracker/#vaccine-effectiveness>

Caused by

SARS-CoV-2
(an RNA virus)



Transmitted by

Droplets and
aerosols
generated by
sneezing or
coughing



<https://prison.cdc.gov/details.aspx?id=11161>

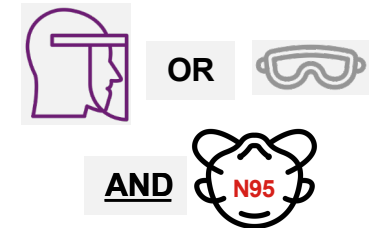
Burden

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COVID

53%
of persons in
state and federal
prisons have
had COVID

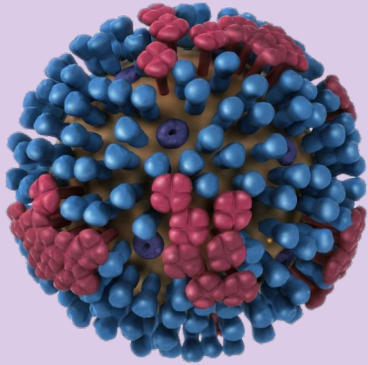
Precautions

For close contact with
infected persons:



If blood or bloody
fluid anticipated:

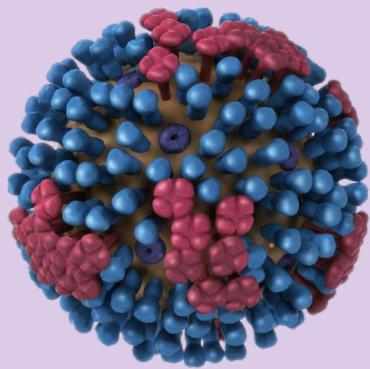


Caused by	Transmitted by	Burden	Curable?
Orthomyxovirus (a segmented RNA virus)  https://phil.cdc.gov/Details.aspx?pid=11823	Droplets and aerosols generated by sneezing or coughing  https://phil.cdc.gov/Details.aspx?pid=11161	16% of Americans had influenza in 2022-23 season ??? of persons in state and federal prisons get influenza each season	Maybe Medication shortens symptoms and infectiousness Vaccine effectiveness averages 40-60% (lots of variables...)

Caused by

Orthomyxovirus

(a segmented
RNA virus)



<https://phil.cdc.gov/Details.aspx?pid=11823>

Transmitted by

Droplets and
aerosols
generated by
sneezing or
coughing



<https://phil.cdc.gov/Details.aspx?pid=11161>

Burden

16%

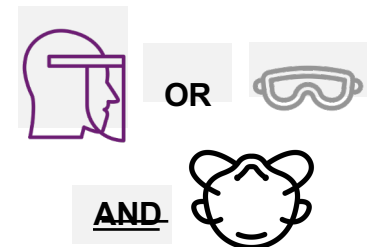
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2022-23 season

???

of persons in
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each season

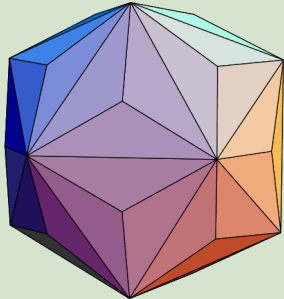
Precautions

Droplet

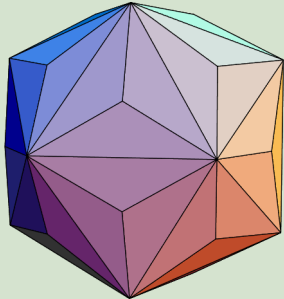


**If blood or bloody
fluid anticipated:**

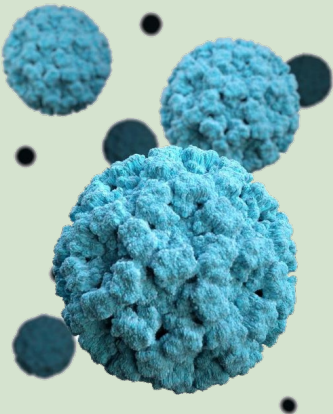


Caused by	Transmitted by	Burden	Curable?
Hepatovirus (a non-enveloped RNA virus)  https://mathworld.wolfram.com/Triakisicosahedron.html	Ingesting viruses from an infected person's stool Shared injection drug equipment May remain infectious on surfaces for at least 28 days	19,900 Americans had hepatitis A in 2020 11% of persons with hepatitis A in 2016-2020 had recently been incarcerated	Sort of Infection resolves on its own, providing lifelong immunity Vaccine effectiveness is $\geq 94\%$ and long-lived

Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/30011724/> AND <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC272509/>
 US count (19,900 estimated infections of 329.5M in 2020 = 0.006% of US population) → <https://www.cdc.gov/hepatitis/statistics/2020surveillance/index.htm>
 Incarceration data (2,093 of 18,327 cases) → <https://pubmed.ncbi.nlm.nih.gov/35856418/>
 Vaccine effectiveness → <https://www.cdc.gov/mmwr/volumes/69/rr/rr6905a1.htm>

Caused by	Transmitted by	Burden	Precautions
Hepatovirus (a non-enveloped RNA virus)  https://mathworld.wolfram.com/Triakisicosahedron.html	Ingesting viruses from an infected person's stool Shared injection drug equipment May remain infectious on surfaces for at least 28 days	19,900 Americans had hepatitis A in 2020 11% of persons with hepatitis A in 2016-2020 had recently been incarcerated	Standard If patient is incontinent of stool or you're otherwise concerned: 

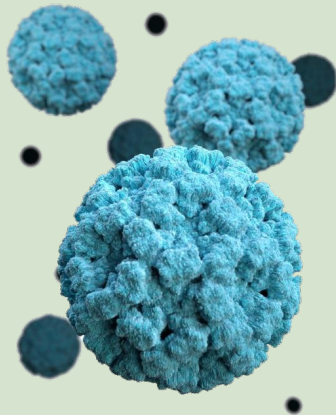
Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/30011724/> AND <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC272509/>
 US count (19,900 estimated infections of 329.5M in 2020 = 0.006% of US population) → <https://www.cdc.gov/hepatitis/statistics/2020surveillance/index.htm>
 Incarceration data (2,093 of 18,327 cases) → <https://pubmed.ncbi.nlm.nih.gov/35856418/>
 Vaccine effectiveness → <https://www.cdc.gov/mmwr/volumes/69/rr/rr6905a1.htm>

Caused by	Transmitted by	Burden	Curable?
A calicivirus (a non-enveloped RNA virus)  https://phil.cdc.gov/Details.aspx?pid=21348	Ingesting viruses from an infected person's stool or vomit May remain infectious on surfaces for at least 7 days	6.4% of Americans get norovirus each year ??? of incarcerated persons acquire norovirus per year; outbreaks are explosive	No Infection resolves on its own, with supportive care There is no vaccine against norovirus

Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/16473426/>
 US count (21M estimated infections of 329.5M in 2020 = 6.4% of US population) → <https://www.cdc.gov/norovirus/burden.html>
 Incarceration data (2,093 of 18,327 cases) → <https://pubmed.ncbi.nlm.nih.gov/35856418/>
 Vaccine effectiveness → <https://www.cdc.gov/mmwr/volumes/69/rr/rr6905a1.htm>

Caused by

A calicivirus
(a non-enveloped
RNA virus)



<https://phil.cdc.gov/Details.aspx?pid=21348>

Transmitted by

Ingesting viruses
from an infected
person's stool
or vomit

May remain
infectious on
surfaces for
at least 7 days

Burden

6.4%
of Americans
get norovirus
each year

???
of incarcerated
persons acquire
norovirus per
year; **outbreaks
are explosive**

Precautions

Standard

**If patient is
vomiting or
having
uncontrolled
diarrhea:**



Viability outside body → <https://pubmed.ncbi.nlm.nih.gov/16473426/>
US count (21M estimated infections of 329.5M in 2020 = 6.4% of US population) → <https://www.cdc.gov/norovirus/burden.html>
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Vaccine effectiveness → <https://www.cdc.gov/mmwr/volumes/69/rr/rr6905a1.htm>

Caused by	Transmitted by	Burden	Curable?
Varicella zoster virus (VZV) (an enveloped DNA virus) https://commons.wikimedia.org/wiki/File:Shingles_on_the_chest.jpg 	Contact with or inhalation of aerosolized material from shingles lesions People who have immunity to varicella are not at major risk from shingles (chickenpox infection or vaccination)	1 in 3 Americans will ever develop shingles ??? incarcerated persons develop shingles each year	No Infection with VZV is lifelong, but medications can speed healing The shingles vaccine is highly effective

Caused by	Transmitted by	Burden	Precautions
Varicella zoster virus (VZV) (an enveloped DNA virus) https://commons.wikimedia.org/wiki/File:Shingles_on_the_chest.jpg 	Contact with or inhalation of aerosolized material from shingles lesions People who have immunity to varicella are not at major risk from shingles (chickenpox infection or vaccination)	1 in 3 Americans will ever develop shingles ??? incarcerated persons develop shingles each year	If widespread (disseminated), airborne AND contact precautions for protection of vulnerable coworkers and incarcerated persons

Caused by	Transmitted by	Burden	Curable?
Mpox virus (an enveloped DNA virus)  	Inhalation of virus or skin contact with lesions, scabs, and/or contaminated surfaces Bedding and clothing are potentially contagious	30,487 Americans diagnosed with mpox since January 2023 ??? incarcerated persons had mpox	Yes Medications speed healing, but people with weakened immune systems are at risk for severe disease or death Vaccine helps!

Skin image (TOP) → <https://www.who.int/publications/i/item/WHO-MPX-Clinical-Lesions-2023.1>

Skin image (BOTTOM) → <https://www.cmaj.ca/content/cmaj/194/29/E1031.full.pdf>

US estimated lifetime burden → <https://www.cdc.gov/shingles/surveillance.html>

Caused by

Mpox virus
(an enveloped
DNA virus)



Transmitted by

Inhalation of
virus or skin
contact with
lesions, scabs,
and/or
contaminated
surfaces

**Bedding and
clothing are
potentially
contagious**

Burden

30,487
Americans
diagnosed with
mpox since
January 2023

???
incarcerated
persons had
mpox

Precautions

**Airborne
and
Contact**



OR



AND



Caused by	Transmitted by	Burden	Curable?
Bacteria (methicillin-resistant <i>Staphylococcus aureus</i>) https://phil.cdc.gov/Details.aspx?pid=7826 	Contact with skin lesions <u>or</u> the skin of persons colonized with the bacteria Bedding and clothing are potentially contagious	1.5% of Americans carry MRSA in their nostril(s) 5-85% of incarcerated persons carry MRSA in their nostril(s)	Yes Invasive infections with MRSA can be successfully treated with antibiotics There is no vaccine for MRSA

Caused by	Transmitted by	Burden	Precautions
Bacteria (methicillin-resistant <i>Staphylococcus aureus</i>) https://phil.cdc.gov/Details.aspx?pid=7826 	Contact with skin lesions <u>or</u> the skin of persons colonized with the bacteria Bedding and clothing are potentially contagious	1.5% of Americans carry MRSA in their nostril(s) 5-85% of incarcerated persons carry MRSA in their nostril(s)	Standard If patient has an uncovered skin lesion or open wound: 



Questions?

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