A SHORT UPDATE ON INFECTIOUS DISEASE

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DISCLOSURES

• No financial disclosures
OUTLINE

• Discuss COVID-19: variants, vaccines & antivirals
• Review false positives in HIV testing
• Review *Candida auris*--what every clinician should know
• Review Blastomycosis
• Review pneumococcal vaccine recommendations
• Review Hepatitis B vaccine recommendations
SARS COV-2 LINEAGES
CURRENT SARS COV-2 VARIANTS

Weighted and Nowcast Estimates in HHS Region 5 for 2-Week Periods in 2/5/2023 – 5/27/2023

Hover over (or tap in mobile) any lineage of interest to see the amount of uncertainty in that lineage’s estimate.

Weighted Estimates: Variant proportions based on reported genomic sequencing results

<p>| Region 5 - Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin |</p>
<table>
<thead>
<tr>
<th>WHO label</th>
<th>Lineage #</th>
<th>US Class</th>
<th>%Total</th>
<th>95%PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omicron</td>
<td>XBB.1.5</td>
<td>VOC</td>
<td>57.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>XBB.1.16</td>
<td>VOC</td>
<td>15.4%</td>
<td>11.2-20.6%</td>
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<tr>
<td></td>
<td>XBB.1.9.1</td>
<td>VOC</td>
<td>9.3%</td>
<td>7.5-11.5%</td>
</tr>
<tr>
<td></td>
<td>XBB.1.9.2</td>
<td>VOC</td>
<td>6.0%</td>
<td>3.5-10.0%</td>
</tr>
<tr>
<td></td>
<td>XBB.1.16.1</td>
<td>VOC</td>
<td>4.3%</td>
<td>2.2-7.9%</td>
</tr>
<tr>
<td></td>
<td>XBB.2.3</td>
<td>VOC</td>
<td>3.5%</td>
<td>2.0-6.1%</td>
</tr>
<tr>
<td></td>
<td>XBB.1.5.1</td>
<td>VOC</td>
<td>3.1%</td>
<td>2.2-4.4%</td>
</tr>
<tr>
<td></td>
<td>XBB</td>
<td>VOC</td>
<td>0.3%</td>
<td>0.2-0.5%</td>
</tr>
<tr>
<td></td>
<td>CH.1.1</td>
<td>VOC</td>
<td>0.2%</td>
<td>0.1-0.3%</td>
</tr>
<tr>
<td></td>
<td>FD.2</td>
<td>VOC</td>
<td>0.2%</td>
<td>0.1-0.3%</td>
</tr>
<tr>
<td></td>
<td>BQ.1.1</td>
<td>VOC</td>
<td>0.1%</td>
<td>0.1-0.1%</td>
</tr>
<tr>
<td></td>
<td>BQ.1</td>
<td>VOC</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
<tr>
<td></td>
<td>BA.5</td>
<td>VOC</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
<tr>
<td></td>
<td>BA.2</td>
<td>VOC</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
<tr>
<td></td>
<td>BN.1</td>
<td>VOC</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
<tr>
<td></td>
<td>BA.5.2.6</td>
<td>VOC</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other*</td>
<td>0.0%</td>
<td>0.0-0.0%</td>
</tr>
</tbody>
</table>

Nowcast Estimates in HHS Region 5 for 5/14/2023 – 5/27/2023

Collection date, two-week period ending
CURRENT COVID-19 HOSPITALIZATION TRENDS

Weekly Trends in COVID-19 New Hospital Admissions in The United States Reported to CDC
COVID-19 DEATH TRENDS

Weekly Trends in Provisional COVID-19 Deaths in The United States Reported to CDC
BIVALENT BOOSTER EFFECTIVENESS

- Retrospective cohort study, Israel, age >65
- 9/27/22-1/25/23
- Primary endpoint = COVID-19 hospitalization
- Absolute risk reduction = 0.089 (0.075-0.101)
COVID-19 IMMUNITY IN US

Among 96% of people with antibodies against SARS-CoV-2:

- 23% had antibodies from infection alone
- 26% had antibodies from vaccination alone
- 48% had hybrid immunity

VARIANT VACCINE BOOSTERS

Is including SARS CoV-2 variants in vaccine boosters really worth it?

The NEW ENGLAND JOURNAL of MEDICINE

**Bivalent Covid-19 Vaccines — A Cautionary Tale**

Paul A. Offit, M.D.


https://www.nature.com/articles/d41586-022-02806-5
PAXLOVID, MOLNUPIRAVIR & HOSPITALIZATION

What is the effectiveness of nirmatrelvir–ritonavir and molnupiravir for outpatient treatment of COVID-19 in high-risk patients in the setting of the Omicron variant and COVID-19 vaccination?

Nonhospitalized veterans at risk for severe COVID-19
January–July 2022

Hospitalization or death

Nirmatrelvir–Ritonavir vs. No Treatment
Molnupiravir vs. No Treatment
Nirmatrelvir–Ritonavir vs. Molnupiravir

Cumulative incidence of hospitalization or death, %

0 5 10 15 20 25 30

Days

Conclusion: Nirmatrelvir–ritonavir and molnupiravir were effective in reducing hospitalization or death in high-risk COVID-19 patients.

https://doi.org/10.7326/M22-3565
PAXLOVID AND LONG-COVID

- VA retrospective cohort study
- >281K pt, 81% male, median age 61
- No tx: 246K
- Tx: 35K
- Reduced risk of PCC = 0.74 (95% CI 0.72-0.77)
- Suggests benefit at preventing PCC but need RCT
HIV TESTING

GET TESTED FOR HIV...

CDC recommends that everyone between the ages of 13 and 64 get tested at least once as part of routine care.

People with certain risk factors should get tested at least once a year.

Find an HIV testing site near you: Locator.HIV.gov

KNOW YOUR STATUS

Knowing your HIV status helps you make decisions to prevent getting or transmitting HIV.

Find an HIV testing site near you: Locator.HIV.gov
CURRENT HIV TESTING ALGORITHM

https://www.hiv.uw.edu/go/screening-diagnosis/diagnostic-testing/core-concept/all
### FALSE POSITIVE & FALSE NEGATIVE HIV TESTS

<table>
<thead>
<tr>
<th>False positive test results</th>
<th>False negative test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematologic malignant disorders</td>
<td>Window period</td>
</tr>
<tr>
<td>Autoimmune disorders</td>
<td>Immunosuppressive therapy</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>Malignant disorders</td>
</tr>
<tr>
<td>Primary biliary cirrhosis</td>
<td>B-cell dysfunction</td>
</tr>
<tr>
<td>Alcoholic hepatitis</td>
<td>Bone marrow transplantation</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>Late stage of HIV infection (AIDS)</td>
</tr>
<tr>
<td>Pregnancy</td>
<td></td>
</tr>
</tbody>
</table>

HTTPS://WWW.RESEARCHGATE.NET/FIGURE/CONDITIONS-OF-FALSE-POSITIVE-AND-FALSE-NEGATIVE-HIV-TEST-RESULTS_TBL1_332800241
COVID-19 & FALSE POSITIVE 4TH GEN HIV TESTING

- Retrospective study at Henry Ford Hospital March 2020-Jan 2022
- Reviewed all 4th gen HIV Ag/Ab tests obtained w/in 2 weeks of SARS CoV-2 PCR test
- 3 groups: False+ (FP), true+ (TP), presumptive- (PN)
- 31,910 records reviewed
  - PN: 31,575
  - TP: 248
  - FP: 87
- FP tests had highest percent of +COVID-19 tests (19.5%)
- Found statistically significant association of FP HIV Ag/Ab testing w/in 2 weeks of +COVID-19 test
- Bottom line: 4th gen HIV Ag/Ab testing w/in 2 weeks of positive COVID-19 test may produce false positive result
MDR INFECTIONS

6 of the 18 most alarming antibiotic resistance threats cost the U.S. more than $4.6 billion annually

Vancomycin-resistant Enterococcus (VRE)

Carbapenem-resistant Acinetobacter species (CRAsp)

Methicillin-resistant Staphylococcus aureus (MRSA)

Carbapenem-resistant Enterobacteriales (CRE)

Extended-spectrum cephalosporin resistance in Enterobacteriales, supportive of extended-spectrum β-lactamase (ESBL) production

Multidrug-resistant (MDR) Pseudomonas aeruginosa

www.cdc.gov/DrugResistance
DRUG RESISTANT CANDIDA

Dozens of Candida species—a group of fungi—cause infections, ranging from mild oral and vaginal yeast infections to severe invasive infections. Many are resistant to the antifungals used to treat them.

**WHAT YOU NEED TO KNOW**

- Only three classes of antifungal drugs are available to treat severe Candida infections: azoles, echinocandins, and amphotericin B.
- Candida species commonly cause bloodstream infections in hospitalized patients. About one in four of these patients die.
- Candida species also cause common yeast infections, which can affect the mouth, skin, and vagina, resulting in more than 1.6 million U.S. healthcare visits each year, and $5 billion estimated direct medical costs.
- Antibiotics used to treat bacterial infections increase the risk of Candida infections.

**CASES OVER TIME**

Resistant Candida are commonly detected in hospitalized patients. About 7% of bloodstream infections are resistant to antifungals.
CANDIDA AURIS - THE NEW KID ON THE BLOCK

*Candida auris* (C. auris) is an emerging multidrug-resistant yeast (a type of fungus). It can cause severe infections and spreads easily between hospitalized patients and nursing home residents.

**WHAT YOU NEED TO KNOW**
- C. auris, first identified in 2009 in Asia, has quickly become a cause of severe infections around the world.
- C. auris is a concerning drug-resistant fungus:
  - Often multidrug-resistant, with some strains (types) resistant to all three available classes of antifungals
  - Can cause outbreaks in healthcare facilities
  - Some common healthcare disinfectants are less effective at eliminating it
  - Can be carried on patients’ skin without causing infection, allowing spread to others

**CASES OVER TIME**
*C. auris* began spreading in the United States in 2015. Reported cases increased 318% in 2018 when compared to the average number of cases reported in 2015 to 2017.

Data represents U.S. cases only. Isolates are pure samples of a germ.
WHY IS C. AURIS A CONCERN?

- Ability to colonize multiple body sites
- Easily spread in healthcare setting
- Drug resistance very common
- Lab identification difficult
CANDIDA AURIS INFECTIONS

- Wound infections
- Fungemia
- Osteomyelitis
- Prosthetic device associated infections
- High mortality: ~30-60%

Source: MDHHS
## RISK FACTORS FOR CANDIDA AURIS INFECTIONS

<table>
<thead>
<tr>
<th>Individual</th>
<th>Comorbid Conditions</th>
<th>Wounds</th>
<th>Antibiotics</th>
<th>Indwelling Devices</th>
<th>Multiple Healthcare Exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older age</td>
<td>Weakened immune system</td>
<td>Chronic non-healing wounds</td>
<td>Antibiotic and antifungal use</td>
<td>Mechanical ventilation</td>
<td>Long-term care</td>
</tr>
<tr>
<td>Colonized with other MDROs</td>
<td>Chronic lung disease</td>
<td>Surgical wounds</td>
<td>Tracheostomy</td>
<td>PEG tube</td>
<td>Acute care</td>
</tr>
<tr>
<td>CRO</td>
<td>Diabetes</td>
<td></td>
<td>CVC/PICC</td>
<td>Urinary catheter</td>
<td>Skilled nursing w/vent</td>
</tr>
<tr>
<td>ESBL</td>
<td>Renal disease</td>
<td></td>
<td></td>
<td></td>
<td>Outside U.S.A</td>
</tr>
<tr>
<td>MRSA</td>
<td>Cardiovascular disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRE</td>
<td>Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CANDIDA AURIS IN THE US

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).

- 0 clinical cases and at least 1 screening case
- 11 to 50
- 101 to 500
- 51 to 100
- 501 to 1000

Source: CDC
CANDIDA AURIS IN MICHIGAN-TOTAL CASES

Fig 1. Candida auris Cases in Michigan by Case Type, May 1, 2021 – June 5, 2023

- Total Cases = 255
  - Screening Case, n = 184
  - Screening-to-Clinical Case, n = 27
  - Clinical Case, n = 44
CANDIDA AURIS IN MICHIGAN BY COUNTY
ANTIFUNGAL SUSCEPTIBILITY

- High resistance to fluconazole
- 90% isolates resistant to at least one antifungal
- ~30% with resistance to ≥2 antifungals
  - Reports of pan-resistant strains

Clinical Isolate Antifungal Resistance - MI

<table>
<thead>
<tr>
<th>Antifungal Drug</th>
<th>MIC&lt;sub&gt;50&lt;/sub&gt; (Range)</th>
<th>% Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>1 (0.5-1)</td>
<td>0</td>
</tr>
<tr>
<td>Anidulafungin</td>
<td>1 (0.06-4)</td>
<td>5&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>Caspofungin</td>
<td>0.25 (0.06-8)</td>
<td>7&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>Micafungin</td>
<td>0.25 (0.03-4)</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Fluconazole</strong></td>
<td>128 (4 -&gt;256)</td>
<td>99</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>1 (0.12-2)</td>
<td>NA</td>
</tr>
<tr>
<td>Isavuconazole</td>
<td>1 (0.03-2)</td>
<td>NA</td>
</tr>
<tr>
<td>Posaconazole</td>
<td>0.5 (0.03-1)</td>
<td>NA</td>
</tr>
<tr>
<td>Voriconazole</td>
<td>1 (0.03-8)</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: MDHHS
Phenotypic characteristics not sufficient for ID

Common yeast methods of identification can fail to identify or misidentify

Many labs do not fully identify yeast isolates from non-sterile sites (e.g. sputum, catheterized urine, etc)

Isolates may need to be sent to regional labs

Source: MDHHS
PREVENTION IS THE KEY TO CONTROL

<table>
<thead>
<tr>
<th>Transmission-based Precautions</th>
<th>Hand Hygiene</th>
<th>Environmental Cleaning &amp; Disinfection</th>
<th>Communication of MDRO Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ACH, LTAC, IRF – <strong>Contact Precautions</strong>, single room</td>
<td>• Standard <strong>hand hygiene</strong> practices</td>
<td>• Use an EPA-registered hospital-grade disinfectant effective against <em>C. auris</em> – <strong>LIST P</strong></td>
<td>• Implement effective verbal and written communication strategies during transfers</td>
</tr>
<tr>
<td>• vSNF &amp; SNF – <strong>Enhanced Barrier Precautions</strong> or Contact Precautions</td>
<td>• ABHS preferred in most clinical situations</td>
<td>• Daily, terminal, shared equipment</td>
<td>• Inter- and Intra-facility <strong>communication forms</strong></td>
</tr>
<tr>
<td>• Cohorting may be possible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Disposable or dedicated equipment, when possible</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://www.cdc.gov/fungal/candida-auris/c-auris-infection-control.html
BLASTOMYCES OUTBREAK IN ESCANABA

- 118 cases to date
- 14 hospitalizations
- 1 fatality
- All cases employees, contractors or visitors of Billerud paper mill
- Ongoing investigation by CDC/NIOSH
BLASTOMYCOSIS

Caused by *Blastomyces dermatitidis*

Fungus found in soil, especially associated with decaying wood & leaves

Dimorphic: yeast & mold forms
BLASTOMYCES DERMATITIDIS

http://thunderhouse4-yuri.blogspot.com/2012/12/blastomyces-dermatitidis.html

BLASTOMYCOSIS GEOGRAPHIC DISTRIBUTION

CDC.GOV
BLASTOMYCOSIS

- Primary route of exposure is inhalation of spores
  - Inoculation into skin can occur

- **NOT spread person to person**

- Incubation period ~21-90 days

- Most cases are asymptomatic or mild flu-like illness
  - Cough, SOB, fever, night sweats, fatigue
  - Increased risk for symptomatic infection: lung disease, immunocompromised

- Can disseminate from lungs via reticuloendothelial system
DISSEMINATED BLASTOMYCOSIS

• Sites of dissemination include:
  • Brain, bone, skin, GU

• Immunocompromised at much higher risk, particularly those with depleted T-cell mediated immunity
  • Long-term steroids
  • TNF blocking drugs
  • Advanced HIV/AIDS
  • Organ transplant
CUTANEOUS BLASTOMYCOSIS

https://doi.org/10.1016/S1473-3099(18)30291-3

PULMONARY & CNS BLASTOMYCOSIS

https://doi.org/10.1016/j.mmcr.2020.03.006

https://doi:10.4103/2156-7514.157854
BLASTOMYCOSIS DIAGNOSIS

• Index of suspicion: symptoms, radiographic changes, possible exposure
• Imaging: chest CT, +/- brain MRI
• Pulmonary disease
  • Respiratory culture or tissue pathology best
  • Serology has low yield
• Skin: tissue path/culture, PCR
• Disseminated disease
  • Respiratory cultures
  • Tissue biopsy/culture/PCR (e.g. skin or bone lesion)
  • Serology: **urine & serum antigens**, serum antibodies
BLASTOMYCOSIS TREATMENT

• Isolated mild pulmonary cases typically do not require treatment

• More severe pulmonary infection or primary cutaneous
  • Itraconazole x 6-12 weeks
  • 2-4 weeks induction with Ampho B may be needed for severe pulmonary disease

• Disseminated infection
  • Amphotericin B x 2-4 weeks ➔ itraconazole x10-12 mths

• Osteomyelitis: itraconazole x 10-12 mths

• CNS: Ampho B x 4-6 weeks ➔ fluconazole or voriconazole x >10-12 mths

• Itraconazole use requires periodic therapeutic drug monitoring to assure therapeutic levels

• Voriconazole, posaconazole, isavuconazole used as salvage therapy
PNEUMOCOCCAL VACCINATION

- Conjugate pneumococcal vaccines have resulted in significant drops of invasive pneumococcal disease
  - 2000: PCV-7
  - 2010: PCV-13
  - 2021: PCV-15
  - 2022: PCV-20

http://dx.doi.org/10.15585/mmwr.mm6846a5
PNEUMOCOCCAL VACCINES

Current and new pneumococcal vaccines serotypes

- **PCV15 non-PCV13**: includes serotypes 22F and 33F
- **PCV20 non-PCV15**: includes serotypes 8, 10A, 11A, 12F, and 15B/C
- **PPSV23 non-PCV20**: includes serotypes 2, 9N, 17F, and 20

Important to know the coverage of each vaccine. 22F and 33F were added in PCV15

[https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-06/02-Pneumococcal-Gierke-508.pdf](https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-06/02-Pneumococcal-Gierke-508.pdf)
PNEUMOCOCCAL VACCINATION IN ADULTS 19-64

HTTPS://WWW.NFID.ORG/2022/06/03/PROTECTING-ADULTS-AGAINST-PNEUMOCOCCAL-DISEASE/
PNEUMOCOCCAL VACCINE ADULTS ≥65

ADULTS AGE 65 YEARS AND OLDER

Did the patient receive prior pneumococcal vaccine?

YES

RECEIVED

1 dose of PPSV23 or 1 dose of PCV13

ADMINISTER

1 dose of PCV15 or PCV20 at least 1 year later*

Pneumococcal Vaccinations Complete

NO/UNSURE

ADMINISTER

1 dose of PCV15 or 1 dose of PCV20

Pneumococcal Vaccinations Complete

+ 1 dose of PPSV23 at least 1 year later*

Pneumococcal Vaccinations Complete

Pneumococcal Vaccinations Complete

HTTPS://WWW.NFID.ORG/2022/06/03/PROTECTING-ADULTS-AGAINST-PNEUMOCOCCAL-DISEASE/
HEPATITIS B

HEPATITIS B

- No appreciable decline in cases over last decade
- Increased rates in 40-59 yrs
HEPATITIS B VACCINATION RATES

- 1991 US adopted goal to eliminate HBV transmission
- Only ~25% high risk adults >19 vaccinated against HBV
- Coverage FAR higher among children (>90%)

Schaffner, et al Inf Dis in Clinical Practice, 2018
BARRIERS TO HBV VACCINATION

BARRIERS TO ALL VACCINES
• Limited access to care
• Low awareness
• Safety & efficacy beliefs
• Complex recommendations
• Competing medical priorities
• No reminders for providers
• Logistical challenges

HBV SPECIFIC BARRIERS
• >2 dozen target populations
• Multiple doses over time
• Not readily admitting risk factors
  • IVDU & sexual exposure
• Stocking financial & logistical challenges
• Insurance coverage

Schaffner, et al Inf Dis in Clinical Practice, 2018
OLD HBV VACCINATION RECOMMENDATIONS

3 Risk Groups
1. Sexual exposure
2. Exposure to blood & body fluids
3. Health, Living, Travel situations

CONFUSING!!!!
2022 UPDATED ACIP HBV VACCINE RECOMMENDATIONS FOR ADULTS

- Removed previous risk factor assessment
- ALL adults 19-59
- ≥60 with risk factors or if they want to be vaccinated for HBV
# Hepatitis B Vaccine Schedule

## U.S. Children and Adult Hepatitis B Vaccine Schedules

For children ≥ 1 and adults

*Note: The first dose should be given as soon as possible. Additional doses require minimum time intervals required between doses in order for the vaccine to be effective.*

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Dose 1</th>
<th>Dose 2</th>
<th>Dose 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 dose vaccine series</td>
<td>Now</td>
<td>1 month after dose 1</td>
<td>6 months after dose 1</td>
</tr>
<tr>
<td>Brand names:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engerix-B, Recombivax HB, Twinrix (hepatitis A and B)</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>PreHevBrio (adults ages 18 and older)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 dose vaccine series</td>
<td>Now</td>
<td>1 month after dose 1</td>
<td></td>
</tr>
<tr>
<td>Adults ≥ 18 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brand name: Heplisav-B</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- ✔️ = Monovalent hepatitis B vaccine (protection against hepatitis B only)
- ✂️ = Approved for adults
- 🧒 = Approved for children

SUMMARY

New COVID variants continue to emerge making vaccination strategy challenging

Bivalent vaccines effective at preventing hospitalization/death but limited impact on prevention of infection

Use of Paxlovid may reduce risk for long COVID but further study needed

4th generation HIV Ag/Ab tests may be false positive in setting of recent COVID-19 infection thus positive tests in this setting should have confirmatory testing

*Candida auris* is an emerging drug resistant fungus that will likely continue to spread & cause increased challenges in the healthcare system

Blastomycosis often asymptomatic or mild but can cause severe disease requiring long courses of antifungal therapy

ACIP now recommends ALL adults age 19-59 receive HBV vaccination in an effort to increase vaccine uptake & reduce prevalence of HBV
THANK YOU!