# Diagnosis and Management of HIV in High Acuity Settings

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# DISCLOSURES

- Dr. Blackwell has no relevant financial disclosures
- Dr. Armstrong has no relevant financial disclosures
- Dr. Guido-Sanz has no relevant financial disclosures
- All images that appear are in the public domain and are either without copyright or are on accessible platforms that allow use of the image (Creative Commons)
- This presentation does not discuss management of patients with AIDS or opportunistic infection management

# OBJECTIVES

Purpose/Goals: Provide an overview of most recent HIV epidemiology in the US, discuss the process of diagnosing HIV in hospitals, emphasizing the ICU, and outline major principles of antiretroviral therapy in patients with high acuity and life-threatening illness.

Objectives:

1) Describe the most recent incidence trends of the epidemiology of HIV in the United States;
2) Articulate diagnosis of HIV in acute care settings, including consent, confidentiality, counseling, laboratory and confirmatory assays;
3) Apply principles of management of HIV using antiretroviral therapy, emphasizing care during high acuity and life-threatening illnesses.

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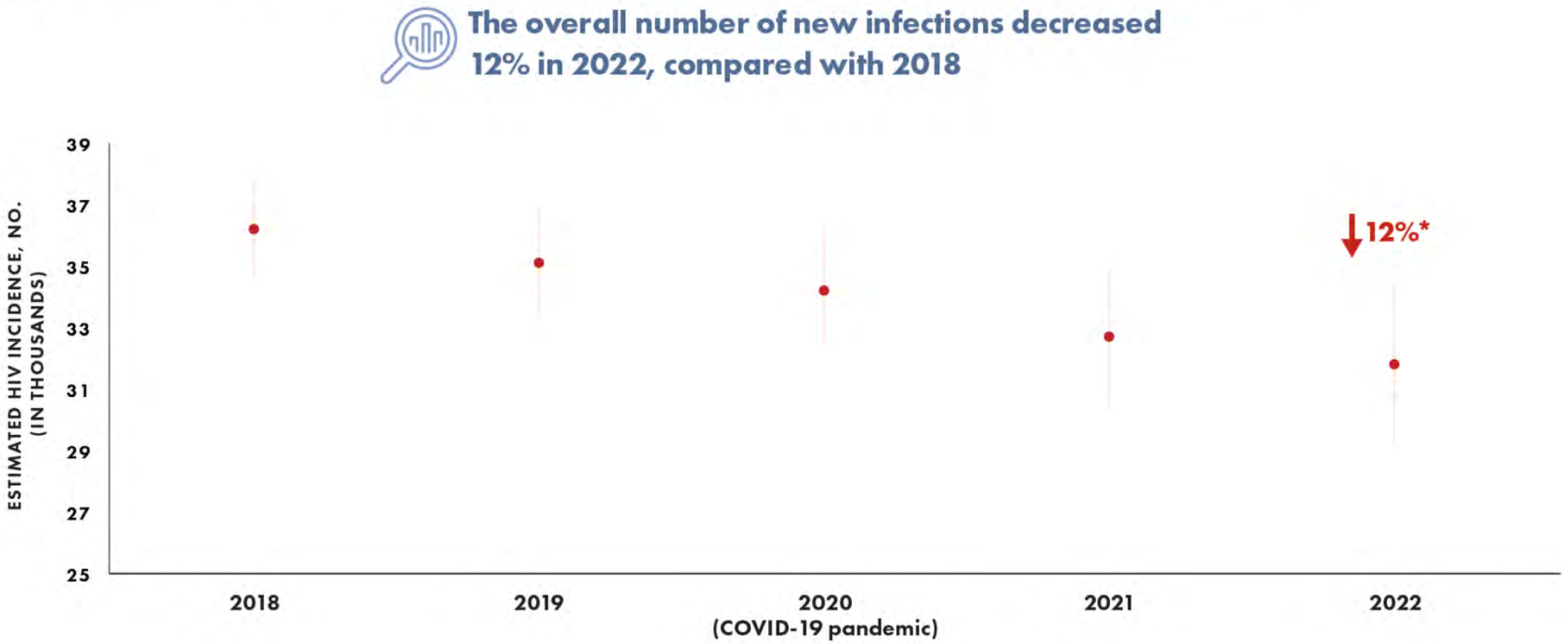
# INCIDENCE OF HIV INFECTION & AIDS

- Review of Centers for Disease Control and Prevention (CDC) Data: Updated through 2022 (2018-2022)

- These can all be obtained from:
  - Centers for Disease Control and Prevention. (2024). Estimated HIV incidence and prevalence in the United States, 2018–2022. *HIV Surveillance Supplemental Report,* 29(1).
- https://www.cdc.gov/hiv/library/reports/hiv-surveillance/vol-34/index.html
- The figures on slides 4-11 all come from these CDC sources

# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 1. Estimated HIV incidence among persons aged ≥13 years, 2018–2022—United States**

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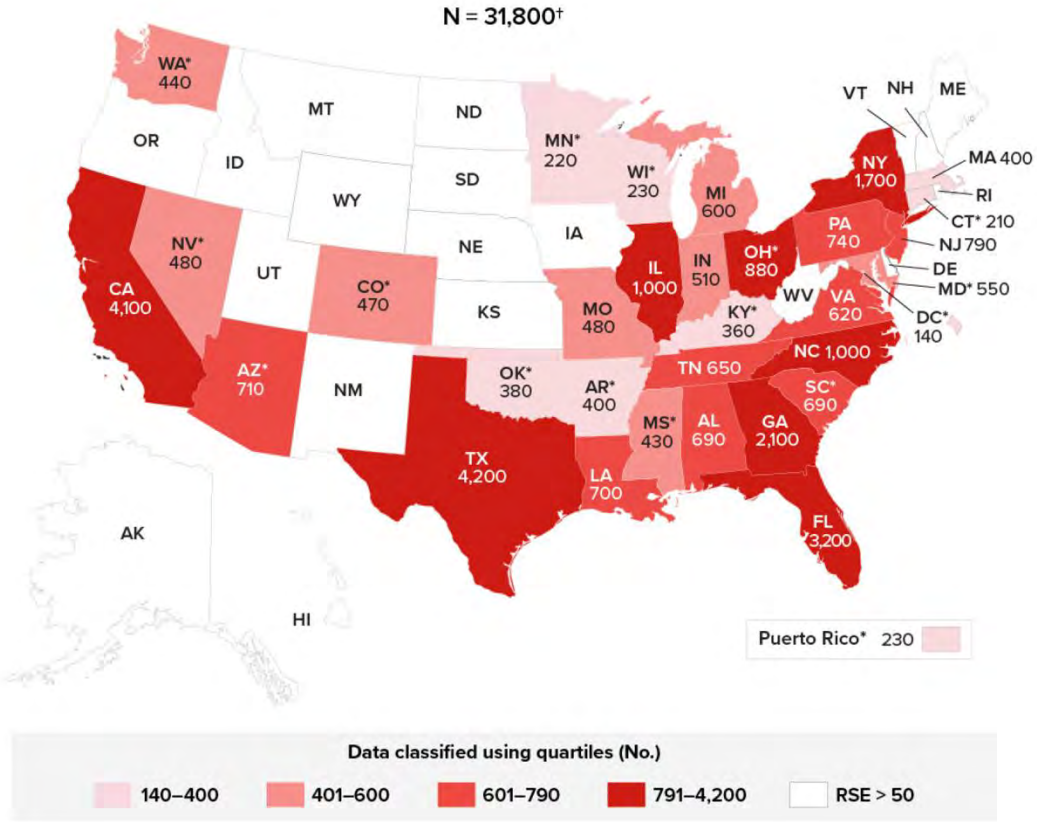
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 11. Estimated HIV incidence among persons aged ≥13 years, by area of residence, 2022—United States and Puerto Rico**

**In 2022, 57% of new infections were in eight states:**

- California
- Florida
- Georgia
- Illinois
- New York
- North Carolina
- Ohio
- Texas

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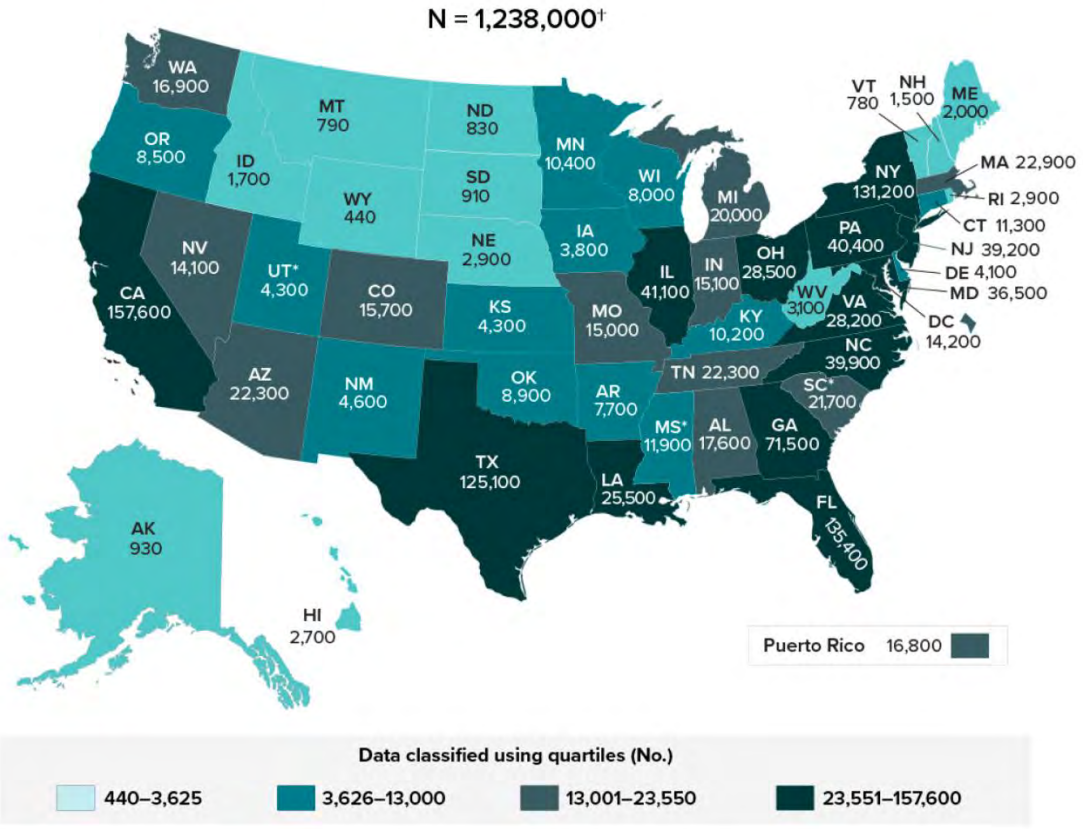
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 23. Estimated HIV prevalence among persons aged ≥13 years, by area of residence, 2022—United States and Puerto Rico**

**In 2022, states with lowest estimated HIV prevalence:**

- Alaska
- Hawaii
- Idaho
- Maine
- Montana
- Nebraska
- New Hampshire
- North Dakota
- Rhode Island
- South Dakota
- Vermont
- West Virginia
- Wyoming

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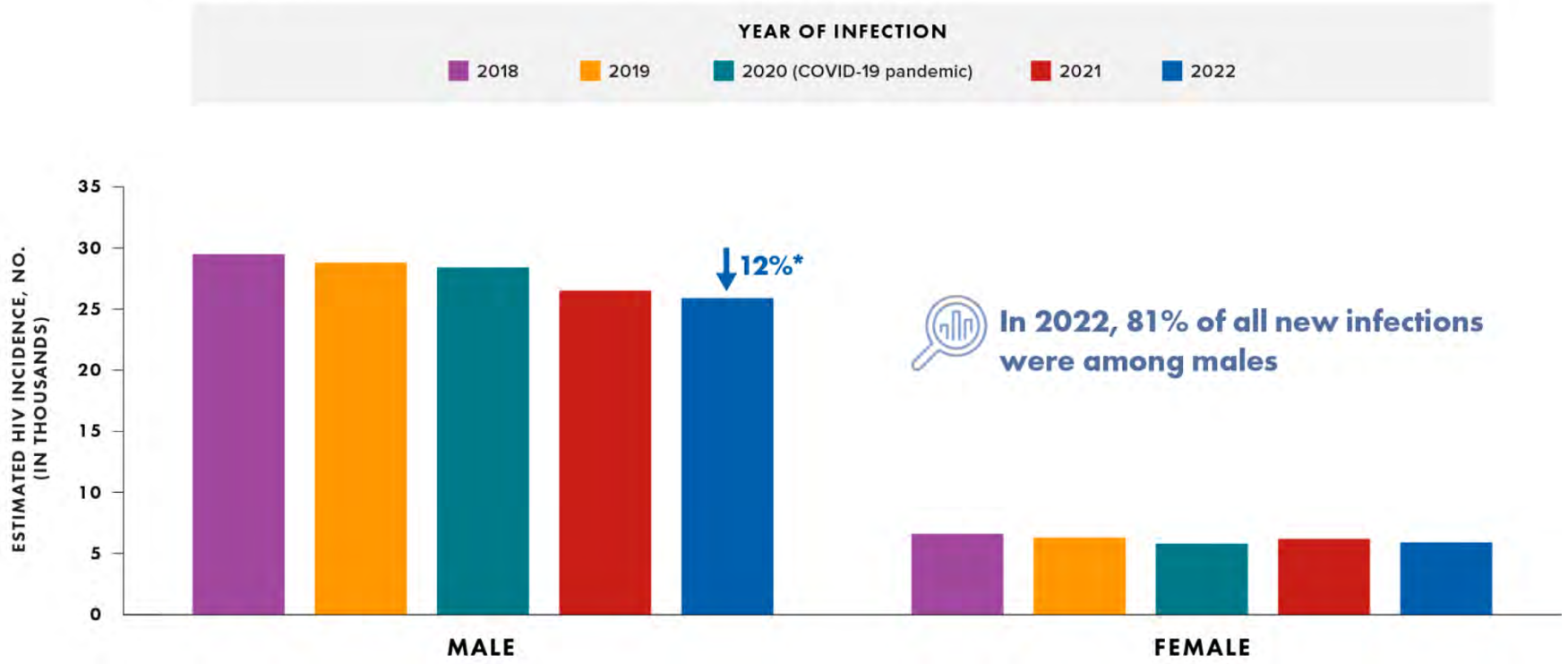
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 2. Estimated HIV incidence among persons aged ≥13 years, by sex assigned at birth, 2018–2022—United States**

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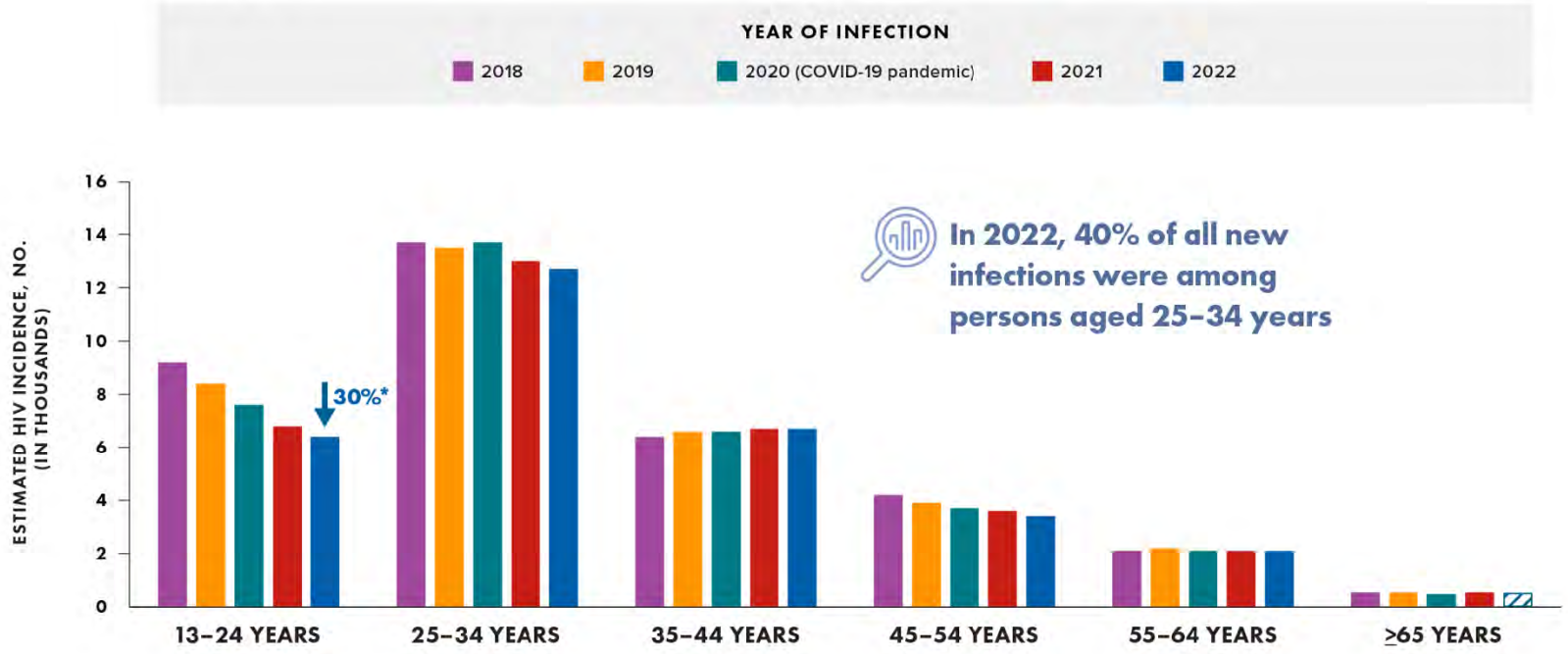
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 3. Estimated HIV incidence among persons aged ≥13 years, by age at infection, 2018–2022—United States**

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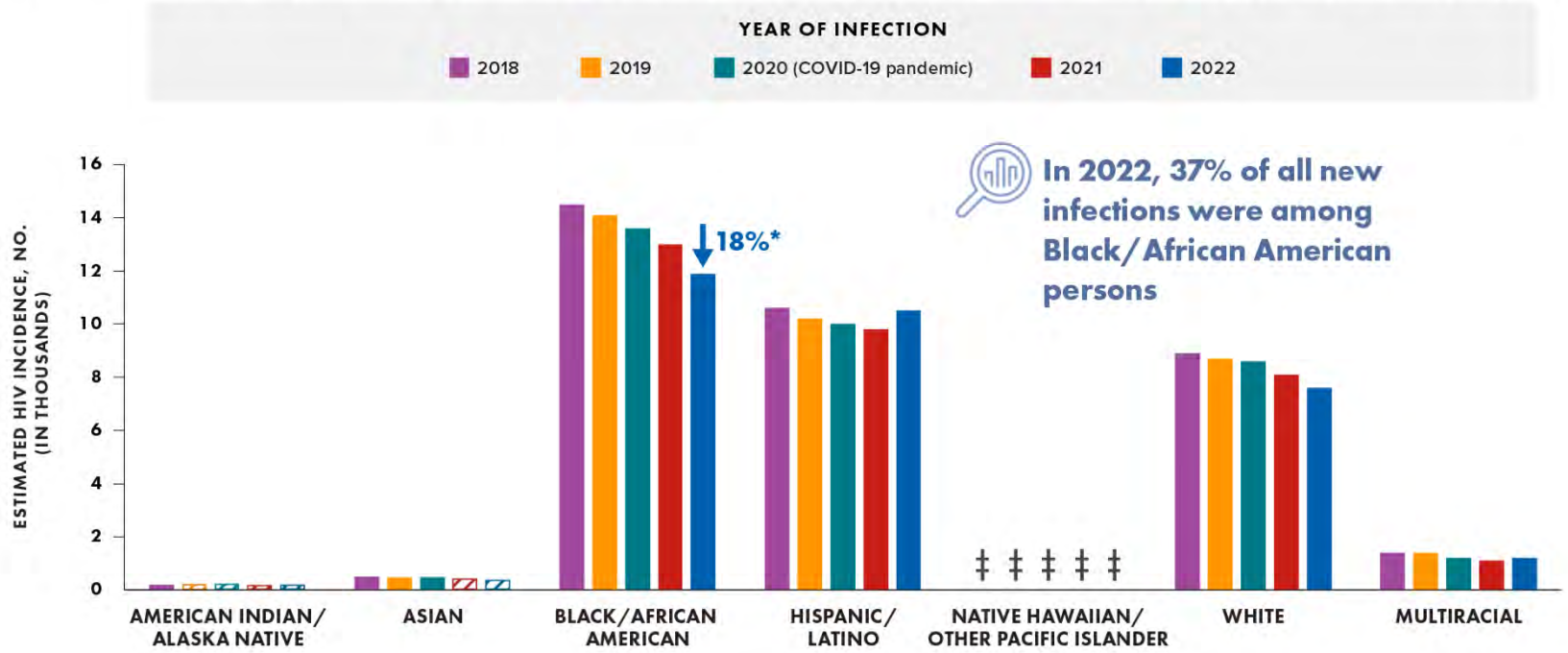
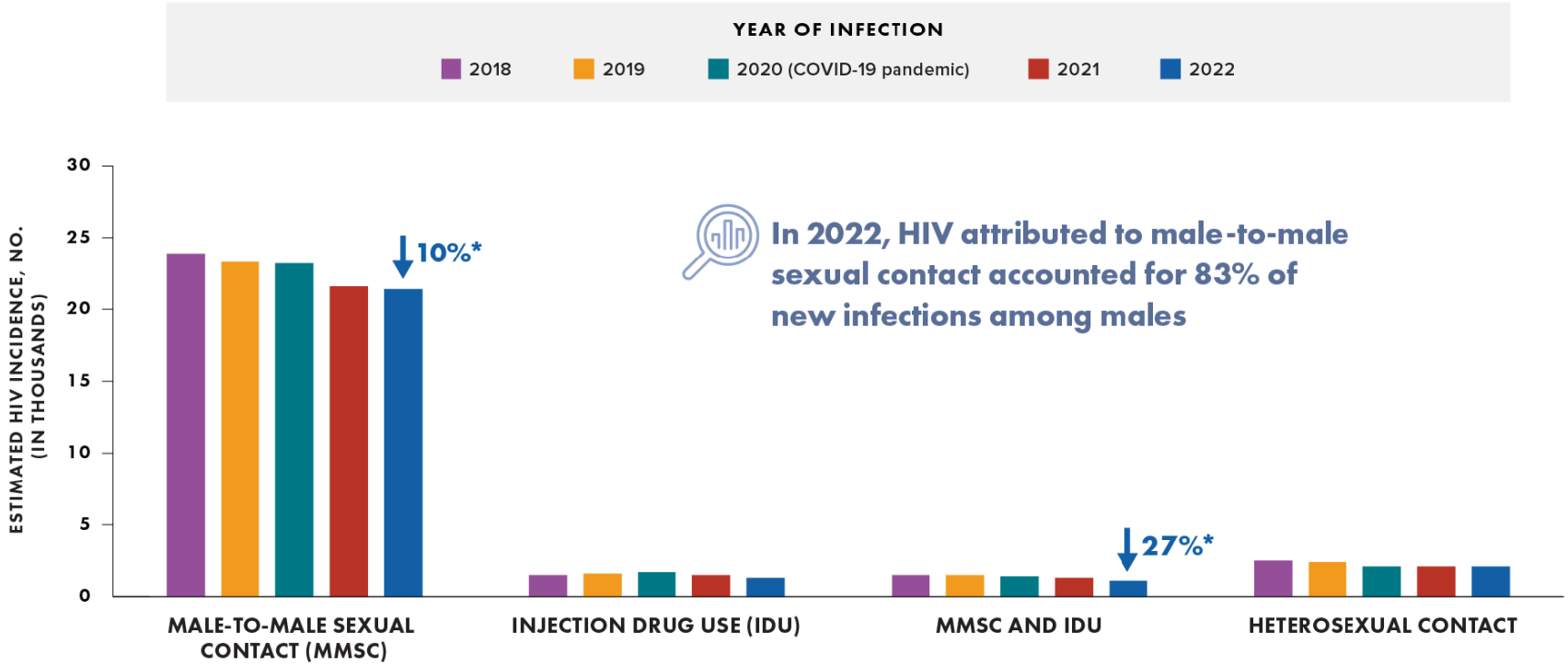
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 4. Estimated HIV incidence among persons aged ≥13 years, by race/ethnicity, 2018–2022—United States**



# Incidence of HIV Infection & AIDS 2018-2022: Take Away Points

**Figure 8. Estimated HIV incidence among males aged ≥13 years, based on sex assigned at birth, by transmission category, 2018–2022—United States**

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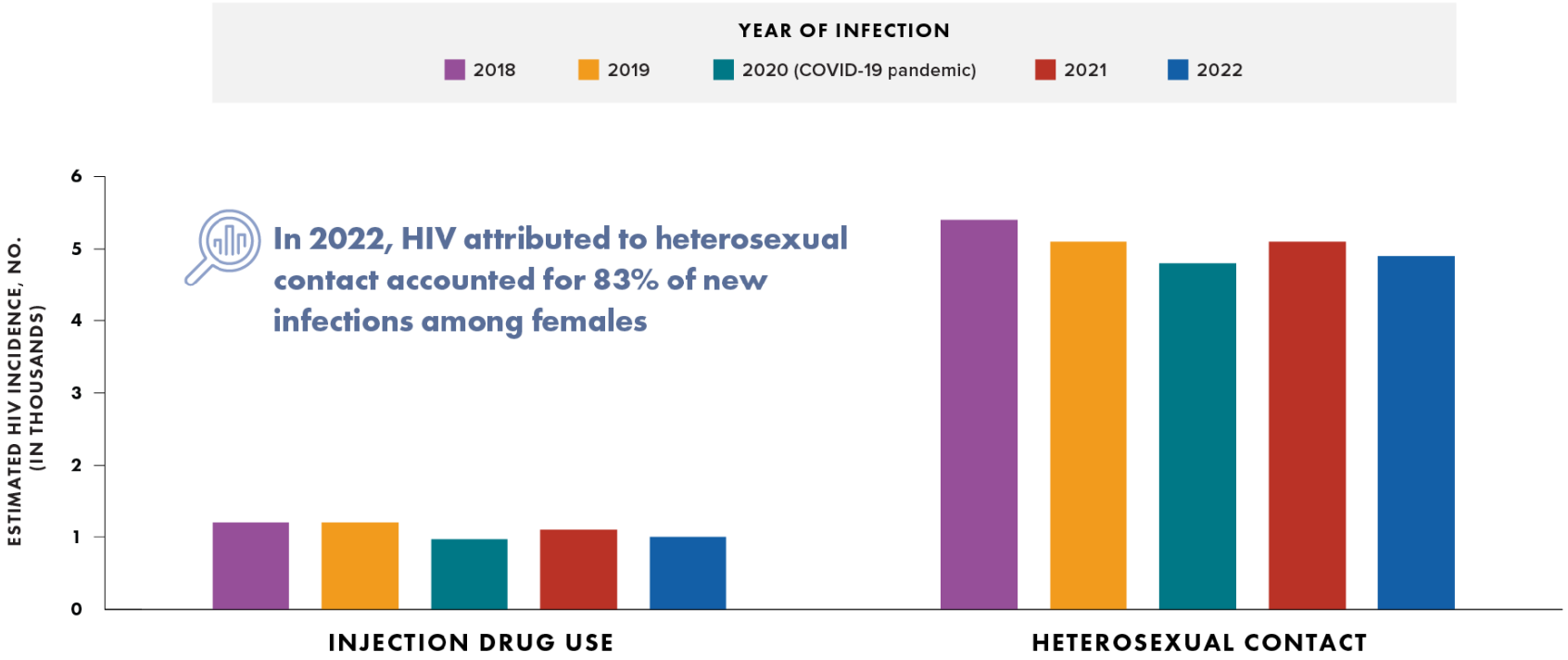
# Incidence of HIV Infection & AIDS 2018-2022: Take Away Points

**Figure 9. Estimated HIV incidence among females aged ≥13 years, based on sex assigned at birth, by transmission category, 2018–2022—United States**

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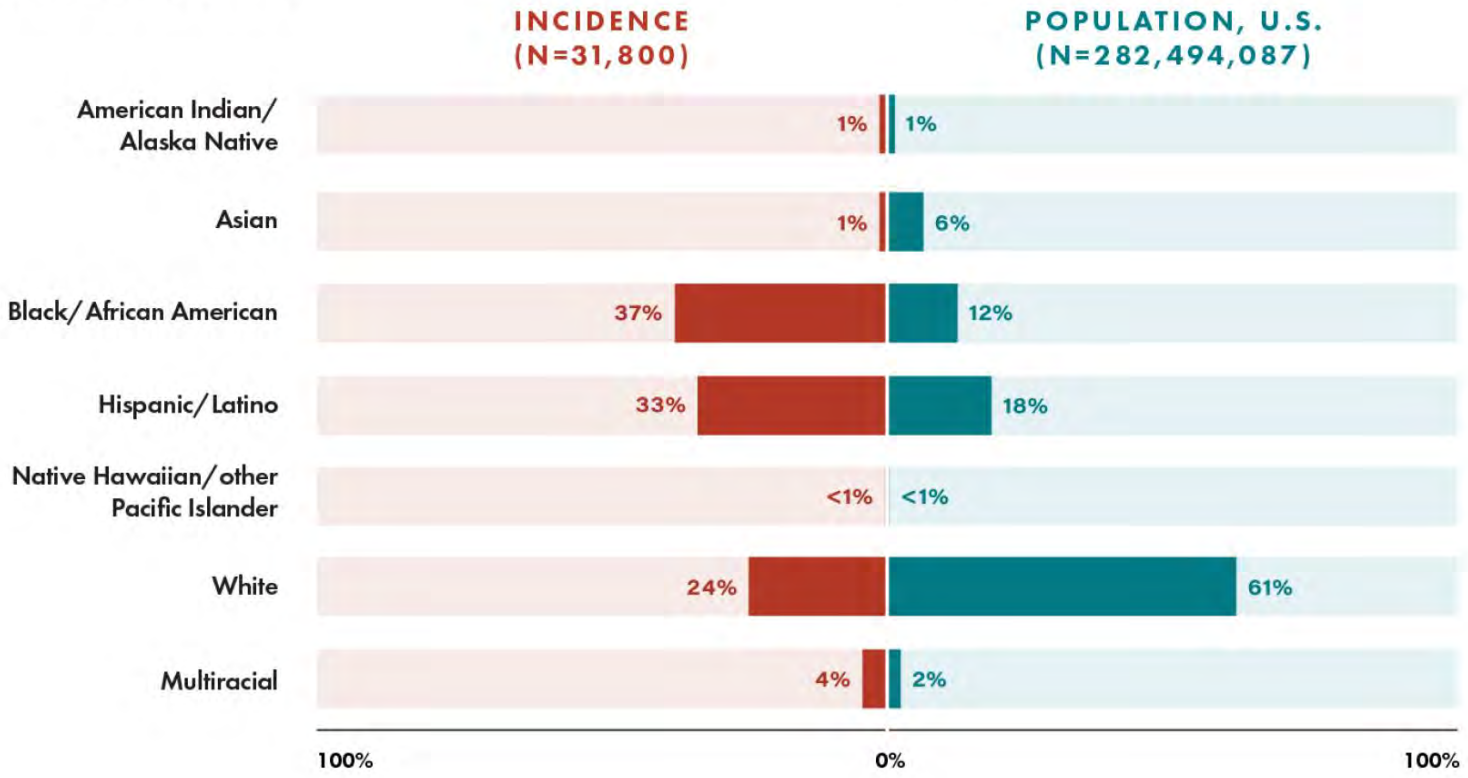
# INCIDENCE OF HIV INFECTION & AIDS 2018-2022: TAKE AWAY POINTS

**Figure 5. Estimated HIV incidence and population among persons aged ≥13 years, by race/ethnicity, 2018–2022—United States**

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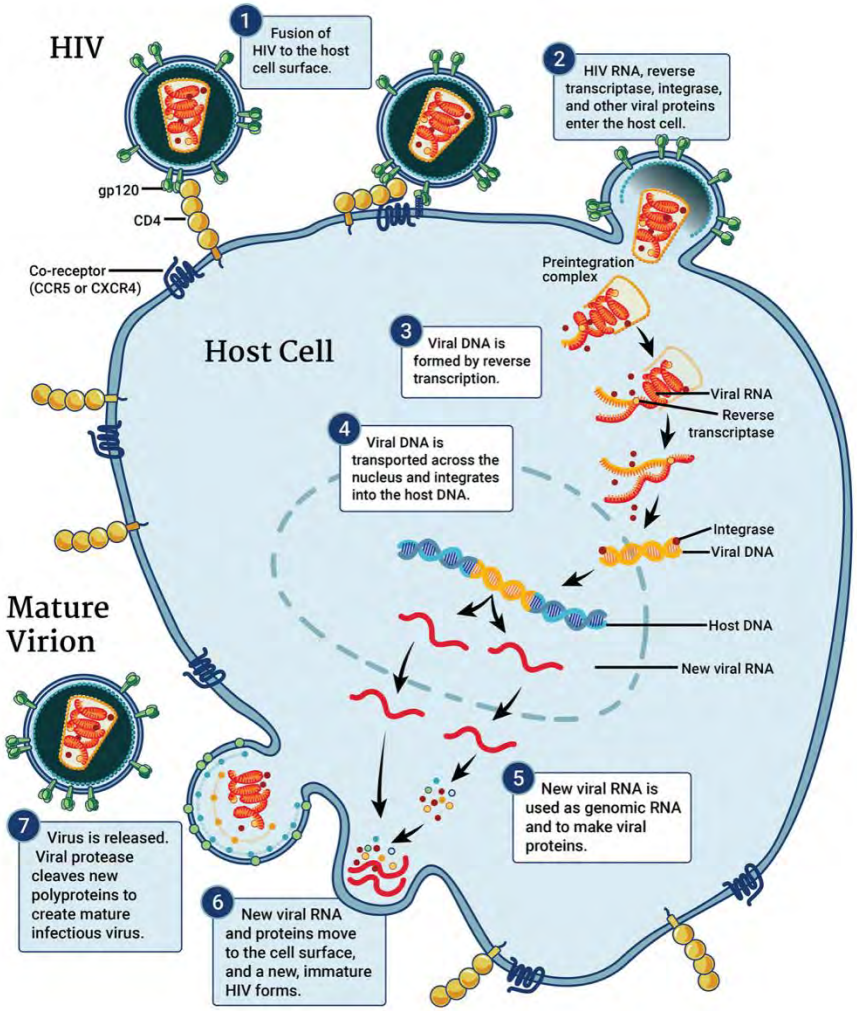
# HIV REPLICATION CYCLE



# PATHOPHYSIOLOGY OF HIV INFECTION

- HIV is a retrovirus, transcribing RNA-containing genetic material into DNA of the host cell nucleus by using an enzyme called reverse transcriptase
- Glycocoproteins allow HIV to attach to CD4 Cell and incorporate its RNA into the cell membrane, which then transcribes the RNA to DNA using reverse transcriptase
- This is then integrated into the CD4 nucleus using integrase. Integrated viral genes then transcribe back into genomic RNA and messenger RNA, which are translated to viral proteins
- These proteins then are cleaved with protease into new HIV particles, which release to infect other cells
- HIV progresses to AIDS
- Seroconversion (HIV- → HIV+) typically occurs in 2-12 weeks post-exposure. 95% (1 month; 99.9% by week 12)

# PATHOPHYSIOLOGY OF HIV INFECTION

- After seroconversion, HIV antibody titers decrease as infected cells are sequestered in the lymph nodes
- This is the latent period, lasting up to 10 years
- During this period, CD4 cell lines drop as a result of infection and lysis of healthy T-Helper cells

# PATHOPHYSIOLOGY OF HIV INFECTION

- As CD4 cells continue to decline, the patient becomes susceptible to opportunistic infections, malignancies, and neurological diseases
  - AIDS develops
- A very few HIV+ individuals are termed “Non-Progressors”

# PATHOGENIC PROCESS OF HIV

- Exposure to HIV
- HIV Infection
- Seroconversion
- Latency Period
- Initial Symptoms of Immunodeficiency and Declining Immune Function
- Immune System Failure and AIDS
- Severe Immune Deficiency

# PATHOGENIC PROCESS OF HIV

- Important Points:
- Transmission of HIV is possible at any stage of the disease process
- Risk to health workers is overall small
- With blood product screening emerging in 1985, transfusion-related HIV transmission decreased dramatically
- Since the introduction of maternal antiretroviral therapy, HIV transmission from mom to child has decreased
- *Practically Preventable*

# PREVENTION OF HIV TRANSMISSION

- Sexual Transmission:
  - Alteration in Sexual Behaviors
  - Women more susceptible via vaginal mucosa compared to male penis
  - Anal intercourse (regardless of orientation) also risky secondary to rectal trauma, tearing, and fistula formation
  - Oral sex is actually very low risk
  - Viral Load is NOT a determinant of degree of safeness (theoretically)—CDC (2017) issued newer statement about this

# PREVENTION OF HIV TRANSMISSION

- Pharmacologic: PrEP and PEP
- Parenteral Transmission:
  - Proper cleaning of drug paraphernalia:

    Fill with water (tap to loosen blood debris) and flush →

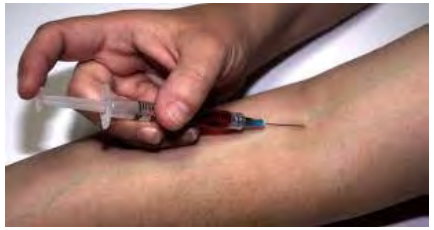
    Fill with bleach and then shake for 30 seconds, flush →

    Repeat x 3 →

    Fill with water, shake and tap x 30 seconds, flush →

    Repeat x 3

    Participation in needle exchange programs



# PREVENTION OF HIV TRANSMISSION

- Perinatal Transmission:
  - HIV transmission thought to occur transplacentally in utero, intrapartally during exposure to blood and vaginal secretions during childbirth, or postpartally through breast milk

# PREVENTION OF HIV TRANSMISSION

- Perinatal Transmission (Ctd):
- Review of prior HIV-related illnesses and past CD4 T lymphocyte (CD4) cell counts and plasma HIV RNA levels;
- Current CD4 cell count;
- Current plasma HIV RNA copy number;
- Assessment of the need for prophylaxis against opportunistic infections such as Pneumocystis jirovecii pneumonia and Mycobacterium avium complex (see Adult and Adolescent Opportunistic Infections Guidelines)

# PREVENTION OF HIV TRANSMISSION

- Perinatal Transmission (Ctd):
- Screening for hepatitis C virus and tuberculosis in addition to standard screening for hepatitis B virus(HBV) infection;
- Assessment of the need for immunizations per guidelines from the American College of Obstetricians and Gynecologists, with particular attention to hepatitis A, HBV, influenza, pneumococcus, and Tdap immunizations;
- Complete blood cell count and renal and liver function testing;
- HLA-B*5701 testing if abacavir (Ziagen®) use is anticipated;
- History of prior and current antiretroviral (ARV) drug use, including prior ARV use for prevention of perinatal transmission or treatment of HIV and history of adherence problems

# PREVENTION OF HIV TRANSMISSION

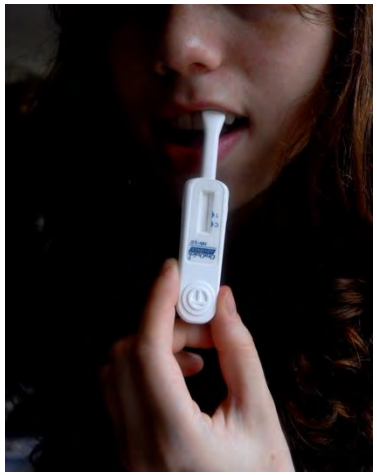
- Perinatal Transmission (Ctd):
  - Infected with HIV and on ART?:
    - Keep taking ART!
  - Infected with HIV and not on ART or with unknown or high HIV RNA load?:
    - Begin zidovudine (Retrovir®) IV near time of delivery
    - C-section in @ 38 weeks gestation
  - Neonate will also be treated with ART
  - Most recent guidelines (updated 2024): https://clinicalinfo.hiv.gov/en/guidelines/perinatal/whats-new

# SCREENING FOR HIV


- Traditional: ELISA → Western Blot (99.5% accurate)
  - Substitution of Western Blot with antigen tests that differentiate HIV1 from HIV2
- Pre-Test and Post-Test Counseling can be valuable but is NOT CDC recommended as a requirement any longer.
  - Check your state regulations for guidance
- General consent for Tx implies consent for HIV
  - Healthcare institutions and acute care facilities differ on consent requirements

# SCREENING FOR HIV

- Antibody tests are specifically designed for the routine testing of HIV in adults, are inexpensive, and are very accurate
- Antibody tests give false negatives results during the *window period* of between three weeks and six months from the time of HIV infection until the immune system produces detectable amounts of antibodies
- Much screening done as POS
  - e.g., OraSure® OraQuick® testing methods



# SCREENING FOR HIV

- Most people have detectable antibodies after three months
- A six-month window is extremely rare with modern antibody testing
- During this window period an infected person can transmit HIV to others, without their HIV infection being detectable using an antibody test
- ART during the window period can delay the formation of antibodies and extend the window period beyond 12 months

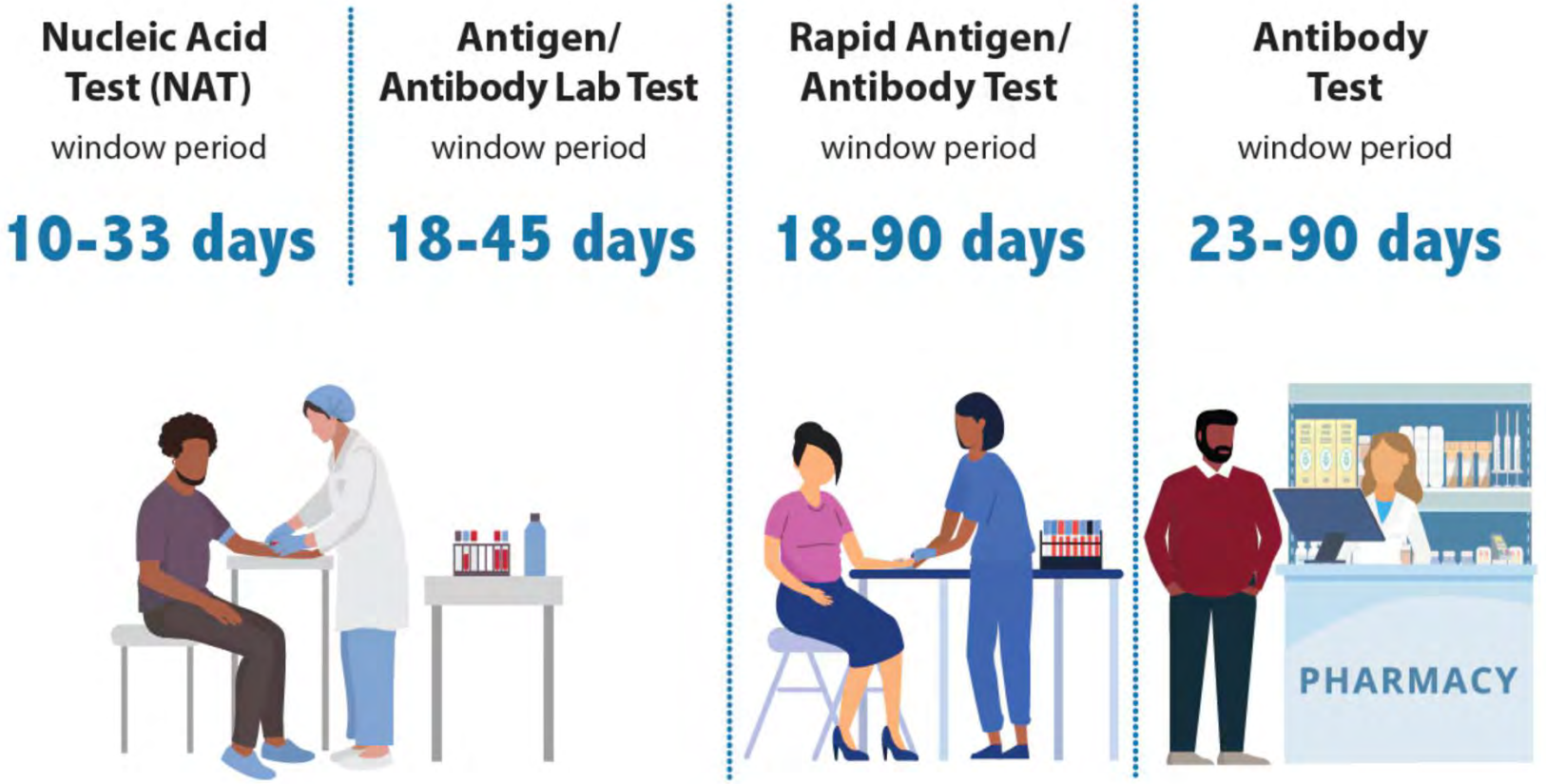
# SCREENING FOR HIV

- OraSure® saliva—collected on oral wand device placed between gum and cheek for 2-5 min--mixed in a vial with solution, wand snapped off, vial closed and sent to lab
  - It is an antibody test which first employs ELISA, then Western Blot
- OraQuick® Advance is an HIV test which uses saliva, plasma, fingerstick, or whole blood specimen
    - Sample is obtained and mixed in a buffer → Device inserted into buffer → Results in 20-40 min
    - CLIA-waived for saliva, fingerstick, and venipuncture whole blood
  - There is also a urine test; it employs both the ELISA and the Western Blot method
  - Home Access Express HIV-1 Test is a FDA-approved home test: the patient collects a drop of blood and mails the sample to a laboratory; the results are obtained over the phone

# SCREENING FOR HIV

- **Antigen Tests:**
  - The **p24 antigen test** detects the presence of the p24 protein of HIV (also known as CA), a major core protein of the virus
  - This test is now used routinely to screen blood donations, thus reducing the window to about 16 days
- **Nucleic Acid-Based Tests:**
  - Nucleic acid-based tests amplify and detect a 142 base target sequence located in a highly conserved region of the HIV *gag* gene
  - Since 2001, donated blood in the US has been screened with nucleic acid-based tests, shortening the window to about 12 days
  - Since these tests are relatively expensive, the blood is screened by first pooling some 10-20 samples, testing these together, and if the pool tests positive, each sample is retested individually

# SCREENING FOR HIV




The window period depends on the type of HIV test.

Image licensed through CDC:
https://www.cdc.gov/hiv/testing/index.html#:~:text=A%20rapid%20antigen%2Fantibody%20test%20done%20with%20blood%20from%20a,to%2033%20days%20after%20exposure.

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# HIV/AIDS SURVEILLANCE AND Dx

- CD4 Testing:
  - Declining CD4 T-cell counts are a marker of the progression of HIV infection.
  - In PLWH, AIDS is officially diagnosed when the count drops below 200 cells or when certain opportunistic infections occur; CDC guidelines recommend beginning ART AT TIME OF Dx (2015)
  - Low CD4 T-cell counts are associated with a variety of conditions, including many viral infections, bacterial infections, parasitic infections, sepsis, tuberculosis, coccidioidomycosis, burns, trauma, intravenous injections of foreign proteins, malnutrition, over-exercising, pregnancy, normal daily variation, psychological stress, and social isolation

# HIV/ AIDS SURVEILANCE AND Dx

- CD4 Testing:
  - The lower the number of T cells, the lower the immune system's function will be
  - Normal T4 counts are between 500 and 1500 CD4+ T cells per microliter and the counts may fluctuate in healthy people, depending on recent infection status, nutrition, exercise and other factors -- even the time of day
  - Women tend to have somewhat lower counts than men

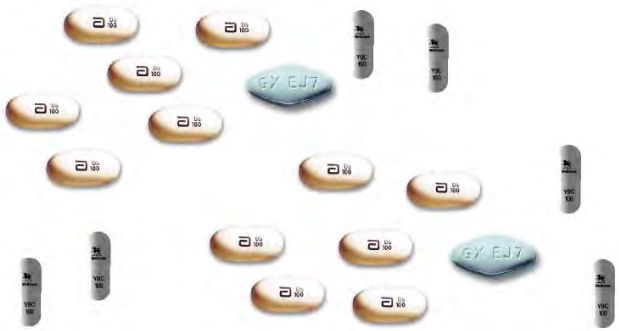
# HIV/AIDS SURVEILLANCE AND Dx

- Viral Load Testing:
  - Evidence shows that keeping the viral load levels as low as possible for as long as possible decreases the complications of HIV disease and prolongs life
  - Most recent public health guidelines state that treatment should be considered for asymptomatic HIV-infected people AT TIME OF Dx
  - There are several methods for testing viral load; results are not interchangeable, so it is important that the same method be used each time
  - Keep viral loads undetectable = decrease/ eliminate transmission

# HIV PHARMACOLOGIC MANAGEMENT

## Antiretroviral therapy for HIV infection

*In the 1990s*




**Up to 20 pills daily, taken at different intervals throughout the day**

*Today*


**As little as 1 pill per day, delivering multiple drugs**



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# Updated 2019 Guidelines

- Rationale for ARV Medication Selection:
  - An ARV regimen generally consists of two NRTIs (one of which is FTC or 3TC) plus an INSTI, NNRTI, or PK- enhanced PI
  - Selection of a regimen should be individualized based on virologic efficacy, potential adverse effects, pill burden, dosing frequency, drug-drug interaction potential, a patient's resistance test results and comorbid conditions, and cost
    - Monthly injectable regimen with cabotegravir/rilpirivine (Cabenuva®) available once patient reach viral suppression to undetectable levels
  - HIV viral load < 200 copies/mL = NO sexual transmission
  - Partner(s) needs to be using prevention measures for first 6 months of Tx initiation AND if HIV viral load > 200 copies/mL

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# HIV Pharmacologic Management

*3-and 2-Drug Antiretroviral Treatment Regimens for HIV*

| **Drug Combination Agents and Dosing** | **Frequency** |
|---|---|
| Bictegravir 50mg/ emtricitabine 200mg/ tenofivir alafenamide 25mg | Once every day |
| Abacavir 600mg/ dolutegravir 50mg/ lamivudine 300mg | Once every day |
| Dolutegravir 50mg | Once every day |
| Plus one of the following: | |
| Emtricitabine 200mg/ tenofovir disoproxil fumarate 300mg | Once every day |
| Emtricitabine 200mg/ tenofovir alafenamide 25mg | Once every day |
| Lamivudine 300mg/ tenofovir disoproxil fumarate 300mg | Once every day |
| Dolutegravir 50mg/ lamivudine 300mg | Once every day |
| Raltegravir 400mg | Twice every day |
| Plus one of the following: | |
| Emtricitabine 200mg/ tenofovir disoproxil fumarate 300mg | Once every day |
| Emtricitabine 200mg/ tenofovir alafenamide 25mg | Once every day |
| Lamivudine 300mg/ tenofovir disoproxil fumarate 300mg | Once every day |

# HIV Pharmacologic Management

- Single Tablet Regimens:
  - Bictegravir, emtricitabine and tenofovir alafenamide (Biktarvy®)
  - Doravirine, lamivudine and tenofovir disoproxil (Delstrigo®)
  - Dolutegravir and lamivudine (Dovato®)
  - Efavirenz/emtricitabine/tenofovir disoproxil
    - (often marketed under the name Atripla®, but generic versions are also available)
  - Rilpivirine, emtricitabine and tenofovir disoproxil (Eviplera®).
  - Elvitegravir, cobicistat, emtricitabine and tenofovir alafenamide (Genvoya®)
  - Dolutegravir and rilpivirine (Juluca®).
  - Rilpivirine, emtricitabine and tenofovir alafenamide (Odefsey®)
  - Elvitegravir, cobicistat, emtricitabine and tenofovir disoproxil (Stribild®)
  - Darunavir, cobicistat, emtricitabine and tenofovir alafenamide (Symtuza®)
  - Dolutegravir, abacavir and lamivudine (Triumeq®)

# HIV Pharmacologic Management

- Nucleoside Analog Reverse Transcriptase Inhibitors (NRTIs)
  - Suppress production of reverse transcriptase and inhibit viral DNA synthesis and genetic replication
    - Tenofovir (Viread®)
    - Emcitricitabine (Emtriva®)
    - Tenofovir Disoproxil (Viread®)
    - Tenofovir Alafenamide (Vemlidy®)
    - Abacavir (Ziagen®)
    - Lamivudine (Epivir®)
    - Stavudine (Zerit®)
    - Common Adverse Event: Bone marrow suppression
      - Epogen for RBC stimulation

# HIV Pharmacologic Management

- Non-Nucleoside Analog Reverse Transcriptase Inhibitors (NNRTIs)
  - Inhibit synthesis of the enzyme reverse transcriptase
  - Protect uninfected cells
  - Suppress viral replication
    - Nevirapine (Viramune®)
    - Effaviranz (Sustiva®)
    - Etravirine (Intelence®)
    - Delaverdine (Rescriptor®)
    - Doravirine (Pifeltro®)
    - Rilpivirine (Edurant®)
  - Interactions: Absorption inhibited by antacids
  - Common Adverse Events: N/V/D, headache, arthalgias
- Protease Inhibitors (PIs):
  - Block the HIV protease enzyme, preventing viral replication & release of viral particles
    - Amprinivir (Agenerase®)
    - Ritonavir (Norvir®)
    - Atazanivir (Reyataz®)
    - Lopinsvir (Kaletra®)
    - Nelfinavir (Viracept®)
  - Common Adverse Events: All PIs are associated with metabolic abnormalities including dyslipidemia, hyperglycemia, insulin resistance, and lipodystrophy. (Atazanavir [Reyataz®] is less likely to cause dyslipidemia.)

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# HIV Pharmacologic Management

- Fusion Inhibitors:
  - Fuzeon®/ binds to a protein gp41 on the HIV cell's surface called
  - Once it does this, HIV cannot successfully bind with the surface of T-cells, thus preventing the virus from infecting healthy cells
  - Because of its fragile structure (it is a peptide), enfuvirtide (Fuzeon®) cannot be taken by mouth:
    - It is currently given in an injectable form and requires two shots a day: one in the morning and one 12 hours later at night.
    - Each SQ injection contains 90mg of Fuzeon®
  - Common Adverse Effects:
    - Injection site reactions
    - Bacterial pneumonia
    - Allergic reaction (fever, urticaria/rash, N/V, chills, hypotension, hepatitis)
    - Peripheral neuopathy, insomnia, depression, decreased appetite, fatigue, muscle pain, constipation, and pancreas problems.

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# HIV Pharmacologic Management

- Integrase Inhibitors:
  - Disable integrase, a protein that HIV uses to insert its genetic material into the infected cell
    - Raltegravir (Isentress®)
    - Dolutegravir (Tivicay®)
    - Bictegravir
      - (2nd generation, used in combination w/ TAF/FTC [single agent Biktarvy®])
    - Elvitegravir
      - (used with Cobicistat [pharmacokinetic booster] w/ TAF/FTC [single agent Genvoya®])
  - Adverse Events: N/V/D, Increased LFTs, headache
- Chemokine Coreceptor Antagonists (CCR5 Receptor Antagonists) (Rare Rx)
  - Entry Inhibitor: Doesn't allow HIV to attach to CD4 cells
    - Maraviroc (Selxentry®)
  - Adverse Event: Cough/URI, fever, dizziness, headache, hypotension

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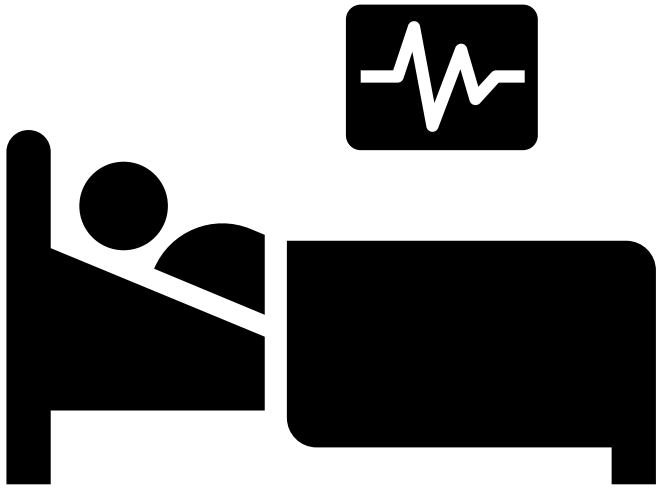
# HIV Pharmacologic Management

- Newer Drug in Phase III Trials
  - Lenacapavir (Sunlenca®)
    - Used with ARV Tx failure
    - Used in combination with background regimen
    - Two Initiation Options:
      - Day 1: 927mg SQ injection + 600 mg PO (2 x 300mg)
      - Day 2: 600 mg PO (2 x 300mg)
    - Maintenance: 927mg SQ q26 weeks, +/- 2 weeks from last injection
    - Interacts with CYP3A Rxs; may remain in systemic circulation for $\geq$ 12 months
    - Will be a game changer in HIV prevention globally
    - Most Common AEs: Injection site reactions (65%) and nausea (4%)



# HIV Management During Critical Illness

# HIV MANAGEMENT DURING CRITICAL ILLNESS

- People living with HIV (PLWH) are at high risk for developing critical illness due to:
  - Significant susceptibility to bacterial sepsis and tuberculosis at every stage of HIV infection
  - Increasing prevalence of comorbid conditions as patients on combination antiretroviral therapies (cART) are aging with controlled viral replication
  - Severe opportunistic infections in those with advanced immunosuppression (*more common in patients with unknown seropositivity or limited access to antiretroviral treatments*)

Short term survival of PLWH has improved due to advancements in the management of these patients in the ICU with in-hospital mortality rates dropping from 80% in the 1980's to 20-40% in most recent U.S. cohorts.

# HIV MANAGEMENT DURING CRITICAL ILLNESS

**Late-stage HIV infection is a common reason for ICU admission in certain populations and demographics.**

| | |
|---|---|
| Limited access to care for diagnosis, cART, and specialized follow up | Migrants, homeless people, and individuals without adequate health insurance coverage |

**Typically present with severe AIDS-related opportunistic infections, may present with two or more coexisting infections, and account for 10 – 30% of ICU admissions of HIV-infected individuals.**

| | | |
|---|---|---|
| Pneumocystis jirovecii pneumonia (PCP) | Cerebral toxoplasmosis | Tuberculosis (TB) |

# HIV MANAGEMENT DURING CRITICAL ILLNESS

- Up to 70% of PLWH admitted to the ICU are now managed with ART leading to a rise in non-AIDS related ICU admissions.

- Severe AIDS-defining illnesses may still occur in patients with uncontrolled viral replication despite management with ART.
  - Current therapeutics often enable achieving viral suppression and immune restoration within 6 months for the majority of these cases (> 90%)
  - Virological failure usually attributable to compliance issues and procurement issues of cART

- Acute HIV infection may also require ICU admission in cases of severe presentation that includes conditions like encephalitis, myocarditis, or multiple organ failure due to hemophagocytic lymphohistiocytosis (HLH).

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# HIV MANAGEMENT DURING CRITICAL ILLNESS

- With ART and sustained viral control, patients are aging and are now at higher risk for a variety of chronic diseases that can predispose to life threatening complications.
  - More advanced chronic obstructive pulmonary disease (COPD)
  - Atherosclerosis (e.g. coronary artery disease and cerebrovascular disease)
  - Non-AIDS defining cancers (lung and liver are common)
  - Renal and liver impairment (HIV and cART associated)
- Lifetime low level inflammation along with other lifestyle factors and potential toxicities related to certain antiretroviral drugs may be contributing to pathogenesis of chronic diseases and comorbidities.
- Additionally, HIV + status no longer precludes individuals from receiving solid organ transplant which requires immunosuppression which can lead to critical illness.

# HIV MANAGEMENT DURING CRITICAL ILLNESS

- While minimal (~5%), ART related toxicity accounts for some ICU admissions in PLWH.

- Older antiretroviral drugs were associated with disorders such as lactic acidosis, pancreatitis, acute kidney injury, and toxic epidermal necrolysis.

- Newer drugs may also cause rhabdomyolysis which can be critical.

- Initiation of ART can also lead to a paradoxical worsening of previously treated or undiagnosed infections through a disease process called immune reconstitution inflammatory syndrome (IRIS).

# Common Etiologies for ICU Admission Among PLWH

| | |
|---|---|
| Admission for ARF | • Infectious: bacterial pneumonia and tuberculosis (all stages)<br>• COPD, bronchiectasis, lung cancer, pulmonary hypertension, lung fibrosis, heart failure related manifestations, asthma, pulmonary embolism, pneumonitis (CD4 > 200/uL)<br>• Immune reconstitution inflammatory syndrome (IRIS) |
| Admission for Neurologic Disorders | • Bacterial meningitis, commonly S. pneumoniae (all stages)<br>• Stroke, epilepsy, bacterial brain abscess, non-infectious encephalitis, systemic diseases with CNS involvement (CD4 > 200/uL)<br>• Immune reconstitution inflammatory syndrome (IRIS) |
| Acute HIV Infection | • Acute HIV encephalitis (rare) |

(From Barbier et al., 2020)

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# HIV MANAGEMENT DURING CRITICAL ILLNESS

*Overall, the etiological spectrum of ICU admission in PLWH is becoming near equivalent to what is observed in patients not living with HIV.*

- Therefore, for PLWH, work up and diagnostic processes should follow standard procedures and evidence-based guidelines.
- Full level of supportive care such as invasive mechanical ventilation, vasopressors, and renal replacement therapies now used equally in PLWH as in the general ICU patient population.
- There are no specific guidelines for management of PLWH in the ICU setting.

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# HIV MANAGEMENT DURING CRITICAL ILLNESS

- In general, the treatment of PLWH with critical illness should not differ from that of a person without HIV except where it concerns HIV-related diseases, drug-drug interactions, or potential drug toxicities.

- Expert opinions from consulting services such as infectious disease are important to guiding decision making with respect to initiating, continuing, or stopping ART while managing critical illness in PLWH.

- New initiation of ART by acute care/critical care clinicians is unlikely to occur without the aid of an HIV expert clinician, therefore the focus for these providers is understanding continuation of a regimen and its implications.

- Decisions are often collaboratively made on a case-by-case basis.

# HIV MANAGEMENT DURING CRITICAL ILLNESS

Several issues may arise that can complicate continuation of ART in the ICU such as:

- Drug-drug interactions between antiretroviral drugs and commonly used ICU medications
- Lack of enteral access or need to deliver drugs via nasogastric tube
- Ileus or impaired absorption
- Renal insufficiency and drug dosing concerns
- Hepatic insufficiency, shock liver, or concerns for hepatotoxicity
- Need to avoid use of proton-pump inhibitors and H2 antagonists (gastric acidity required for absorption of some ART)
- Ensuring a complete regimen

# HIV MANAGEMENT DURING CRITICAL ILLNESS

In patients previously on ART, continuation is recommended whenever possible while in the ICU but may require adaptation of dosing or regimen.

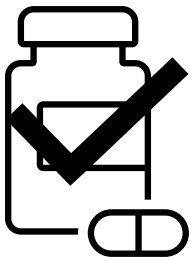
Holding a patient's ART therapy may be required in cases of severe drug-drug interaction, toxicities, ileus, lack of enteral access, or when only partial regimen is known. Short term interruptions should be less than 2 weeks.

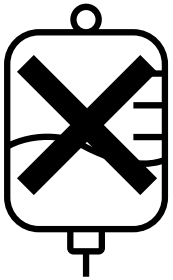
With presentation of acute HIV infection/HIV encephalitis in the ICU, immediate initiation of ART is recommended.

If not previously on ART but found HIV+ on admission for a non-HIV related diagnosis and CD4 > 200/uL, ART initiation is recommended to be delayed until after ICU discharge.

# HIV MANAGEMENT DURING CRITICAL ILLNESS

- Many ART drugs can be formulated as a liquid or come as crushable pills for enteral administration in ICU patients.
- There are virtually no intravenous options for administration of antiretroviral drugs for regular use in ICU patients.
  - Few exceptions exist for pregnant women with HIV during delivery and for use with a highly resistant virus.





# HIV MANAGEMENT DURING CRITICAL ILLNESS

- Common categories of drugs with significant drug-drug interactions with ART include:
  - Chemotherapeutics, antipsychotics, benzodiazepines, opioids, glucocorticoids, anticonvulsants, antiarrhythmics, and antibiotics
- Involvement of the clinical pharmacist along with early consultation of infectious disease/HIV expert is recommended.
  - Screen for drug-drug interactions
  - Guide alternative medications if home regimen cannot be utilized (e.g. cannot be crushed for NG tube administration)
  - Assist with hepatic and renal dosage adjustments when needed

**Great resources for detailed review of these concepts at clinicalinfo.hiv.gov**

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# HIV MANAGEMENT DURING CRITICAL ILLNESS

- Remember patients right to privacy with respect to new or known diagnoses of HIV.
- Unintentional disclosures of HIV can cause undue stress to patients and their loved ones.
- Use diligence regarding disclosure of HIV status.
- Recommend a unified team approach where all involved clinicians are knowledgeable as to whom the HIV diagnosis is known and what the patient's wishes are.
- In patients unable to express their wishes, check medical records for disclosure status and determine if a designated medical decision maker has been declared.
- Most U.S. states have specific laws regarding HIV disclosure. It is prudent for clinicians to be aware of those laws.

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# References

Please see the supplemental handout, which includes a bibliography and additional resources for more information.

Scan the QR Code to access the online bibliography!


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# Diagnosis and Management of HIV in High Acuity Settings

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