Treating Kids vs. Adults with HIV

Cara Gonzales, DDS, PhD

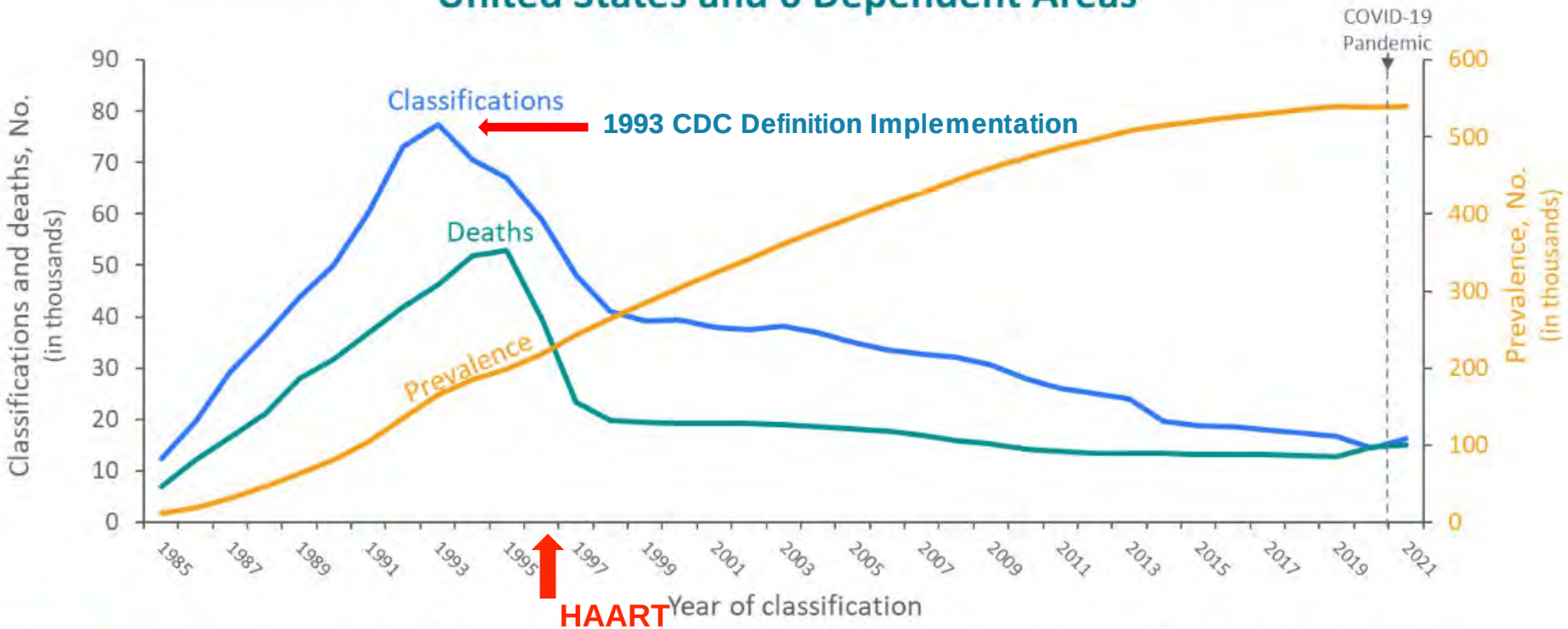
Associate Professor

Department of Comprehensive Dentistry

Phone: 567-3332

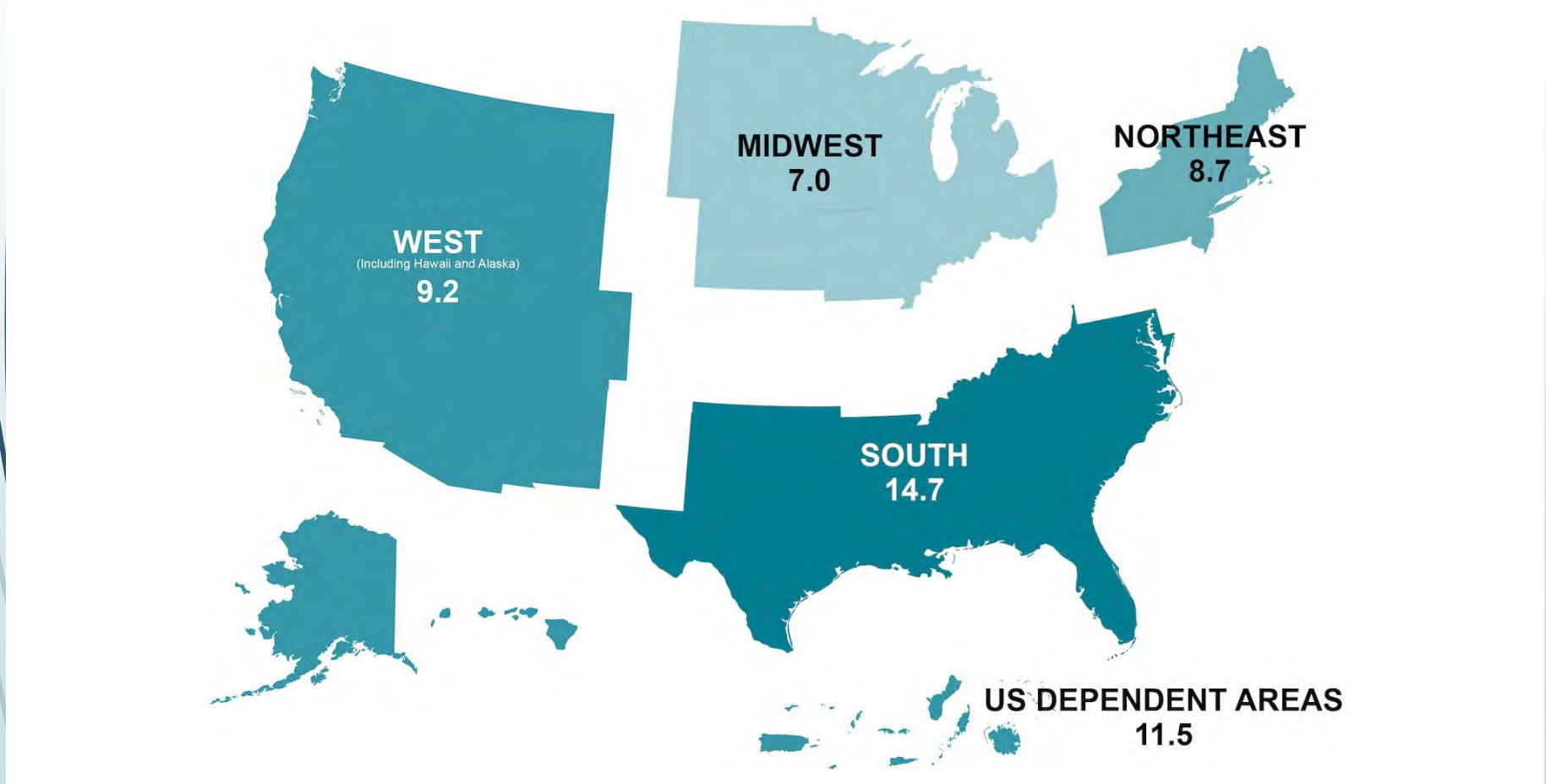
E-mail: gonzalesc5@UTHSCSA.EDU

Stage 3 (AIDS) Classifications, Deaths (Any Cause), and Persons Living with Diagnosed HIV Infection Ever Classified as Stage 3 (AIDS), 1985–2021 United States and 6 Dependent Areas



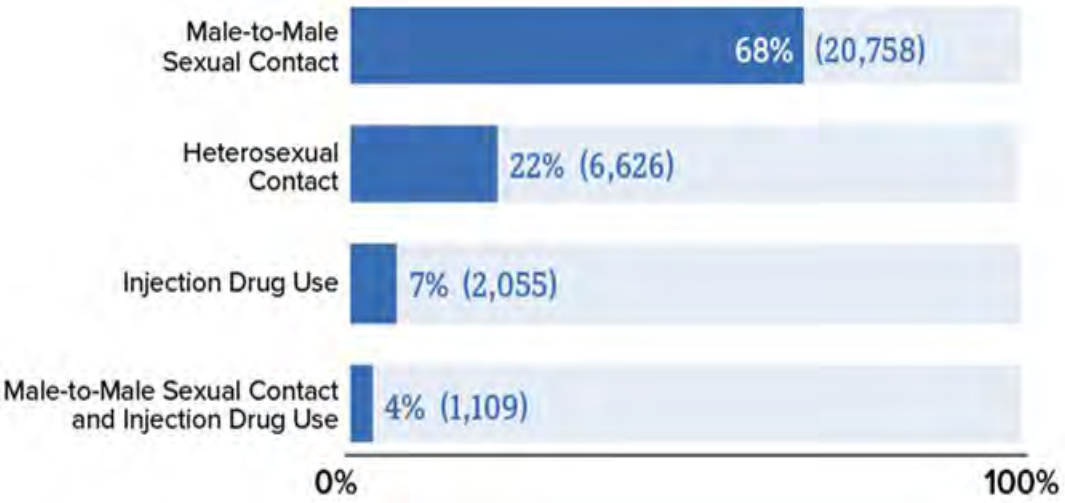
Note. Deaths of persons with HIV infection ever classified as stage 3 (AIDS) may be due to any cause. Data include persons of all ages. Data for the year 2021 are preliminary and based on deaths reported to CDC as of December 2022. Data for 2020 should be interpreted with caution due to the impact of the COVID-19 pandemic on access to HIV testing, care-related services, and case surveillance activities in state/local jurisdictions. Death data for years 2020 and 2021 should be interpreted with caution due to excess deaths in the United States population attributed to the COVID-19 pandemic. For additional information, see https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm.

New Diagnoses Vary across Regions in US



https://www.cdc.gov/hiv/statistics/overview/in-us/diagnoses.html

New HIV Diagnoses in the US and Dependent Areas by Transmission Category, 2020*



Data for 2020 should be interpreted with caution due to the impact of the COVID-19 pandemic on access to HIV testing, care-related services, and case surveillance activities in state and local jurisdictions.

NOTE: Does not include *other* and *perinatal* transmission categories.

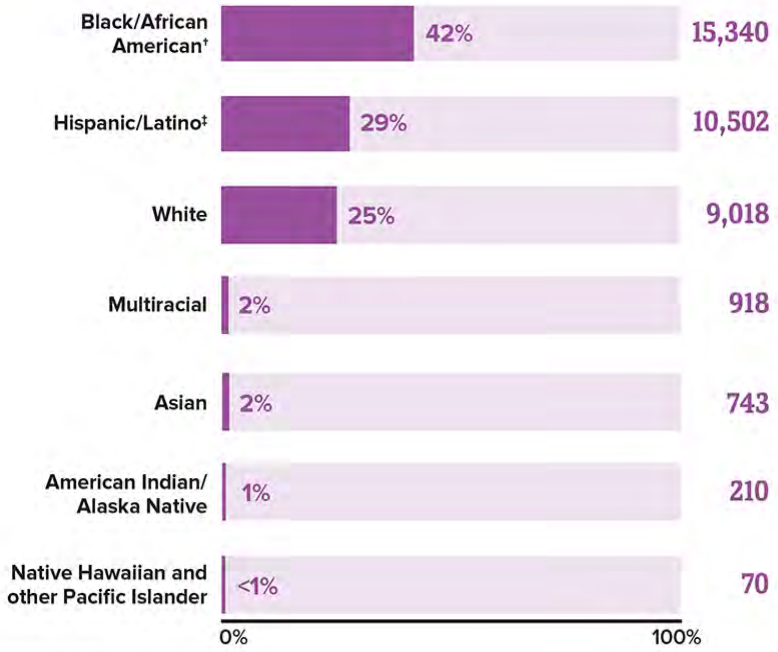
* Among people aged 13 and older.

Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2020. *HIV Surveillance Report* 2022;33.

https://www.cdc.gov/hiv/images/basics/statistics/infographics/cdc-hiv-statistics-diagnoses-category-1200x630.png

New HIV Diagnoses in the US and Dependent Areas by Race/Ethnicity, 2019*

Racial and ethnic differences in HIV diagnoses continue to exist.



* Among people aged 13 and older.

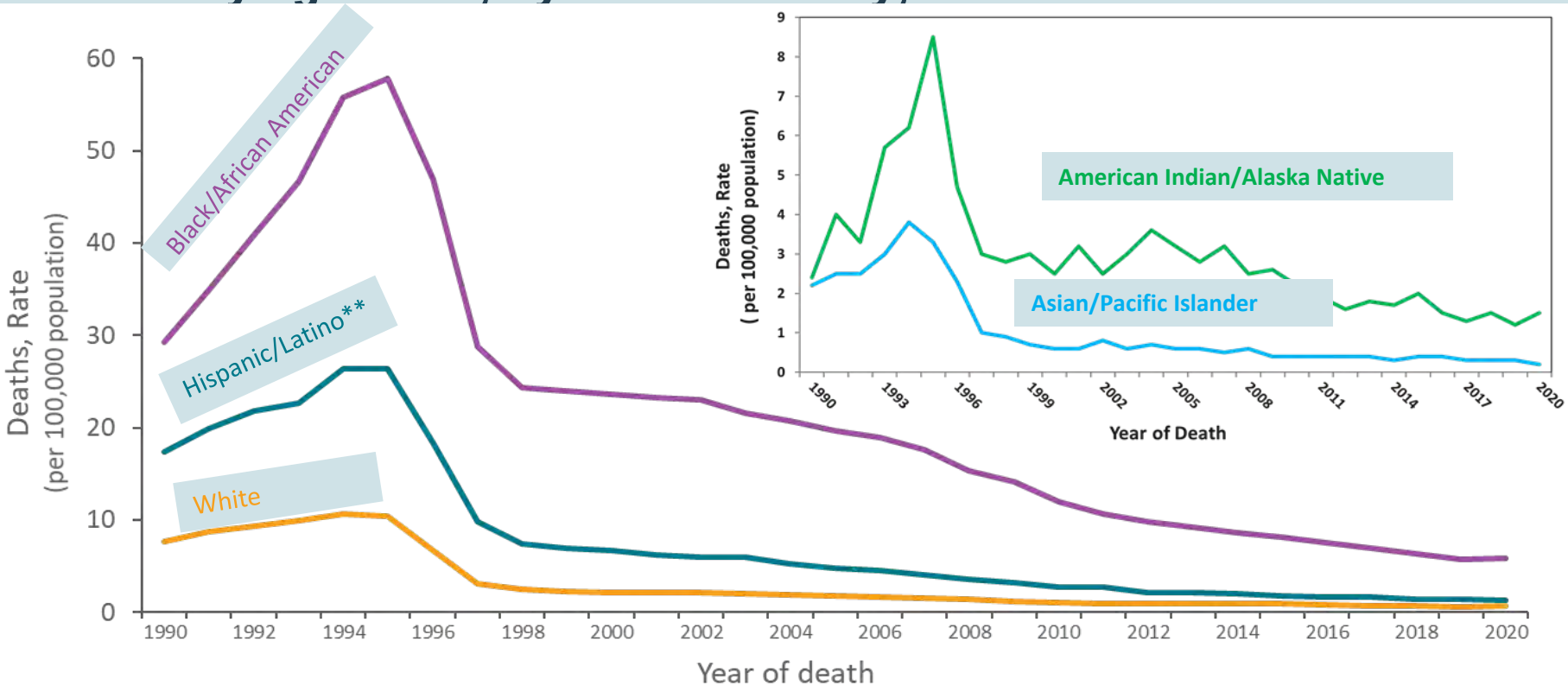
† *Black* refers to people having origins in any of the Black racial groups of Africa. *African American* is a term often used for people of African descent with ancestry in North America.
‡ Hispanic/Latino people can be of any race.

Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2019. *HIV Surveillance Report* 2021;32.

https://www.cdc.gov/hiv/images/group/other-races/infographics/cdc-hiv-new-diagnoses-by-race-infographic-1920x1080.png

HIV has become a chronic disease.

Trends in Age-Adjusted* Annual Rates of Death with HIV Disease as the Underlying Cause, by Race/Ethnicity, 1990–2020—United States



Note. For comparison with data for 1999 and later years, data for 1990–1998 were modified to account for *ICD-10* rules instead of *ICD-9* rules.

*Standard age distribution of 2000 US population.

**Hispanic/Latino persons can be of any race.

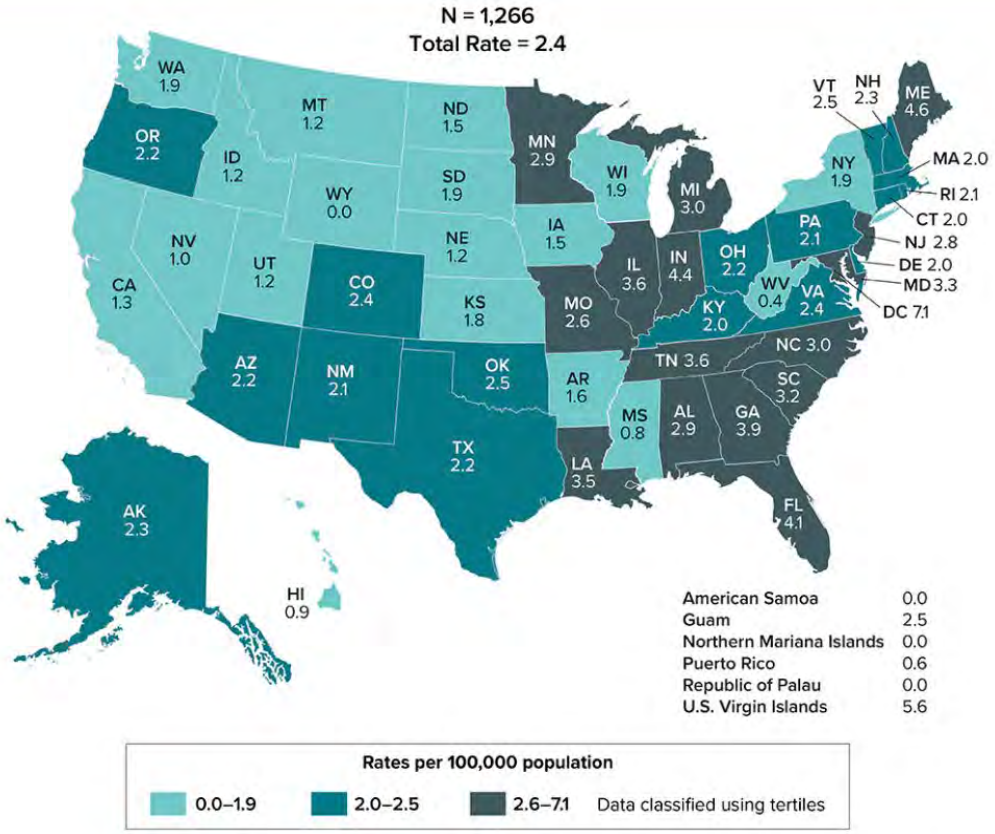
https://www.cdc.gov/hiv/library/slideSets/index.html

Background

- In 1999 the CDC estimated that there were 10,000 perinatally HIV-infected children living in the United States
- These infants acquired the virus in utero, at birth, or from their mothers' breast milk.
- In 2006, the 25% perinatal transmission rate was reduced to 8% with the implementation of anti-retroviral drugs given to the mother during pregnancy and to the child post-delivery.
- The rates of children living with HIV steadily declined due to a dramatic reduction of perinatally acquired HIV.
- In 2021 only 1,266 children (<13yo) living with HIV and AIDS in the US.

FIGURE 38

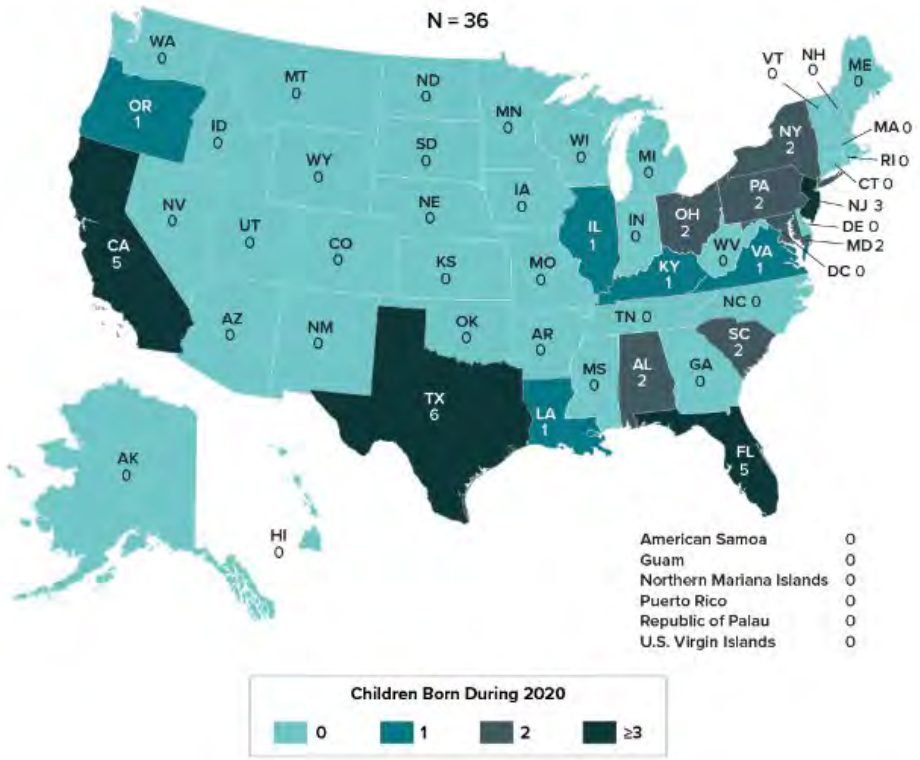
Rates of children aged <13 living with diagnosed HIV infection, year-end 2021—United States and 6 dependent areas



Note. Data for the year 2021 are preliminary and based on deaths reported to CDC as of December 2022. Data are based on address of residence as of December 2021 (i.e., most recent known address).

FIGURE 35

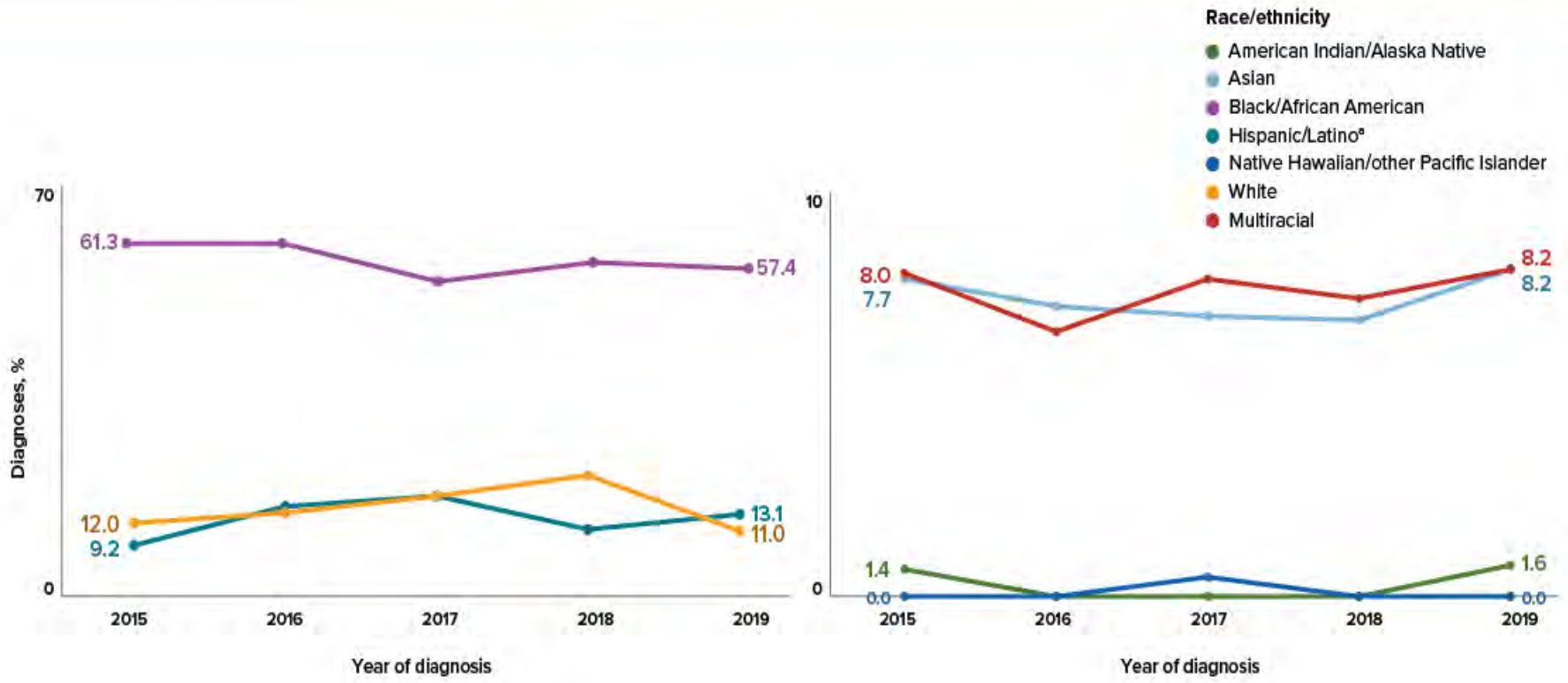
Diagnoses of perinatally acquired HIV infection among children born during 2020 (COVID-19 pandemic)—United States and 6 dependent areas



Note. Data for 2020 should be interpreted with caution due to the impact of the COVID-19 pandemic on access to HIV testing, care-related services, and case surveillance activities in state/local jurisdictions.

https://www.cdc.gov/hiv/images/library/reports/hiv-surveillance/vol-32/infographics/cdc-hiv-surveillance-vol32-infographic-31.png

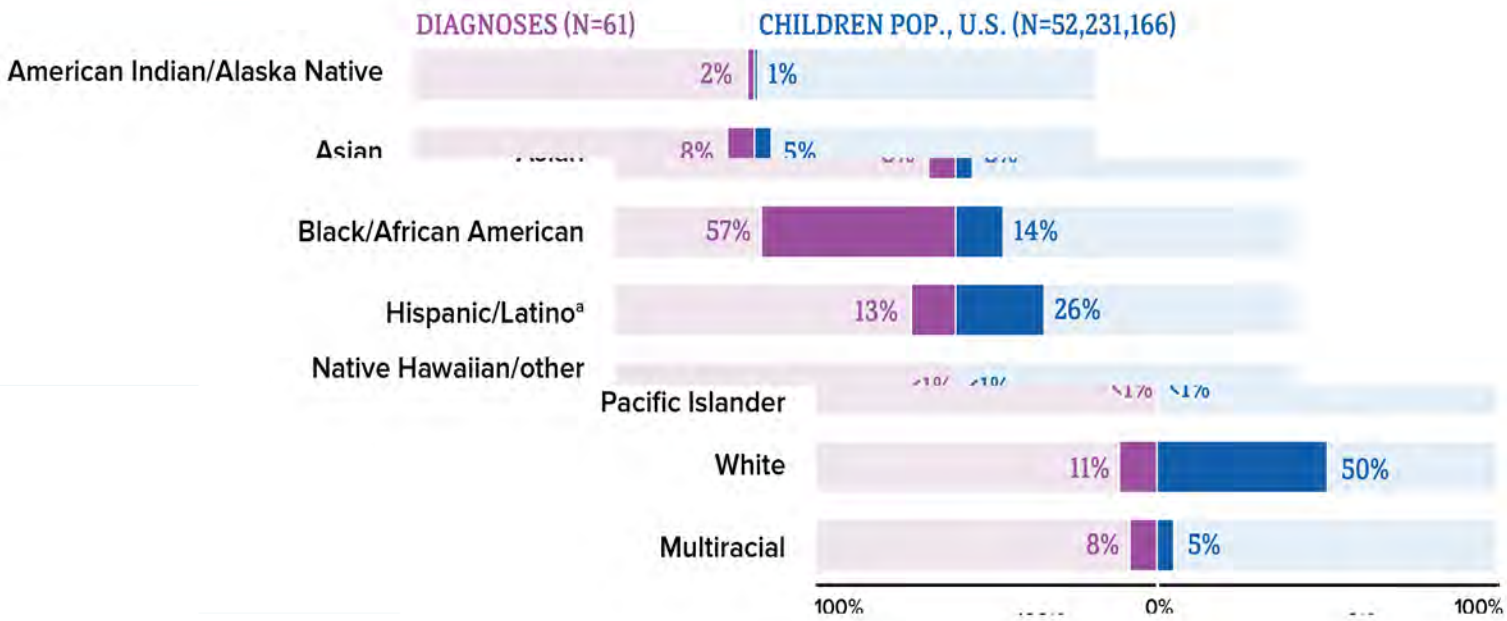
Figure 34. Percentages of Diagnoses of HIV Infection among Children, by Race/Ethnicity, 2015–2019—United States and 6 Dependent Areas



Note: See section D3 in the Technical Notes for more information on race/ethnicity.
[a]Hispanic/Latino persons can be of any race.

https://www.cdc.gov/hiv/images/library/reports/hiv-surveillance/vol-32/infographics/cdc-hiv-surveillance-vol32-infographic-34.png

Figure 35. Percentages of Diagnoses of HIV Infection and Population among Children, by Race/Ethnicity, 2019—United States



Note: See section D3 in the Technical Notes for more information on race/ethnicity.
[a]Hispanic/Latino persons can be of any race.

https://www.cdc.gov/hiv/images/library/reports/hiv-surveillance/vol-32/infographics/cdc-hiv-surveillance-vol32-infographic-35.png

HIV Infection Stage 0, 1, 2, 3

- Used to diagnose based on the CD4+ T cell count and clinical status. Cannot determine Stage 0 cases.
- Now test with RT-PCR for HIV RNA (or DNA) and/or antibody/antigen tests. Enable identification of Stage 0.
- Patients with early infections (acute primary infections) have no antibodies developed and thus will test negative for antibodies early in the disease process.
- Alternatively, newborns may test positive for antibodies from the mother and then later test negative for antibodies.
- Now diagnosis require positive HIV laboratory test (test for virus by RT-PCR of viral RNA) for CDC surveillance purposes.
- Thus, a negative Ab test and positive HIV viral test allow identification of early disease (Stage 0) when viral load is high and enables early intervention.

HIV Infection Stage 0, 1, 2, 3

- **Stage 0** is within the first six months of infection. Know this to be true if an HIV antibody test was performed (and negative) and then within 6 months of the definitive positive HIV test.
- After 6 months the patient will have antibodies and **stage 1 and 2** is then determined by CD4 T-lymphocyte counts (adults)/**percentages (kids).**
- If the patient has an "AIDS Defining Condition" (see list) then they are **stage 3** (AIDS) regardless of the CD4+ T cell count.

https://www.cdc.gov/hiv/statistics/surveillance/terms.html#:~:text=If%20there%20was%20a%20negative,diagnosed%2C%20the%20stage%20is%203.

AIDS Defining Conditions Adults

Candidiasis of bronchi, trachea, or lungs
Candidiasis of esophagus, may be diagnosed presumptively
Cervical cancer, invasive, in those aged 13 or older
Coccidioidomycosis, disseminated or extrapulmonary
Cryptococcosis, extrapulmonary
Cryptosporidiosis, chronic intestinal for more than 1 month
Cytomegalovirus disease, other than liver, spleen, or nodes, onset after one month of life
Cytomegalovirus retinitis (with loss of vision), may be diagnosed presumptively
Encephalopathy, HIV related
Herpes simplex: chronic ulcers for more than 1 month or bronchitis, pneumonitis, or oesophagitis with onset after 1 month of life
Histoplasmosis, disseminated or extrapulmonary
Isosporiasis, chronic intestinal for more than 1 month
Kaposi's sarcoma, may be diagnosed presumptively
Lymphoid interstitial pneumonia or pulmonary lymphoid hyperplasia complex,
Lymphoma, Burkitt (or equivalent term)
Lymphoma, immunoblastic (or equivalent term)
Lymphoma, primary, of brain
***Mycobacterium avium* complex or *Mycobacterium kansasii*, disseminated or extrapulmonary, may be diagnosed presumptively**
***Mycobacterium tuberculosis* of any site (pulmonary, disseminated, or extrapulmonary) in those aged 13 years or older, may be diagnosed presumptively**
***Mycobacterium*, other species or unidentified species, disseminated or extrapulmonary, may be diagnosed presumptively**
***Pneumocystis jirovecii* pneumonia, may be diagnosed presumptively**
Pneumonia, recurrent, only in those aged 13 years or older; may be diagnosed presumptively
Progressive multifocal leukoencephalopathy
***Salmonella* septicemia, recurrent**
Toxoplasmosis of brain, onset after 1 month of life, may be diagnosed presumptively
Wasting syndrome attributed to HIV

*** AIDS-defining condition *only in persons under 6 years of age*:**
Bacterial infections, multiple or recurrent

Surveillance Case Definitions

- **Stage 0: based on a sequence of negative and positive test results during early HIV infection.**
- **Stages 1 and 2: based on CD4+ T-cell percentage in children.**
- **Stage 3 is based on T-lymphocyte percentage/count or an AIDS-defining conditions.**
- **Ages ≥ 6 same as adult.**

CD4 counts are much higher for children than adults. A new-born baby for example can have a CD4 count that is 2-3,000 cells/mm^3.

Because of this, children are monitored using CD4 percentage (CD4%). This is the percentage of white blood cells (lymphocytes) that are CD4 cells. The CD4% of an HIV-negative person is around 40%.

HIV disease category	CD4%	CD4 0-12 months old	CD4 1-5 years old	CD4 6-12 years old
Category 1 – no damage	25% or over	over 1,500	over 1,000	over 500
Category 2 – moderate	15-24%	750-1,500	500-1,000	200-500
Category 3 – severe	less than 15%	less than 750	less than 500	less than 200

https://i-base.info/cd4-count-and-equivalent-cd4-for-babies-and-children/#:~:text=CD4%20counts%20are%20much%20higher,lymphocytes)%20that%20are%20CD4%20cells.

Assessment of CD4+ T-Lymphocyte %

HIV Infection Stage	CD4+ T-lymphocyte count (%total)		
	< 12 mo	1-5 yr	> 6
Stage 1	>1,500 (≥34%)	>1,000 (≥30%)	>500 (≥26%)
No AIDS-defining condition			
** Stage 2	750-1,499(26-33%)	500-999(12-29%)	200-499(14-25%)
No AIDS-defining condition			
** Stage 3 (AIDS)	<750 (<26%)	<500 (<22%)	<200 (<15%)

AIDS defining condition or CD4 < 15%.

**Antibiotic Prophylaxis necessary prior to dental treatment due to risk of opportunistic infections.

- You need to know if their CD4+ T-lymphocyte count has **EVER** dropped below 15% or 200 (children ≥ 6 yo and adults).
- The CD4+ T-lymphocyte count may not be at a suppressed level today, but if it has ever dropped below 15% or 200 then the patient is **ALWAYS** diagnosed as having AIDS and will **ALWAYS** require antibiotic prophylaxis with dental treatment.

Antibiotic Prophylaxis

Single Dose 30'-1 Hour Before Treatment:

- **Amoxicillin: Oral**
  - Adults 2g
  - Children 50mg/kg
- **Ampicillin: IM or IV**
  - Adults 2g
  - Children 50mg/kg
- **Cefazolin or Ceftriaxone: IM or IV**
  - Adults 1g
  - Children 50mg/kg

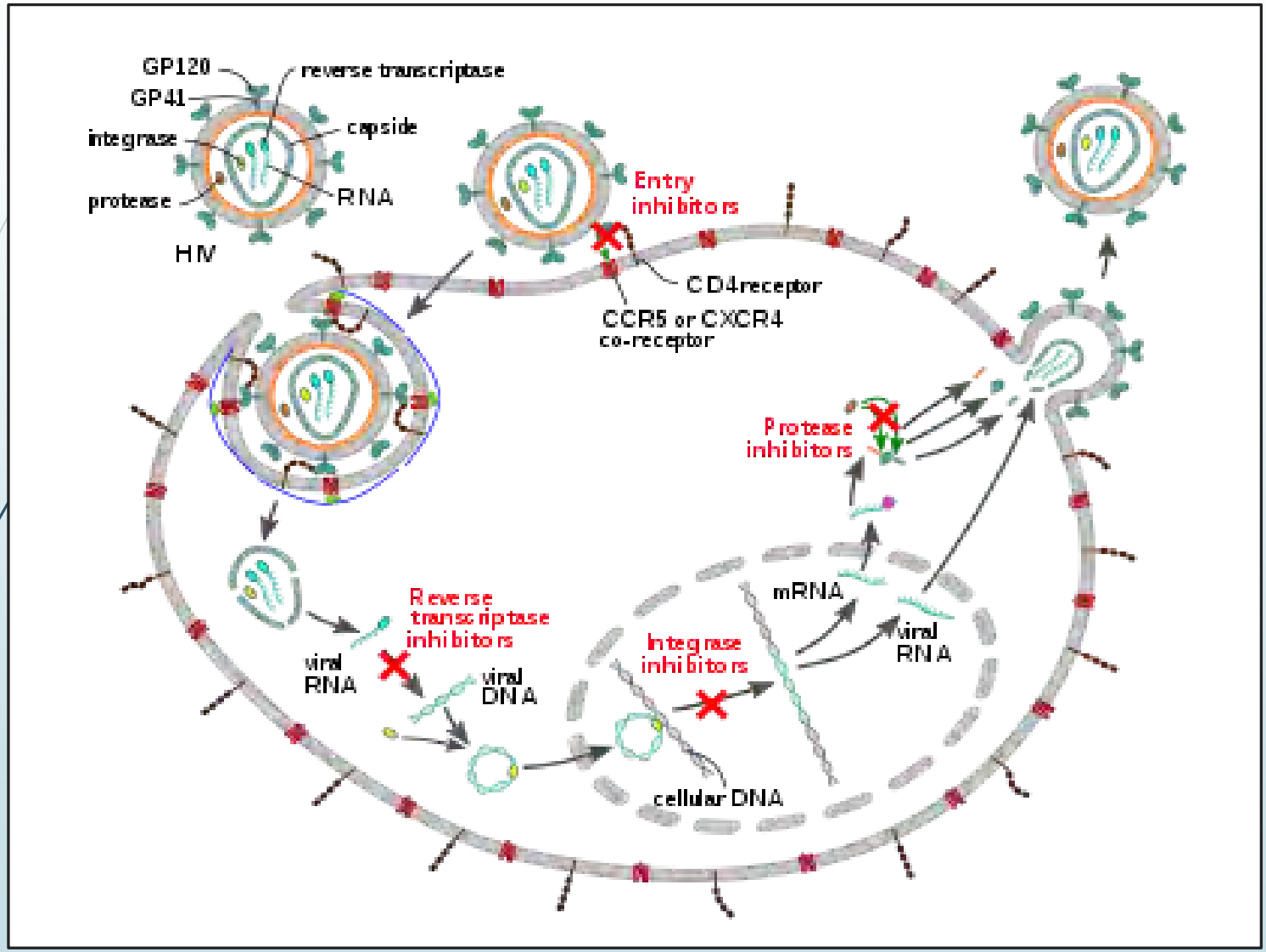
Allergic to Penicillins or Amplicillin:

- **Cephalexin: Oral**
  - Adults 2g
  - Children 50mg/kg
- **Azithromycin: Oral**
  - Adults 500mg
  - Children 15mg/kg
- **Clarithromycin: Oral**
  - Adults 500mg
  - Children 15mg/kg

HIV Viral Load

- **Determined by RT-PCR**: Viral load enables you to monitor disease progression in adults.
- Children <13
  - No normal values defined for viral load
- Adults and children > 13
  - < 400 Viral load count is considered undetectable
  - Virus is still present, just not at a detectable range.

HIV Life Cycle

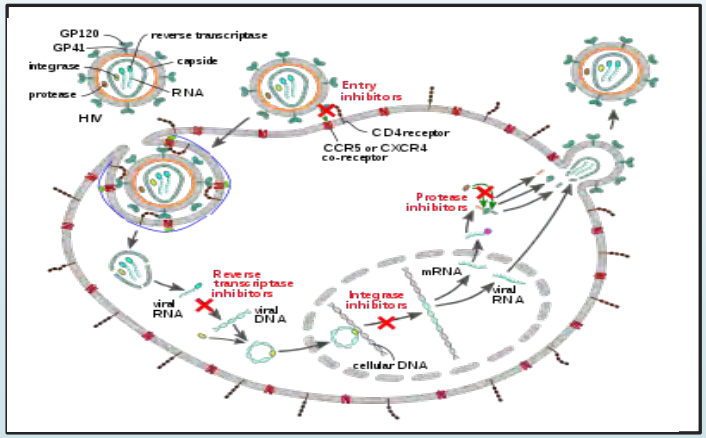


Interactions and Side Effects of HAART

- Ten classes of anti-retroviral drugs aimed at halting HIV replication at various stages of the life cycle.
  - Nucleoside reverse transcriptase inhibitors (NRTIs)
  - Nucleotide reverse transcriptase inhibitors (NtRTIs)

  } Cannot form Proper Bonds thus Halt DNA synthesis

  - Non-nucleoside reverse transcriptase inhibitors (NNRTIs): inhibit HIV reverse transcriptase activity
  - Protease Inhibitors (PI)
  - Fusion Inhibitors
  - Integrase Inhibitors
  - Capsid Inhibitors
  - Attachment Inhibitors
  - Post-Attachment Inhibitors
  - Entry Inhibitor (CCR5 Antagonists)
  - Pharmacokinetic Enhancers



- 46 FDA approved anti-retroviral drugs on the market.
- Patients will be on a regimen that combines 2 or more of these drugs.

Drug-Drug Interactions

- The Protease Inhibitor, Ritonavir (Norvir), is a potent inhibitor of the cytochrome P-450 isoform 3A4 (CYP3A4) enzymatic pathway.
- Midazolam and triazolam are metabolized by CYP3A4.
- Concomitant administration of **midazolam** or **triazolam** with **ritonavir** results in reduced clearance of these sedatives thereby increasing their sedative affect and potentially causing respiratory depression and is **strictly contra-indicated.**
- Ritonavir may be prescribed alone, or in combination with lopinavir in the drug called Kaletra.
- **Demerol** is contra-indicated for patients taking **protease inhibitors** and should not be used at all (metabolized by three CYPS; 2B, 3A4, & 2C19.2).
- Increased plasma concentrations of Demerol (meperidine) active metabolite normeperidine and respiratory depression.
- **Diazepam** is recommended for stress management of HIV-infected patients; metabolized by CYP2C19.

Dooley *et al.*, 2008

Drug-Drug Interactions

- Azole antifungal drugs are competitive inhibitors of the CYP3A4 pathway.
- Ketoconazole is the most potent inhibitor followed by itraconazole and, lastly, fluconazole.
- Ketoconazole is also shown to have significant interactions with NNRTIs; accordingly, **co-administration of ketoconazole with NNRTIs is not advised.**
- Ketoconazole can also increase protease inhibitor concentrations by 30%-130% and lead to increased ketoconazole levels as well.
- **Fluconazole** should be prescribed for treatment for oral candidiasis in patients on anti-retroviral therapy.
- **Nystatin** troches may also be prescribed as they are not metabolized by the liver.

Dooley *et al.*, 2008

Side Effects of HAART

- Protease Inhibitors are toxic to the liver; especially with HBV or HCV co-infections.
  - Liver function tests: Within the last 3 months.
    - Alanine aminotransferase (ALT)
    - Aspartate aminotransferase (AST)
    - Alkaline phosphatase (ALP)
    - Bilirubin; hyperbilirubinemia is mild and not indicative of hepatic injury (even in jaundice patients).
  - Increases ALT, AST, and ALP due to liver toxicity require antibiotic prophylaxis prior to dental work.

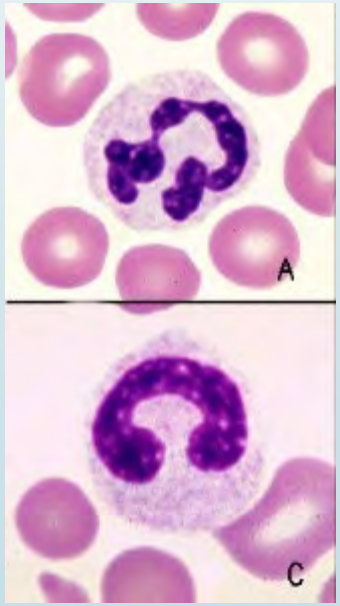
Side Effects of HAART

- HIV medications and advanced disease can induce neutropenia and place patients at increased risk for infections.

- CBC with differential: WBC, RBC, Platelets
  - Absolute Neutrophil Count (ANC) from the WBC

- The WBC consists of the following (differential):
  - Lymphocytes: 20-40%
  - Neutrophils: 50-60%
  - Basophils: 0.5-2%
  - Eosinophils: 1-4%
  - Monocytes: 2-9% (average: 4%).

- ANC = Total WBC x (% "Segs" + % "Bands")
  - Segs: Mature neutrophils (segmented; panel A)
  - Bands: Immature neutrophils (no segments; panel C)
  - ANC determines risk for infection



Absolute Neutrophil Count (ANC)

- **ANC Values:**
  - **Normal** value: ≥ 1500 cells/mm^3
  - **Mild** neutropenia: ≥1000 - <1500 cells/mm^3: low risk of infection
  - **Moderate** neutropenia: ≥500 - <1000 cells/mm^3: mod. risk of infection
  - **Severe** neutropenia: < 500 cells/mm^3: severe risk of infection

- **Supportive Measures for Neutropenia:**
  - > 2000/mm^3 **No antibiotic prophylaxis** needed
  - 1000-2000/mm^3 **Antibiotic Prophylaxis**
  - <1000/mm^3 IV Timentin or Zosyn 30' before surgery and Amikacin 1 hour before surgery

Side Effects of HAART

- **HIV medications can also induce thrombocytopenia and idiopathic thrombocytopenic purpura.**
  - **CBC (WBC, RBC and Platelets)**
    - **Platelet count >75,000/mm^3 : No support needed**
    - **40,0000-70,000/mm^3 : Manage with local hemostasis measures including pressure, topical thrombin, microfibrillar collagen, primary closure etc.**
    - **<40,000/mm^3 : Transfuse platelets 1 hour before procedure. Goal is to raise count >50,000/mm^3. 1 unit of platelets will raise count by an average of 10,000/mm^3.**

Adverse Systemic Effects of HIV Medications

- **Hyperglycemia**
  - Monitor sugar levels
- **Dyslipidemia associated with metabolic syndrome**
  - *Abdominal obesity (lipodystrophy)
  - *Insulin resistance or glucose intolerance (the body can't properly use insulin or blood sugar)
  - Peripheral subcutaneous fat atrophy
  - Atherogenic dyslipidemia (blood fat disorders — high triglycerides, low HDL cholesterol and high LDL cholesterol — that foster plaque buildups in artery walls)
  - Elevated blood pressure
  - Prothrombotic state (e.g., high fibrinogen or plasminogen activator inhibitor–1 in the blood)
  - Proinflammatory state (e.g., elevated C-reactive protein in the blood)

Tests to Order

- CD4+ T-lymphocyte count or percentage
  - Current (within the last **3 months**)
- HIV Viral Load (within the last **3 months**)
- Liver Function Test (within the last **3 months**)
- CBC with Differential
  - ANC
  - Platelet

Common Oral Manifestations of HIV in Children

- **Oral Candidiasis**
  - Pseudomembranous
  - Erythematous
  - Angular Cheilitis
- **Herpes Simplex Virus**
- **Linear Gingival Erythema**
- **Parotid Enlargement**
- **Recurrent Aphthous Ulcers**
  - Minor (3-10mm)
  - Major (>10mm)
  - Herpetiform (numerous 1-3mm)

amos-Gomez *et al* and the Collaborative Workgroup on the Oral Manifestations of Pediatric HIV Infection ,1999.

Less Common Oral Manifestions of HIV in Children

- Necrotizing Ulcerative Periodontitis (NUP)
- Xerostomia
- Human Papilloma Virus Associated Warts
- Varicella Zoster

Ramos-Gomez *et al* and the Collaborative Workgroup on the Oral Manifestations of Pediatric HIV Infection ,1999.

Rare Oral Manifestations in HIV-Infected Children but Common in HIV-Infected Adults

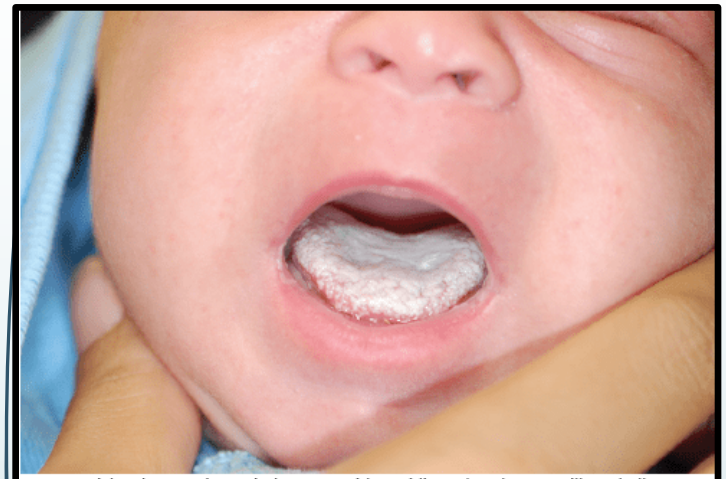
- Oral Hairy Leukoplakia
- Kaposi Sarcoma

Ramos-Gomez *et al* and the Collaborative Workgroup on the Oral Manifestations of Pediatric HIV Infection ,1999.

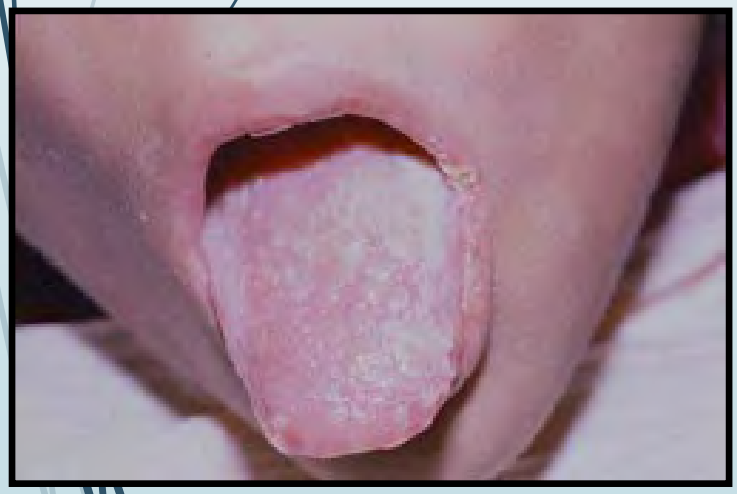
Common Oral Manifestations of HIV in Children

- Candidiasis
- Parotid Enlargement
- Angular Cheilitis
- Recurrent Aphthous Ulcers
- Herpes Simplex Virus
- Linear Gingival Erythema

Candidiasis



Source: Richard P. Usatine, Mindy Ann Smith, Heidi S. Chumley, Camille Sabella, E.J. Mayeaux, Jr., Elumalai Appachi: *The Color Atlas of Pediatrics*: www.accesspediatrics.com



The most common oral lesion in children with HIV.

Affects up to 72% of HIV-infected children.

Prevalence is not statistically proportional to CD4+ values as seen in adults.

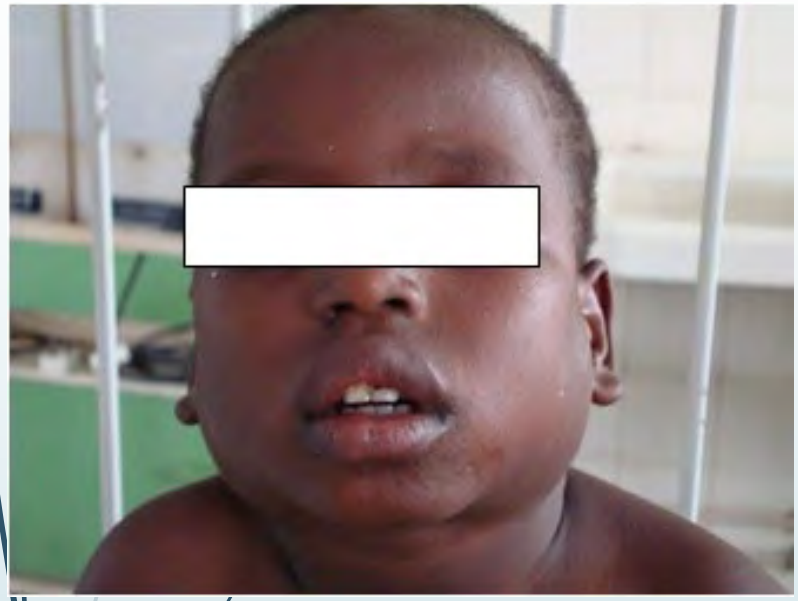
Candidiasis infection is associated with disease progression and a more rapid rate of progression to death.

Median time to death following diagnosis is 3.4 years.

Treatment:

- **Topical** applications of Nystatin or Clotrimazole initially.
- **Systemic** Ketoconazole or **Fluconazole** is recommended for children with >2 episodes or a history of esophageal candida.

Parotid Enlargement



Affects 1-10%of HIV-infected children.

Non-tender bilateral parotid enlargement is a “soft” indicator of HIV in children.

Occurs late in the course of the disease (Stage 2). Correlates with a slower progression of the disease with a median time to death of 5.4 years (Ramos-Gomez *et al.*, 1999).

Almost always noted bilaterally but may be unilateral.

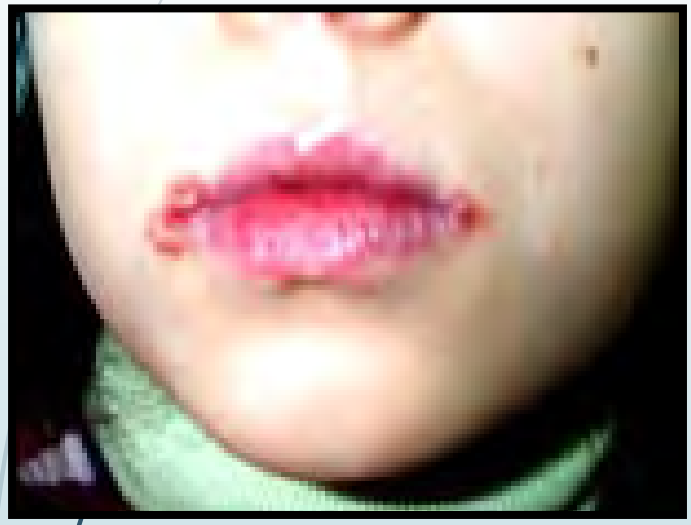
Associated with lymphoid interstitial pneumonitis: Rare lung disease with lymphocytes infiltrate lung causing inflammation and fibrosis.

Due to active replication of the virus within the parotid gland, and **most** likely represent forms of lymphoid hyperplasia.

Treatment:

- Usually left untreated and improves with HAART. Rarely, anti-inflammatory agents, analgesics, antibiotics or steroids may be prescribed.

Angular Cheilitis



Represents a candida infection at the corners of the mouth. Often concurrent with intra-oral candidiasis..

Linear red or ulcerated fissures radiating from the corners of the mouth.

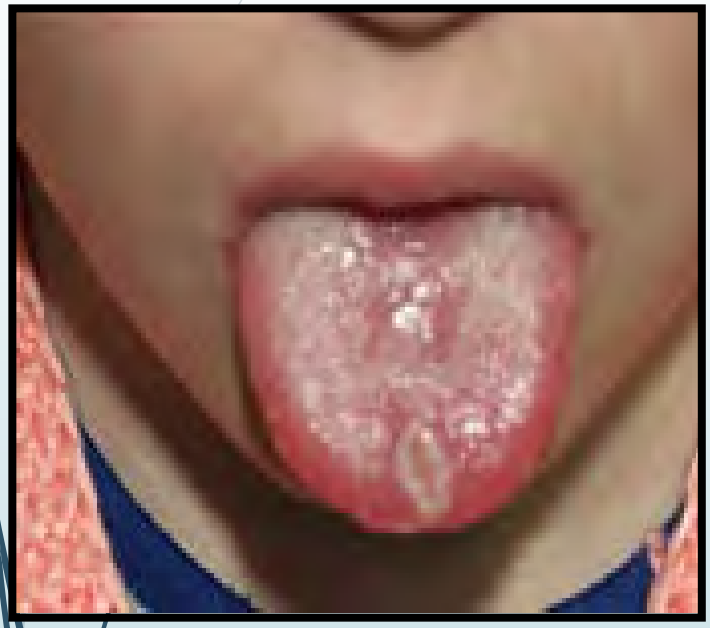
Lesions tend to be bilateral with multiple red papules when the adjacent peri-oral skin is affected.

Slow to heal and may have staphylococcal or streptococcal co-infection.

Treatment:

- Same as for Candidiasis.

Recurrent Aphthous Ulcers



Occur in 2-6% of HIV-infected population and are more common in HIV-infected children.

Several clinical forms including major, minor, herpetiform.

Minor < 5 mm and covered with pseudomembrane (may be mistaken for candidiasis, however, unlike candidiasis, aphthous ulcers will respond to steroid therapy).

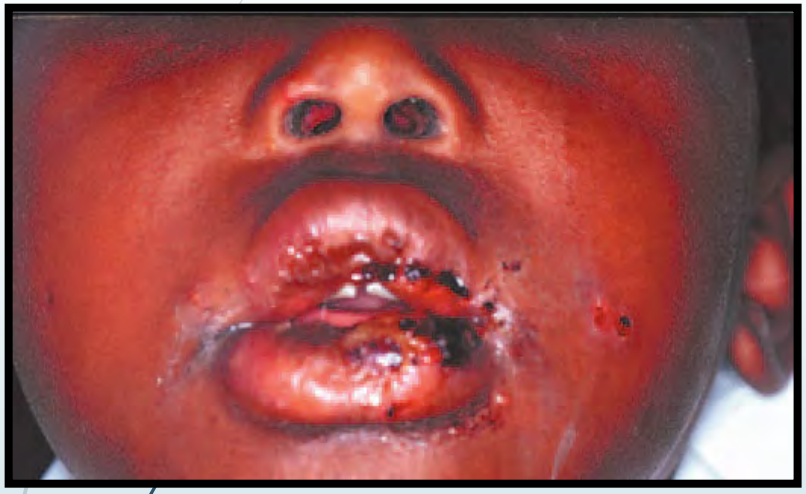
Major are much larger up to 2 cm and persist for weeks.

Herpetiform appear as clusters of tiny recurrent apthous ulcers. Tend to occur on the soft palate, buccal mucosa, tonsillar arches, and tongue.

Treatment:

- Topical steroids are the first choice (Fluocinonide ointment). Swishing with Benadryl mixed with Kaopectate relieves pain and burning. Reinforcement of good oral hygiene.

Herpes Simplex Virus



Common in HIV-infected children affecting up to 24%.

Typically presents as intra-oral and peri-oral lesions on the gingiva, hard palate, and vermilion border of the lips.

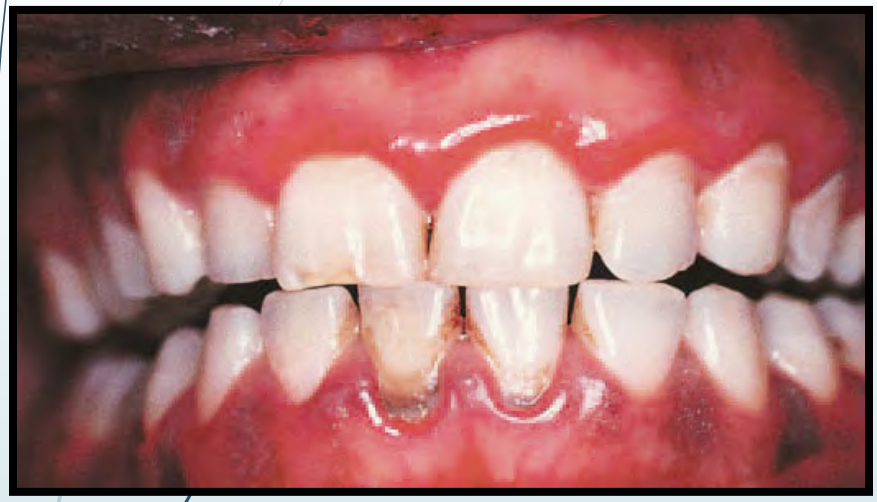
Initially, presents as vesicles that later rupture and develop crust formations.

HIV-infected children tend to have severe lesions that may require hospitalization.

Treatment:

- Systemic antiviral drugs such as acyclovir.
- Chronic lesions should be biopsied to rule out co-infections such as CMV.

Linear Gingival Erythema



The most common form of HIV associated periodontal disease in HIV-infected children.

Prevalence varies form 0-48%.

The most accepted theory regarding the etiology is that it is due to a “unique form” of candidiasis (Allen *et al.,* 2002).

1-3 mm band of marginal gingival erythema often with petechiae.

The erythema often persists following simple dental prophylaxis.

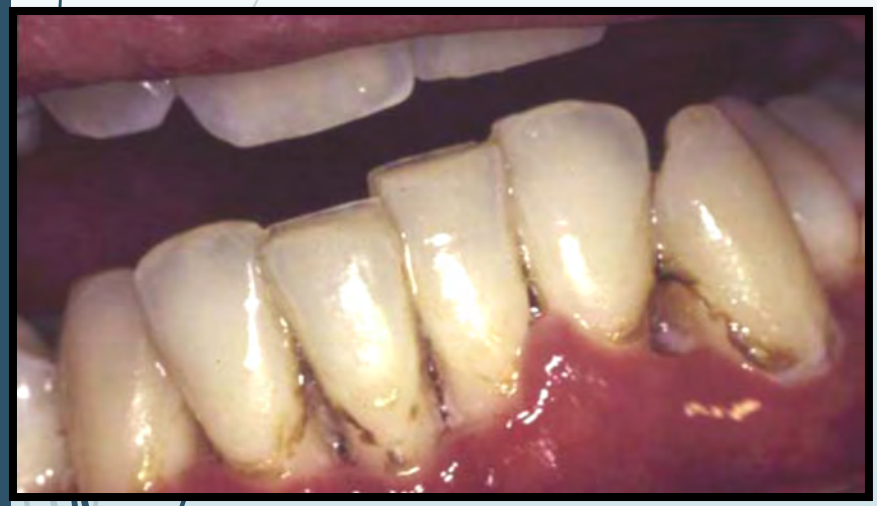
Treatment:

- Periodontal debridement, chlorhexidine mouth rinse twice a day for 2 weeks, and improved home oral hygiene. Antifungal regimens may be considered.

Less Common Oral Manifestions of HIV in Children

- Necrotizing Ulcerative Periodontitis (NUP)
- Xerostomia
- Human Papilloma Virus Associated Warts
- Varicella Zoster

Necrotizing Ulcerative Periodontitis (NUP)



More common in adults than in children.

Severe soft-tissue necrosis, destruction of the periodontal attachment and bone over a short period of time.

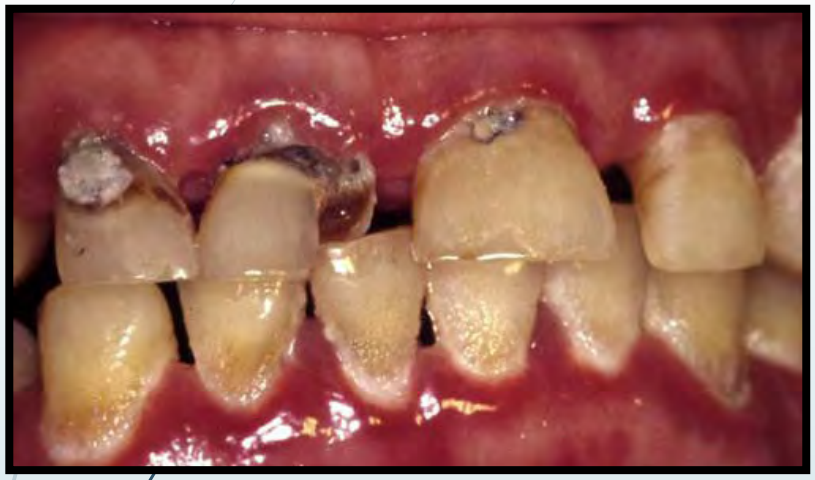
Necrotizing ulcerative gingivitis (NUG) is similar to NUP and is characterized by destruction of one or more inter-dental papilla with necrosis and ulceration that is limited to gingival margin.

Necrotizing stomatitis is the severe form of the same disease. Affects tongue, palate and cheeks as well.

Treatment:

- Good oral hygiene, routine prophylaxis, and regular chlorhexidine rinses. HIV-infected children may also be prescribed Augmentin, and/or Metronidazole.

Xerostomia/Caries



Xerostomia is more common in HIV infected children than in adults.

Approximately 30% of HIV-infected individuals experience xerostomia associated with the medications.

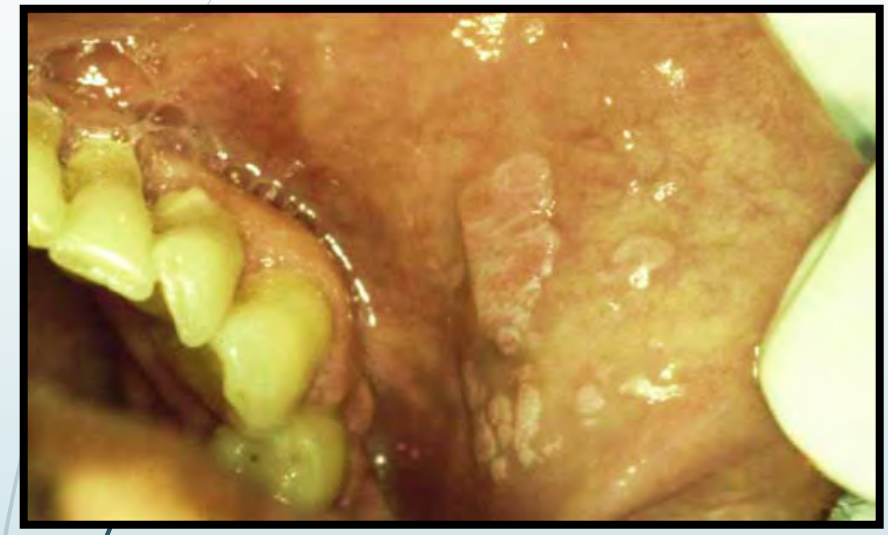
Xerostomia is a major contributing factor in the high caries risk for HIV-infected patients.

It also contributes to oral candidiasis, mucosal injury and dysphagia.

Treatment:

- Good oral hygiene, regular maintenance exams, and regular application of fluoride.
- Pilocarpine treatment may be effective, but must be managed in collaboration with the patient's pediatrician (Ramos-Gomez *et al*., 1999).
- The patient should also be monitored for candidiasis infection.

Human Papilloma Virus (HPV) Associated Warts



Appear cauliflower-like, spiked or raised with irregular, flesh colored lesion.

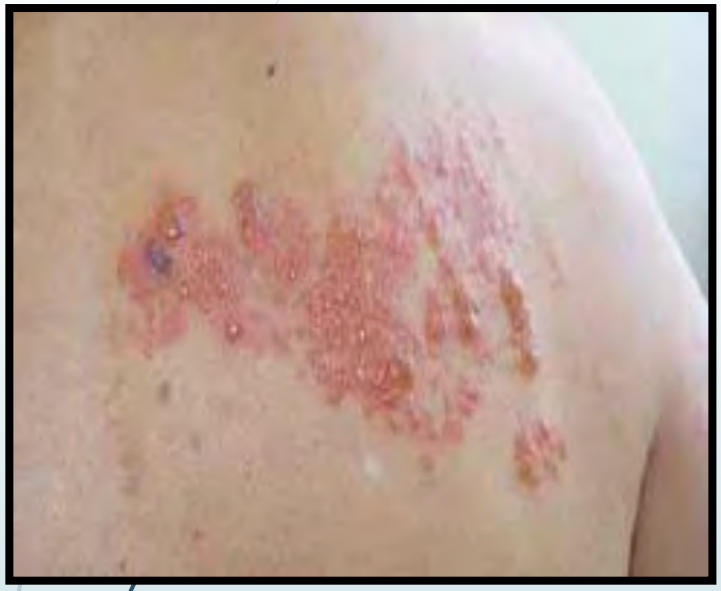
The lesions are more prevalent in adults than in children.

Children with HPV may develop verruca vulgaris, widespread flat warts and condylomata acuminate.

Treatment:

- Surgery, laser surgery or cryotherapy.

Varicella Zoster



Primary infections with Varicella Zoster (VZ) virus causes chickenpox.

Herpes Zoster (HZ) are recurrent VZ and occur more frequently in older adults.

HIV-infected children are at a much higher risk for VZ and HZ.

Primary VZ presents as a rash involving the head, neck and trunk (this distribution of the lesions aids in diagnosis of VZ).

Rash is vesicular, pustular, then ulcerated.

> 50% reduction of VZ in HIV-infected children is noted since the implementation of HAART.

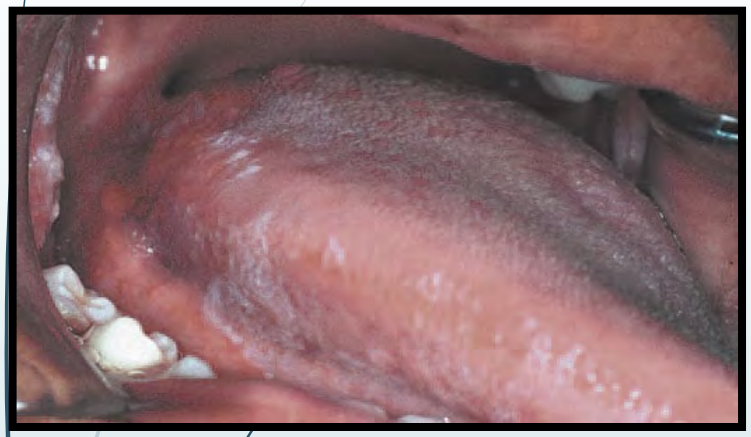
Treatment:

- Studies show that HAART and immunization against VZ is efficient in preventing primary and recurrent VZ and HZ in HIV-infected kids (Wood *et al,* 2008).

Rare Oral Manifestations in HIV-Infected Children but Common in HIV-Infected Adults

- **Oral Hairy Leukoplakia**
- **Kaposi Sarcoma**

Oral Hairy Leukoplakia



Present as white, non-removable lesions found bilaterally on the lateral borders of the tongue and are rarely found on the buccal mucosa.

Caused by the Epstein-Barr virus.

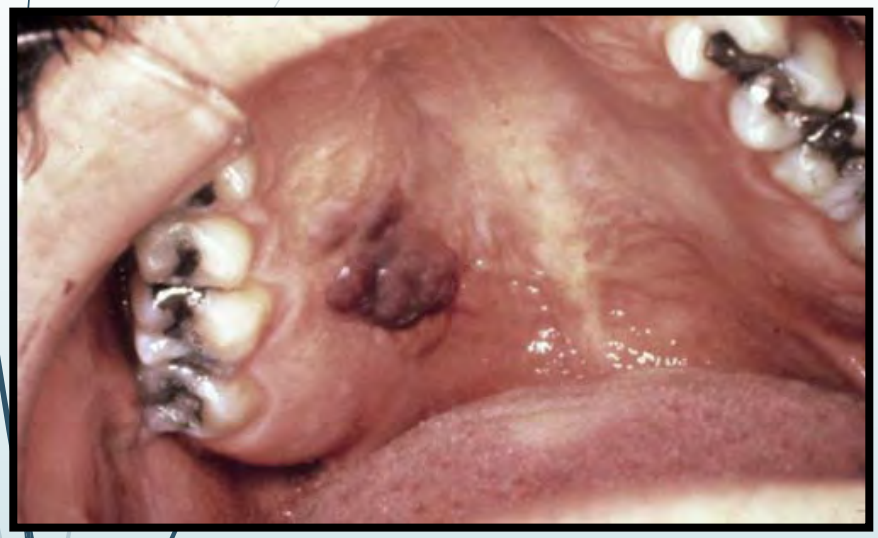
Often asymptomatic, therefore treatment may be considered elective.

Lesions do not respond to anti-fungal therapy.

Treatment:

- Acyclovir therapy in adults but tend to recur when treatment is discontinued.
- Only local treatments are recommended for HIV-infected children.
- These include 1-2 applications of Podophyllin resin (25%) to the affected areas (careful, carcinogenic and numerous adverse effects).
- Applications should be done 1 week apart.
- Application of retinoic Acid (Tretinoin) or surgical excision are other options.

Kaposi Sarcoma



HIV Associated neoplasms are found in less than 2% of HIV-infected symptomatic children.

Kaposi's sarcoma (KS) is the most common intra-oral malignancy associated with HIV infection.

KS may be caused by a human's herpes virus (HHV8).

Found mostly on heavily keratinized tissue (> 90% of reported cases found on the palate) and may appear as a red-purple macule, an ulcer, or as a nodule or mass.

Treatment:

- There is no cure for KS.
- Small lesions may be treated with intra-lesional chemotherapy (Vinblastine Sulfate) or sclerotherapy (Sodium Tetradecyl Sulfate).
- Larger lesions are normally treated with radiation therapy (800-2,000 cGy).

Review Patient History

- Confirm current meds, their risk for xerostomia, and sugar content.
- Confirm if the child's CD4+ T-lymphocyte count or % has ever dropped below threshold for AIDS (Stage 3 HIV).
- Check for co-infections (Hepatitis).

Protocol for Dental Care

- Early treatment of HIV infection must be initiated to reduce the prevalence of oral manifestations described here.
- Children with HIV must have access to dental services at the earliest possible stage following their diagnosis in order to prevent and treat dental disease.
- Co-ordination of dental care with the patients' physician is mandatory.
- The prescription of sugar-free HIV drugs should be enforced.
- Both the parents and children alike require education to recognize the relationship between HIV infection and oral health.

Protocol for Dental Care

- HIV infected children should get periodic dental exams every **3-6 months** to monitor and treat dental diseases.
- Antibiotic prophylaxis
  - CD4+ T-lymphocyte count or % (current and previous)
  - Liver Function Test
  - CBC (ANC values)
- Dental prophylaxis and oral hygiene instruction must be provided every **3-6 months**.
- Regular use of fluoride gels must be considered especially with high caries risk children.

References

http://www.cdc.gov/hiv/topics/surveillance/index.htm

1. Church, J.A. HIV disease in Children: The many ways it differs from the disease in adults. *Postgraduate Medicine* 107(4):163-182, 2000.

2. Hicks, M.J., Flaitz, C.M., Carter, B., Cron, S. G., Rossmann, S.N., Simon, C.L., Demmler, G.J., and Kline, M.W. Dental caries in HIV-infected children: a longitudinal study. *Pediatric Dentistry* 22(5):359-363, 2000.

3. Howell, R.B., Jandinski, J.J., Palumbo, P., Shey, Z., and Houpt, M.I. Oral soft tissue manifestations and CD4 lymphocyte counts in HIV-infected children. *Pediatric Dentistry* 18(2): 117-119, 1996.

4. Madigan, A., Murray, P. A., Catalanotto, F., Feuerman, M., and Houpt, M. Caries experience and cariogenic markers in HIV-positive children and-their siblings. *American Academy of Pediatric Dentistry Pediatric Dentistry* 18(2):129-236, 1996.

5. Ramos-Gomez, F.J., Flaitz, C., Catapano, P., Murray, P., Milnes, A.R., and Dorenbaum, A., et al., Classificaiton, diagnostic criteria, and treatment recommendations for orofacial manifestations in HIV-infected pediatric patients. *Journal of Clinical Pediatric Dentistry* 23 (2):85-96, 1999.

6. Ramos-Gomez, F.J. and Folyaran, M.). Oral Health Consideration in HIV-Infected Children. *Curr HIV/AIDS Rep* 10:283-293, 2013.

7. Reznik, D.A. Oral Manifestations of HIV Disease. *Perspective* 13(5):143-148, 2005.

8. Vaseliu, N., Kamiru, H., and Kabue, M. "Oral Manifestations of HIV Infections." HIV Curriculum for the Health Professional. Houston, Texas, Baylor College of Medicine, Baylor International Pediatric AIDS Initiative, 2003.

9. Wood, S. M., Samir, S.S., Steenhoff, A.P., and Rutstein, R.M. Primary Varicella and Herpes Zoster Among HIV-Infected Children from 1989-2006. *Pediatrics* 121(1):150-156, 2008.