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HIV Care for Infants and Young Children

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Disclosures

- I have no financial interests or other potential conflicts to disclose.
- I will not discuss any experimental or unapproved medications or products.
- Any off-label use of medications is in accordance with recommendations made by the NIH.

Educational Need/Practice Gap

- Many providers who are quite comfortable selecting antiretroviral regimens for adults have not been trained to care for infants and young children and therefore are not comfortable initiating antiretroviral regimens in this population.

Objectives

- At the conclusion of this activity the participant will be able to:
  - Describe challenges associated with caring for HIV infected infants and young children.
  - Choose an antiretroviral regimen for a newly diagnosed infant or young child.
  - Choose an antiretroviral regimen for an infant or young child with treatment experience.

Expected Outcome

- At the conclusion of this presentation, it is my hope that participants may be comfortable initiating antiretroviral therapy in a newly-diagnosed HIV-infected infant or young child in a situation where a Pediatric HIV provider is unavailable.

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Case #1

Case #1

- A 2 month old male presents to his local ED with fever and respiratory difficulty. He is diagnosed with viral bronchiolitis and transferred to KCH for further care.
- On the general pediatrics floor his condition steadily deteriorates and he is transferred to the PICU with an increased oxygen requirement.
- In the PICU he continues to decline and is intubated and ventilated.
- After further respiratory decline he is started on VV ECMO.

Case #1

- PCR of bronchoscopy material is positive for PJP
  - Started on IV tmp/smx and methylprednisolone with prompt response
- HIV 4th gen Ab/Ag is positive
- HIV viral load >10,000,000
- CD4 778/43%
  - Percentage is normal but likely effected by overall lymphopenia
  - Absolute count is markedly abnormal (1728-5060)

Case #1

- What next?

ARV Availability

- NRTI
  - Abacavir - 20 mg/mL solution
  - Emtricitabine - 10 mg/mL suspension
  - Lamivudine - 10 mg/mL oral solution
  - TAF - No solution available, investigational use in children >/= 6 years
  - TDF - oral powder 40 mg per 1 gram of powder
  - Zidovudine - 10 mg/mL oral syrup

ARV Availability

- NNRTI
  - Doravirine – not approved <18 years of age
  - Efavirenz – capsules can be sprinkled, >/= 3yo and 10 kg
  - Etravirine – capsules can be dispersed into liquid, >/= 2yo and 10kg
  - Nevirapine – 10 mg/mL suspension
  - Rilpivirine - >/= 12yo and 35 kg

ARV Availability

- PI
  - Atazanavir – powder packet 50mg must be given with ritonavir, >/= 3mo (kernicterus)
  - Darunavir – 100 mg/mL oral suspension, >/= 3yo and 10kg (seizures/death)
  - Lopinavir/ritonavir – 80/20 mg/mL

ARV Availability

- INSTI
  - Bictegravir – Biktarvy approved >/=18yo, investigational in younger
  - Dolutegravir – No dosing <25kg, (current dosing under/over doses in children)
  - Elvitegravir – Genvoya >/=25kg, Stribild >/=35 kg and SMR 4 or 5
  - Raltegravir – Chewable tablets 100mg and 25mg, Granules for suspension

Raltegravir

Raltegravir Oral Suspension Dosing Table for Full-Term Neonates from Birth to Age 4 Weeks: Neonates Aged ≥37 Weeks and Weighing ≥2 kg

Body Weight	Volume (Dose) of Suspension
Birth to 1 Week of Age: Once-Daily Dosing	**Approximately 1.5 mg/kg/dose**
2 kg to <3 kg	0.4 mL (4 mg) once daily
3 kg to <4 kg	0.5 mL (5 mg) once daily
4 kg to <5 kg	0.7 mL (7 mg) once daily
1–4 Weeks of Age: Twice-Daily Dosing	**Approximately 3 mg/kg/dose**
2 kg to <3 kg	0.8 mL (8 mg) twice daily
3 kg to <4 kg	1 mL (10 mg) twice daily
4 kg to <5 kg	1.5 mL (15 mg) twice daily

Chewable Tablet Dosing Table[a]

Body Weight	Dose	Number of Chewable Tablets
11 kg to <14 kg	Raltegravir 75 mg twice daily	Three 25-mg tablets twice daily
14 kg to <20 kg	Raltegravir 100 mg twice daily	One 100-mg tablet twice daily
20 kg to <28 kg	Raltegravir 150 mg twice daily	One and a half 100-mg tablets[b] twice daily
28 kg to <40 kg	Raltegravir 200 mg twice daily	Two 100-mg tablets twice daily
≥40 kg	Raltegravir 300 mg twice daily	Three 100-mg tablets twice daily

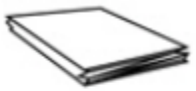
Raltegravir Oral Suspension Dosing Table for Patients Aged ≥4 Weeks[a]

Body Weight	Volume (Dose) of Suspension to be Administered Twice Daily
3 kg to <4 kg	2.5 mL (25 mg)
4 kg to <6 kg	3 mL (30 mg)
6 kg to <8 kg	4 mL (40 mg)
8 kg to <11 kg	6 mL (60 mg)
11 kg to <14 kg	8 mL (80 mg)
14 kg to <20 kg	10 mL (100 mg)

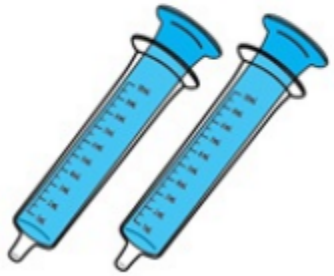
- Prescription (on box)

- 2 mixing cups

- Use (this booklet)
- Prescribing Information
- 6 syringes



- 60 packets of ISENTRESS



2 **blue** (10mL) syringes

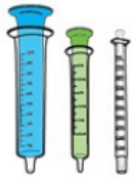
2 **green** (3mL) syringes

2 **white** (1mL) syringes

1 mixing cup (Using the tab on the mixing cup, pull open the lid)

1 packet of ISENTRESS

a clean glass



3 syringes (Have one of each size ready, but you will only need 1 or 2, depending on the prescribed dose)

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source: package insert

ARV Recommendations (Naïve)

	Patient Age and Weight Class			
	Birth to <14 Days of Age[a,b,c]	Children Aged ≥14 Days to <3 Years	Children Aged ≥3 Years and Weighing <25 kg	Children Aged ≥3 Years and Weighing ≥25 kg
INSTI-Based Regimens	Two NRTIs **plus** RAL[c]			
				Two NRTIs **plus** DTG[d]
				Two NRTIs **plus** EVG/c[e]
NNRTI-Based Regimens	Two NRTIs **plus** NVP[a,f]			
PI-Based Regimens		Two NRTIs **plus** LPV/r[b]		
			Two NRTIs **plus** ATV/r	
			Two NRTIs **plus** DRV/r[g]	

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ARV Recommendations (Naïve)

Preferred Regimens			
Age	**Regimens**		**FDC Available** (see Fixed-Dose Combinations)
Infants, Birth to Age <14 Days[a,b]	Two NRTIs **plus** NVP		No
	Weight ≥2 kg	Two NRTIs **plus** RAL[c]	No
Children Aged ≥14 Days to <3 Years	Two NRTIs **plus** LPV/r		No
	Weight ≥2 kg	Two NRTIs **plus** RAL[c]	No
Children Aged ≥3 Years	Weight <25 kg	Two NRTIs **plus** ATV/r	No
		Two NRTIs **plus** twice-daily DRV/r[d]	No
		Two NRTIs **plus** RAL[c]	No
	Weight ≥25 kg	Two NRTIs **plus** DTG[f]	Yes
		Two NRTIs **plus** EVG/COBI[e]	Yes
Adolescents Aged ≥12 Years with SMR 4 or 5	Refer to the Adult and Adolescent Antiretroviral Guidelines		Yes

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ARV Recommendations (Naïve)

Alternative Regimens			
Age	**Regimens**		**FDC Available**
Children Aged ≥14 Days to <3 Years	Two NRTIs **plus** NVP[g]		No
Children Aged ≥3 Months to <3 Years	Two NRTIs **plus** ATV/r		No
Children Aged ≥3 Years and Weighing ≥25 kg	Two NRTIs **plus** ATV/r		No
	Two NRTIs **plus** DRV/r[d]		No
	Two NRTIs **plus** RAL[c]		No
Children Aged ≥3 Years	Two NRTIs **plus** EFV[h]		No[i]
	Two NRTIs **plus** LPV/r		No
Adolescents Aged ≥12 Years with SMR 1–3	Weight ≥35 kg	Two NRTIs **plus** RPV[j]	Yes
Adolescents Aged ≥12 Years with SMR 4 or 5	Refer to the Adult and Adolescent Antiretroviral Guidelines		Yes

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ARV Recommendations (Naïve)

Preferred Dual-NRTI Backbone Options for Use in Combination with Other Drugs			
Age	**Dual-NRTI Backbone Options**		**FDC Available**
Children, Birth to Age <3 Months	ZDV **plus** (3TC **or** FTC)[k]		No
Children Aged ≥3 Months to <6 Years	ABC **plus** (3TC **or** FTC)[l]		Yes
	ZDV **plus** (3TC **or** FTC)[k]		Yes
Children and Adolescents Aged ≥6 Years with SMR 1–3	ABC **plus** (3TC **or** FTC)[l]		Yes
	Weighing ≥25 kg and receiving a regimen that contains an INSTI or an NNRTI	FTC/TAF[m]	Yes

Preferred Dual-NRTI Backbone Options for Use in Combination with Other Drugs		
Age	**Dual-NRTI Backbone Options**	**FDC Available**
Adolescents Aged ≥12 Years with SMR 4 or 5	Refer to the Adult and Adolescent Antiretroviral Guidelines	Yes

Alternative Dual-NRTI Backbone Options for Use in Combination with Other Drugs		
Age	**Dual-NRTI Backbone Options**	**FDC Available**
Children Aged ≥3 Months	ZDV **plus** ABC	No
Children Aged ≥2 Years to 12 Years	TDF **plus** (3TC **or** FTC)[n]	Yes
Children and Adolescents Aged ≥6 Years and SMR 1–3	ZDV **plus** (3TC **or** FTC)[k]	Yes

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Case #1

- What to start?
  - Started ART while awaiting HLA B5701 and Genotyping
    - Zidovudine
    - Lamivudine
    - Raltegravir
- HLA B5701 Negative, Genotype wild-type
  - Changed to preferred regimen
    - Abacavir
    - Lamivudine
    - Raltegravir

Case #1

- Viral load trend
  - 4/24: >10,000,000
  - 5/6: 66,159
  - 5/28: 7,205
- CD4 trend
  - 4/19: 778/43%
  - 5/28: 2007/38.67%
- Appears well and is developing normally

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Case #2

Case #2

- Pediatrician notified that her 2 year old male patient (in out of home foster care) must be screened for HIV as his biological mother has tested positive during another pregnancy. He gets frequent SSTI but is otherwise reported to be well.
- HIV ELISA positive
- HIV Western blot positive
- Viral load: 61,700 copies/mL
- Genotype: no resistance
- CD4: 542/24%
- HLA B5701 negative

Case #2

- What to start?

- Started ABC - 3TC - LPV/r
  - (2014 RAL was considered alternative)
- Modernized in 2017 to ABC – 3TC – RAL

- Has been fully suppressed and healthy and is now 7 years old.

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Case #3

Case #3

- 2yo girl newly arrived from DRC after being adopted by US family. In orphanage from 2mo to 8mo and then in foster care. Arrives on the following medications:
  - Tmp/smx
  - Chewable tablet ZDV/3TC/NVP
    - All components subtherapeutically dosed (~30-50% of correct dose)
- Problems?

Case #3

- Viral load: 40,800 copies/mL
- CD4: 1348/28%
- Genotype:
  - NRTI: M184V and TAMS
    - High-level resistance to 3TC and FTC
    - Low-Med level resistance to ABC
    - Sensitive to ZDV and TDF (resistant without M184V sensitization)
  - NNRTI: K101E and G190A
    - Resistant to NVP, EFV, RPV
    - Sensitive to ETR
  - PI:
    - Possible resistance to TPV/r
    - Otherwise sensitive

Case #3

- Stopped ART
- Viral load: 80,200
- New Regimen?
- Restarted with:
  - ZDV, 3TC, LPV/r, RAL
- 4 weeks later viral load 165 copies/mL
- Has been healthy and fully suppressed, now 7 years old.

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Other Issues

Other Pediatric Issues

- Vaccines
  - Pneumococcal
    - PCV13 given routinely
    - PPSV23 given at 2 years of age
  - Meningococcal
    - Given at 2 years of age
  - Live viruses?
    - OK if suppressed with normal CD4

Other Pediatric Issues

- Social issues
  - Adherence

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Case #4

Case #4

- 10yo girl previously on Complera (FTC/RPV/TDF) and Zidovudine who was lost to follow up and who had stopped ART. She has been “well” but does have generalized adenopathy on examination.
- Known resistance including M184V
- Never fully suppressed
- Split BID dosing regimen problematic
- Once daily regimen?

Case #4

- New regimen
  - Stribild (EVG/COBI/FTC/TDF) + Atazanavir
- Viral load decreases but still not fully suppressed
- NON ADHERENCE
  - Father reminds to take medications but is not available to directly supervise.
  - Patient will not admit to non-adherence.

Case #4

- What now

Case #4

- Directly observed therapy instituted
- Once daily visit from RN to administer medication
  - Cannot easily swallow pills which leads to frustration and difficulty
  - Taught to swallow pills using pudding
- Rapidly became fully suppressed
- Has remained fully suppressed and well, now 14 years old.

Other Pediatric Issues

- Social issues
  - Adherence
  - DCBS

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Case #2 revisited

Other Pediatric Issues

- 2yo boy in out of home foster care with foster mother and her wife is newly diagnosed with perinatal HIV infection. Foster mother is a PEDIATRIC RN.
- Foster mother alerts me that DCBS has stated they will be looking for a new placement for the patient because they are concerned about risks to other children who have been placed in the home.

Other Pediatric Issues

Other Pediatric Issues

- I provided education to DCBS in the form of a written letter.
- Patient was allowed to stay in his foster home and has since been adopted along with his biological brother (uninfected) and several other children.
- I now provide education to the medically fragile/complex foster program at their training events.

Other Pediatric Issues

- Social issues
  - Adherence
  - DCBS
- Medication palatability
- Disclosure
- Fear of needles

Other Pediatric Issues

- ADOLESCENCE

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Questions?