

HIV and HCV:
From Specialist to Internist
Pearls and Pitfalls

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Disclosures

- I have no actual or potential conflicts of interest in relation to this presentation.

Learning Objectives:

- Be informed of facts surrounding HIV in the US and Oklahoma
- Identify symptoms related to HIV infection
- Understand the diagnostic algorithm of HIV
- Be able to summarize treatment options and clinical care in HIV
- Be informed of facts surrounding hepatitis C in the US and Oklahoma
- Identify symptoms related to hepatitis C infection
- Understand the diagnostic algorithm of hepatitis C
- Be able to summarize treatment options and clinical care in hepatitis C
- Recognize the statistics and importance of identify HIV/hepatitis C co-infection
- Understand the considerations related to treatment of HIV/hepatitis C co-infection
- Develop treatment plans for HIV/hepatitis C co-infection with acknowledgement of drug-drug interactions

HIV

HIV in the US – National Statistics

HIV in Oklahoma – State Statistics

Clinical Presentation and Care in HIV

HIV IN THE US – NATIONAL STATISTICS

HIV in the US – National Statistics

- Approximately 1.2 million people in the U.S. have HIV
- In 2022, an estimated 31,800 people acquired HIV in the U.S.
- Disproportionate impacts:
 - Gay
 - Bisexual
 - Men who have sex with men (MSM)

1.2 Million

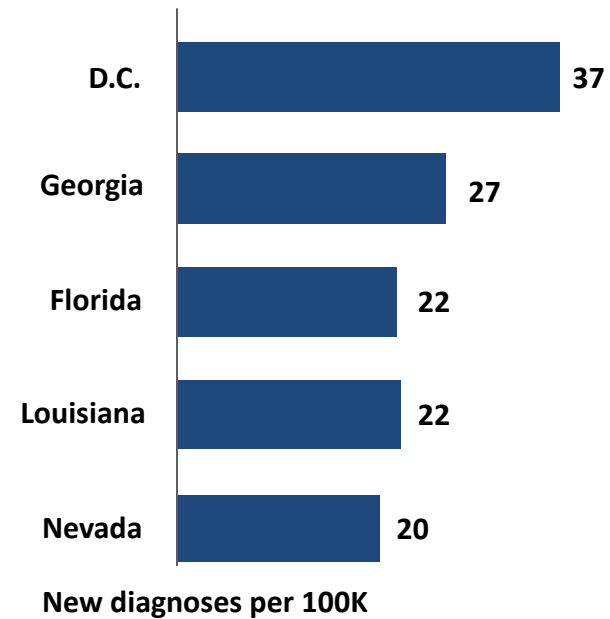
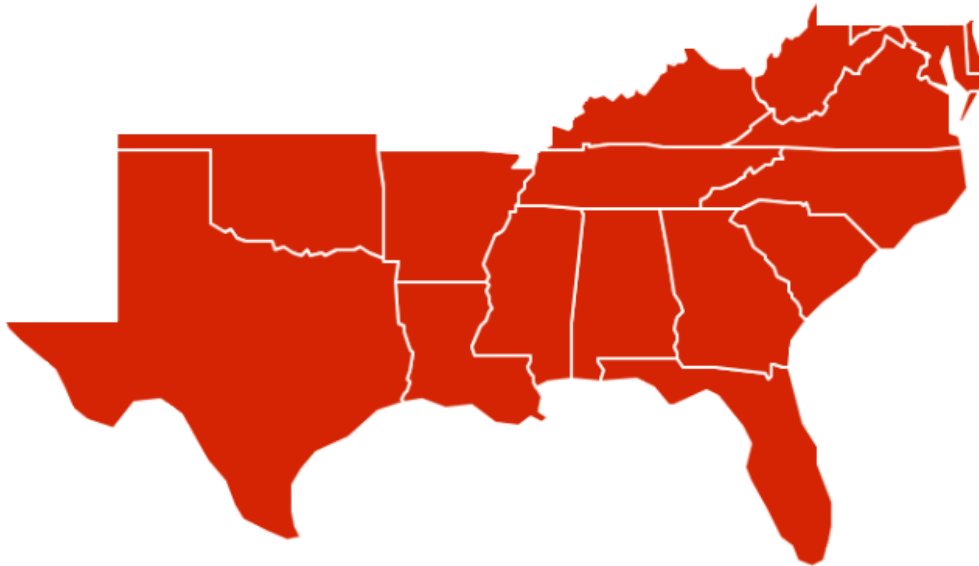
Approximately how many
people are living with
HIV in the US
(diagnosed & undiagnosed)

13%

People with HIV who
do not know they
have it

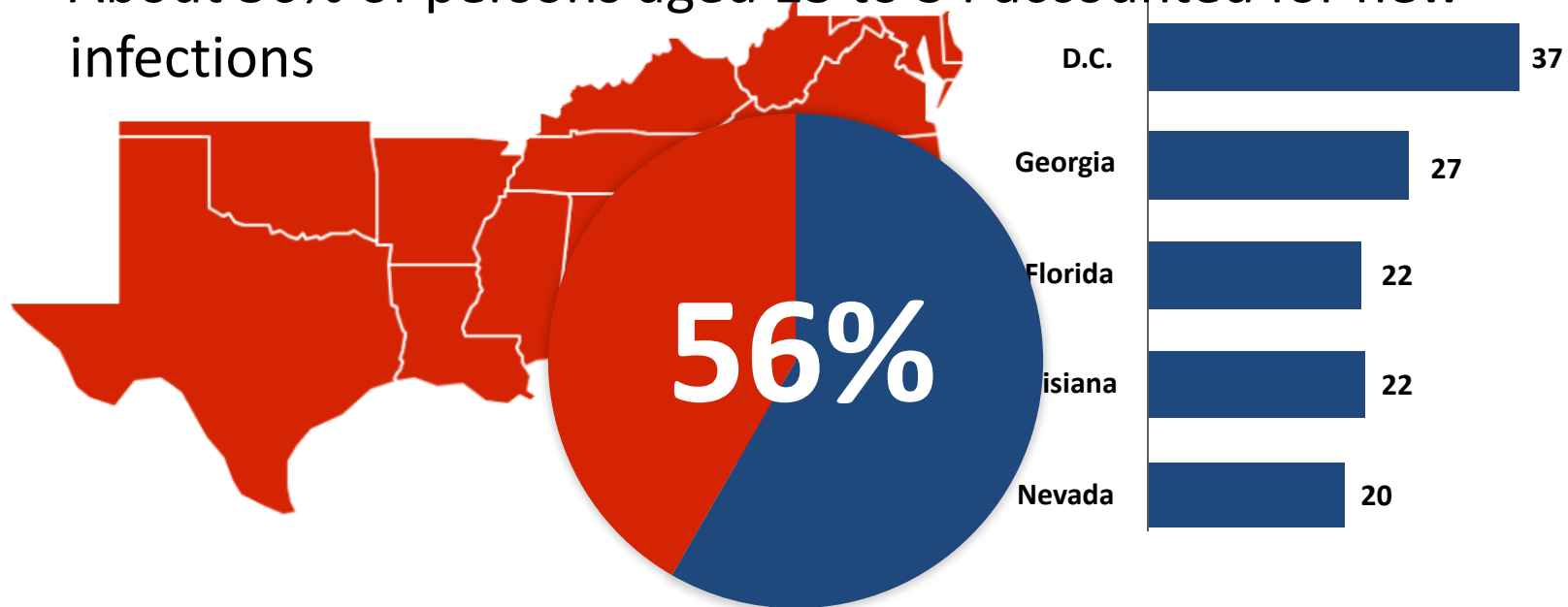
HIV in the US – National Statistics

- From 2018 to 2022, new HIV infections decreased 12%



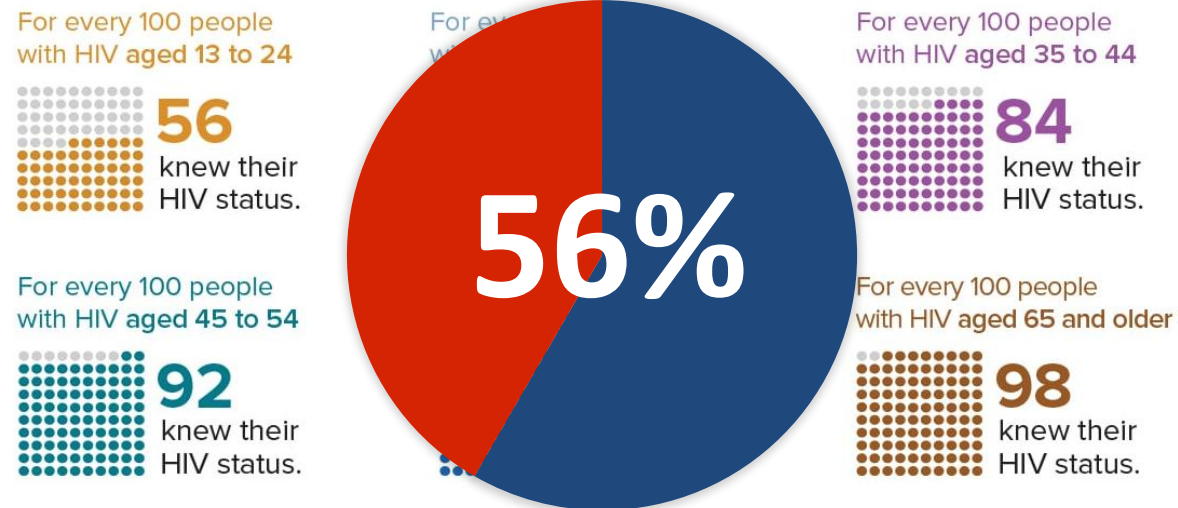
HIV in the US – National Statistics

- From 2018 to 2022, new HIV infections decreased 12%
- About 56% of persons aged 13 to 34 accounted for new infections



HIV in the US – National Statistics

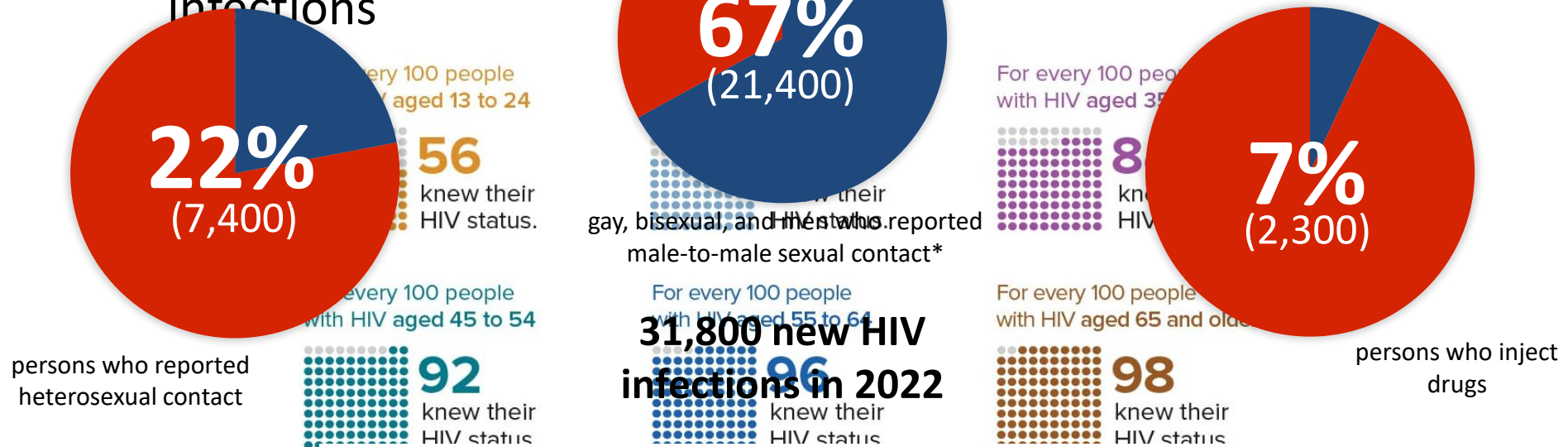
- From 2018 to 2022, new HIV infections decreased 12%
- About 56% of persons aged 13 to 34 accounted for new infections



* Data not available for children aged 12 and under.

HIV in the US – National Statistics

- Estimated infections in 2022 disproportionately effected
- From 2018 to 2022, new HIV infections decreased 12%
- About 56% of persons who reported male-to-male sexual contact accounted for new infections

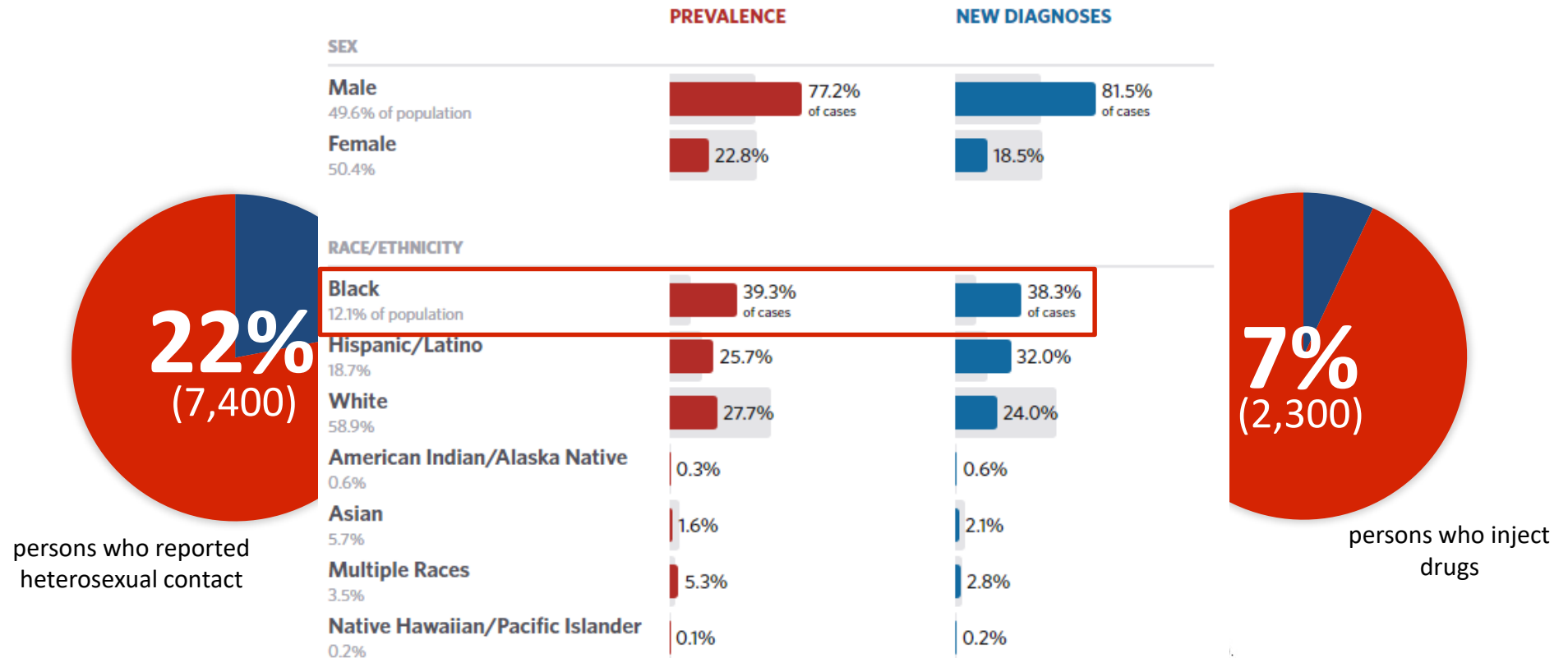


* Includes infections attributed to male-to-male sexual contact and injection drug use (men who reported both risk factors).

Source: CDC. Estimated HIV incidence and prevalence in the United States, 2018–2022. *HIV Surveillance Supplemental Report*, 2024; 29(1).

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HIV in the US – National Statistics



Source: CDC. Estimated HIV incidence and prevalence in the United States, 2018–2022. *HIV Surveillance Supplemental Report*, 2024; 29(1).

HIV IN OKLAHOMA — STATE STATISTICS

HIV in the Oklahoma – State Statistics

- Approximately 7,264 people are living with HIV in Oklahoma in 2022
- In 2022, an estimated 394 people acquired HIV in Oklahoma
- Disproportionate impact in rural Oklahoma

7,264

Approximately how many people are diagnosed with HIV in OK

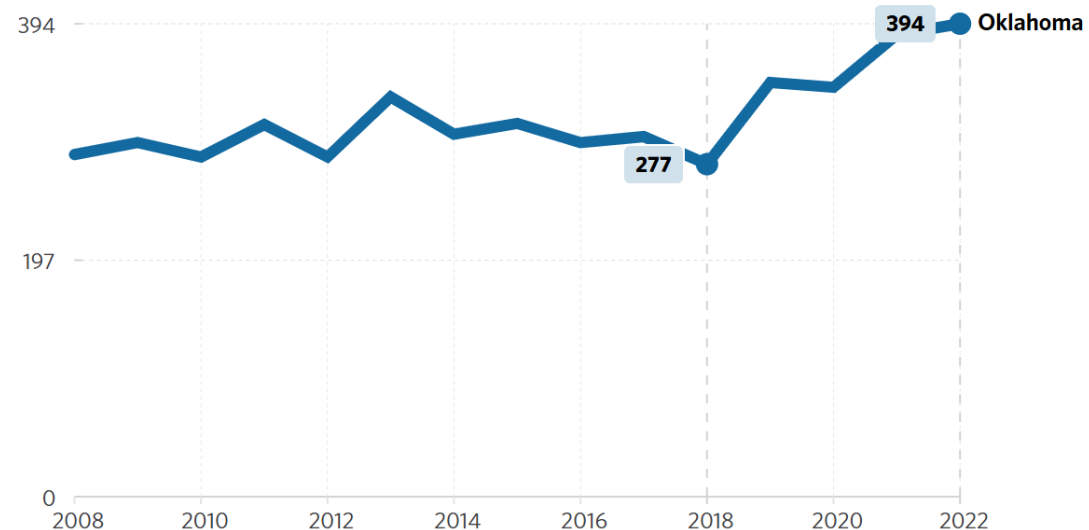
17%

People with HIV that don't know they have it

HIV in the Oklahoma – State Statistics

- From 2018 to 2022, new HIV infections increased by 42%

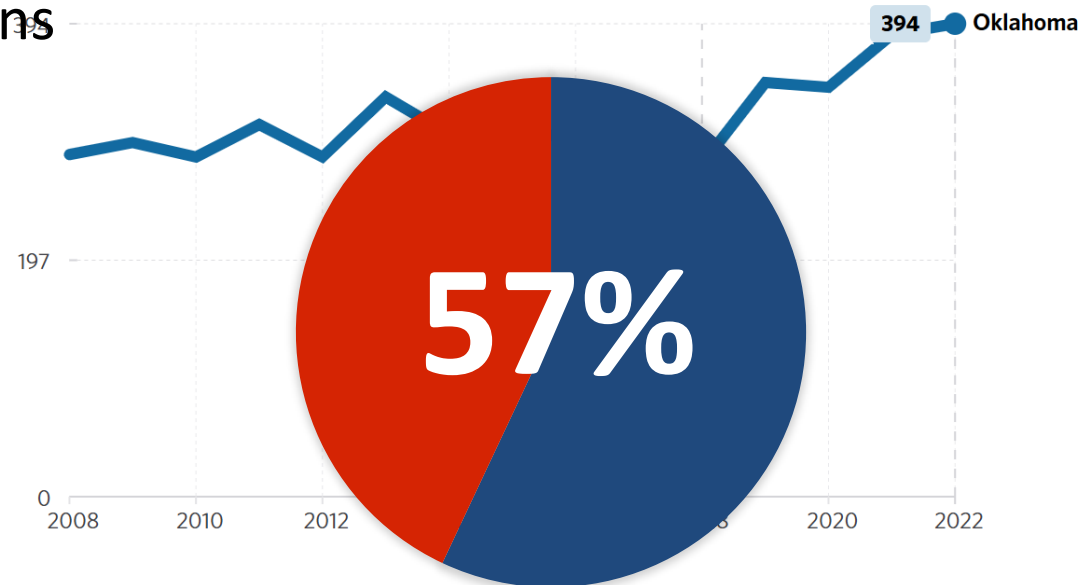
NEW DIAGNOSES CASES, 2008-2022



Due to the COVID-19 pandemic, data from 2020 and 2021 should be interpreted with caution.

HIV in the Oklahoma – State Statistics

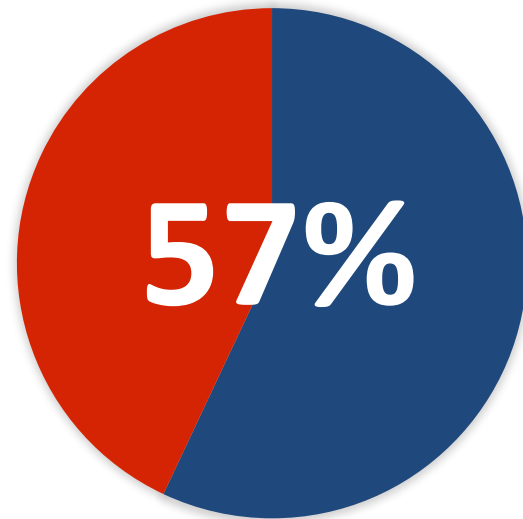
- From 2018 to 2022, new HIV infections increased by 42%
- About 57% of persons aged 13 to 34 accounted for new infections



Due to the COVID-19 pandemic, data from 2020 and 2021 should be interpreted with caution.

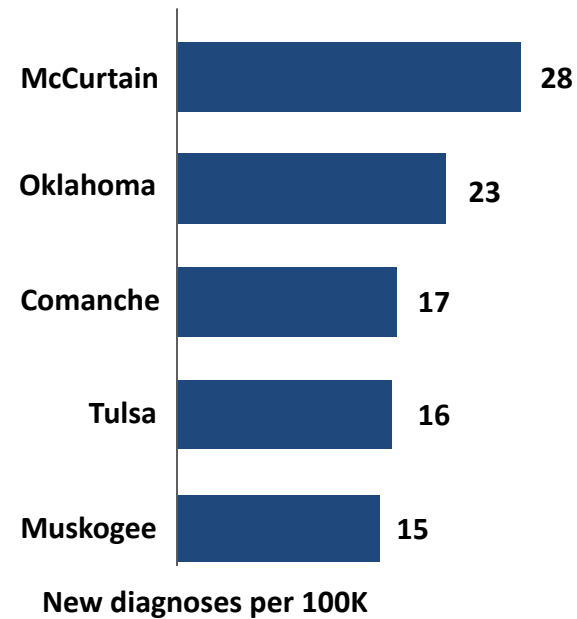
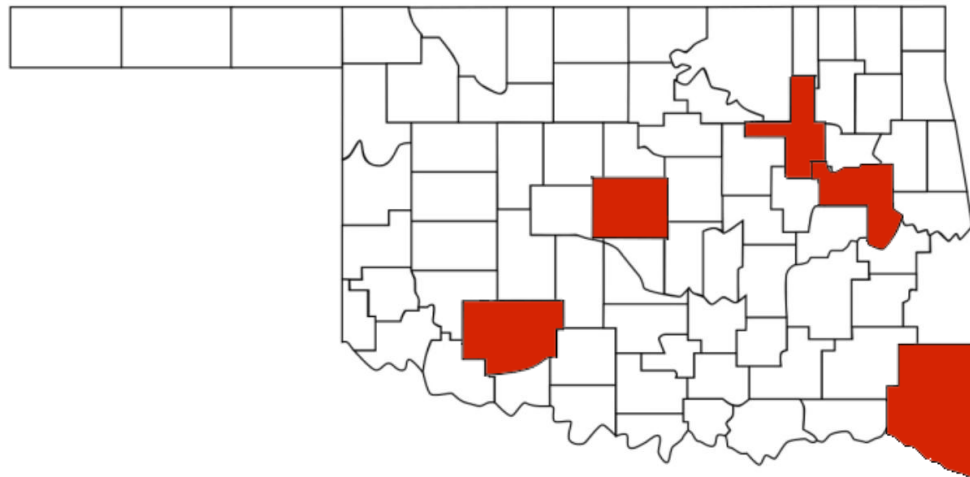
HIV in the Oklahoma – State Statistics

- Estimated 18 infections in 2022, in 2021 disproportionately affected by 42% specific areas
- About 57% of persons aged 13 to 34 accounted for new infections



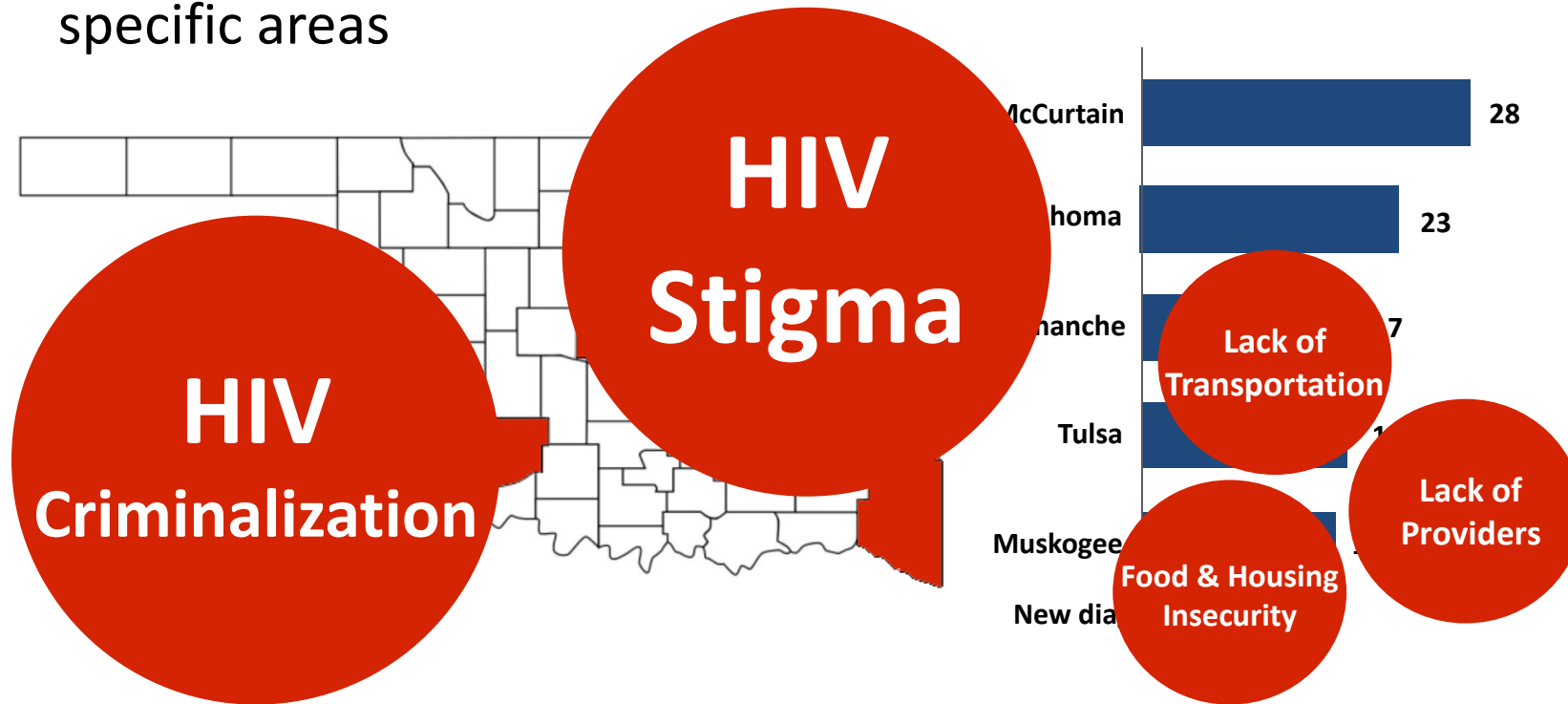
HIV in the Oklahoma – State Statistics

- Estimated infections in 2022 disproportionately effected specific areas



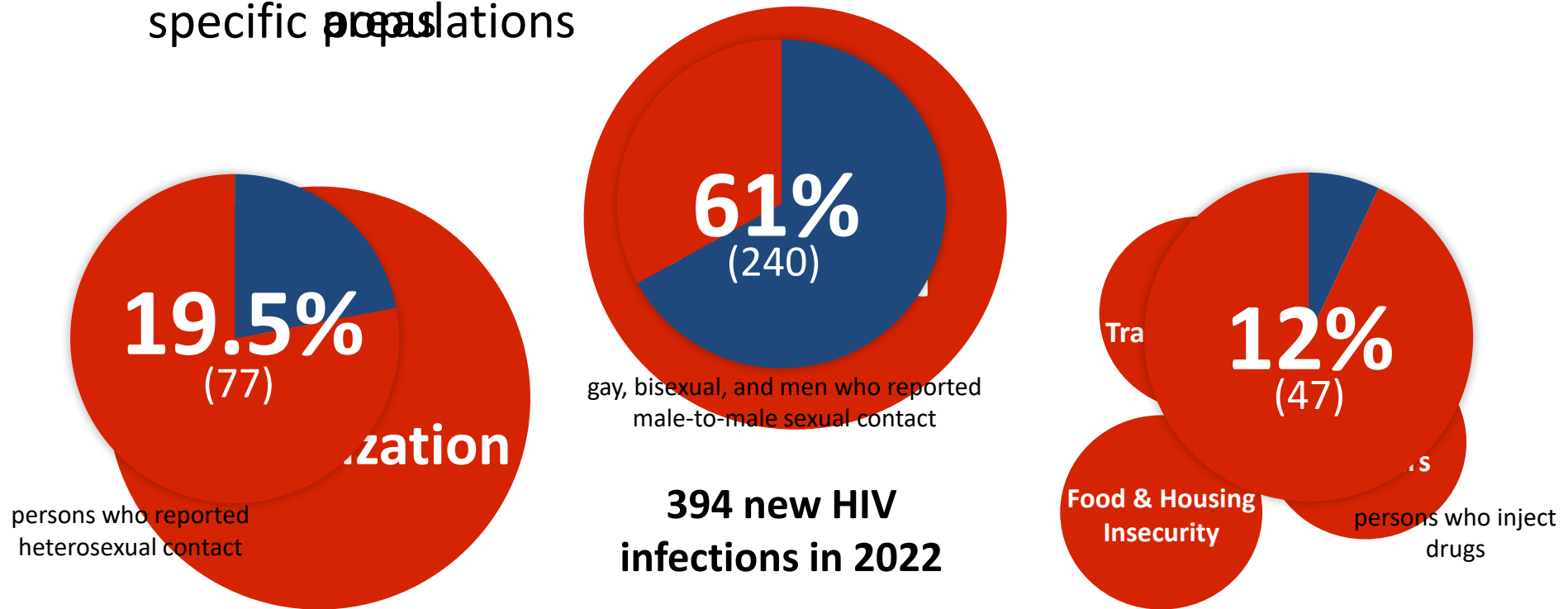
HIV in the Oklahoma – State Statistics

- Estimated infections in 2022 disproportionately affected specific areas



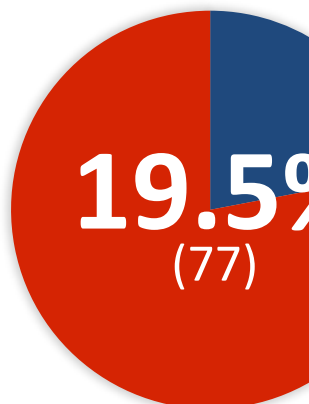
HIV in the Oklahoma – State Statistics

- Estimated infections in 2022 disproportionately effected specific populations



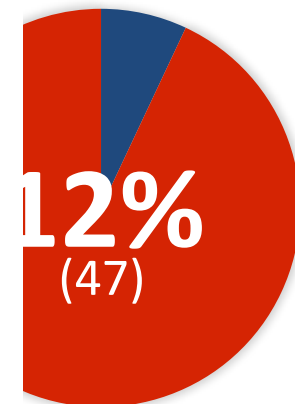
HIV in the Oklahoma – State Statistics

- Estimate specific



persons who reported heterosexual contact

SEX	PREVALENCE	NEW DIAGNOSES
Male 49.9% of population	81.5% of cases	78.4% of cases
Female 50.1%	18.5%	21.6%
RACE/ETHNICITY		
Black 7.0% of population	23.9% of cases	29.4% of cases
Hispanic/Latino 11.6%	13.0%	16.5%
White 63.7%	49.0%	38.1%
American Indian/Alaska Native 7.0%	4.8%	4.6%
Asian 2.3%	1.6%	1.0%
Multiple Races 8.0%	7.6%	10.4%
Native Hawaiian/Pacific Islander 0.2%	0.2%	0.0%

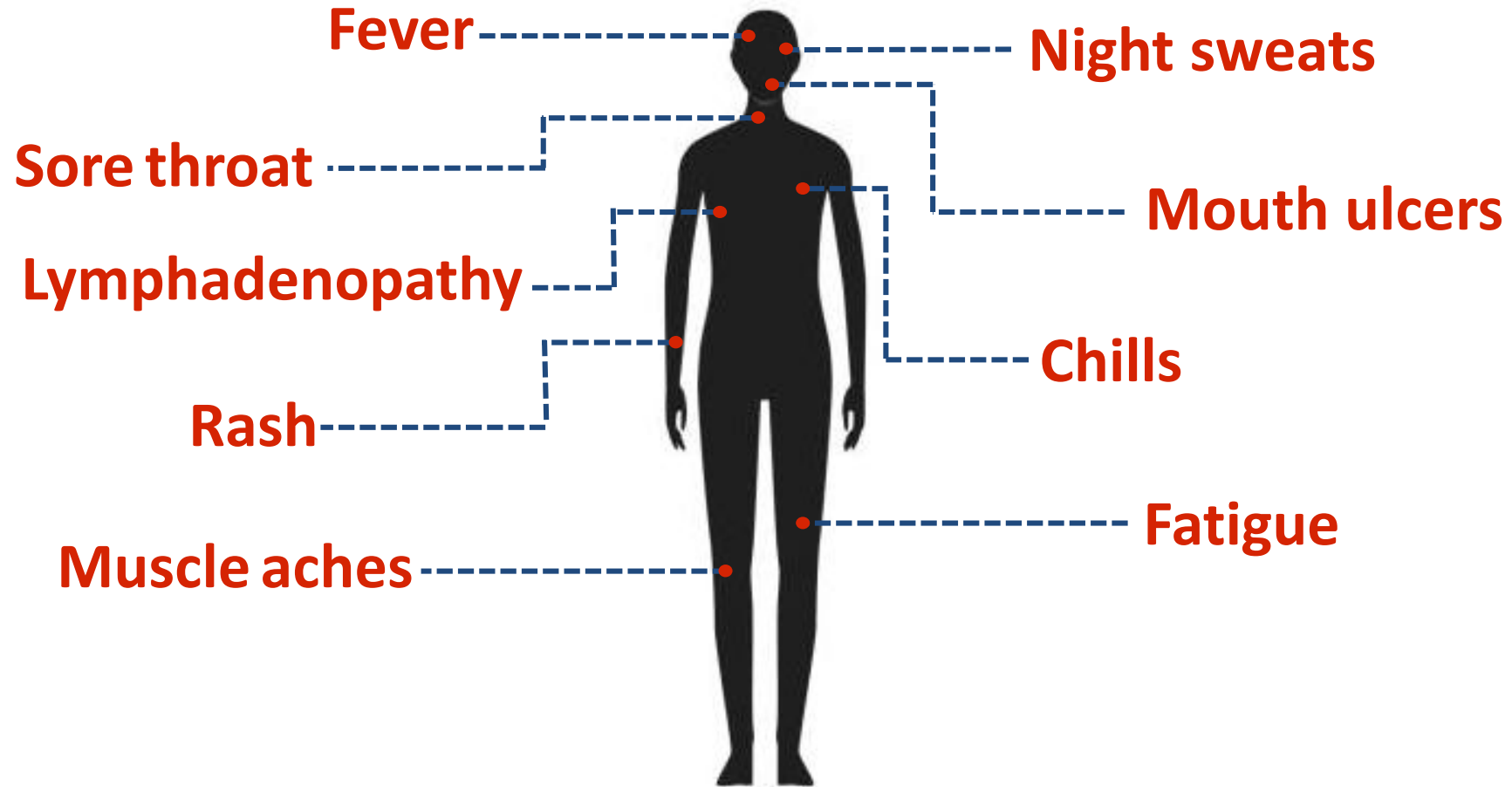


persons who inject drugs

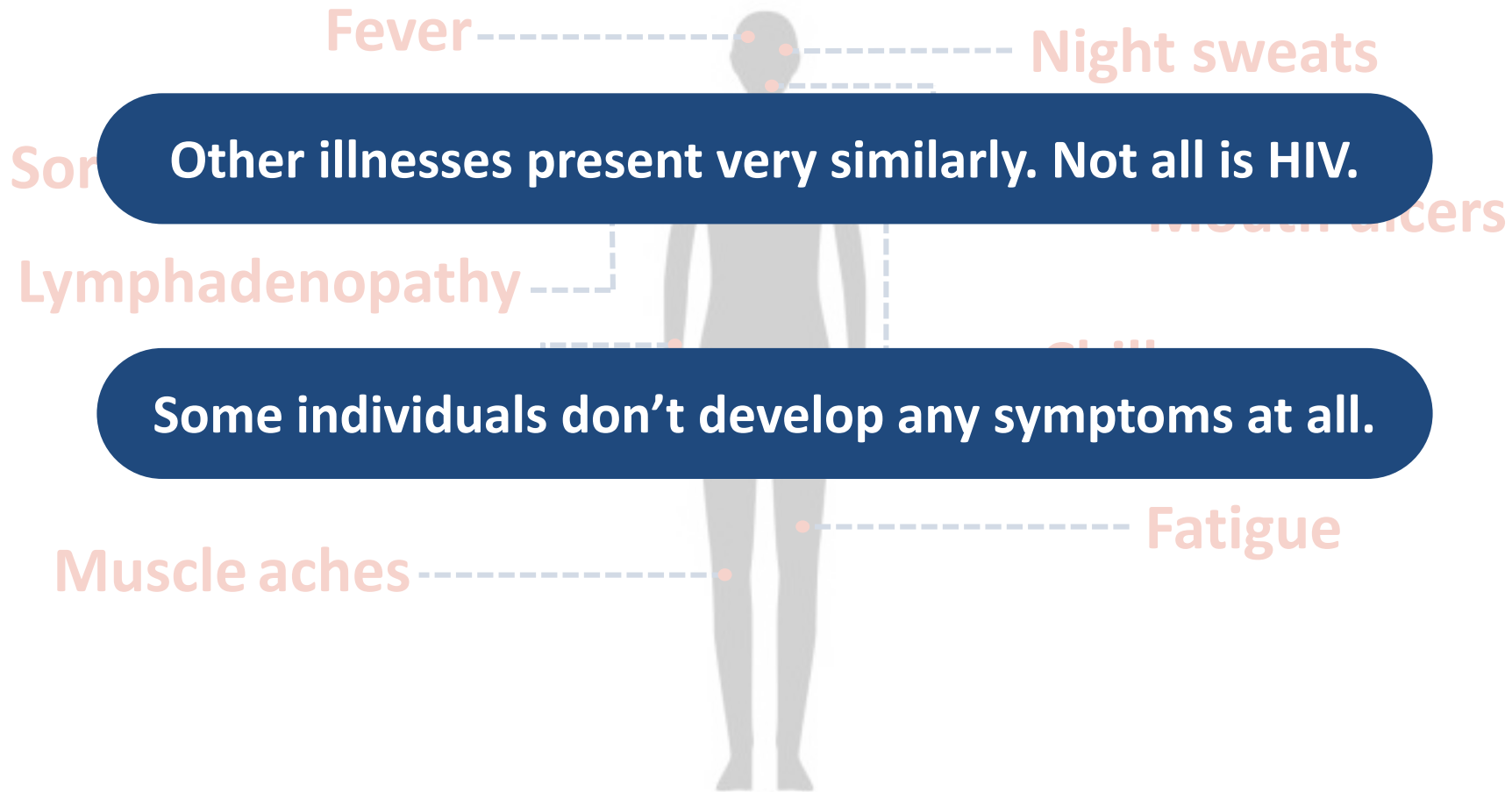
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CLINICAL PRESENTATION AND CARE IN HIV

HIV Symptoms



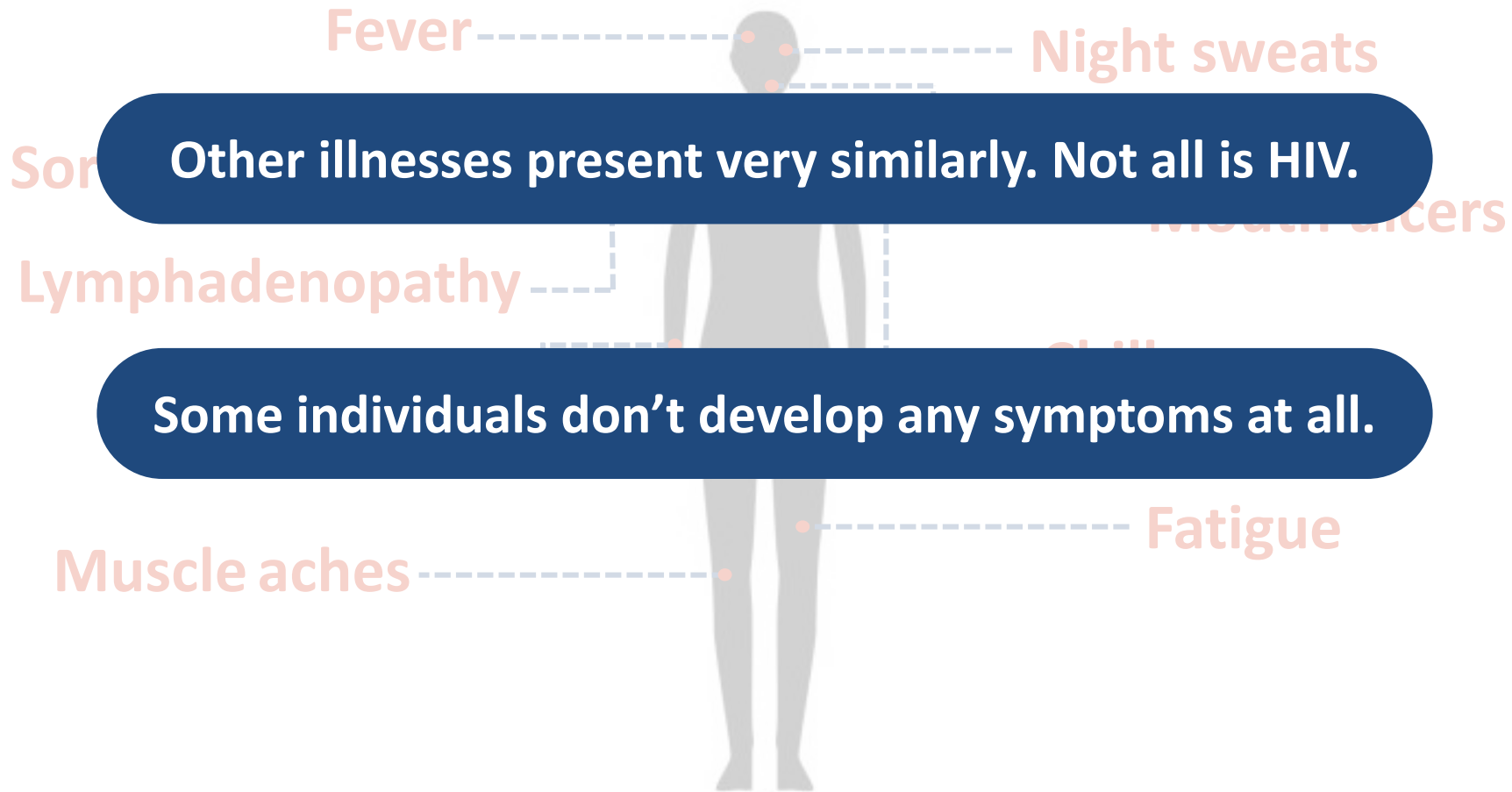
HIV Symptoms



Other illnesses present very similarly. Not all is HIV.

Some individuals don't develop any symptoms at all.

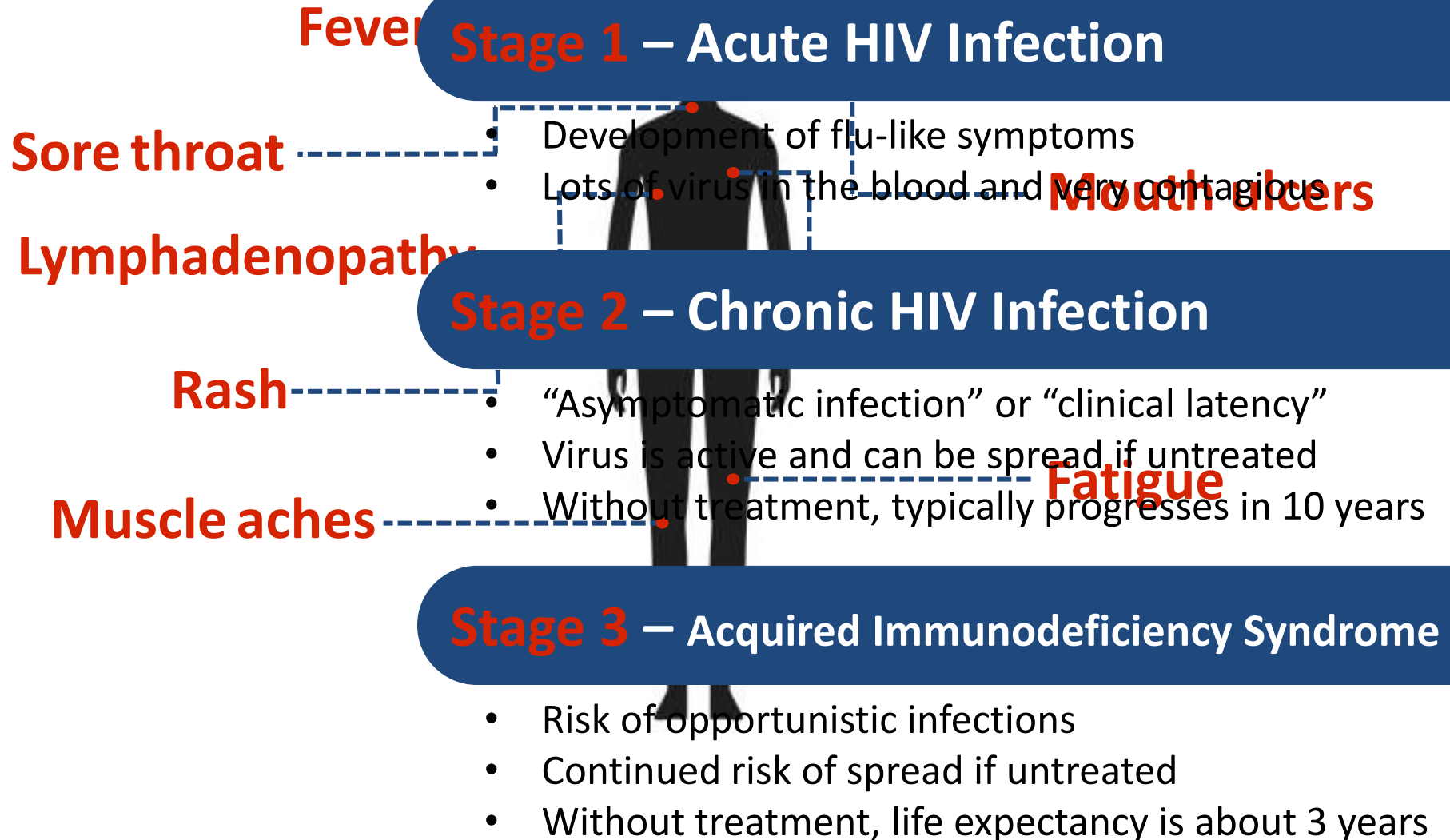
HIV Symptoms



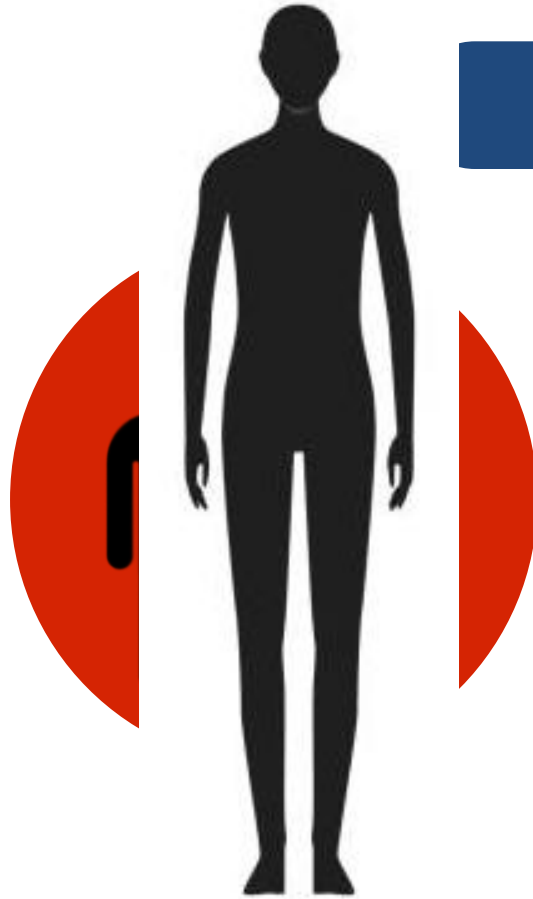
Other illnesses present very similarly. Not all is HIV.

Some individuals don't develop any symptoms at all.

HIV Symptoms



HIV Diagnosis



Stage 1 – Acute HIV Infection

WHO TO SCREEN

- Development of flu-like symptoms
- Lots of virus in the blood and very contagious

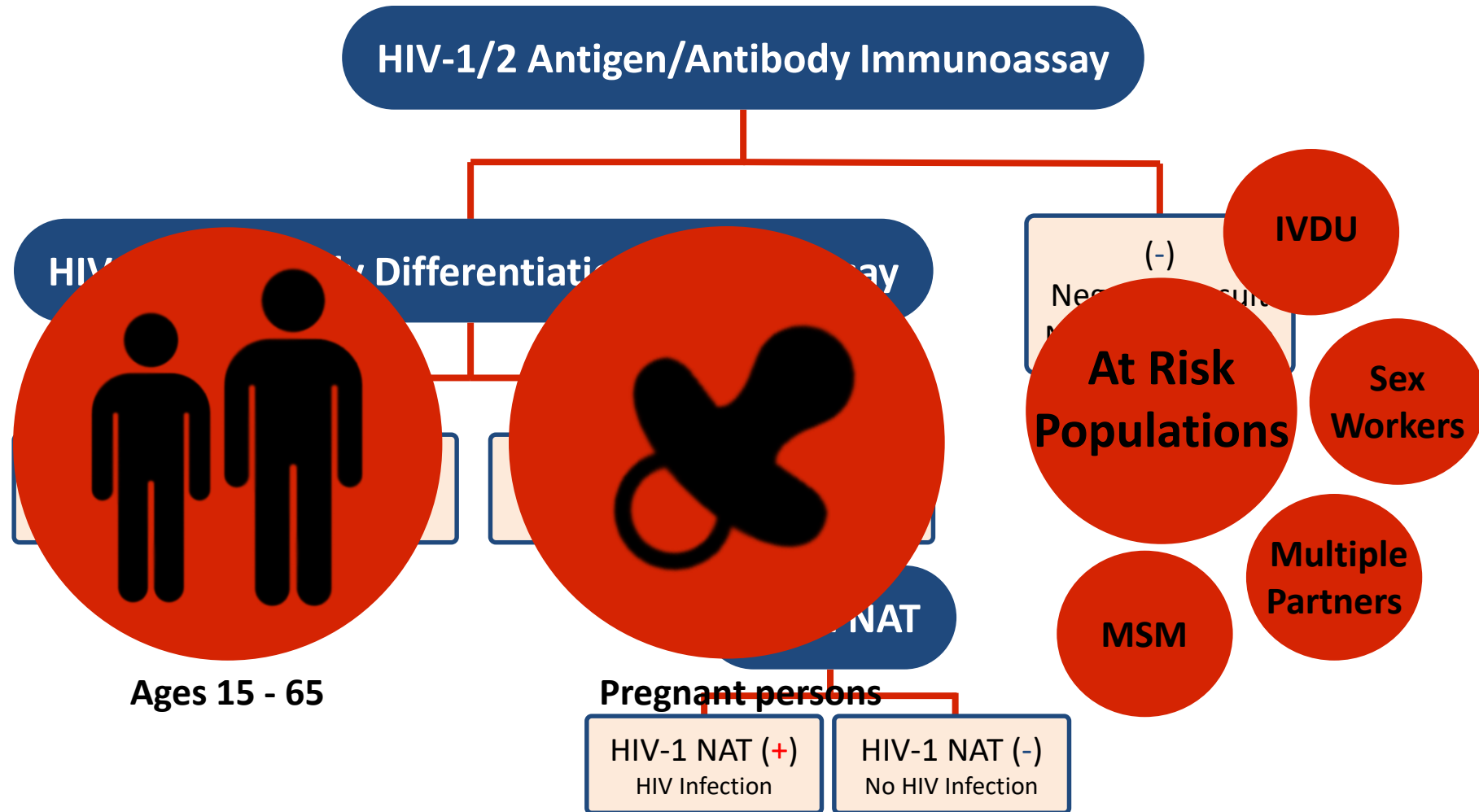
Stage 2 – Chronic HIV Infection

- “Asymptomatic infection”
- Virus remains and can be spread if untreated
- Without treatment, typically progresses in 10 years

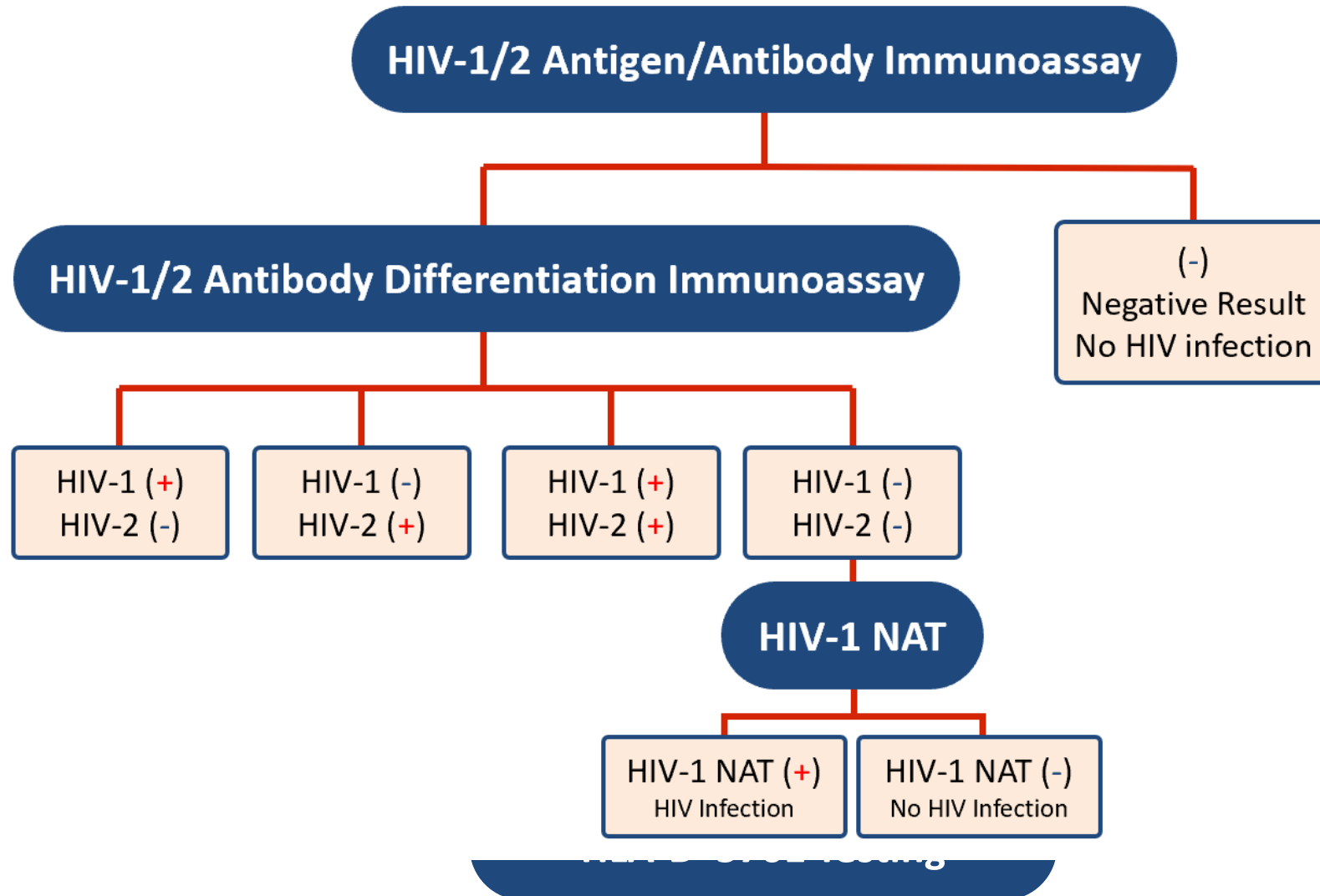
Stage 3 – Acquired Immunodeficiency Syndrome

- Risk of opportunistic infections
- Continued risk of spread if untreated
- Without treatment, life expectancy is about 3 years

HIV Diagnosis



HIV Diagnostic Care

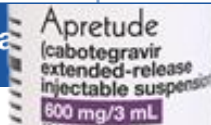


HIV Clinical Care

Resistance Testing

1985-89	1990-94	1995-99	2000-04	2005-09	2010-14	2015-19	2020-24
1987 Zidovudine (NRTI)	1991 Didanosine* (NRTI) 1992 Zalcitabine* (NRTI) 1994 Stavudine* (NRTI)	1995 Lamivudine (NRTI) Saquinavir Mesylate* (PI) 1996 Indinavir* (PI) Nevirapine (NNRTI) Ritonavir (PI) 1997 Combivir* (FDC) Delavirdine* (NNRTI) Nelfinavir* (PI) Saquinavir* (PI) 1998 Abacavir (NRTI) Efavirenz (NNRTI) 1999 Amprenavir* (PI)	2000 Didanosine EC* (NRTI) Kaletra (FDC) Trizivir* (FDC) 2001 Tenofovir DF (NRTI) 2002 Stavudine XR* (NRTI) 2003 Atazanavir (PI) Emtricitabine (NRTI) Enfuvirtide (FI) Fosamprenavir* (PI) 2004 Epzicom* (FDC) Truvada (FDC)	2005 Tipranavir* (PI) 2006 Atripla* (FDC) Darunavir (PI) 2007 Maraviroc (CA) Raltegravir (INSTI) 2008 Etravirine (NNRTI)	2011 Complera (FDC) Nevirapine XR (NNRTI) Rilpivirine (NNRTI) 2012 Stribild (FDC) Truvada (PrEP) 2013 Dolutegravir (INSTI) 2014 Cobicistat (PE) Elvitegravir* (INSTI) Trimeq (FDC)	2015 Evotaz (FDC) Genvoya (FDC) Prezcobix (FDC) 2016 Descovy (FDC) Odefsey (FDC) 2017 Juluca (FDC) Raltegravir HD (INSTI) 2018 Biktarvy (FDC) Cimduo (FDC) Delstrigo (FDC) Doravirine (NNRTI) Ibalizumab-uiyk (PAI) Symfi (FDC) Symfi Lo (FDC) Symtuza (FDC) Temixys* (FDC) 2019 Dovato (FDC) Descovy (PrEP)	2020 Fostemsavir* (AI) Tivicay PD (INSTI) 2021 Cabenuva (FDC) Cabotegravir (INSTI) Cabotegravir (PrEP) 2022 Triumeq PD (FDC) Lenacapavir (CI) 2024 Rilpivirine PED (NNRTI)

For more information

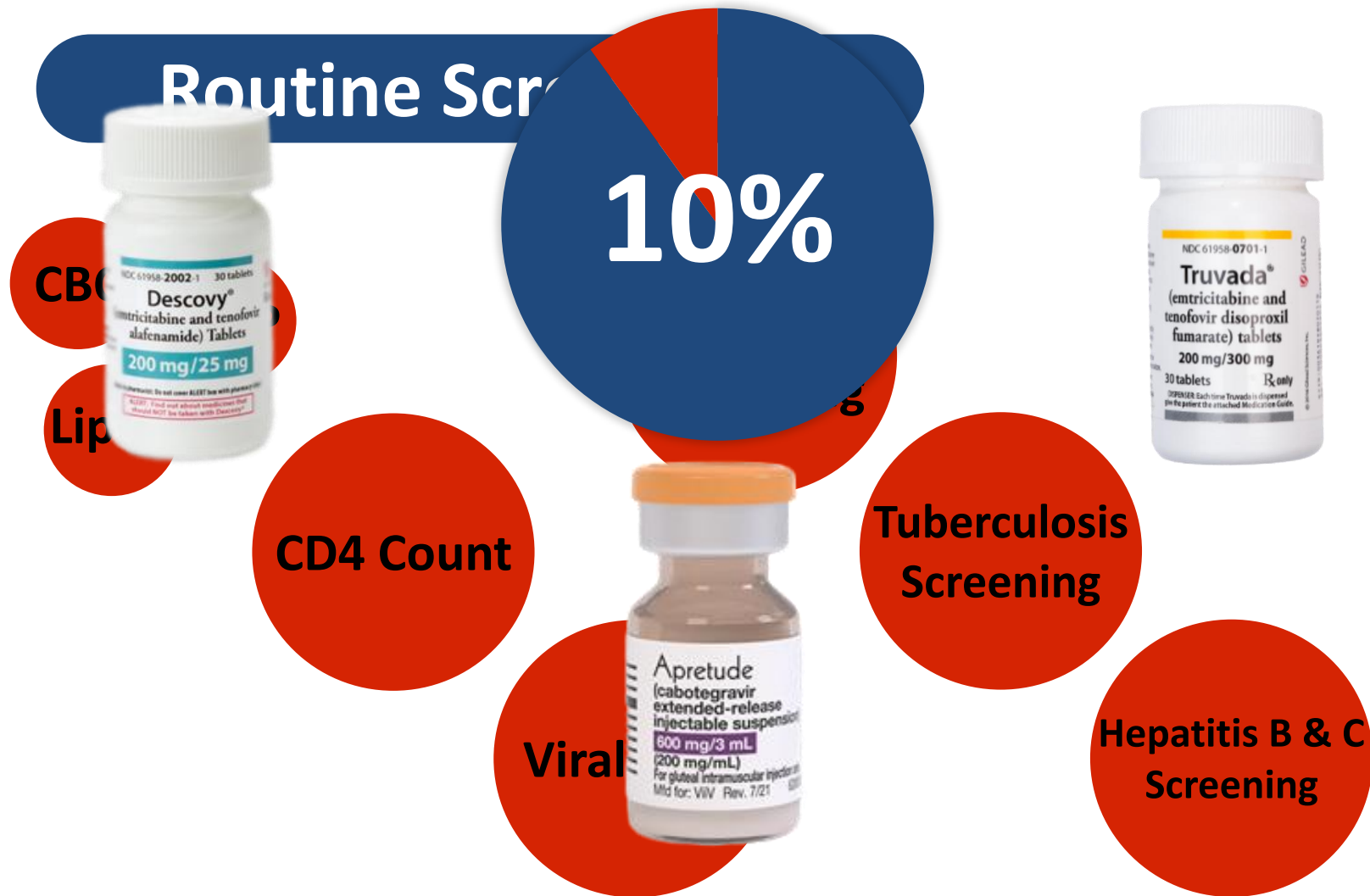


info.NIH.gov



HLA-B*5701 Testing

HIV Clinical Care



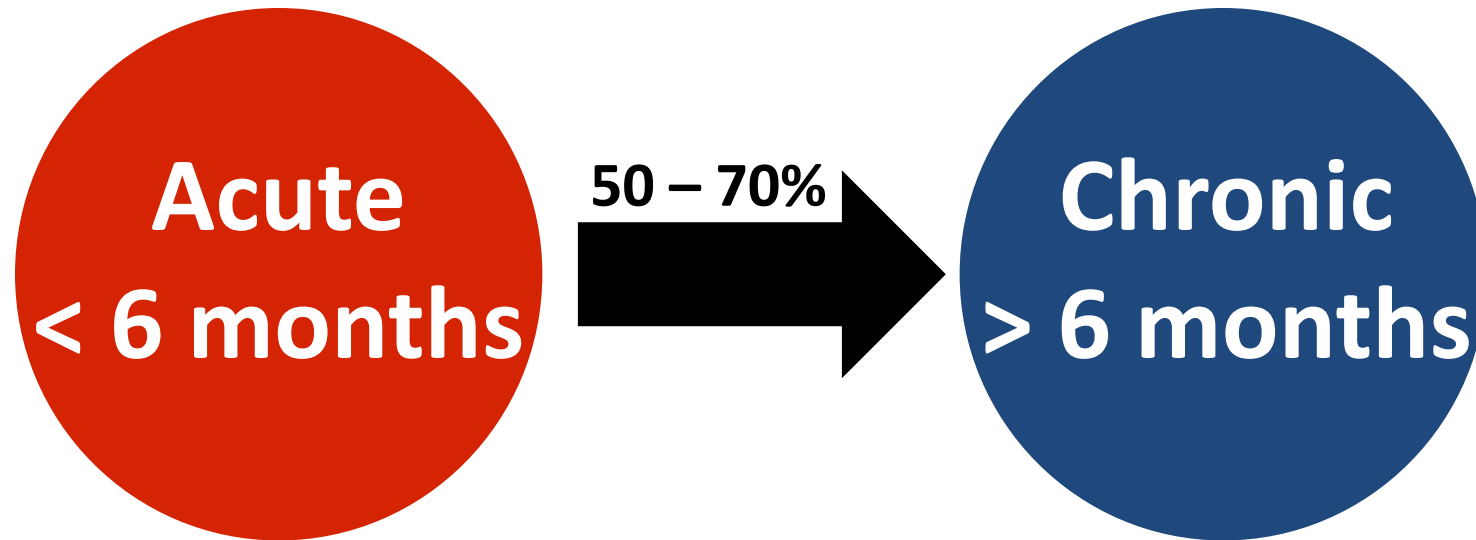
Hepatitis C

HCV in the US – National Statistics

HCV in Oklahoma – State Statistics

Clinical Presentation and Care in HCV

Hepatitis C



HCV IN THE US – NATIONAL STATISTICS

HCV in the US – National Statistics

- There's an estimated 2.2 million persons with HCV (**acute** and **chronic**)
- In 2021, it's estimated that there were 69,800 new **acute** infections
- For **chronic** infections, the reported number is 107,540
- Disproportionately impacts person who inject drugs

2.2 million

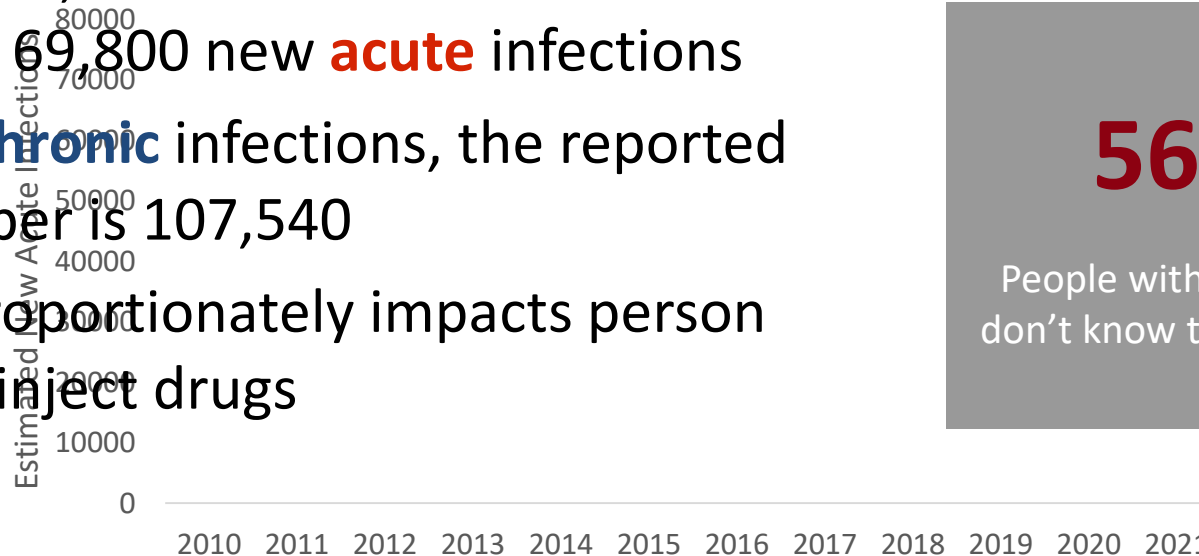
Approximately how many people are diagnosed with HCV

56%

People with HCV that don't know they have it

HCV in the US – National Statistics

- From 2010 to 2021, new **acute** cases increased by 148%
- New **chronic** cases increased by 148%
- In 2021, it's estimated that there were 69,800 new **acute** infections
- For **chronic** infections, the reported number is 107,540
- Disproportionately impacts person who inject drugs



2.2 million

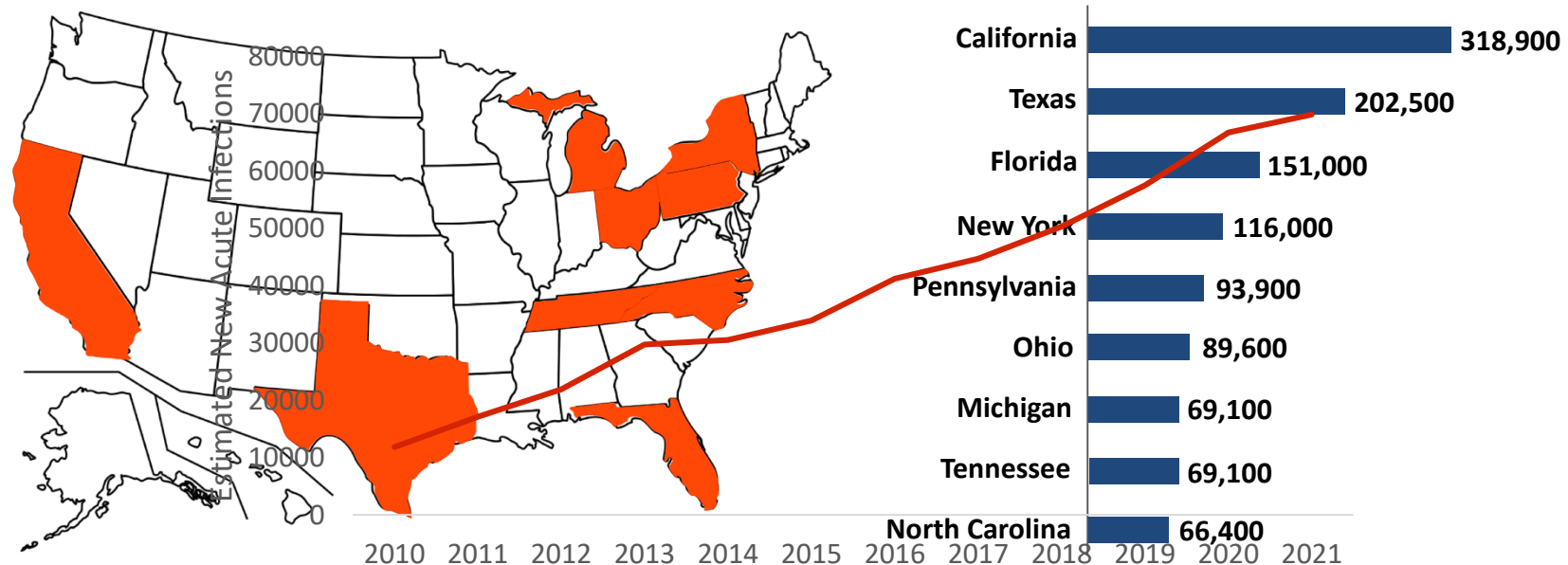
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People with HCV that don't know they have it

HCV in the US – National Statistics

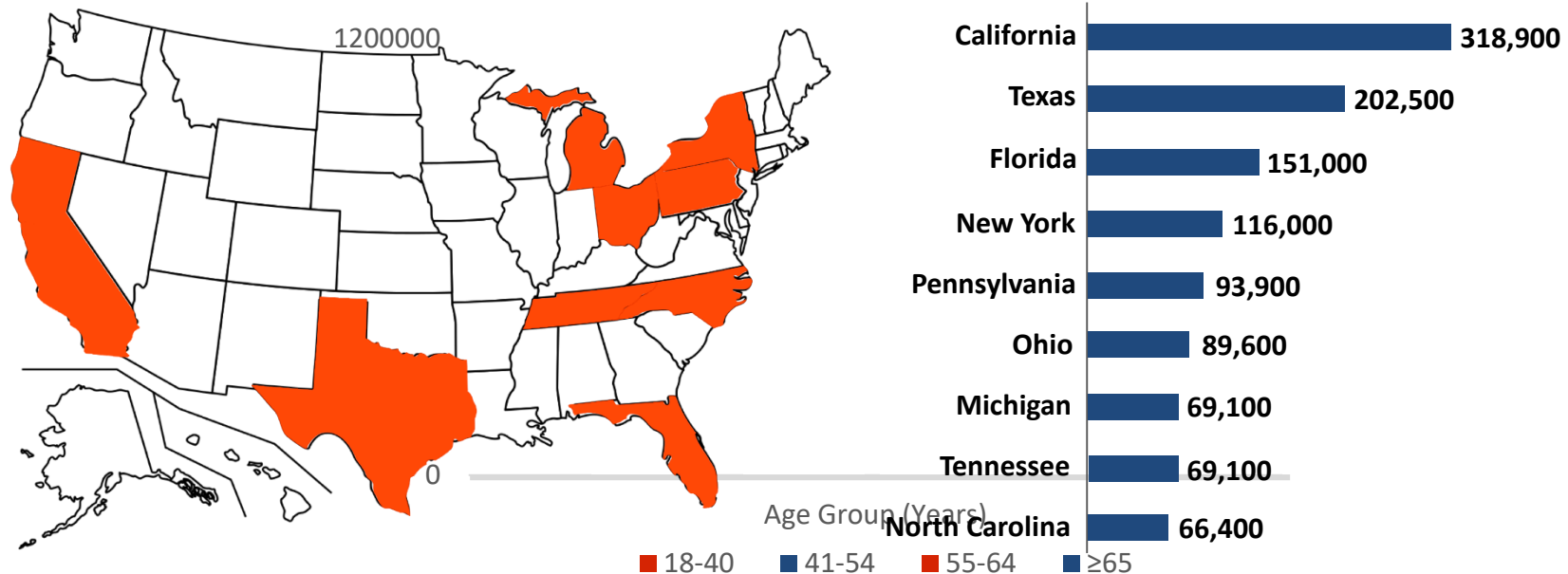
- From 2010 to 2021, new **acute** cases increased by 492%
- New **chronic** cases increased by 148%



HCV in the US – National Statistics

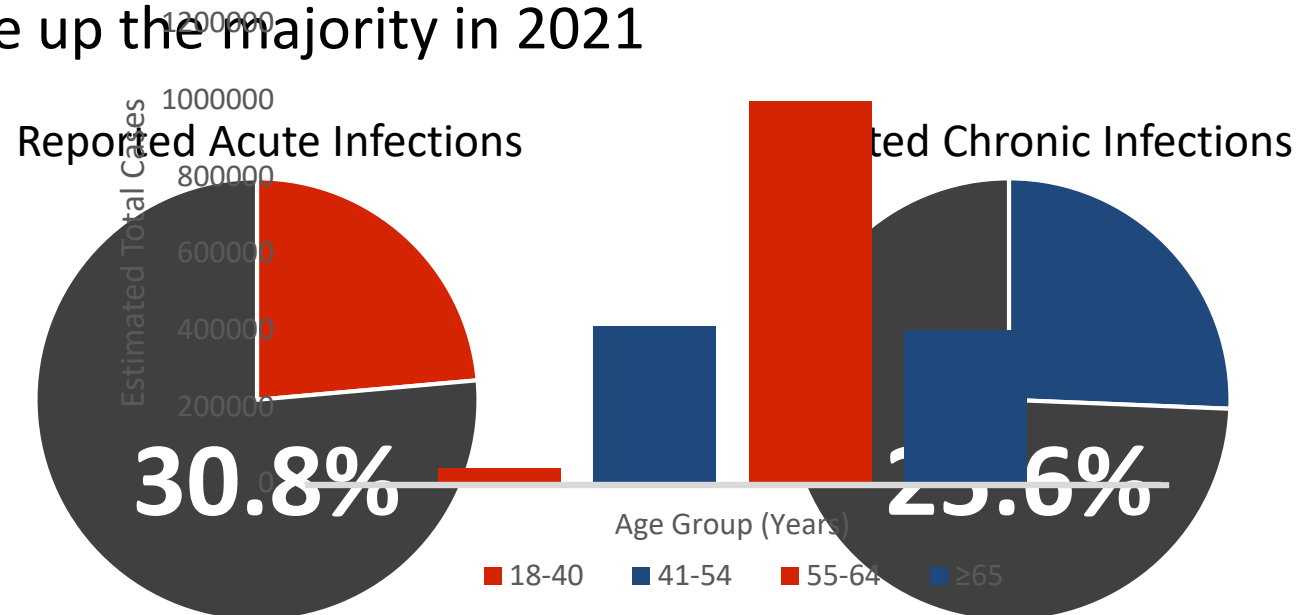
- For total infections, more than 50% of people with HCV are age 55 y

Estimated 2.2 million total HCV cases



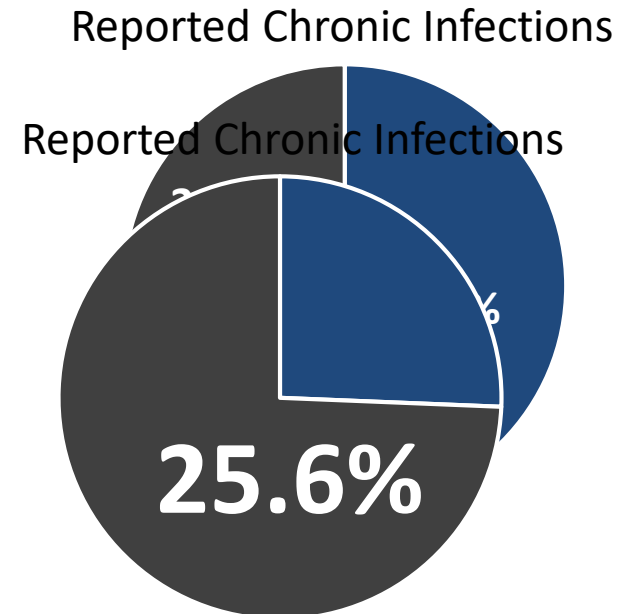
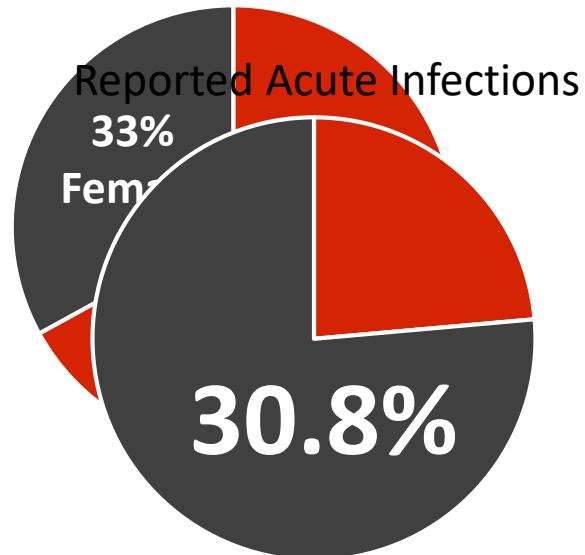
HCV in the US – National Statistics

- For total infections, more than 50% of people with HCV are age 55 years or older
- For both new **acute** and **chronic** infections, those aged 30-39 make up the majority in 2021



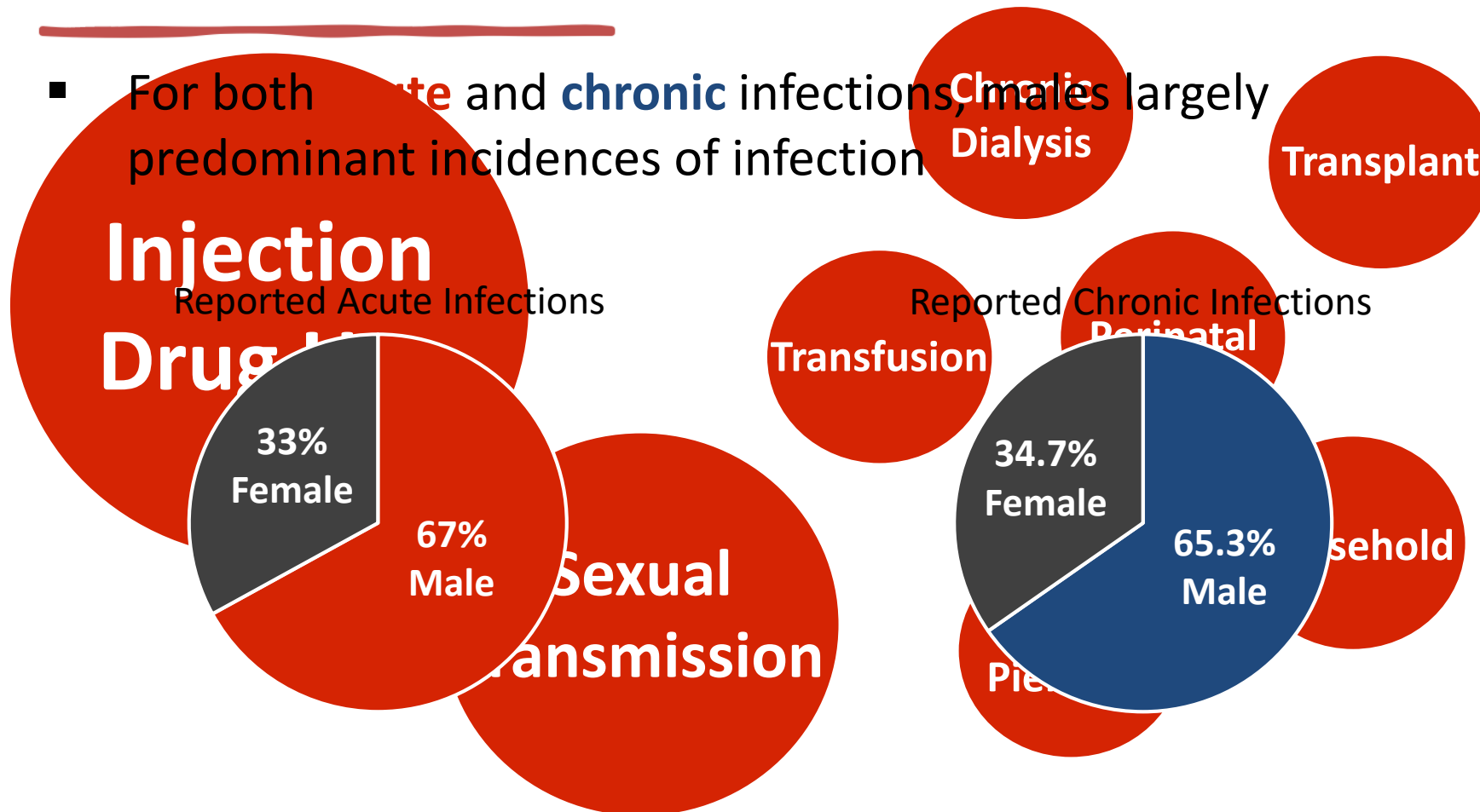
HCV in the US – National Statistics

- For both **acute** and **chronic** infections, **50%** of people with HCV are aged 50 years or older
- For both new **acute** and **chronic** infections, those aged 30-39 make up the majority in 2021

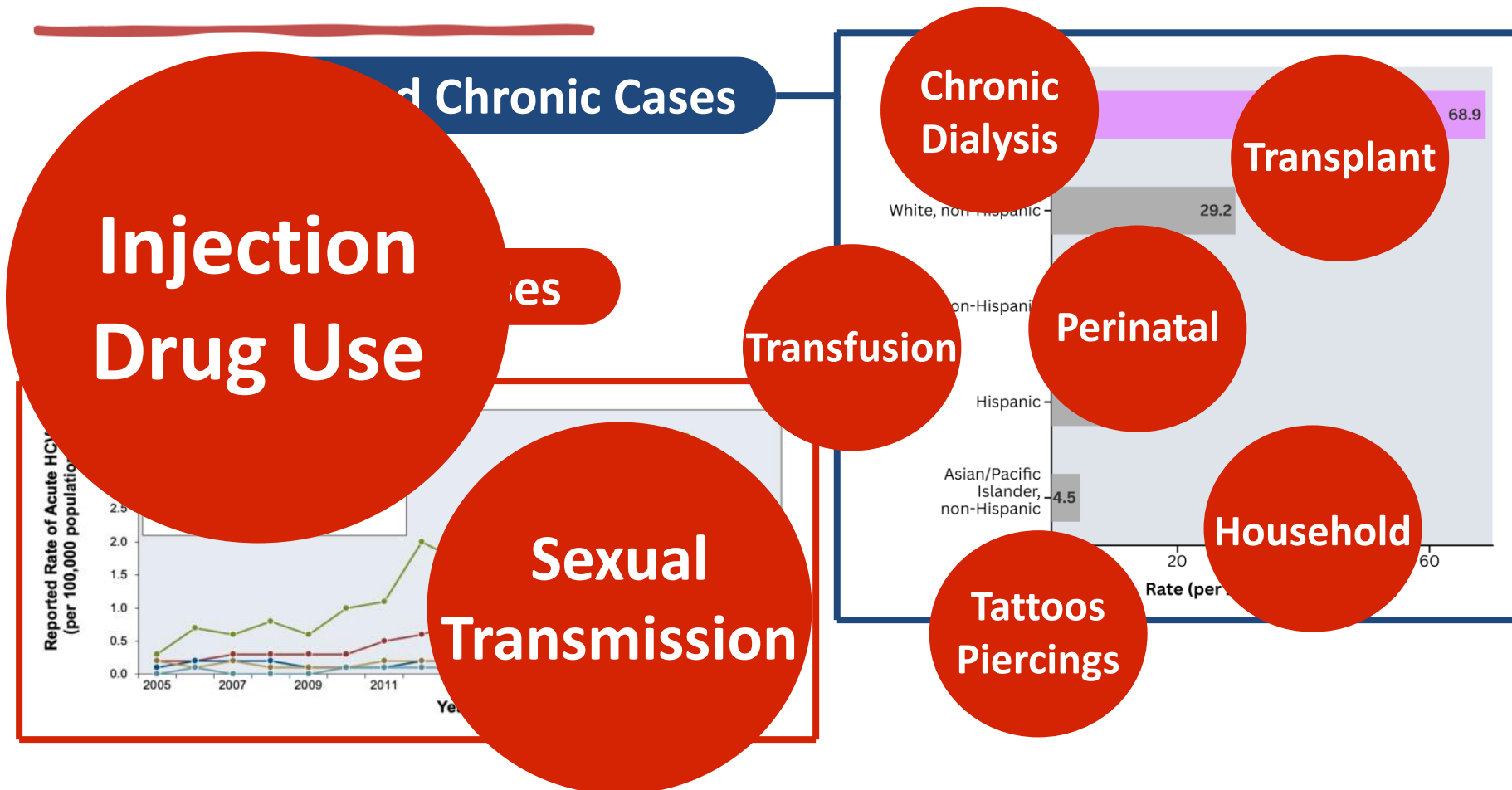


HCV in the US – National Statistics

- For both **acute** and **chronic** infections, males largely predominant incidences of infection



HCV in the US – National Statistics



HCV IN OKLAHOMA – STATE STATISTICS

HCV in Oklahoma – State Statistics

- There's an estimated 53,000 persons with HCV in Oklahoma (**acute** and **chronic**)
- Oklahoma is **#2** in the nation for prevalence of hepatitis C infections
- Oklahoma is **#1** in the nation for newly reported **chronic** infections

53,300

Approximately how many people are diagnosed with HCV in Oklahoma

#1

For rate of new chronic hepatitis C infections

HCV in Oklahoma – State Statistics

- There's an estimated 53,000 persons with HCV in Oklahoma (**acute** and **chronic**)

Oklahoma Risk Factors

- Oklahoma is **#2** in the nation for prevalence of hepatitis C infections
- Oklahoma is **#1** in the nation for newly reported **chronic** infections

53,300

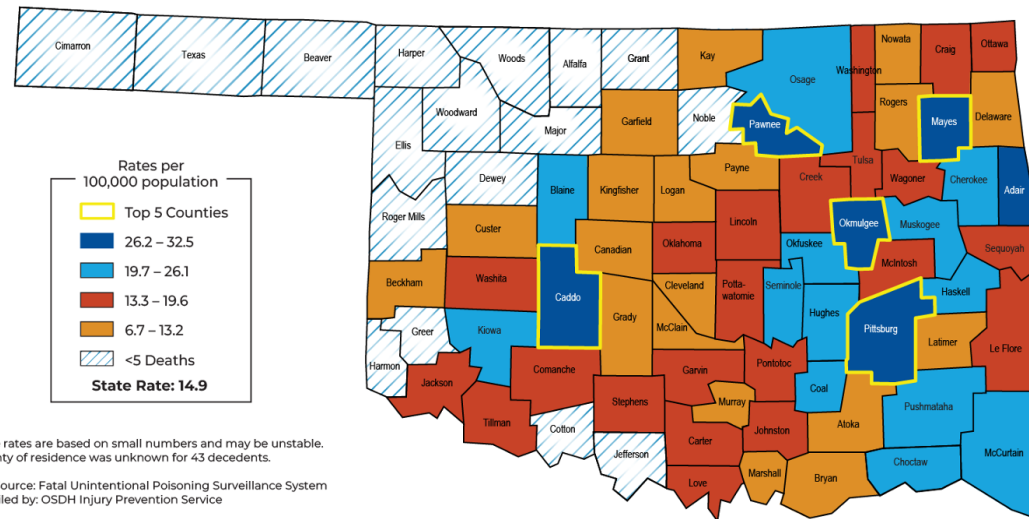
Approximately how many people are diagnosed with HCV in Oklahoma

#1

For rate of new chronic hepatitis C infections

HCV in Oklahoma – State Statistics

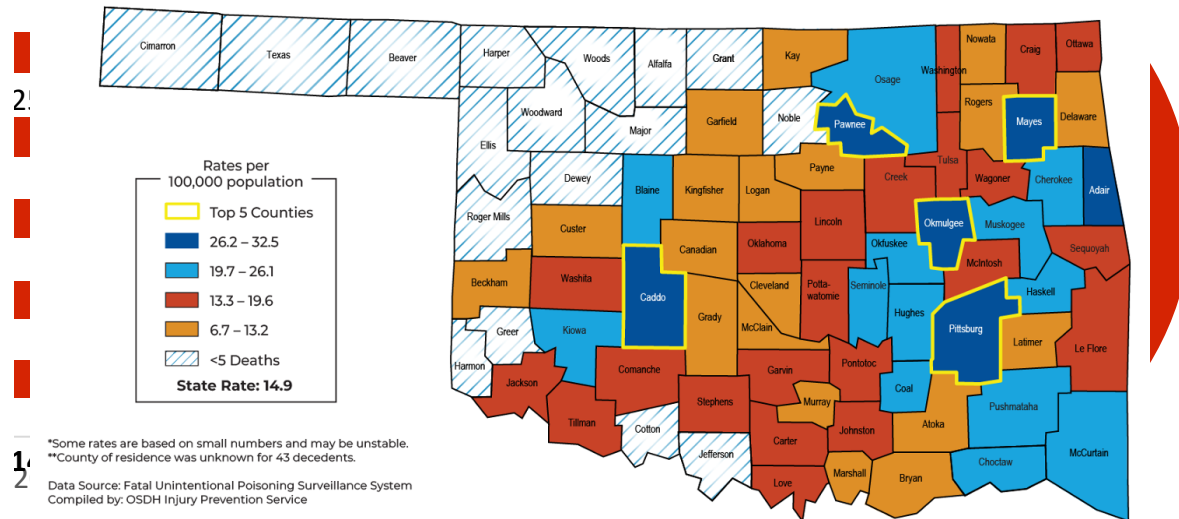
Oklahoma Unintentional Meth Overdose Deaths 2019 - 2023



HCV in Oklahoma – State Statistics



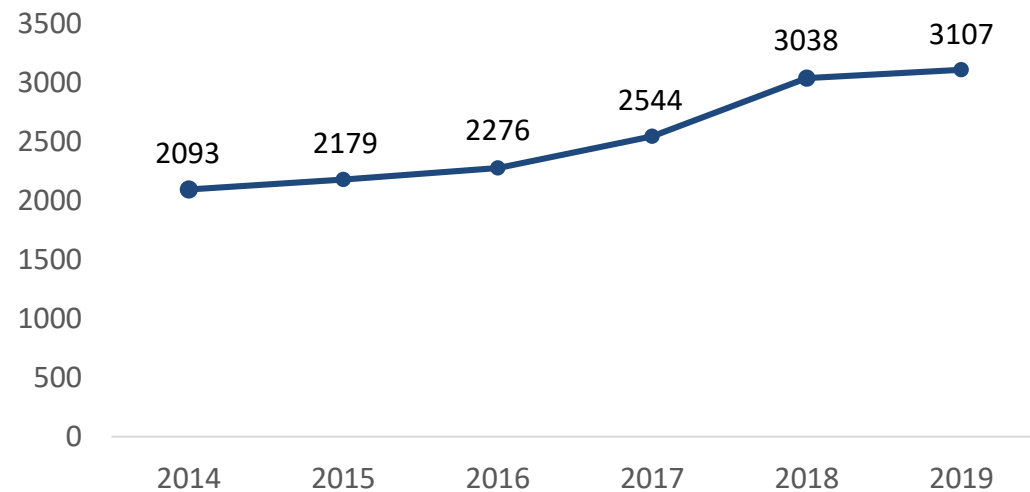
Unintentional Meth Overdose Deaths 2019 - 2023



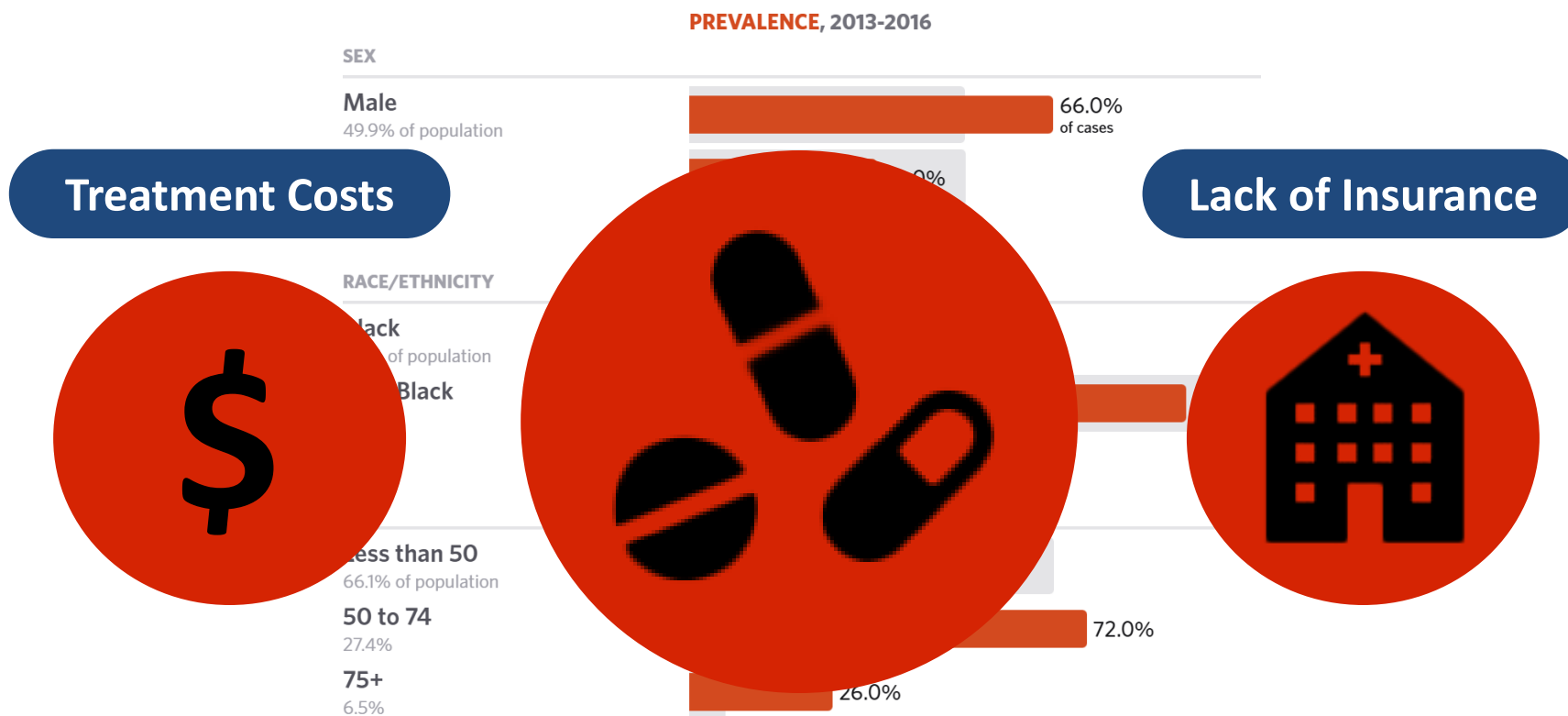
incarcerations per 100K

HCV in Oklahoma – State Statistics

Incarceration Infection Rates

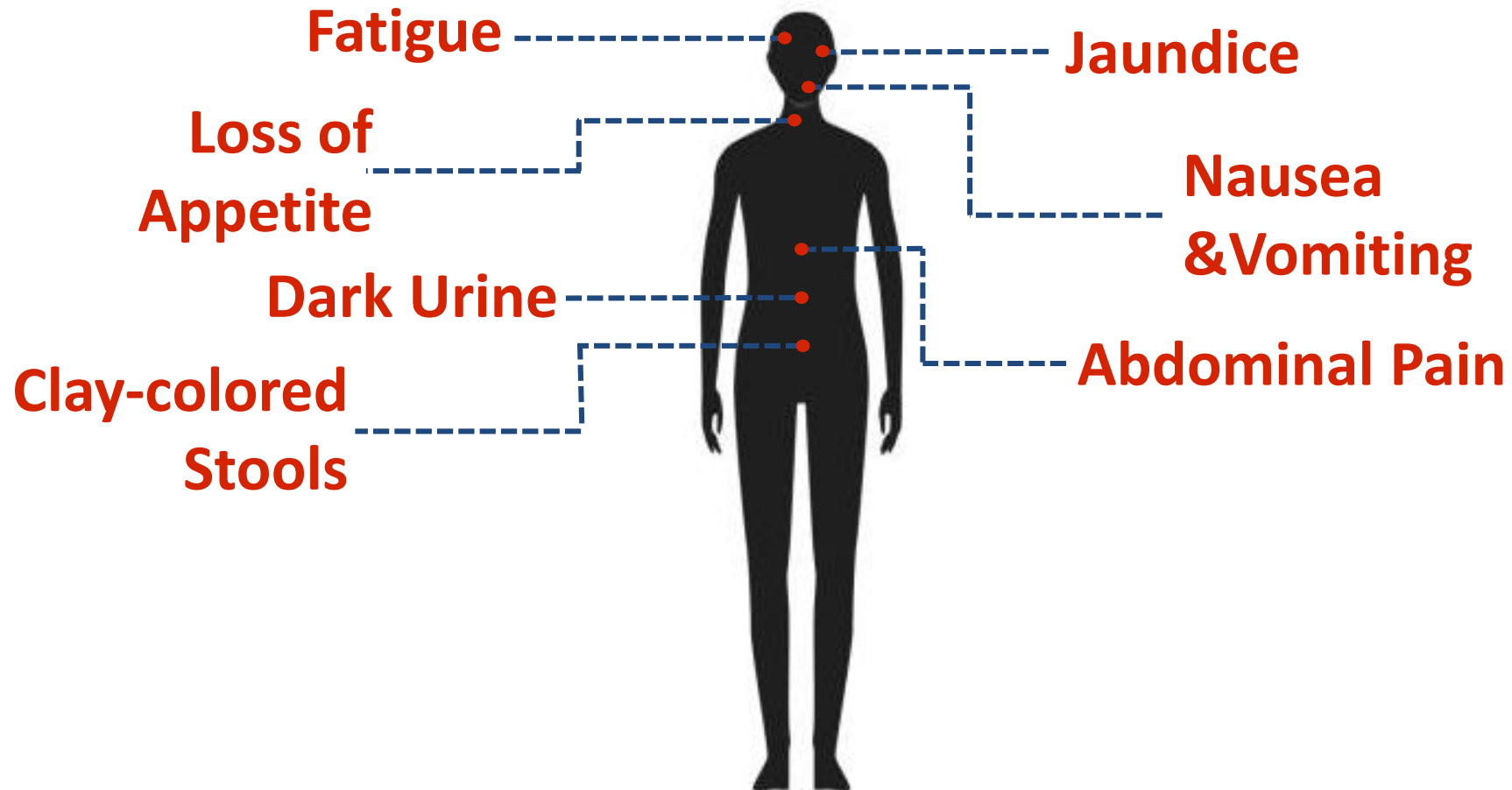


HCV in Oklahoma – State Statistics

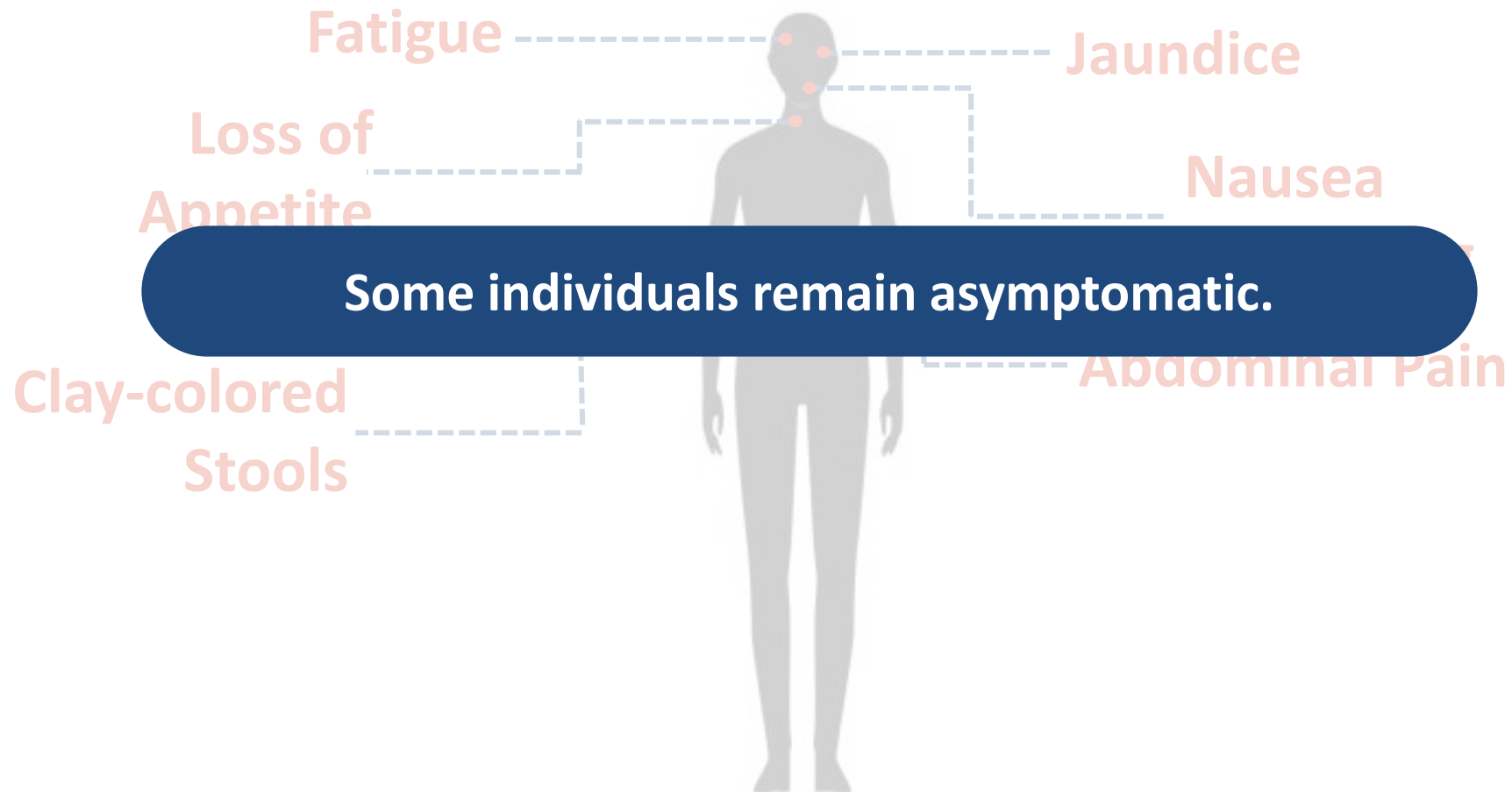


CLINICAL PRESENTATION AND CARE IN HCV

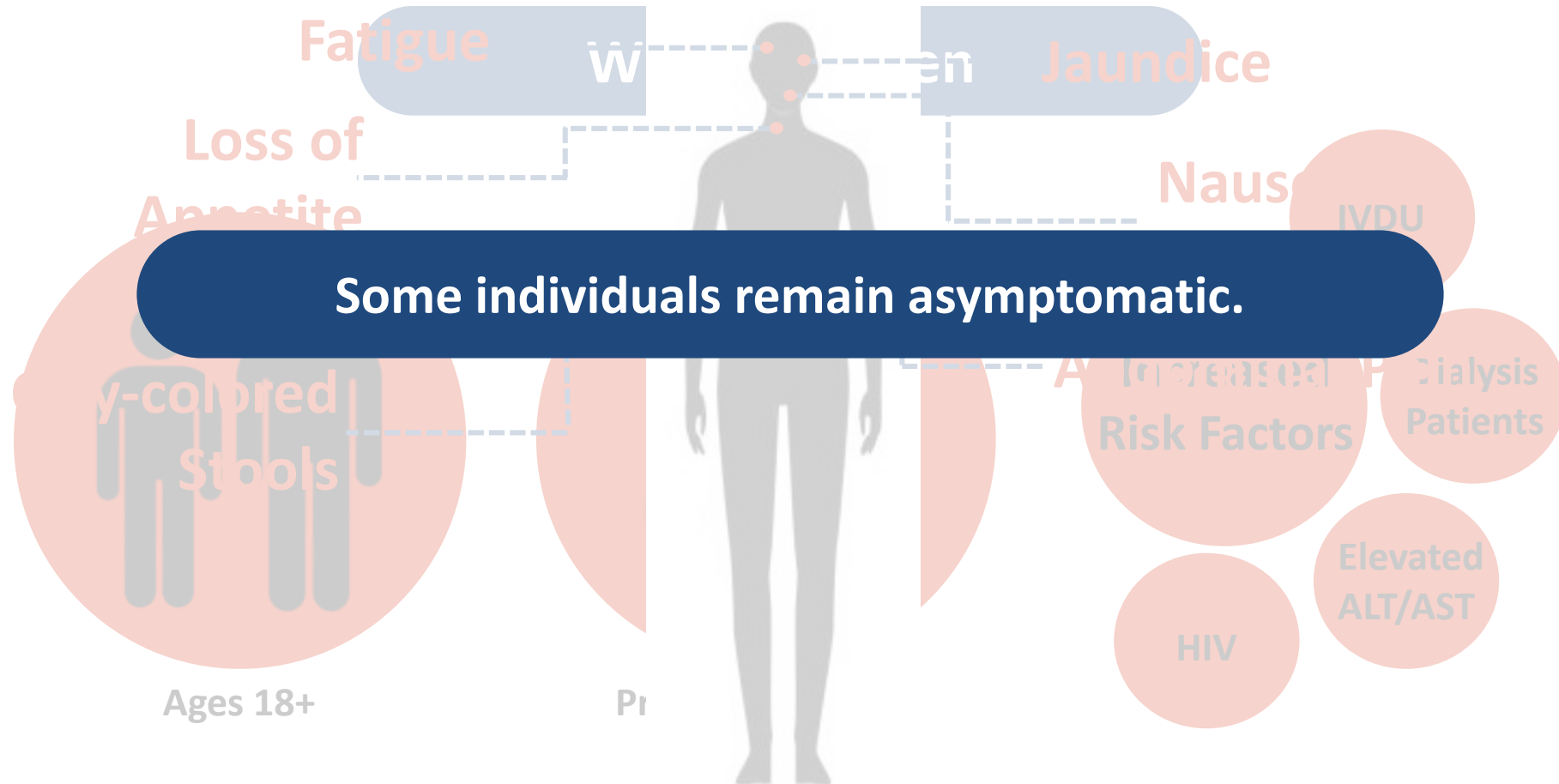
HCV Symptoms



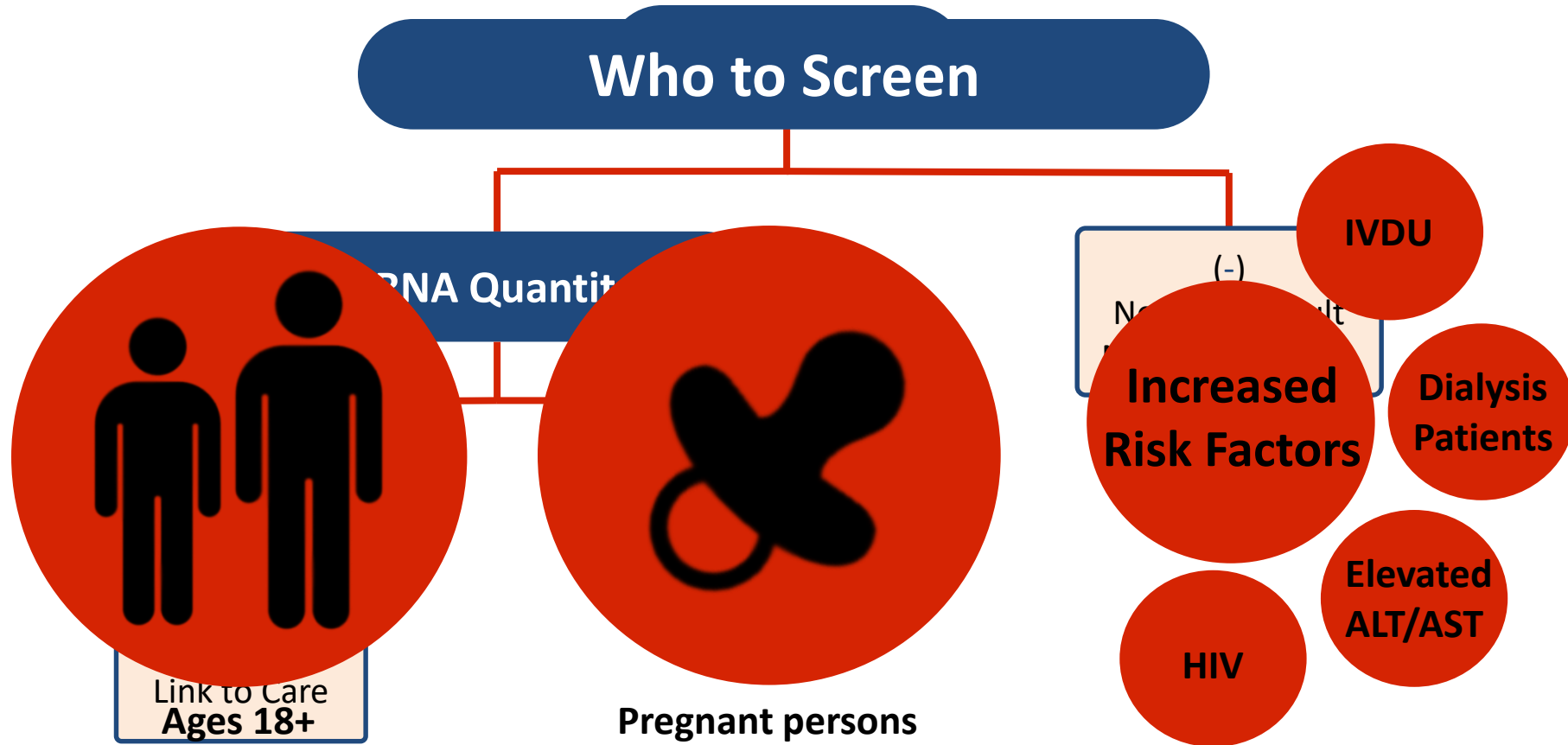
HCV Symptoms



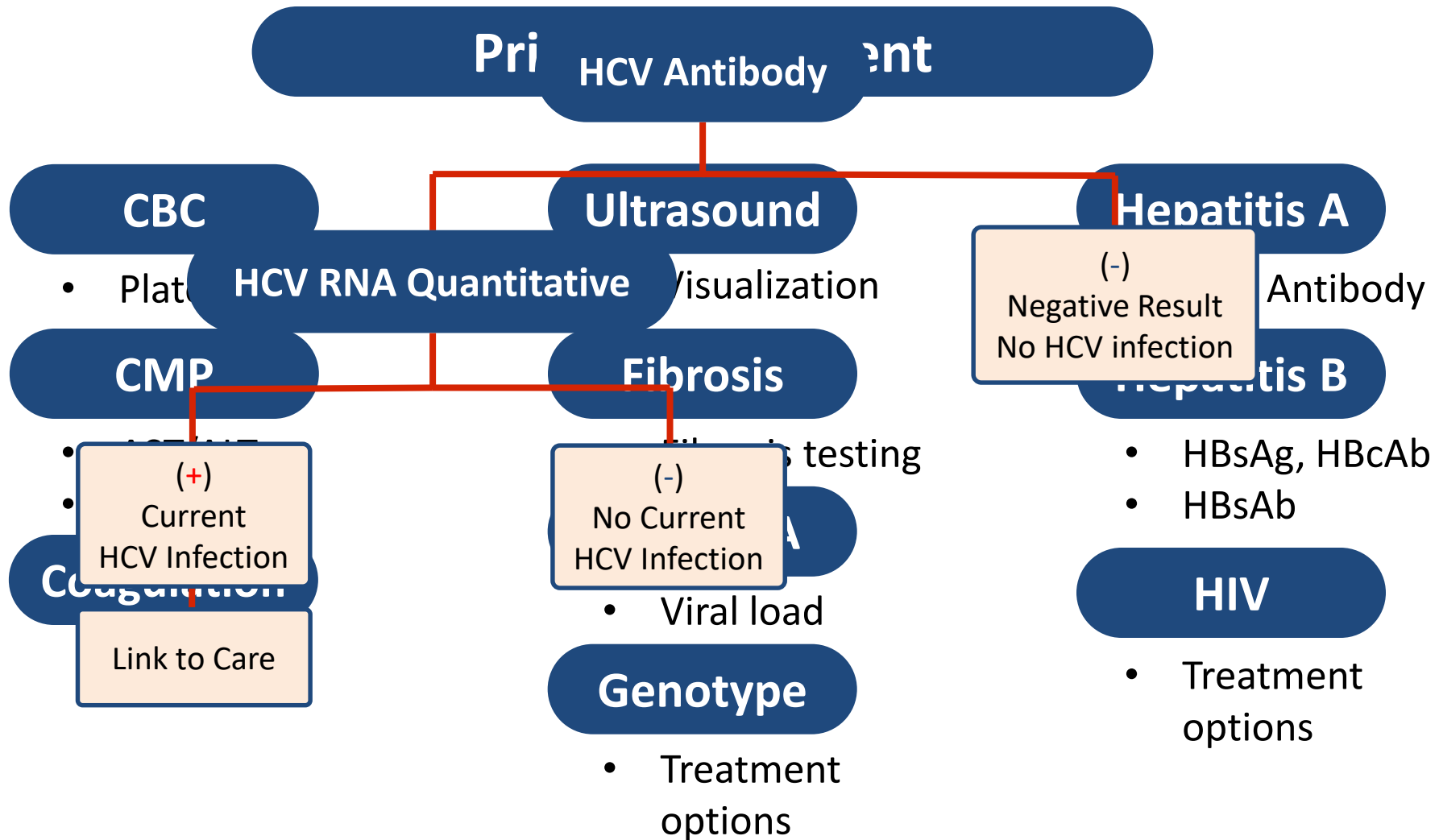
HCV Diagnosis



HCV Diagnosis

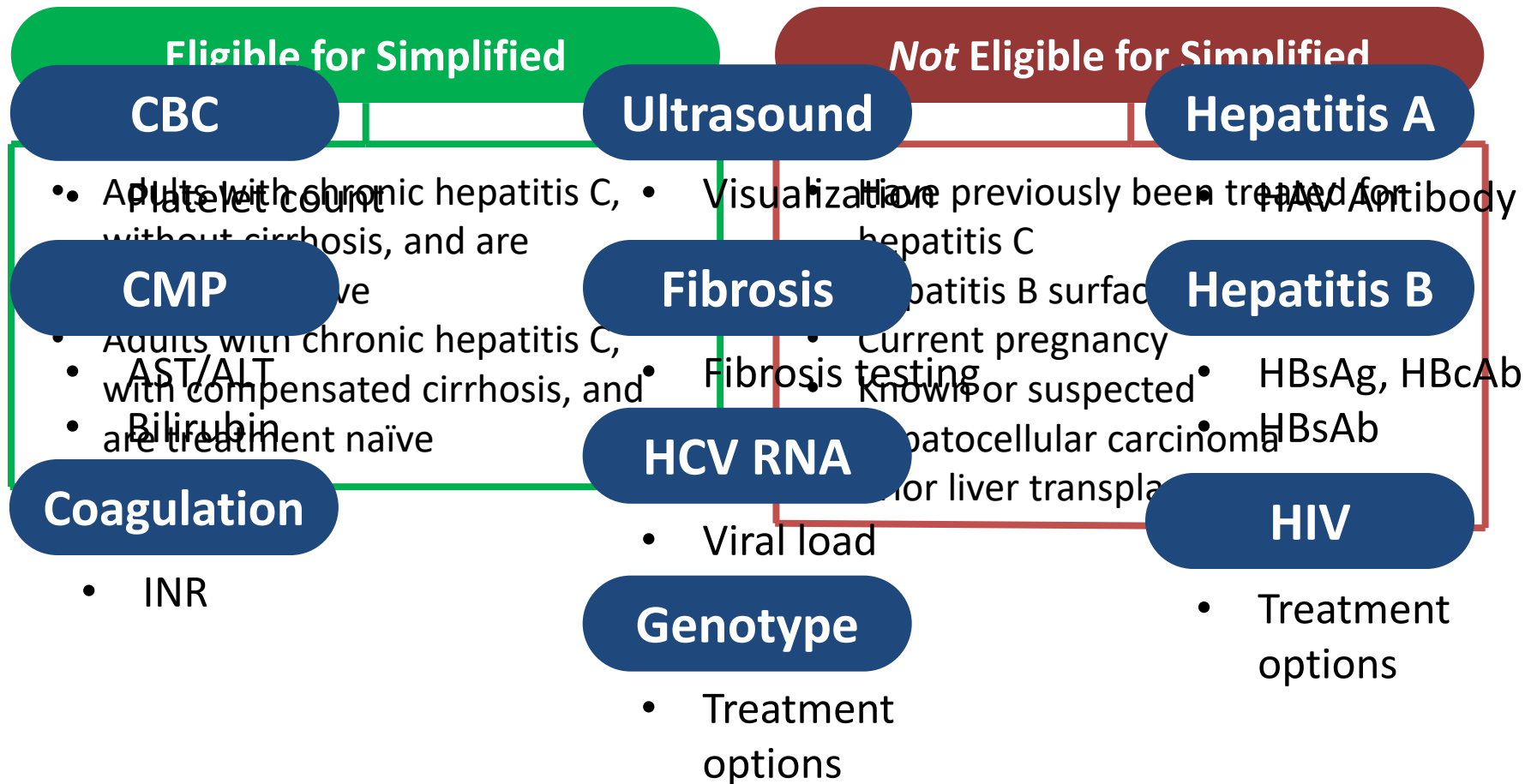


HCV Diagnostic Care



HCV Clinical Care

Prior to Treatment



HCV Clinical Care

Chronic Hepatitis C

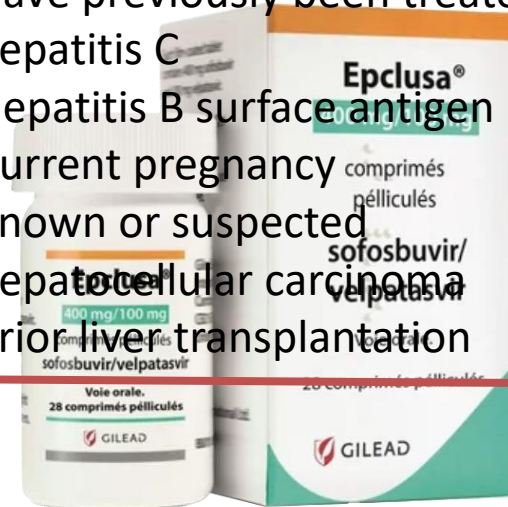
Eligible for Simplified

- Adults with chronic hepatitis C, without cirrhosis, and are treatment naïve
- Adults with chronic hepatitis C, with compensated cirrhosis, and are treatment naïve



Not Eligible for Simplified

- Have previously been treated for hepatitis C
- Hepatitis B surface antigen positive
- Current pregnancy
- Known or suspected hepatocellular carcinoma
- Prior liver transplantation



HCV Clinical Care

Chronic Hepatitis C

Eligible for Simplified



For genotypes 1-6
Three pills, once daily, with food
Total of 8 weeks



HCV Clinical Care

Chronic Hepatitis C

Eligible for Simplified

For genotypes 1, 2, 4, 5, & 6
One pill, once daily
Total of 12 weeks

Genotype 3

NS5A Resistance Testing

Y93H Resistance

Add
Ribavirin

Switch to
Vosevi



HCV Clinical Care

Chronic Hepatitis C

Eligible for Simplified



Add
Ribavirin

Switch to
Vosevi



HCV Clinical Care

Chronic Hepatitis C

Eligible for Simplified



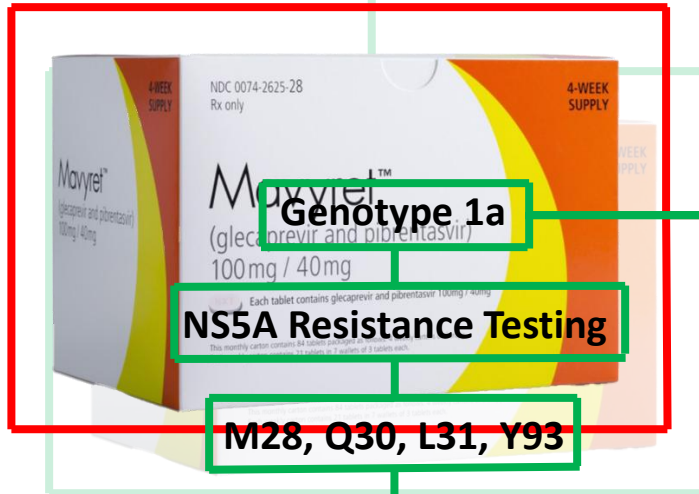
16-week Course



HCV Clinical Care

Acute Hepatitis C

Eligible for Simplified



Genotype 1a

NS5A Resistance Testing

M28, Q30, L31, Y93

16-week Course



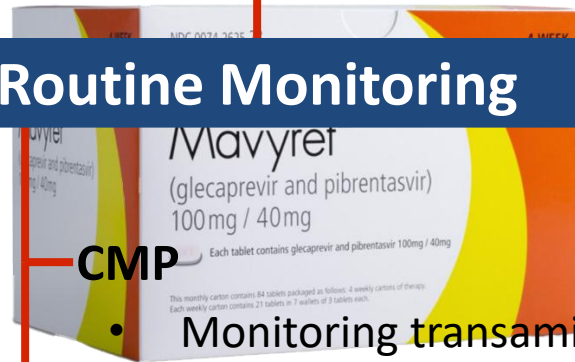
HCV Clinical Care

Acute Hepatitis C

Treatment Monitoring

- Confirm compliance
- Potential side effects
- Drug-drug interactions

Routine Monitoring



CMP

- Monitoring transaminases

CBC

- Monitoring drug-drug interactions

Special Monitoring



Blood glucose

- If diabetic

INR

- If on warfarin

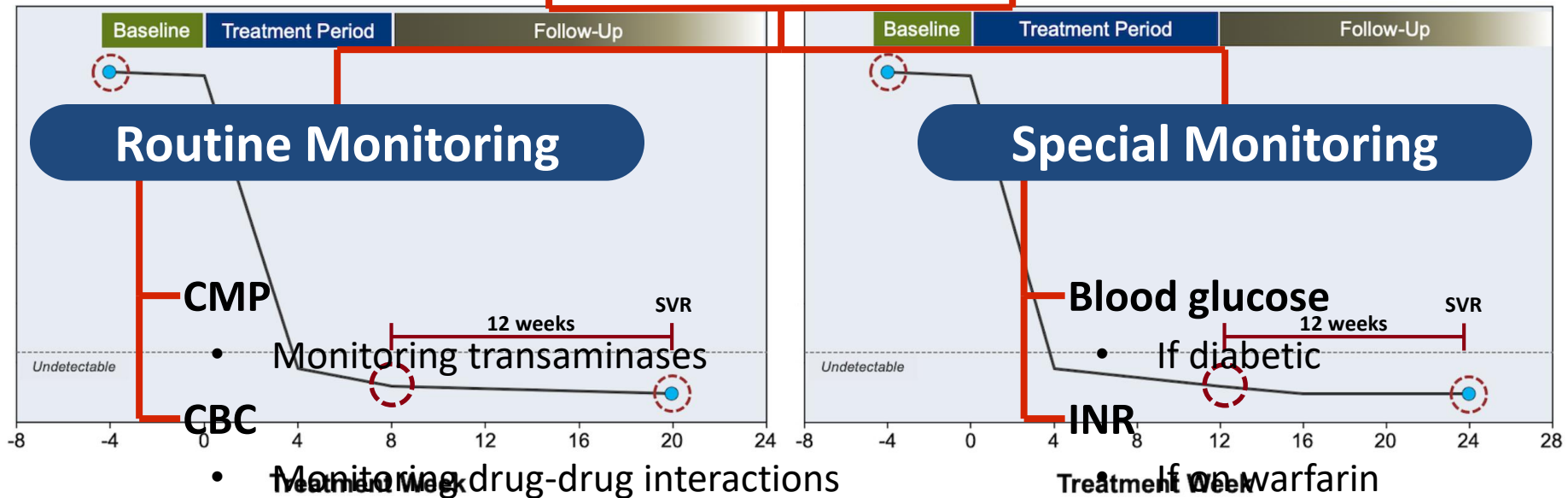
HCV Clinical Care

Treatment Success

- Confirm compliance
- Potential side effects
- Drug-drug interactions

8-week Treatment Course

12-week Treatment Course



Routine Monitoring

Special Monitoring

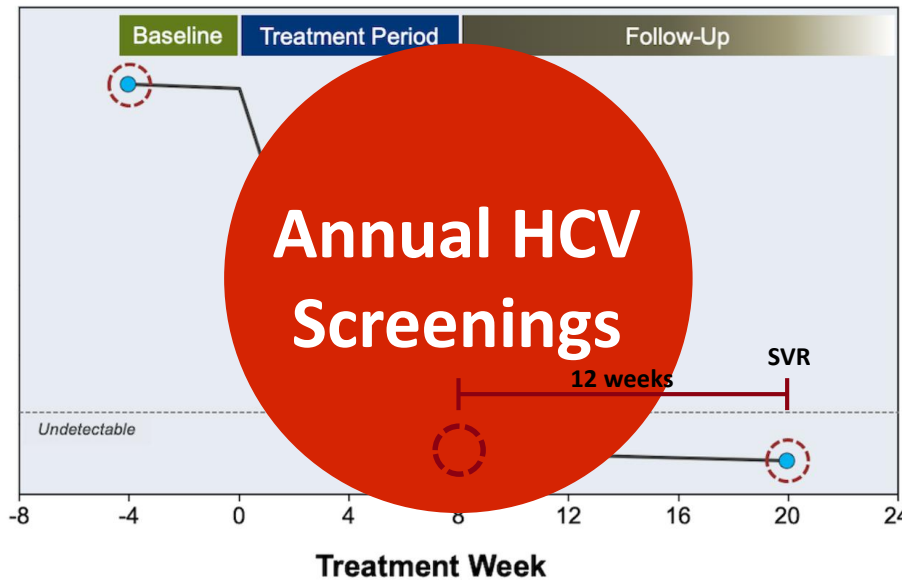
- Monitoring drug-drug interactions

If on warfarin

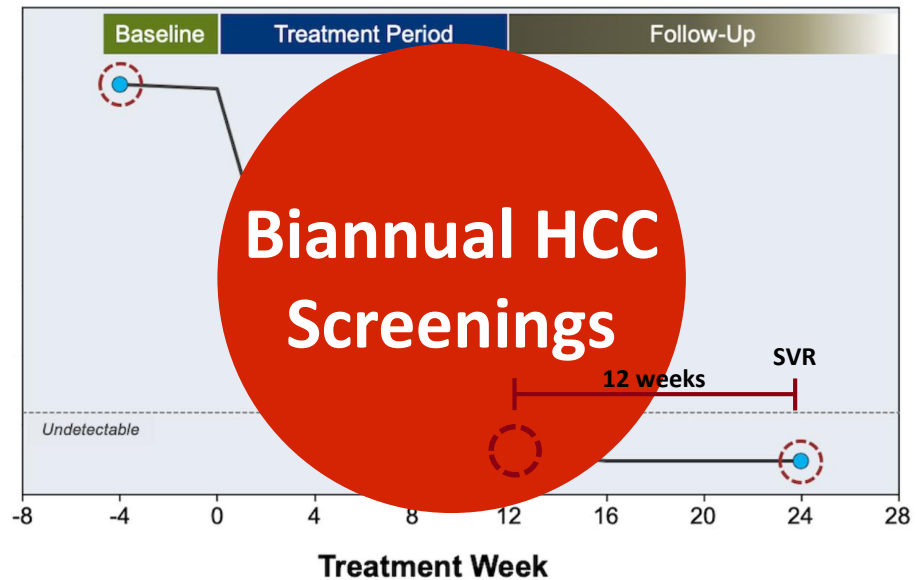
HCV Clinical Care

Treatment Success

Recurrent Exposures



Presence of Cirrhosis



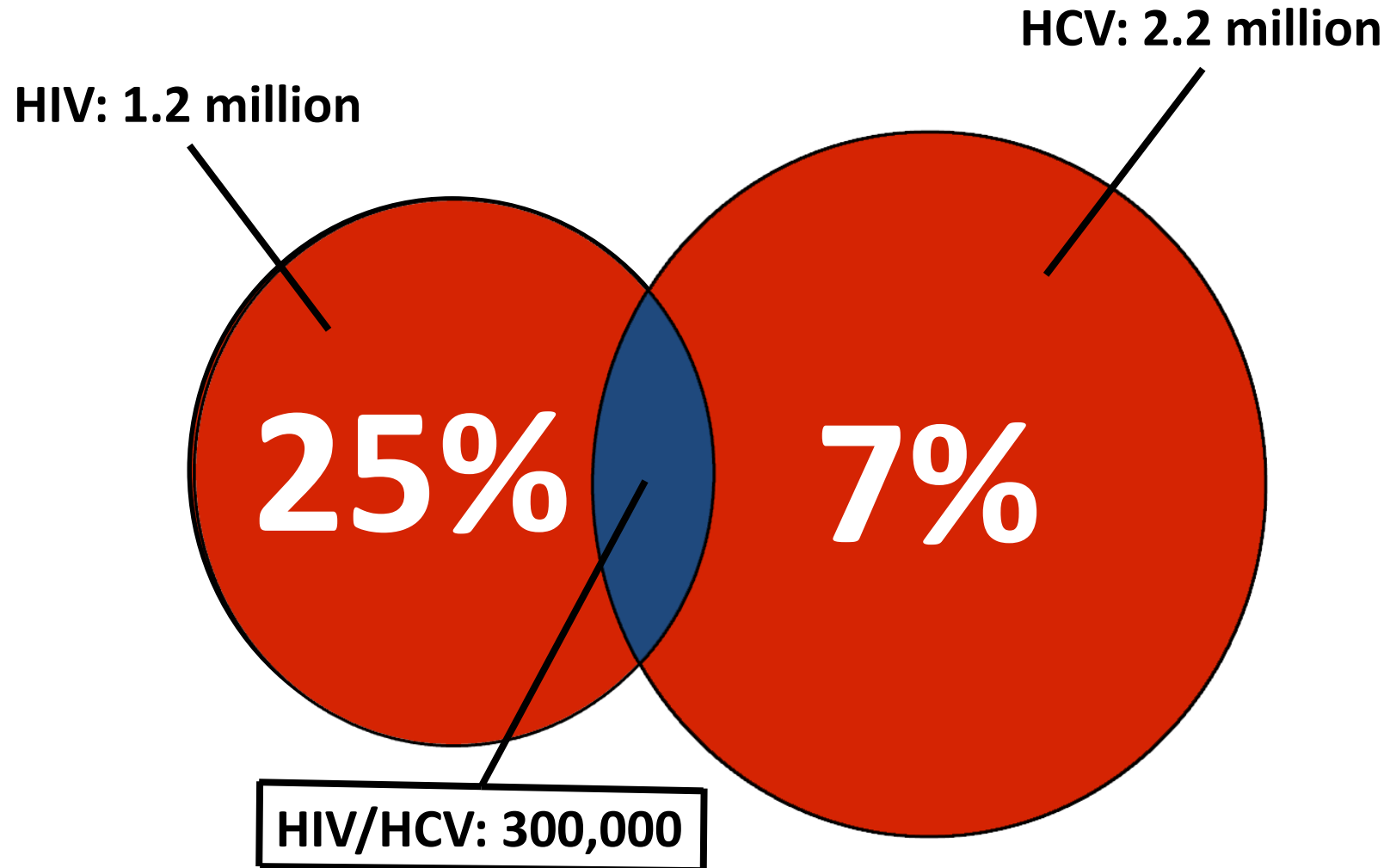
Co-Infection – HIV & HCV

Co-Infection Clinical Information

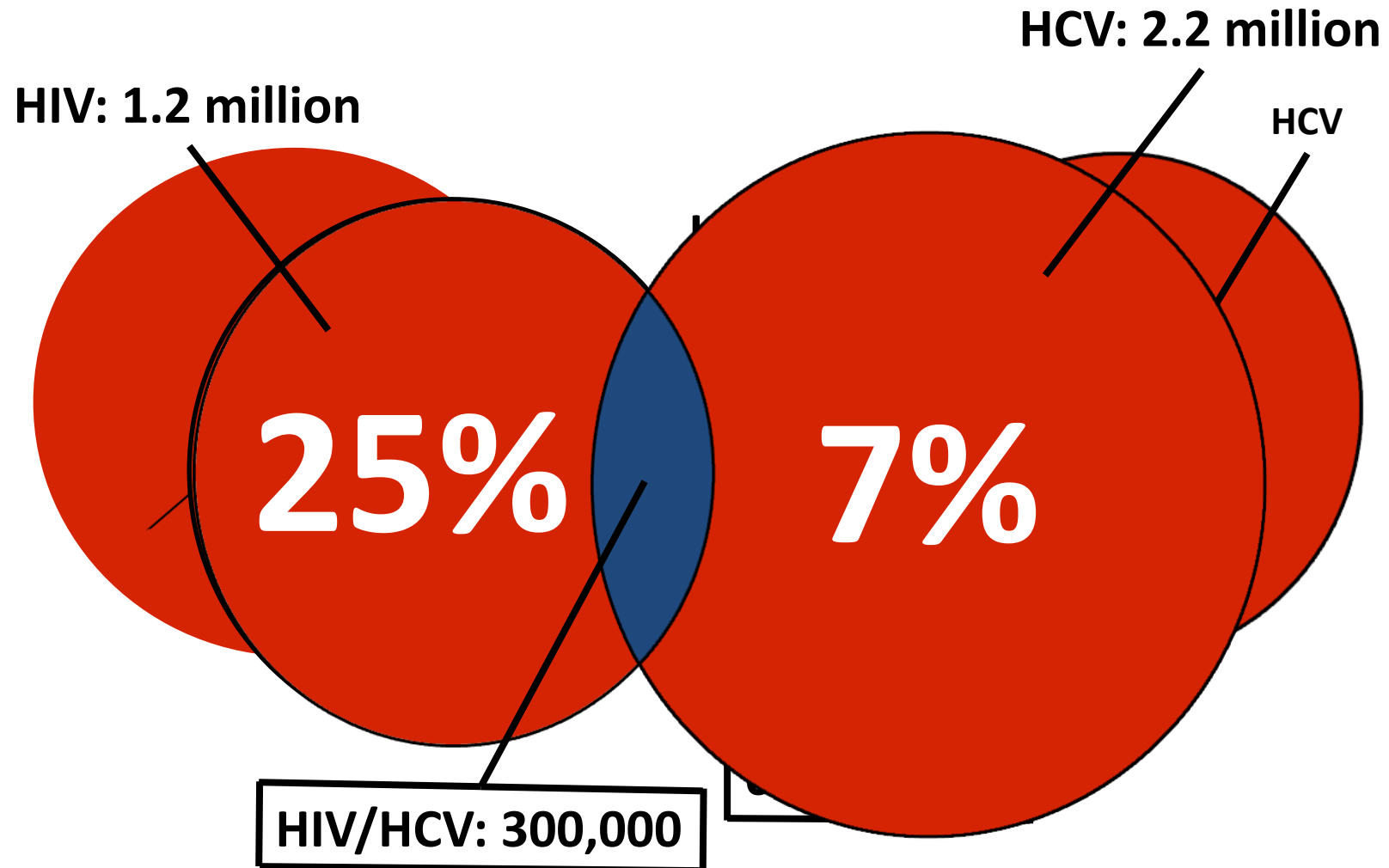
Treatment in Co-Infection

CO-INFECTION CLINICAL INFORMATION

Co-Infection Clinical Information

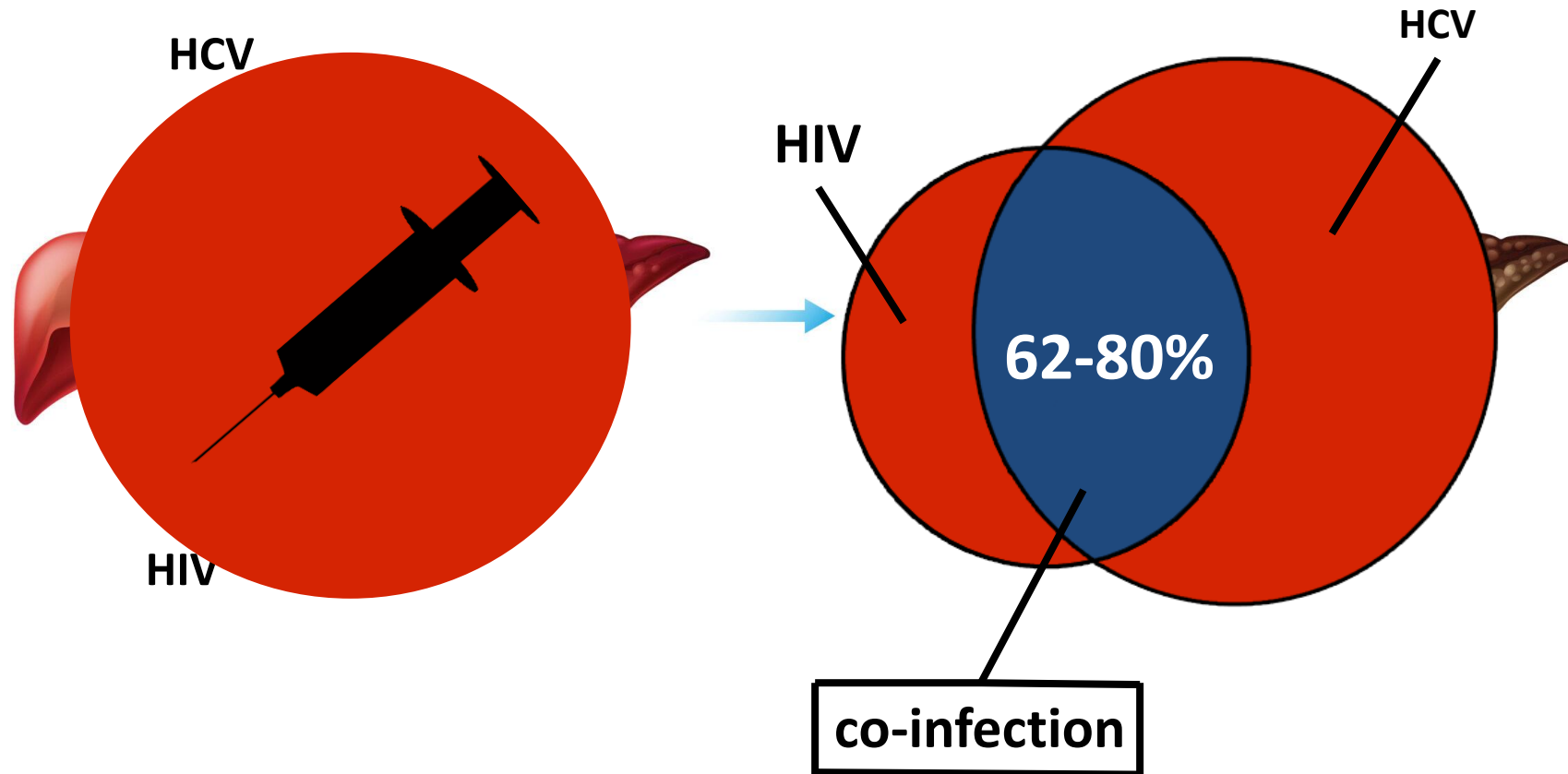


Co-Infection Clinical Information



Co-Infection

Clinical Information



TREATMENT IN CO-INFECTION

Co-Infection Treatment Considerations

Treatment is always considered.

Slow Disease Progression

Unique Motivation

Co-Infection

Treatment Considerations

Additional Considerations

Low CD4
NO HIV TREATMENT

Treatment is always considered.

HCV Complications
NO HIV TREATMENT

Slow Disease Progression

Same outcomes for co-infection

Unique Motivation

Consider GI/hepatology referral
in cirrhosis cases

Co-Infection

Treatment Considerations

Additional Considerations

Low CD4
≠
No HCV Treatment

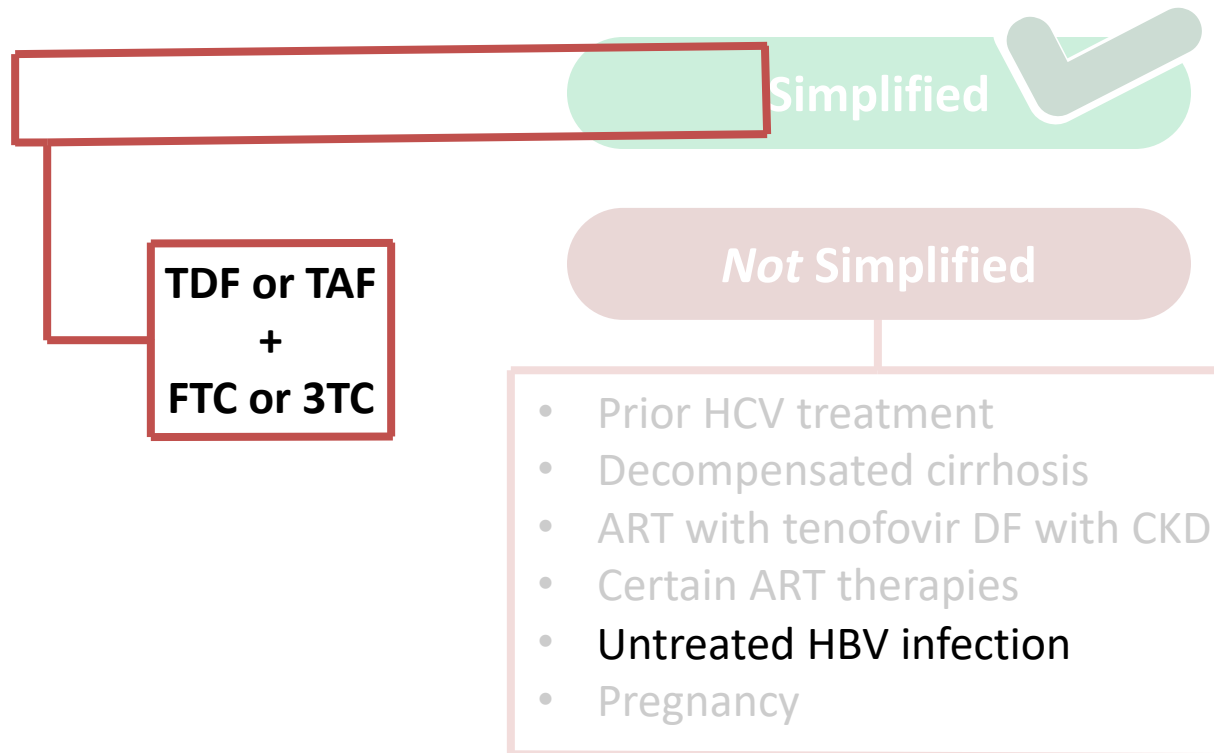
HCV Complications
≠
No HIV Treatment

Do not pause HIV treatment

Same outcomes for co-infection
and HCV mono-infection

Consider GI/hepatology referral
in cirrhosis cases

Co-Infection Treatment Options



Co-Infection

Drug-drug Interactions

		Ledipasvir/ Sofosbuvir (LDV/SOF)	Sofosbuvir/ Velpatasvir (SOF/VEL)	Eibasvir/ Grazoprevir (ELB/GRZ)	Glecaprevir/ Pibrentasvir (GLE/PIB)	Sofosbuvir/ Velpatasvir/ Voxilaprevir (SOF/VEL/VOX)
Protease Inhibitors	Boosted Atazanavir	A	A			
	Boosted Darunavir	A	A			
	Boosted Lopinavir	ND, A	A			ND
NNRTIs	Doravirine		ND		ND	ND
	Efavirenz				ND	ND
	Rilpivirine					
	Etravirine	ND	ND	ND	ND	ND
Integrase Inhibitors	Bictegravir			ND	ND	
	Cabotegravir	ND	ND	ND	ND	ND
	Cobicistat-boosted elvitegravir	C	C			C
	Dolutegravir					ND
	Raltegravir					ND
Entry Inhibitors	Fostemsavir	ND	ND	ND	ND	ND
	Ibalizumab-uiyk	ND	ND	ND	ND	ND
	Maraviroc	ND	ND	ND	ND	ND
NRTIs	Abacavir		ND	ND		ND
	Emtricitabine					
	Lamivudine		ND	ND		ND
	Tenofovir disoproxil fumarate	B, C	B, C			C
	Tenofovir alafenamide	D	D	ND		D

Co-Infection

Drug-drug Interactions



Mavyret
(glecaprevir/pibrentasvir)

Three pills, once daily
Total of 8 weeks

		Component					Example
		Ledipasvir/ Sofosbuvir (LDV/SOF)	Sofosbuvir/ Velpatasvir (SOF/VEL)	Eibasvir/ Grazoprevir (ELB/GRZ)	Glecaprevir/ Pibrentasvir (GLE/PIB)	Sofosbuvir/ Velpatasvir/ Voxilaprevir (SOF/VEL/VOX)	
Protease Inhibitors	Boosted Atazanavir	A	A				
	Boosted Darunavir	A	A				
	Boosted Lopinavir	ND, A	A			ND	a
NNRTIs	Doravirine		ND		ND	ND	Tivicay, Triumeq
	Efavirenz				ND	ND	
	Rilpivirine						
	Etravirine	ND	ND	ND	ND	ND	b, Pifeltro
Integrase Inhibitors	Bictegravir			ND	ND		
	Cabotegravir	ND	ND	ND	ND	ND	
	Cobicistat-boosted elvitegravir	C	C			C	Descovy, Odefsey, Truvada
	Dolutegravir					ND	
	Raltegravir					ND	b, Dovato, Triumeq
Entry Inhibitors	Fostemsavir	ND	ND	ND	ND	ND	
	Ibalizumab-uiyk	ND	ND	ND	ND	ND	
	Maraviroc	ND	ND	ND	ND	ND	
NRTIs	Abacavir		ND	ND		ND	
	Emtricitabine						
	Lamivudine		ND	ND		ND	a, Odefsey
	Tenofovir disoproxil fumarate	B, C	B, C			C	
	Tenofovir alafenamide	D	D	ND		D	Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

Co-Infection

Drug-drug Interactions



**Mavyret
(glecaprevir/pibrentasvir)**

**Three pills, once daily, with food
Total of 8 weeks**

Component	Example
Abacavir	Triumeq
Bictegravir	Biktarvy
Cabotegravir	Cabenuva
Dolutegravir	Dovato, Tivicay, Triumeq
Doravirine	Delstrigo, Pifeltro
Elvitegravir	Genvoya
Emtricitabine*	Biktarvy, Descovy, Odefsey, Truvada
Lamivudine*	Delstrigo, Dovato, Triumeq
Maraviroc	Selzentry
Raltegravir	Isentress
Rilpivirine	Cabenuva, Odefsey
Tenofovir (DF & AF)*	Biktarvy, Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

Co-Infection

Drug-drug Interactions



**Mavyret
(glecaprevir/pibrentasvir)**

One pill, once daily, with food
Total of 8 weeks

Component	Example
Atazanavir	Reyataz
Efavirenz	Atripla, Sustiva
Etravirine	Intelence
Nevirapine	Viramune
Ritonavir	Kaletra, Norvir

Found in Paxlovid

Co-Infection

Drug-drug Interactions



**Epclusa
(sofosbuvir/velpatasvir)**

**One pill, once daily
Total of 12 weeks**

Component	Example
Efavirenz	Atripla, Sustiva
Component	Example
Most antiretrovirals!	
Tipranavir	Aptivus

Co-Infection

Drug-drug Interactions



**Epclusa
(sofosbuvir/velpatasvir)**

**One pill, once daily
Total of 12 weeks**

Component	Example
Efavirenz	Atripla, Sustiva
Etravirine	Intelence
Nevirapine	Viramune
Tipranavir	Aptivus
Emtricitabine*	Biktarvy, Descovy, Odefsey, Truvada
Lamivudine*	Delstrigo, Dovato, Triumeq
Maraviroc	Selzentry
Raltegravir	Isentress
Rilpivirine	Cabenuva, Odefsey
Tenofovir (DF & AF)*	Biktarvy, Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

Co-Infection

Drug-drug Interactions



Vosevi
(sofosbuvir/velpatasvir/voxilaprevir)

One pill, once daily
Total of 12 weeks

Component	Example
Abacavir	Triumeq
Bictegravir	Biktarvy
Cabotegravir	Cabenuva
Dolutegravir	Dovato, Tivicay, Triumeq
Doravirine	Delstrigo, Pifeltro
Emtricitabine*	Biktarvy, Descovy, Odefsey, Truvada
Lamivudine*	Delstrigo, Dovato, Triumeq
Maraviroc	Selzentry
Raltegravir	Isentress
Rilpivirine	Cabenuva, Odefsey
Tenofovir (DF & AF)*	Biktarvy, Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

Co-Infection

Drug-drug Interactions



Vosevi
(sofosbuvir/velpatasvir/voxilaprevir)

One pill, once daily
One pill, once daily
Total of 12 weeks
Total of 12 weeks

Component	Example
Atazanavir	Reyataz
Efavirenz	Atripla, Sustiva
Etravirine	Intelence
Lopinavir	Kaletra

Co-Infection

Drug-drug Interactions



**Harvoni
(ledipasvir/sofosbuvir)**

**One pill, once daily
Total of 12 weeks**

Component	
Most antiretrovirals!	
Tipranavir	Aptivus

Co-Infection

Drug-drug Interactions



**Harvoni
(ledipasvir/sofosbuvir)**

**One pill, once daily
Total of 12 weeks**

Component	Example
Abacavir	Triumeq
Bictegravir	Biktarvy
Cabotegravir	Cabenuva
Component	Example
Tipranavir	Aptivus
Doravirine	Delstrigo, Prentro
Emtricitabine*	Biktarvy, Descovy, Odefsey, Truvada
Lamivudine*	Delstrigo, Dovato, Triumeq
Maraviroc	Selzentry
Raltegravir	Isentress
Rilpivirine	Cabenuva, Odefsey
Tenofovir (DF & AF)*	Biktarvy, Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

Co-Infection

Drug-drug Interactions



**Zepatier
(elbasvir/grazoprevir)**

**One pill, once daily
Total of 12 weeks**

Component	Example
Abacavir	Triumeq
Bictegravir	Biktarvy
Cabotegravir	Cabenuva
Dolutegravir	Dovato, Tivicay, Triumeq
Doravirine	Delstrigo, Pifeltro
Emtricitabine*	Biktarvy, Descovy, Odefsey, Truvada
Lamivudine*	Delstrigo, Dovato, Triumeq
Maraviroc	Selzentry
Raltegravir	Isentress
Rilpivirine	Cabenuva, Odefsey
Tenofovir (DF & AF)*	Biktarvy, Delstrigo, Descovy, Odefsey, Truvada

*hepatitis B coverage

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- [Hepatitis C Virus Infection: Adult and Adolescent OIs | NIH](#)
- [Table 3.5 – Chronic – Case Rates by Jurisdiction | 2022 Hepatitis Surveillance | CDC](#)
- [Figure 3.2 – Acute – Case Rates by Jurisdiction | 2022 Hepatitis Surveillance | CDC](#)
- [Figure 3.9 – Map of Death Rates | 2022 Hepatitis Surveillance | CDC](#)
- [Figure 3.3 – Acute – Map of Case Rates | 2022 Hepatitis Surveillance | CDC](#)

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