

Can Australia be the first country to eliminate HIV transmission?

How does Australia compare to other countries?

ASHM HIV/Sexual Health conference 2020

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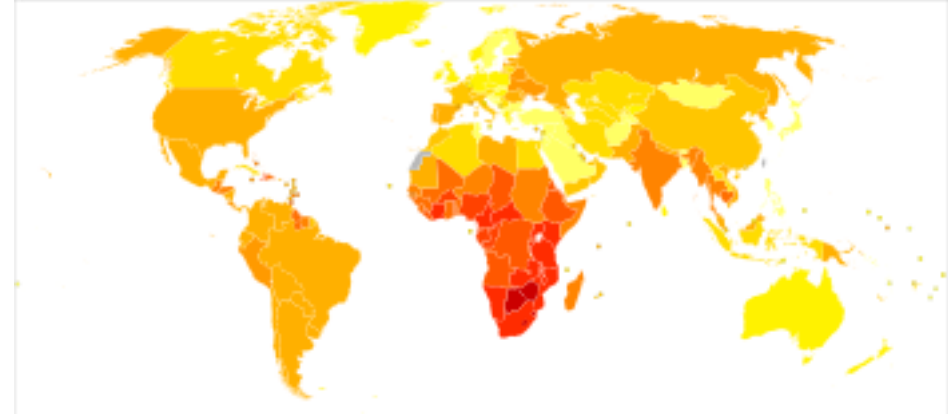
Conflicts of interest

- None

Outline of talk

- What do we mean by elimination?
- What measures should we use?
- How does Australia compare to other countries?

Global summary of the AIDS epidemic | 2019

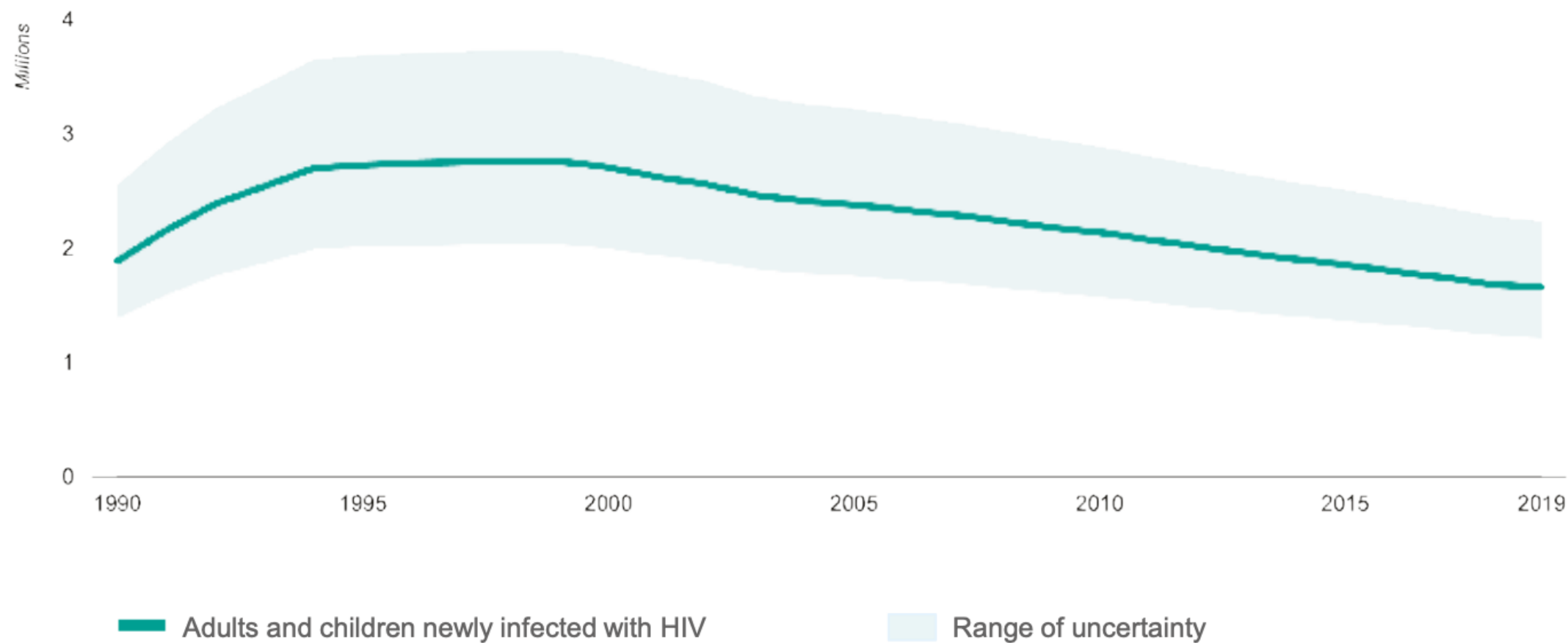


Number of people living with HIV	Total	38.0 million	[31.6 million–44.5 million]
	Adults	36.2 million	[30.2 million–42.5 million]
	Women (15+ years)	19.2 million	[16.4 million–22.2 million]
	Children (<15 years)	1.8 million	[1.3 million–2.2 million]

People newly infected with HIV in 2019	Total	1.7 million	[1.2 million–2.2 million]
	Adults	1.5 million	[1.1 million–2.0 million]
	Children (<15 years)	150 000	[94 000–240 000]

AIDS-related deaths in 2019	Total	690 000	[500 000–970 000]
	Adults	600 000	[430 000–840 000]
	Children (<15 years)	95 000	[61 000–150 000]

Adults and children newly infected with HIV | 1990–2019



There is optimism in the air...



Dr. Edwina Wright, an infectious diseases physician and clinical researcher at the Alfred Hospital at Monash University in Melbourne, who led the first trials of PrEP in Australia. Christina Simons for The New York Times

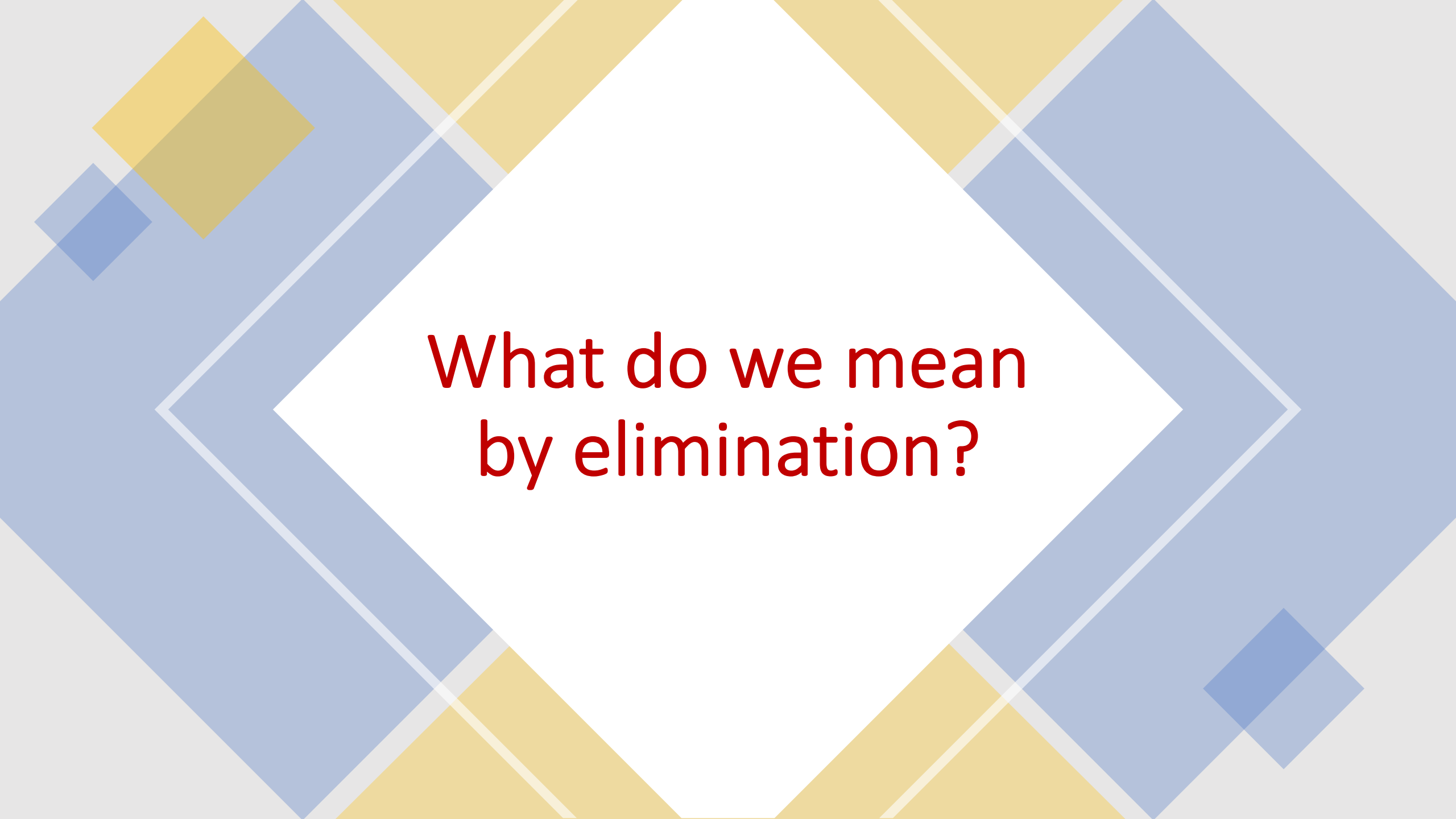
The New York Times

How Australia Could Almost Eradicate H.I.V. Transmissions

By Livia Albeck-Ripka

July 10, 2019

<https://www.nytimes.com/2019/07/10/world/australia/hiv-aids-prep-prevention-drug.html>



What do we mean
by elimination?

EIGHTH

National HIV Strategy

2018–2022



Australian Government
Department of Health

- By end of 2022
 - **Reduce incidence** of HIV transmissions in men who have sex with men, and other priority populations
 - Sustain the **virtual elimination** of HIV among sex workers, PWID and mother to child

Key words



Important definitions

- **Control**

- reduction of disease incidence, prevalence, morbidity, and/or mortality to a locally acceptable level

- **Elimination**

- 0 new transmissions
- Virtual elimination
- Elimination as a public health problem

Important definitions

- **Eradication**

- complete removal of the disease-causing agent from the natural environment
- Permanent termination of ALL transmission, no more risk of reintroduction
- Smallpox (1980)

- **Extinction**

- Pathogen no longer exist in nature or laboratory





Can Australia be the first
country to **eliminate HIV**
transmission?

Elimination

- **Elimination** (0 transmissions)
 - Feasible
 - Blood transfusions
 - Mother-to-child transmission
 - IDU
 - Much harder
 - Sexual transmission

	Year of HIV diagnosis										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2008–2017 ^a
HIV exposure risk category											
Male-to-male sex ^f	587	598	589	687	743	680	761	700	712	607	6664
Male-to-male sex and injecting drug use	32	38	22	32	34	44	50	49	51	53	405
Injecting drug use	32	23	23	20	25	28	31	30	14	33	259
Heterosexual sex	207	231	208	193	207	217	201	205	209	238	2117
<i>Person from a high-prevalence country^g</i>	82	80	73	45	50	36	46	38	35	41	527
<i>Partner from a high-prevalence country</i>	12	20	22	27	21	26	30	33	29	32	252
<i>Partner at high risk^h</i>	27	29	18	33	31	44	28	39	38	30	317
<i>Not further specified</i>	86	102	95	88	105	111	97	95	107	135	1021
Receipt of blood/tissue ⁱ	0	1	0	0	4	3	0	8	1	0	17
Mother with/at risk of HIV	5	8	5	7	1	4	3	4	5	3	45
Other/undetermined	38	46	61	43	52	56	38	30	21	29	414

UNAIDS Sustainable Development Goals

- SDG 3.3. **end AIDS as a public health threat** by 2030, *“By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases”*
- The indicator is new HIV infections (per 1000 uninfected population). The target is to **reduce HIV infections by 90% by 2030 from a 2010 baseline**. This is less than 200,000 new infections per year.



Stigma and
criminalization
associated with HIV
infection



How do we measure progress to
HIV elimination at the country
level?

Definitions

1) Incidence (new cases in a given time)

1) Relative

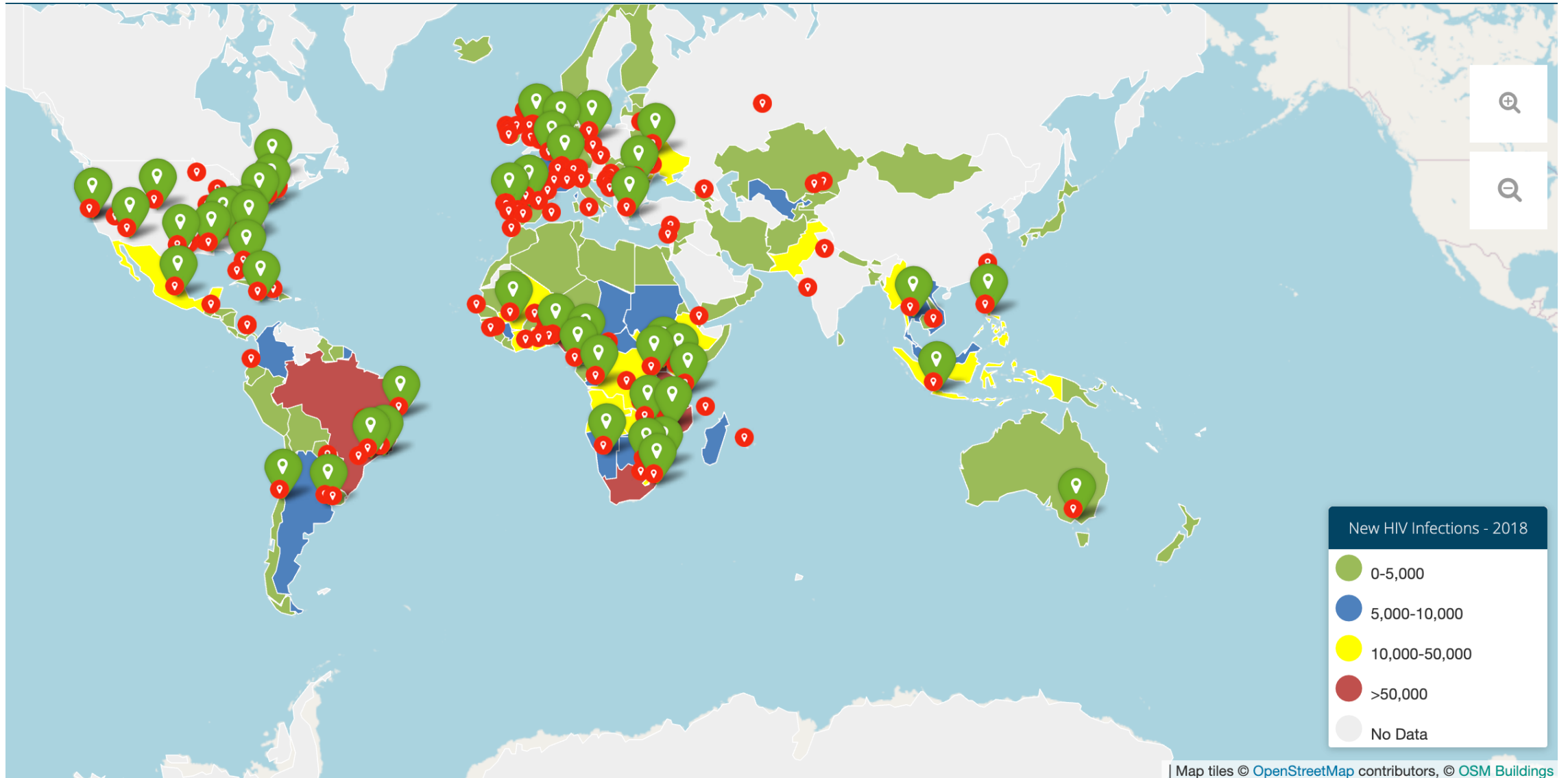
2) Absolute numbers

2) Incidence/prevalence ratio

Incidence

- Direct measures of incidence are generally not available.
- Often use notification rates
 - Estimate duration of HIV infection at time of diagnosis (CD4, Incidence assays)
 - Influenced by testing coverage

<https://www.fast-trackcities.org/>



Sustainable Development Goals

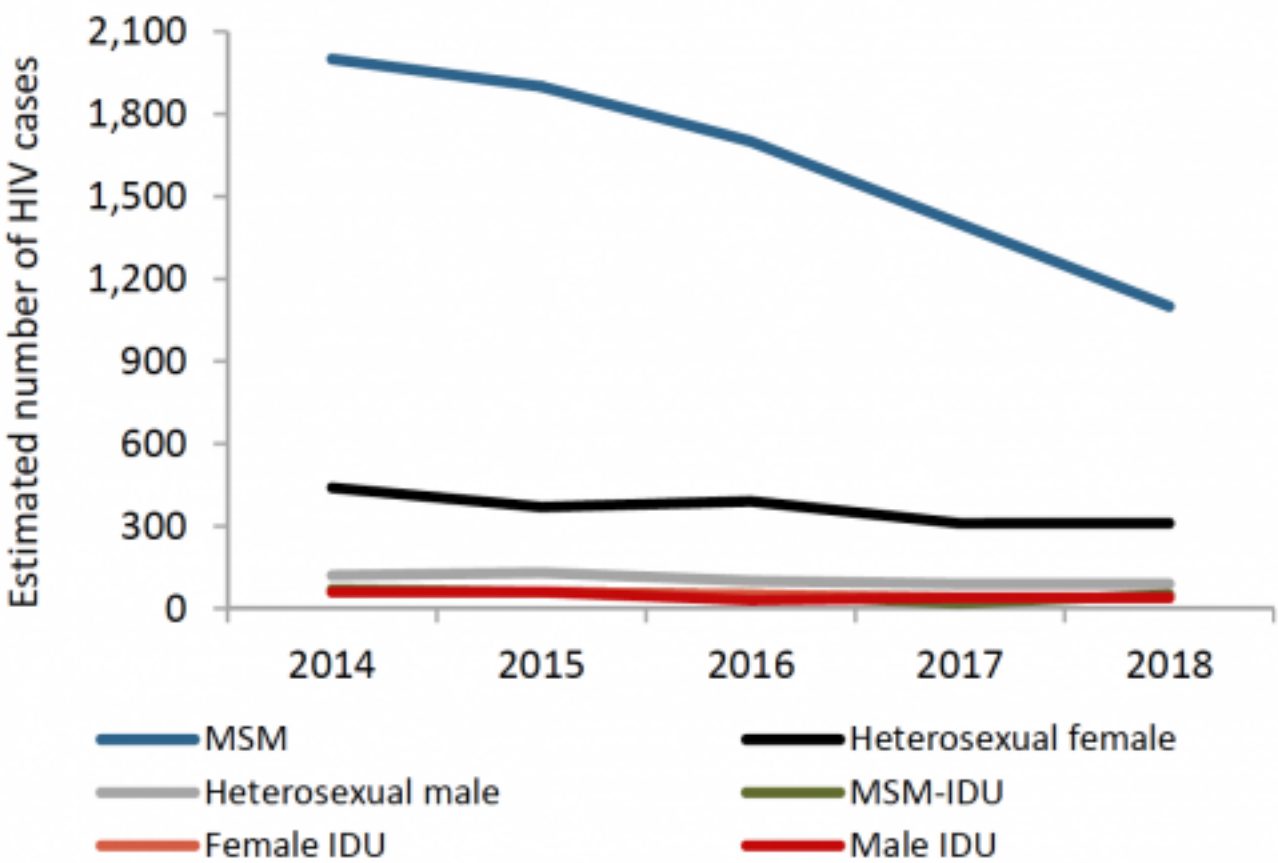
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It's possible at the city level...

- US
 - New York
 - San Francisco
- UK
 - London

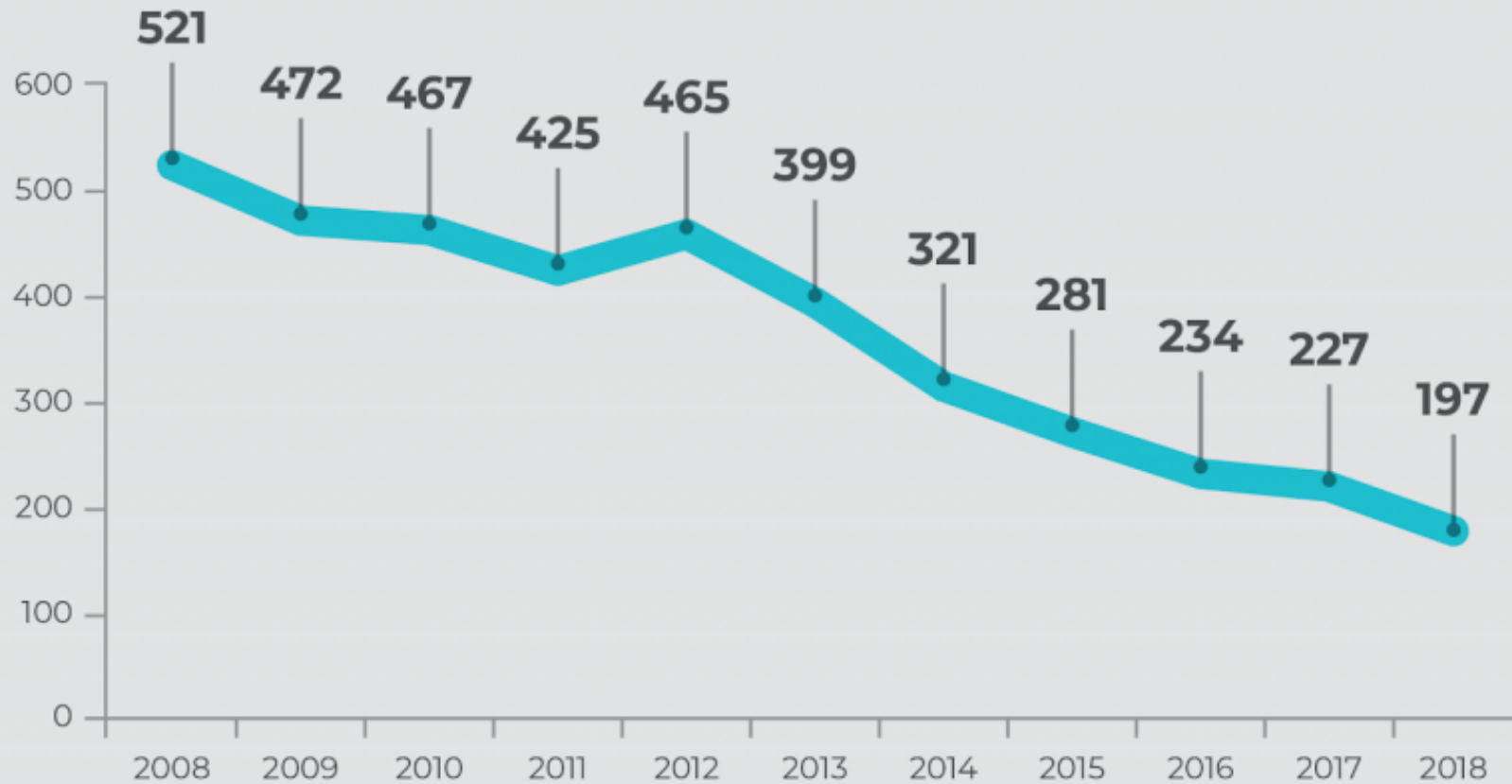
FIGURE 10.2: Trends in estimated incident HIV infections¹ by sex at birth and transmission risk, NYC 2014-2018²



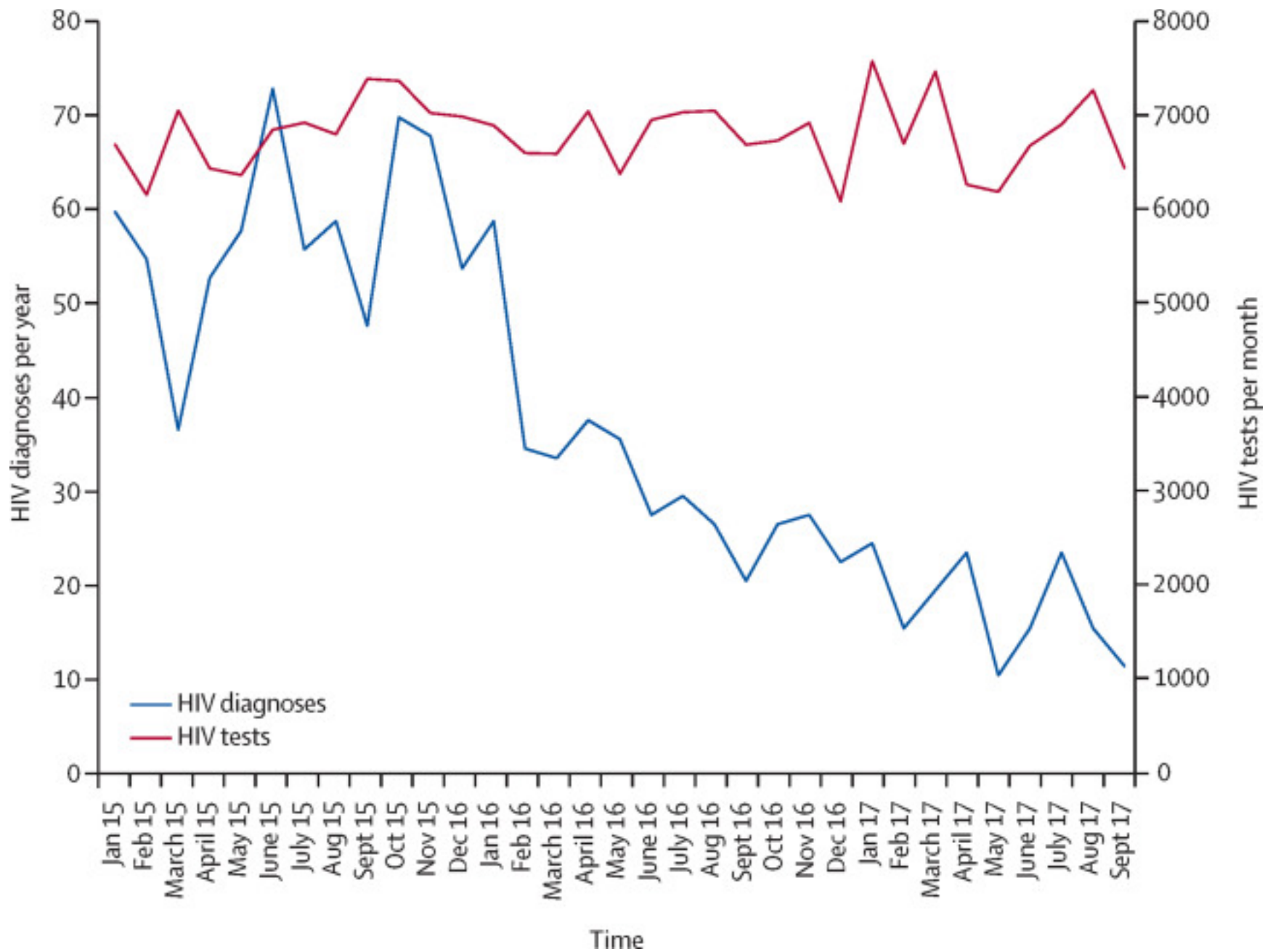
HIV Diagnoses	2001	2018	EAPC
Borough of Residence			
Bronx	1,317	440	-6.42
Brooklyn	1,613	558	-5.51
Manhattan	1,540	375	-7.40
Queens	741	358	-4.05
Staten Island	103	31	-3.78
Outside NYC	445	135	-4.26
Transmission Risk			
Men who have sex with men (MSM)	1,719	997	-1.75
Injection drug use history (IDU)	840	24	-18.2
MSM-IDU	127	35	-6.50
Heterosexual contact	1,450	358	-7.09
Transgender people with sexual contact	49	56	0.65
Perinatal	87	0	-20.5

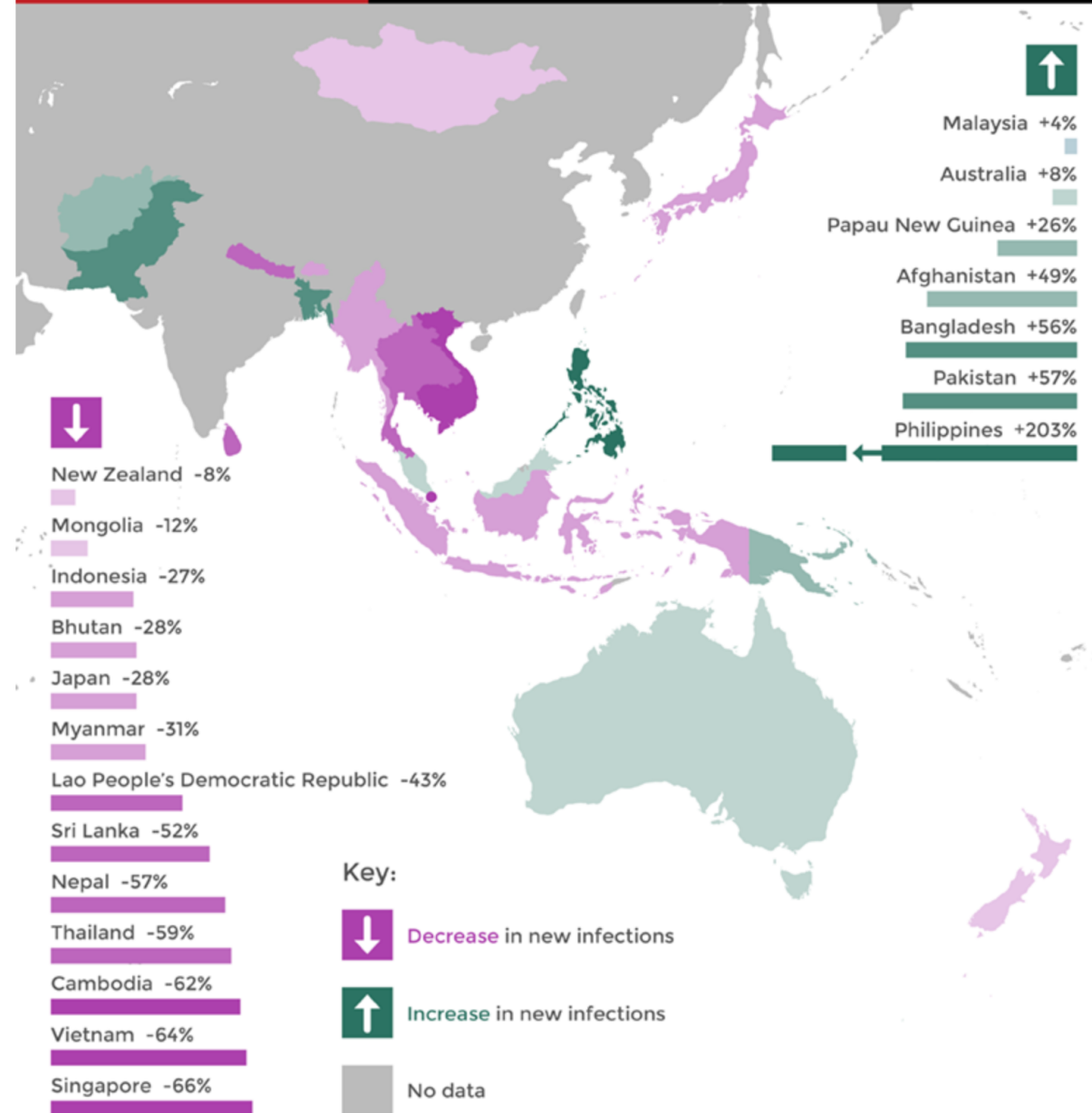
EAPC=Estimated annual percent change.

New HIV Diagnoses 2008–2018, San Francisco



Target 47 by 2030

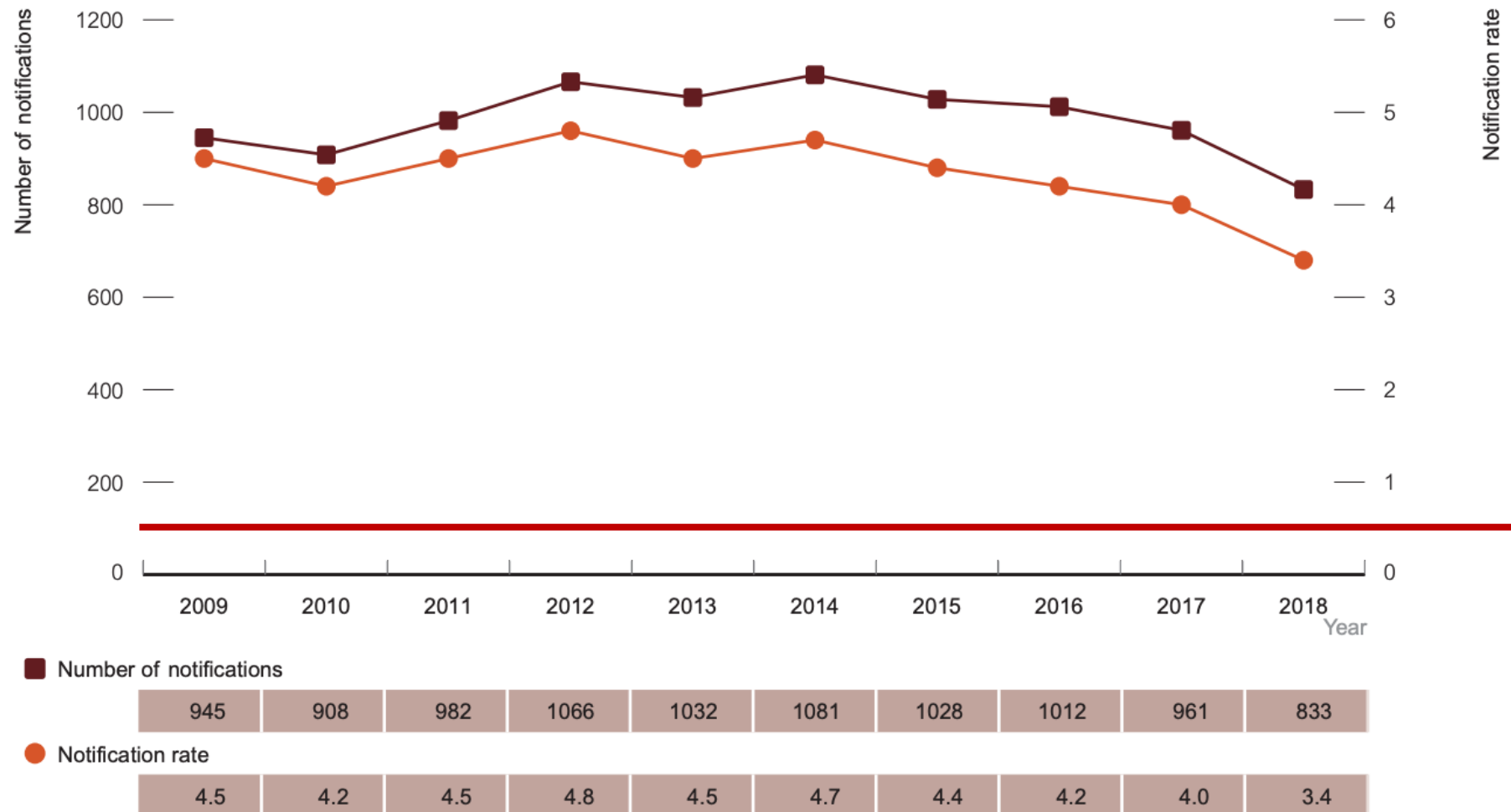




Source: UNAIDS Data 2019

2010-2019 -18%

Figure 1.1.1 Number and age-standardised rate (per 100 000 population) of HIV notifications, 2009–2018



Source: State and territory health authorities.

90 by 2030?

IPR Incidence:Prevalence ratio

$$\text{IPR} = \frac{\text{Number of new infections per year}}{\text{Number of PLHIV}} \text{ in a given population}$$

$$\text{IPR} < x\%$$

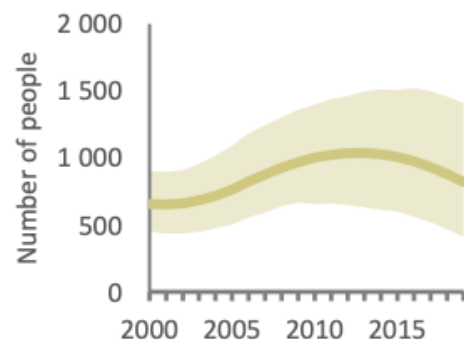
x = threshold when the epidemic declines

”replacement level” <1 new infection per person living with HIV over their lifetime (D)

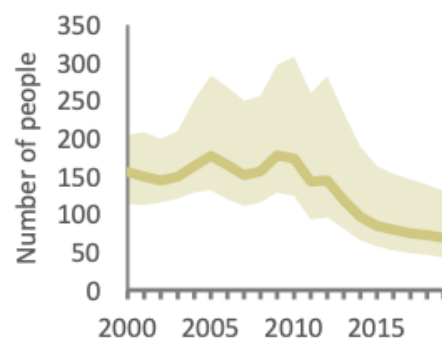
$$\frac{1}{D} \rightarrow \frac{1}{33} = 3\%$$

UNAIDS report

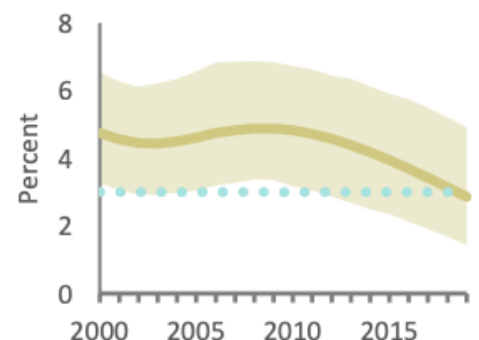
EPIDEMIC TRANSITION METRICS



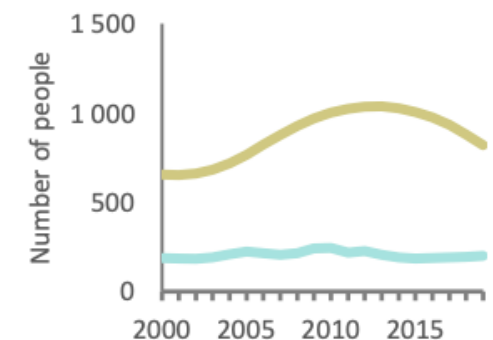
Change in new
HIV infections
since 2010 = **-18%**



Change in AIDS-
related deaths
since 2010 = **-60%**



Incidence:
prevalence
ratio = **2.86**

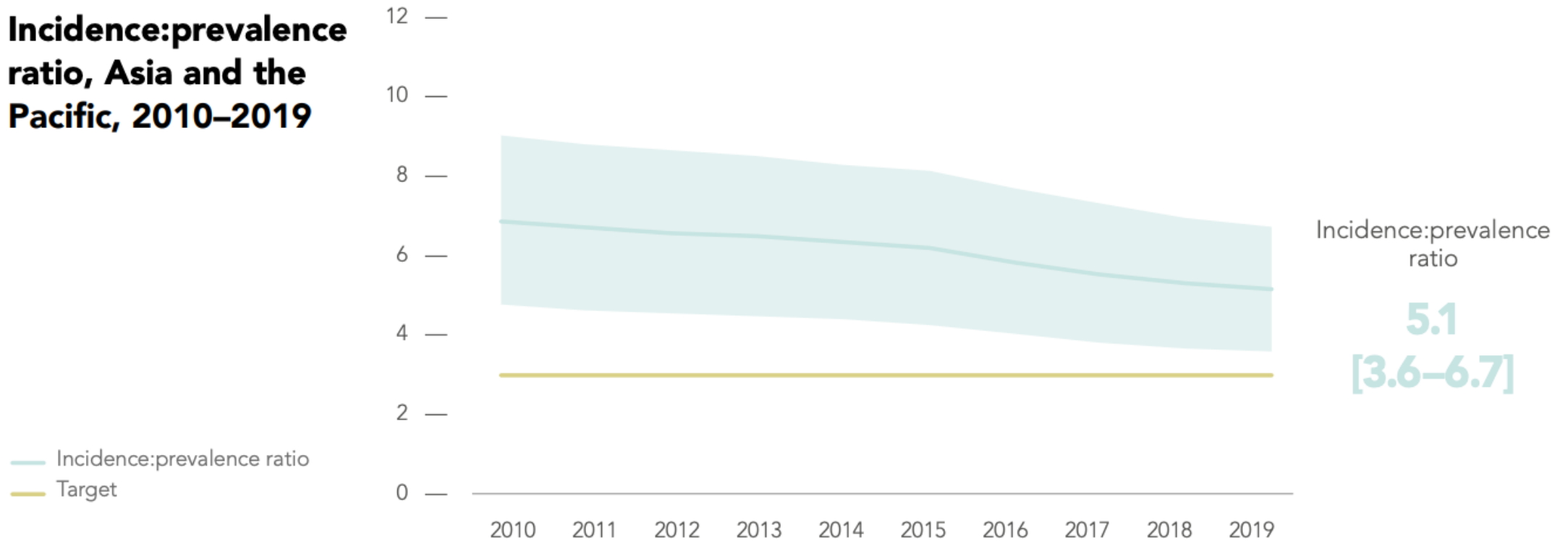


Incidence:
mortality ratio = **4.1**

Target ~3%

Global = 4.4

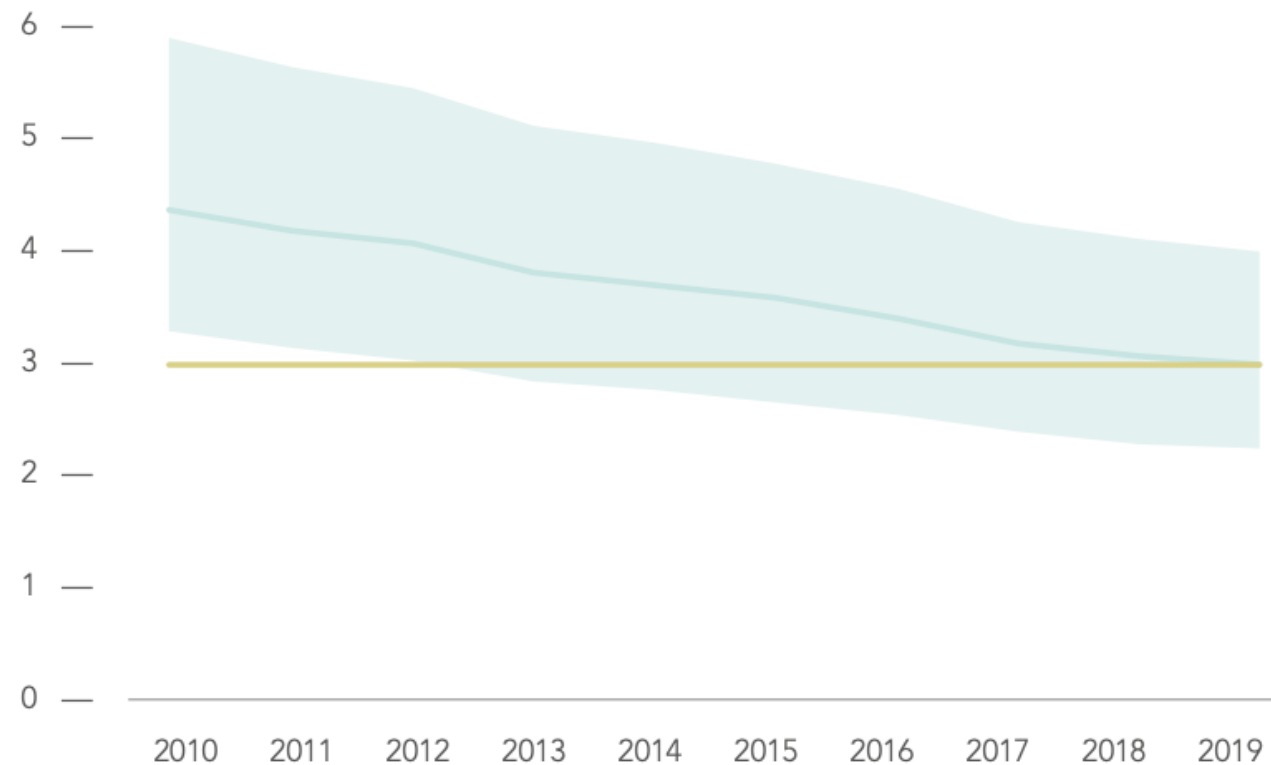
Incidence:prevalence ratio, Asia and the Pacific, 2010–2019



Source: UNAIDS epidemiological estimates, 2020 (see <https://aidsinfo.unaids.org/>).

Incidence:prevalence ratio, western and central Europe and North America, 2010–2019

— Incidence:prevalence ratio
— Target



Incidence:
prevalence
ratio
3.0
[2.2-4.0]

Source: UNAIDS epidemiological estimates, 2020 (see <https://aidsinfo.unaids.org/>).



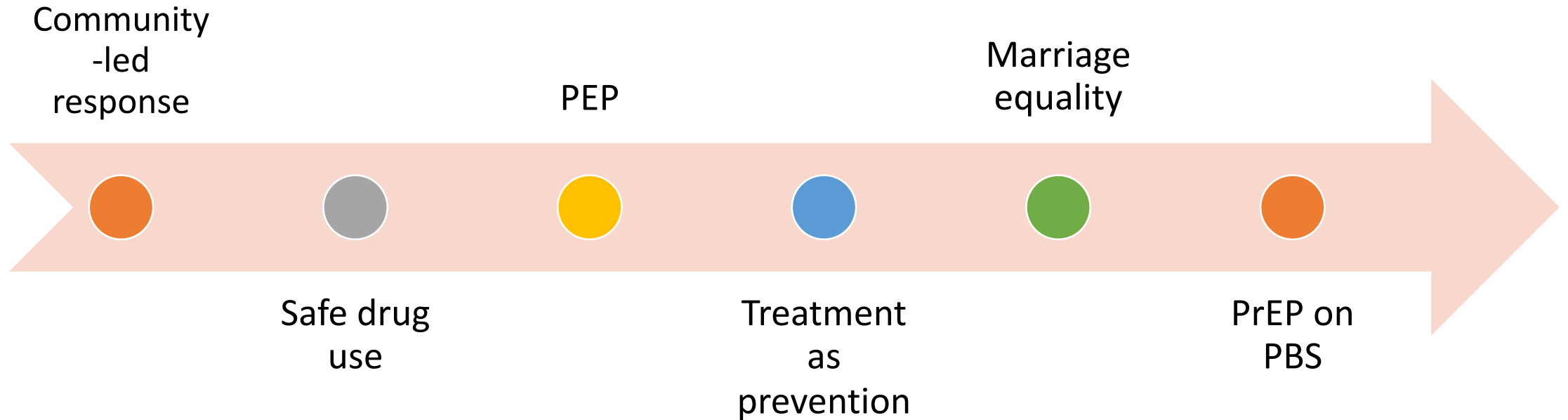
Can Australia be the first country
to eliminate HIV transmission?
How does Australia compare
to other countries?

Strengths

- Early strong response
 - Community led
 - Free condoms
 - Clean needles
 - 2412 new diagnoses 1987
- Ongoing strong response
 - U=U
 - 90-90-90 targets



We have strong foundations and recent victories



PrEP cascade, Gay Community Periodic Surveys Non-HIV-positive gay and bisexual men, 2014-19

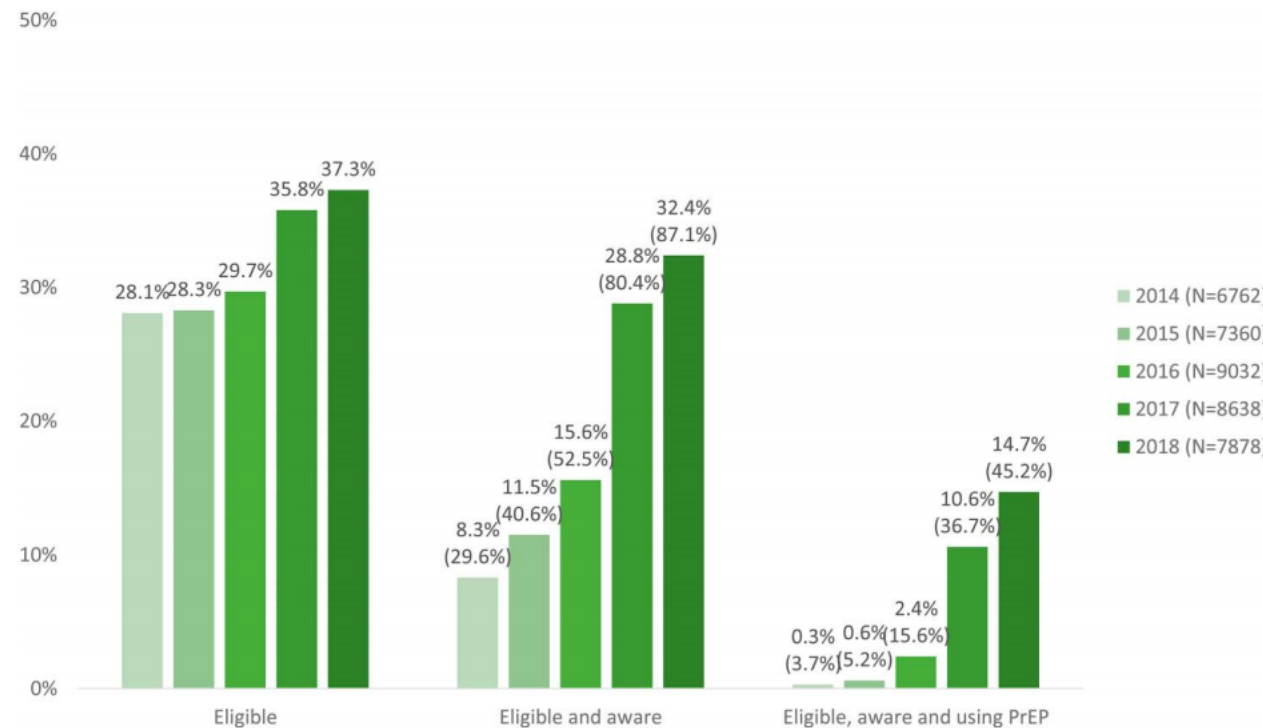


FIGURE 1. PrEP cascade for non—HIV-positive participants in the GCPs, 2014–2018. Percentages in parentheses are calculated with the previous cascade step as the denominator.



A lot more work needs to be
done

KEEP GOING !



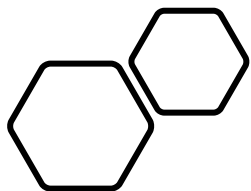
We must adapt our responses

- *Not everyone is benefiting equally*
- **Know your epidemic**
- Subpopulations at risk
 - Overseas born MSM
 - Heterosexuals – travelers
 - PWID
 - ATSI
- ~10% undiagnosed PLHIV -> 59% of new infections¹

¹ Gray. JIAS 2018;21(4):e25104

Conclusion

- Need clear elimination targets
- Australia is doing well compared to other countries
 - but may not be the *first* country to eliminate HIV
- Heading in the right direction
 - but here is still a lot of work to do!



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