Time From HIV Infection To Virological Suppression: Dramatic Fall From 2007-2016.

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Background

Treatment as prevention at the population level works by reducing the number of people with undiagnosed, untreated or unsuppressed HIV who could potentially transmit to others.

At the individual level, this is achieved through reducing:
- the time between HIV infection and diagnosis
- the time between HIV diagnosis and virological suppression
- the duration of potential infectiousness between HIV infection and virological suppression

Aims:

- Examine the combined effect of early diagnosis of HIV infection and early initiation of ART on the duration of potential infectiousness
- Using data not always available at the jurisdictional level
- Determine if it has changed over time or is associated with clinical, behavioural or demographic predictors

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Methods

All new HIV diagnoses in MSM at MSHC from Jan 2007 to March 2016.

- Never tested positive elsewhere (even if referred in having just been diagnosed elsewhere)
- Extracted behavioural, demographic, laboratory and clinical data from electronic health record (CPMS), on-site laboratory (MDU) and off-site laboratory (VIDRL) records
- HIV testing history before diagnosis
- Western blot at diagnosis
- Viral load after diagnosis

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Methods

For each patient:

- Estimated date of infection based on testing history and Western blot (and CD4 cell count if no history available)
- Date of diagnosis was the day of the blood draw at which HIV was diagnosed
- Date of virological suppression was the day the first viral load test < 200 copies/ml

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Methods

Estimated date of HIV infection:
- *Midpoint* imputation: date of infection is imputed to be midway between a negative and a positive test,
- but Western blot gives additional information:
  - Western blot is a confirmatory HIV test that is negative or indeterminate if infection is very recent (<90 days)
- If Western blot fully positive:
  - Infection in the last 90 days unlikely
  - Take the midpoint between the last negative test and 90 days before positive test.
- If Western blot indeterminate or negative:
  - Infection in the last 90 days likely
  - Take the date of infection as then 45 days before positive test
- If no prior testing history and Western blot fully positive, then calculated based on CD4 cell count*

*Jansson et al AIDS 2015

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Methods

- Time to diagnosis = months from estimated date of infection to date of diagnosis
- Time to suppression = months from date of diagnosis to date of first VL < 200 copies/ml
- Potentially infectious period = months from estimated date of infection to date of first VL < 200 copies/ml

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Results

|	Total (n=437)	
Age yrs, median (IQR)	30.3 (25.7-39.4)	
Symptomatic STI,[1] % (n)	21.0 (91)	
Recent Syphilis[2] % (n)	6.9 (30)	
Recently arrived from non-English speaking countries[4] % (n)	16.5 (72)	
Anorectal STI[5] % (n)	21.5 (94)	
Urethral STI[6] % (n)	8.2 (36)	
Any STI[7] % (n)	30.9 (135)	
IDU ever[8] % (n)	11.2(47)	
Sexual Risk[9]: Low % (n) High % (n) Very high % (n)	36.3 (147) 30.1 (122) 33.6 (136)	
No serological evidence of recent infection and -no testing history[10] % (n)	14.0 (61)	
-testing history[11] % (n)	59.3 (259)	
Serological evidence of recent infection[12] % (n)	26.8 (117)	
Western Blot result	Negative or Indeterminate	Positive
CD4 mean (±SD)	590 (241)	477 (236)[†]
Viral Load mean (±SD)	671,000 (190,000)	81,000 (255,000)[†]
Log Viral Load mean (±SD)	4.88 (0.95)	4.28 (0.90)[†]

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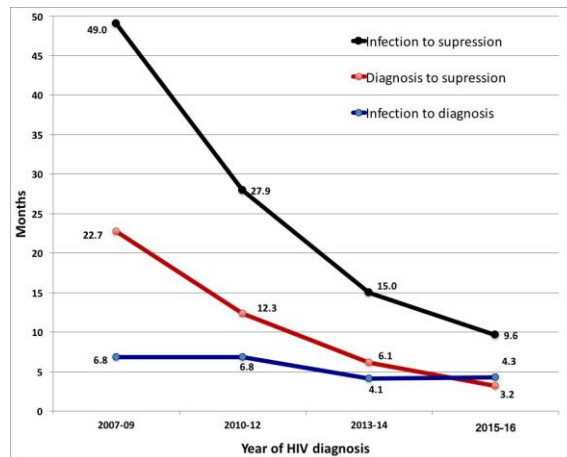
Results

Change in median time from HIV infection to diagnosis, diagnosis to virological suppression and infection to virological suppression 2007-2016

Results

Analysed predictors of:

- Diagnosis with serological evidence of acute infection (logistic regression, adjusted odds ratio)
- Time from diagnosis to suppression (Cox regression, adjusted hazards ratio)
- Time from diagnosis to suppression (Cox regression, adjusted hazards ratio)

More recent diagnosis: **strongly associated**

Age, overseas-born, newly-arrived, IDU: **not associated**

Discussion

Earlier diagnosis (6.8 months to 4.3 months)

-high proportion in acute phase with very high viral load

-opportunity for behavior change after diagnosis while awaiting treatment, even though there was a 3 month "delay" until suppression

-further reductions would involve very substantial increases in testing volume

Earlier suppression:

-2015 universal treatment recommendations

-3 months from diagnosis to suppression is short

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Discussion

No association with country of birth or recent arrival in Australia:

- Successful high access model at MSHC with few obstacles to care
- Medicare ineligible patients treatment
- Compassionate access to ART highly streamlined through ViiV program

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Conclusion

5 fold reduction in duration of potential infectiousness between 2007 and 2016.

Positive milestone for treatment as prevention paradigm.

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