



CHARACTERISTICS ASSOCIATED WITH HIV-1 TRANSMISSION CLUSTERS IN NEW SOUTH WALES

Angie Pinto | Tuesday 25th September



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New approach to ending HIV in NSW

- New diagnoses stabilised → downward trend
- Test often + Treat early + Prevent¹
- Unrecognised or undiagnosed populations
 - Heterosexuals, later diagnosis
 - Culturally and linguistically diverse backgrounds
- Molecular epidemiology can complement traditional methodologies
 - Increased subtype diversity²
 - Role of seroconverters in onward transmission³
 - Inform public health response⁴

1) <https://www.health.nsw.gov.au/endinghiv/Publications/nsw-hiv-strategy-2016-2020.PDF>

2) Castley et al. PLoS One. 2017 May 10;12(5):e0170601

3) AIDS Res Hum Retroviruses. 2012 May;28(5):460-4

4) Grabowski et al. Curr HIV/AIDS Rep. 2018 Apr;15(2):182-189

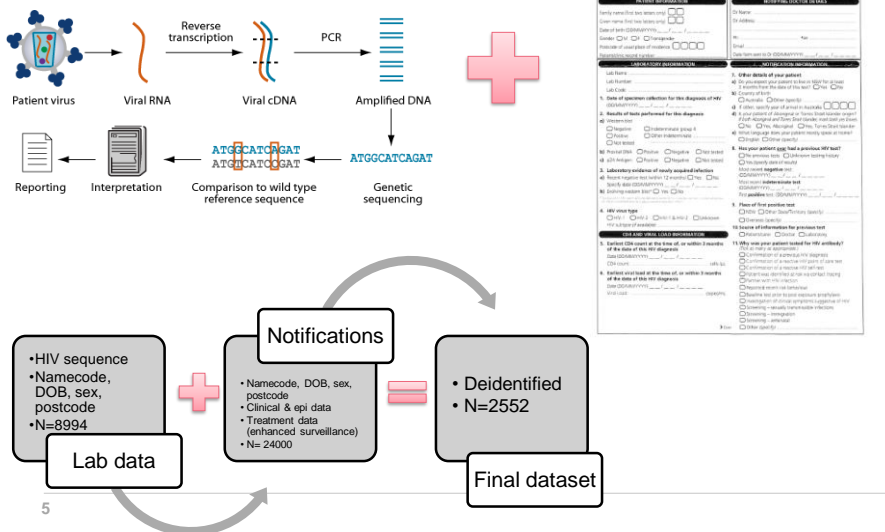
Aims

Understand HIV transmission characteristics

- Are there transmission clusters?
 - Are clusters sustained over time?
- Characteristics of cluster membership
 - Traditional risk groups or emerging at risk populations?
- Impact of public health interventions
 - Do we need to test more or treat more?

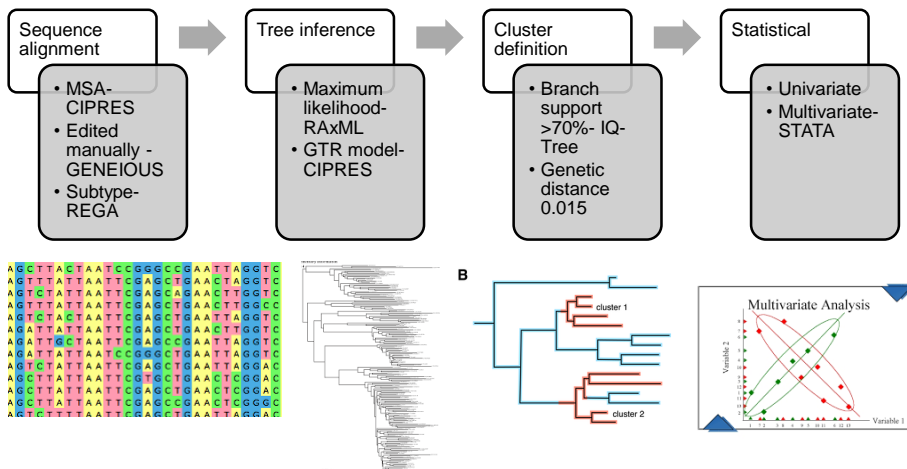
Methods

Data linkage



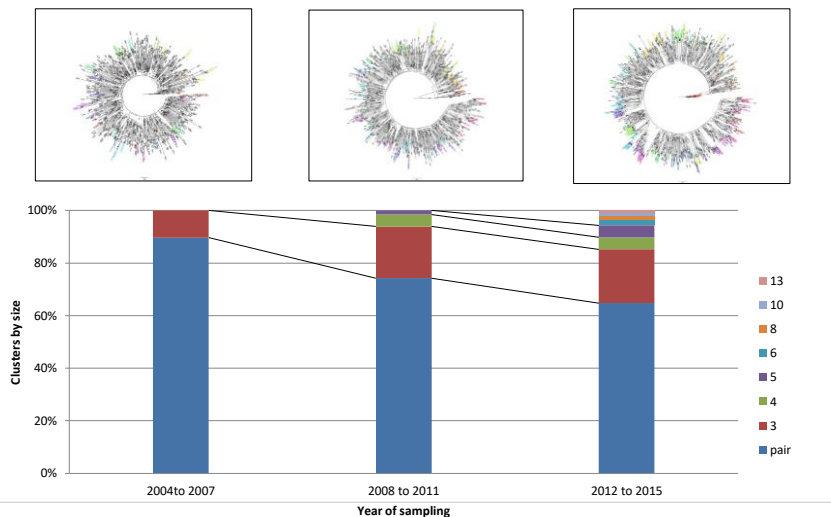
Methods

Phylogenetic & statistical analysis



Results: subtype B

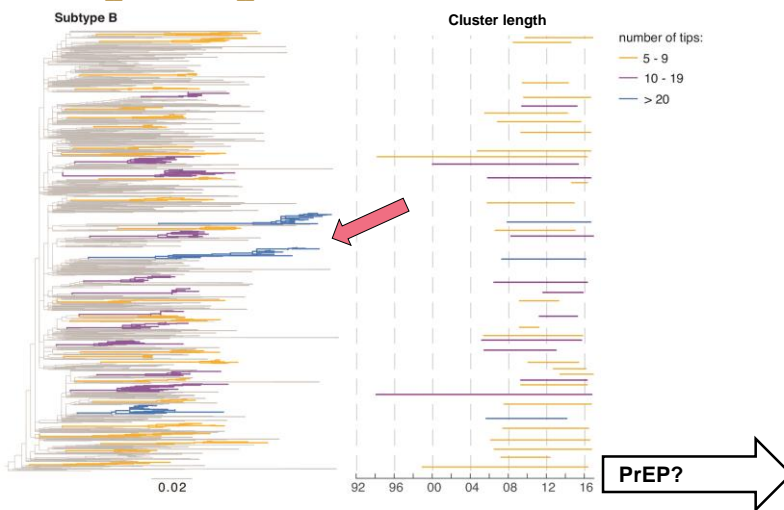
Increasing proportion of sequences in a cluster



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Results: subtype B

Long lasting clusters



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Slide courtesy of Francesca Di Giallonardo

Results: Factors associated with cluster membership

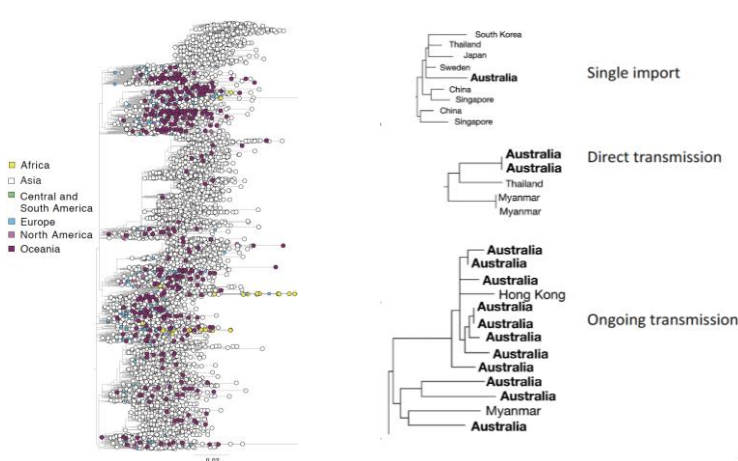
	Odds Ratio	p value	LCI	UCI	Overall p
Age at diagnosis					
15 to 29 years	1.00				0.029
30 to 39 years	0.72	0.13	0.47	1.10	
40 to 49 years	0.77	0.27	0.47	1.23	
50 and over	0.53	0.02	0.32	0.90	
Place of birth					
Aust	1.00				<0.0001
Overseas	0.29	0.00	0.17	0.51	
Unknown	0.59	0.03	0.37	0.94	
Stage of infection					
Early	1.00				<0.0001
500+	0.59	0.10	0.32	1.11	
350 to 499	0.60	0.05	0.36	1.00	
200 to 349	0.39	0.00	0.22	0.67	
less 200	0.27	0.00	0.16	0.44	
Year diagnosed					
Before 2012	1.00				<0.0001
2012-2013	5.99	0.00	3.28	10.92	
2014-2015	5.24	0.00	2.82	9.73	

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Non B subtypes

Results: Non B subtype

Global transmission dynamics of CRF01-AE

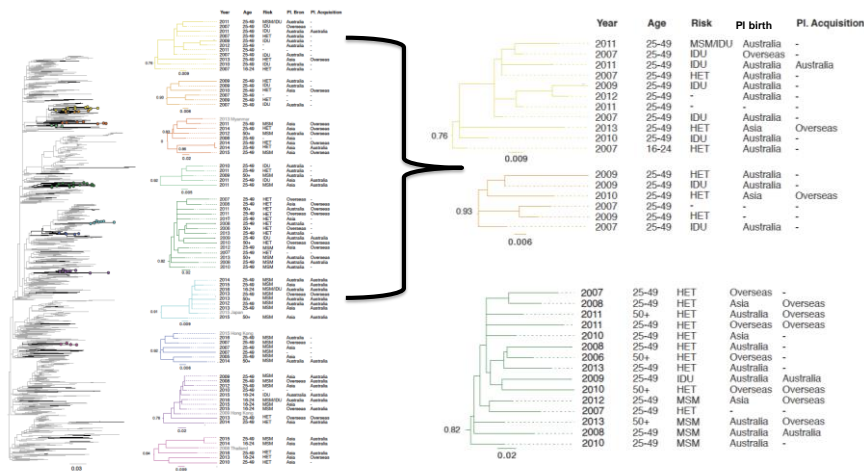


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Slide courtesy of Francesca Di Giallonardo

Results: Non B subtype

Mixed Risk groups within clusters



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Slide courtesy of Francesca Di Giallonardo

Limitations

- Sampling bias
 - Increased sampling / resistance tests over time
 - Historical diagnosis (on Rx)
 - Never diagnosed/ Lost to follow up
- Data linkage
 - Optimised 28% → 59% linkage rates
 - Representativeness assessment
 - Coded clinic identifiers
- NSW notifications only
 - Need for ongoing national collaboration
- Population level assessment
 - De-identified final research dataset
 - Cannot infer individual transmission networks or directionality

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Research impact

Impact for individual and community

- Phylogenetics
 - Test more or treat more, enhanced contact tracing
 - Geographical difference between subtypes – [see poster #38](#)
 - Imported or locally acquired infections
 - Cluster growth/ regression
 - Impact of PH interventions/ strategy
- Subtype diversity
 - Diagnostics & treatment response
 - Transmission differences between subtypes
 - Global and local diversity
- Resistance mutation surveillance
 - Empiric treatment guidelines & rapid initiation of ART
 - PrEP efficacy

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Conclusions & future directions

Greater insights into HIV transmission

- Cluster dynamics in NSW evolving
- Greater number of clusters over time
- Subtype B cluster membership
 - Young, Australian acquired
 - Earlier stage, recent year of onset → testing campaigns, and contact tracing
 - Long lasting clusters lasting decades and still evolving
- Non B subtype
 - Smaller cluster size
 - Mixture of locally and globally acquired
 - Mixed risk group clusters
- Ongoing project to 2020

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HIV Prevention Partnership Project

Investigators: Angie Pinto, Francesca Di Giallonardo, Phillip Keen, Ansari Shaik, Alex Carrera, Hanan Salem, Kiran Thapa, Barbara Telfer, Craig Cooper, Karen Price, Christine Selvey, Jo Holden, Frederick Lee, Dominic Dwyer, David Cooper, Kathy Petoumenos, Andrew Grulich, Anthony Kelleher

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 the voice of people with HIV since 1988

