Integrating CD4 data into undiagnosed estimates

Jeanette Birnbaum

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Project Goal

To use CD4 data to *increase the precision* of undiagnosed estimates from the testing history model

Why - Negative tests that are many years prior to diagnosis, i.e. "long infection windows", are not very informative regarding time of infection - CD4 at diagnosis can indicate recency of infection

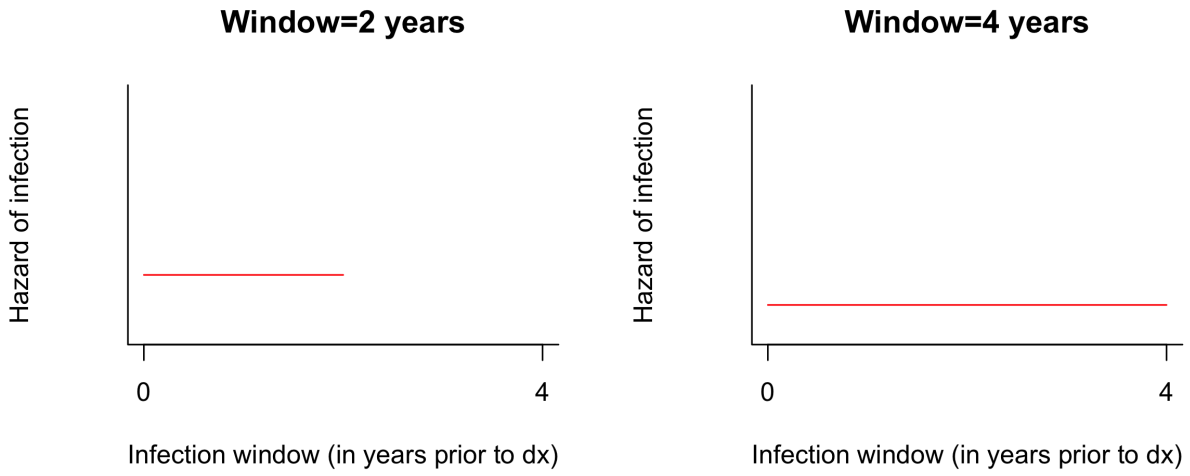
How - From literature, identify typical times to infection for various CD4 counts - Use this to update the probability of infection within long infection windows

Impact in WA - Our pre-analysis of CD4 measurements in WA indicates that using CD4 will increase the precision of our undiagnosed estimates but will not significantly change the estimated number of undiagnosed cases - The main impact of integrating CD4 will be to increase our confidence in the estimates

Reminder: the testing history method

Base Case distributes probability uniformly across the infection window

The hazard (instantaneous rate) of infection at any point within the window is 1/(window length), shown by the red line for two different window lengths. Time=0 refers to time of diagnosis.



The red line is lower when the window is longer, since the probability of infection is spread out over a longer time period.