2016 Undiagnosed Estimates for WA State

Jeanette Birnbaum

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1 Summary of Results

The undiagnosed fraction declined slightly overall, and in every group. However, note that the number of both undiagnosed and total cases rose slightly in all groups.

In both tables, the MSM and KC results are separate marginal results, i.e. they are two different ways of dividing the statewide results.

1.1 2016

Group	PLWHA	Undiagnosed Cases	True Prevalence	Undiagnosed Fraction (%)
WA State	12412	1354.0	13766.0	9.8
By MSM				
MSM	9370	614.8	9984.8	6.2
non-MSM	3042	739.2	3781.2	19.5
By KC				
Inside KC	6796	622.3	7418.3	8.4
Outside KC	5616	731.7	6347.7	11.5

1.2 2015

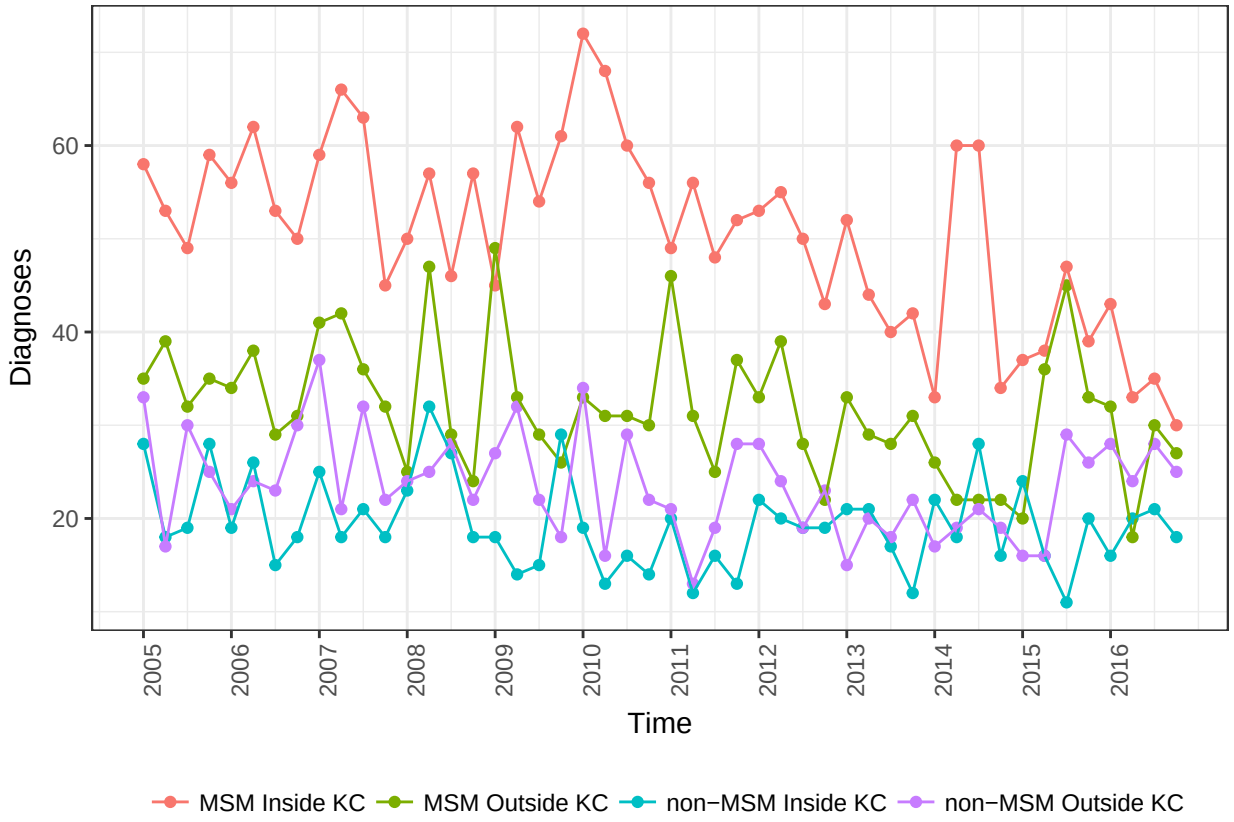
Group	PLWHA	Undiagnosed Cases	True Prevalence	Undiagnosed Fraction (%)
WA State	12068	1379.0	13447.0	10.3
By MSM				
MSM	9129	651.7	9780.7	6.7
non-MSM	2939	727.5	3666.5	19.8
By KC				
Inside KC	6662	641.1	7303.1	8.8
Outside KC	5406	738.1	6144.1	12.0

2 Diagnoses

2.1 Analytic sample

Analytic data set has 6025 cases for 2005-2016. From the original file provided by Jason, we excluded 14776 cases based on year (excluding diagnoses prior to 2005) restrictions, and an additional 79 cases who were 16 or younger and had no observed date of LNT.

2.2 Diagnoses over time by MSM/Area subgroups



3 Subgroup Sizes and Testing Histories

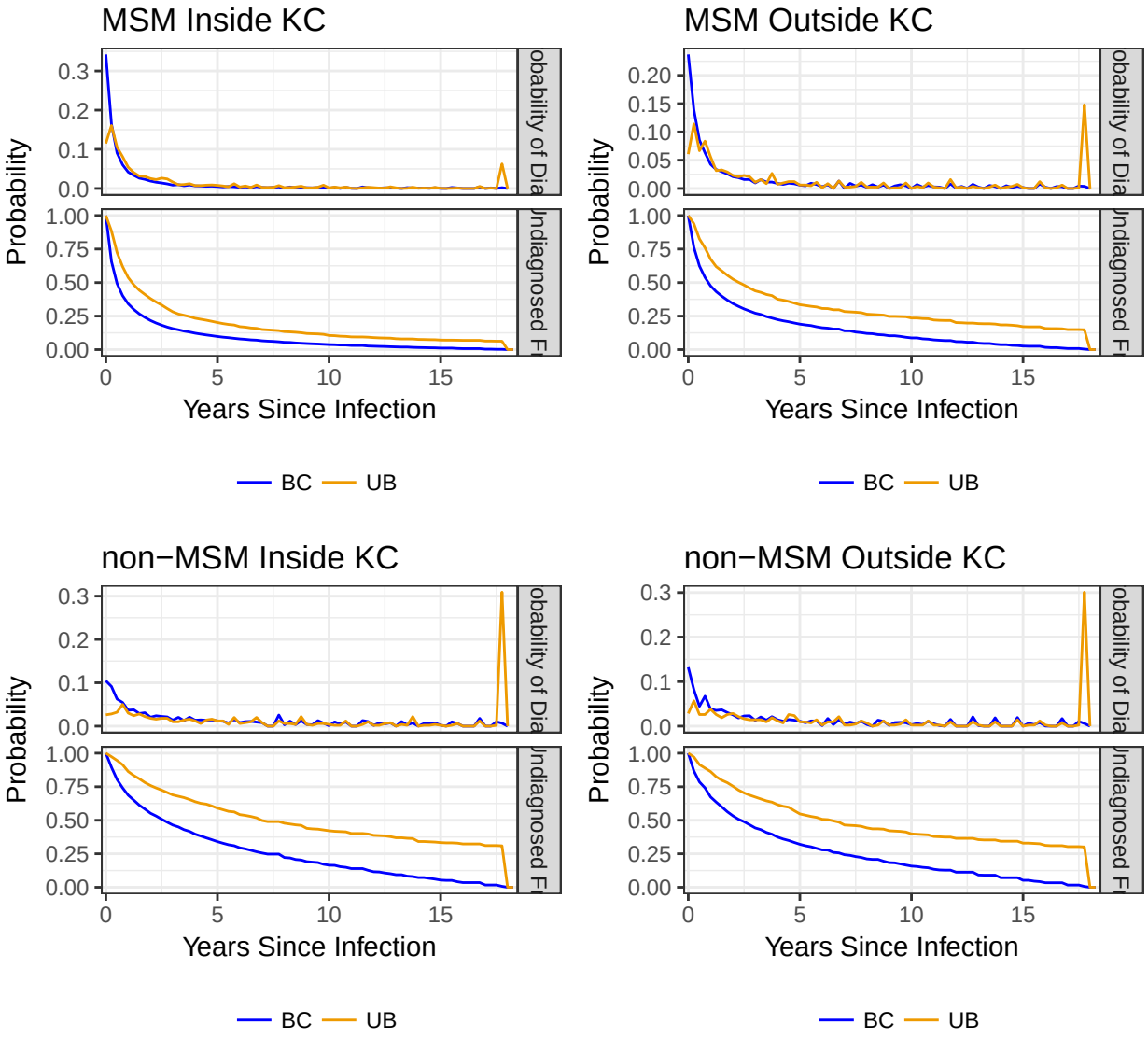
As we would expect, the presence of observed LNTs is higher for MSM than non-MSM and inside KC vs outside KC. MSM outside of KC have much lower observed LNTs (only 25%) than MSM inside KC (41%). This means that the outside-KC estimates, regardless of mode subgroup, are based on low levels of observed LNTs. This makes them particularly dependent on our 'missing at random' assumption.

4 Time from Infection to Diagnosis (TID)

The plots below show the TID curves for the four MSM/Area subgroups. BC=Base Case and UB=Upper Bound. For each subgroup, the upper plot panel is the probability of diagnosis curve (the pdf) and the lower plot panel is the survivor curve (1-cdf). The lower plot panel's y-axis thus indicates the fraction remaining undiagnosed at a given number of years since infection (x-axis).

Table 1: Column Percent shows the composition of the total sample. The Percent Yes, Percent No and Percent Missing columns indicate the row percents of the three possible testing history statuses within each subgroup

Mode	N	Column Percent	Percent Yes	Percent No	Percent Missing
All	6025	100	47	13	40
Inside KC					
MSM	2434	40	69	9	22
non-MSM	933	15	30	24	47
Outside KC					
MSM	1526	25	40	13	46
non-MSM	1132	19	22	15	63

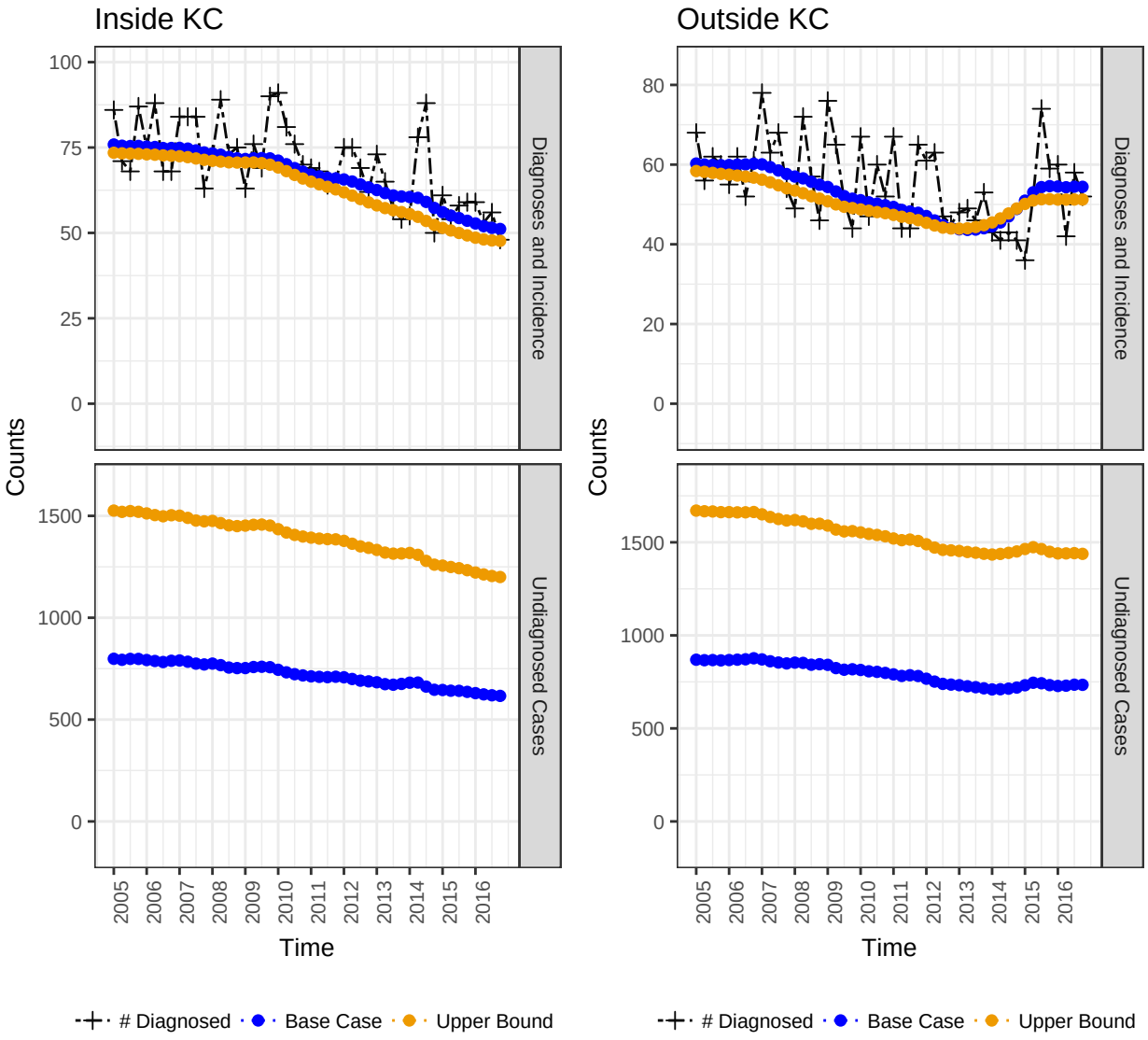


These plots correspond to what we saw in the testing history responses above. MSM outside KC have longer times to diagnosis than MSM inside KC. For example, at 2.5 years since infection, the Base Case fraction of MSM remaining undiagnosed is less than 25% inside KC but is greater than 25% outside KC. The non-MSM

TIDs are more similar, with about 50% of cases remaining undiagnosed at 2.5 years.

5 Incidence and undiagnosed counts

The upper plot panels show diagnoses and estimated incidence, while the lower plot panels show undiagnosed cases. The upper panels have different y-scales.



Taking the y-scales into account, you can see that the number of new diagnoses/cases each quarter is higher inside KC than outside, but the undiagnosed case counts are similar. This reflects longer times to diagnosis outside KC than inside KC.

6 Undiagnosed fractions

These plots show the total number of PLWH (x-axis) broken down by diagnosed and undiagnosed (colors) for the Base Case versus Upper Bound estimates (panels). Undiagnosed fractions are indicated by the percent labels. There is clearly a trend of greater diagnosed PLWH over 2010-2016. If this is a function of

reporting rather than a real increase, it may be masking true trends in the undiagnosed fraction as well as true differences between inside and outside KC. Again, apologies for different x-scales on the inside versus outside KC plots.