

2018 Undiagnosed Estimates for WA State

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1 Summary of Results

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

Year of **estimation** impacts the undiagnosed % through:

1. **PLWH estimate** - the annual update typically alters the estimates for prior years
2. **Undiagnosed estimate**, via
 - a. *Input data* - rolling DOH data cleaning may alter the number and attributes of included cases
 - b. *TID estimate* - the population time from infection to diagnosis (TID) curve depends on the population composition of last negative test dates (LNTs). New cases can impact this key parameter through their LNT dates.

As a point of reference, a section of this report contains some information on the change in PLWH data between the 2018 and 2019 years of estimation.

1.1 2018

Year of estimation: 2019

Group	PLWHA	Undiagnosed Cases	True Prevalence	Undiagnosed Fraction (%)
WA State	13402	1382.0	14784.0	9.3
By MSM				
MSM	10081	552.0	10633.0	5.2
non-MSM	3321	830.1	4151.1	20.0
By KC				
Inside KC	7023	660.0	7683.0	8.6
Outside KC	6379	722.1	7101.1	10.2

1.2 2017

Year of estimation: 2019

Group	PLWHA	Undiagnosed Cases	True Prevalence	Undiagnosed Fraction (%)
WA State	12979	1360.0	14339.0	9.5
By MSM				
MSM	9812	561.4	10373.4	5.4
non-MSM	3167	798.2	3965.2	20.1
By KC				
Inside KC	6901	641.3	7542.3	8.5
Outside KC	6078	718.3	6796.3	10.6

1.3 2017

Year of estimation: 2018

Group	PLWHA	Undiagnosed Cases	True Prevalence	Undiagnosed Fraction (%)
WA State	12933	1330.0	14263.0	9.3
By MSM				
MSM	9774	567.0	10341.0	5.5
non-MSM	3159	762.6	3921.6	19.4
By KC				
Inside KC	6907	592.7	7499.7	7.9
Outside KC	6026	736.9	6762.9	10.9

2 Diagnoses

2.1 Analytic sample

Analytic data set has 6711 cases for 2005-2018. From the original file provided by DOH, we excluded 21747 cases who were either diagnosed before 2005 or were 16 or younger and had no observed date of LNT.

2.2 Diagnoses over time by MSM/Area subgroups

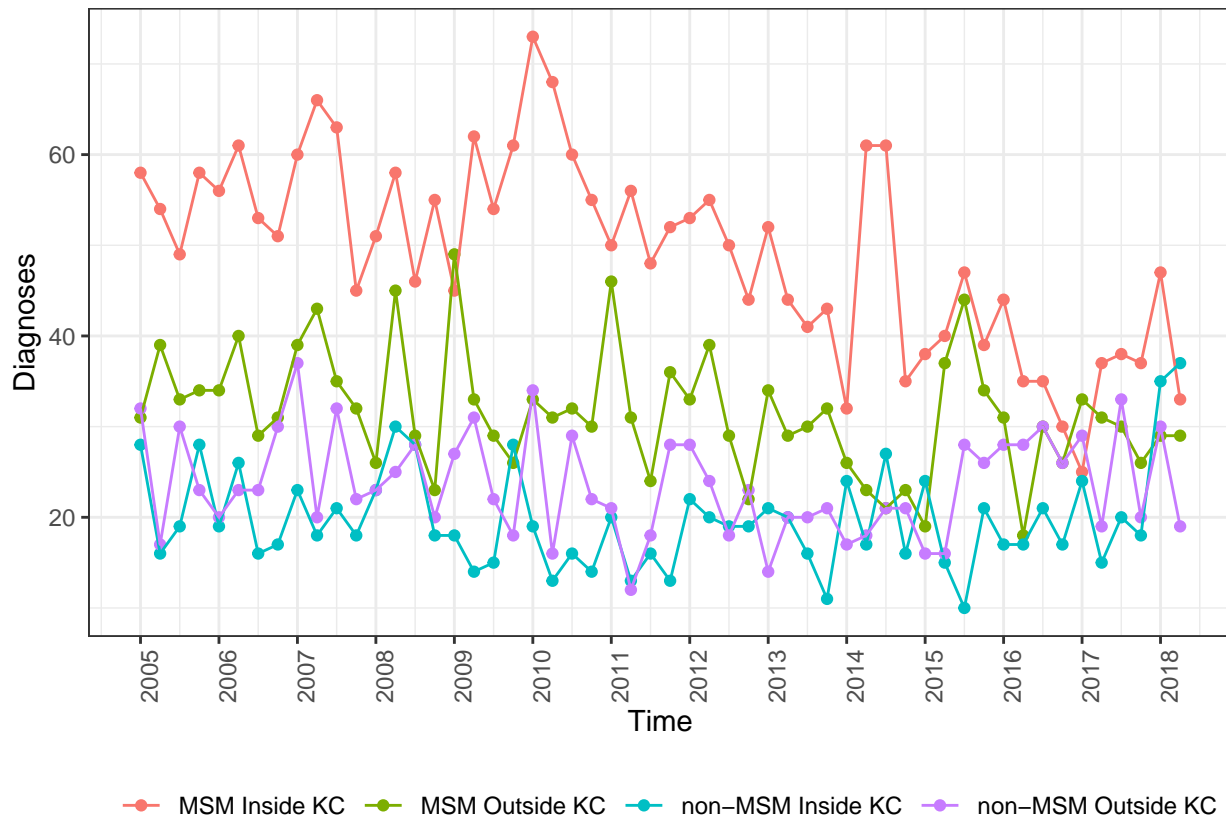


Table 1: Column Percent shows the composition of the total sample. The Percent Yes, Percent No and Percent Missing columns indicate the row percents of the three possible testing history statuses within each subgroup

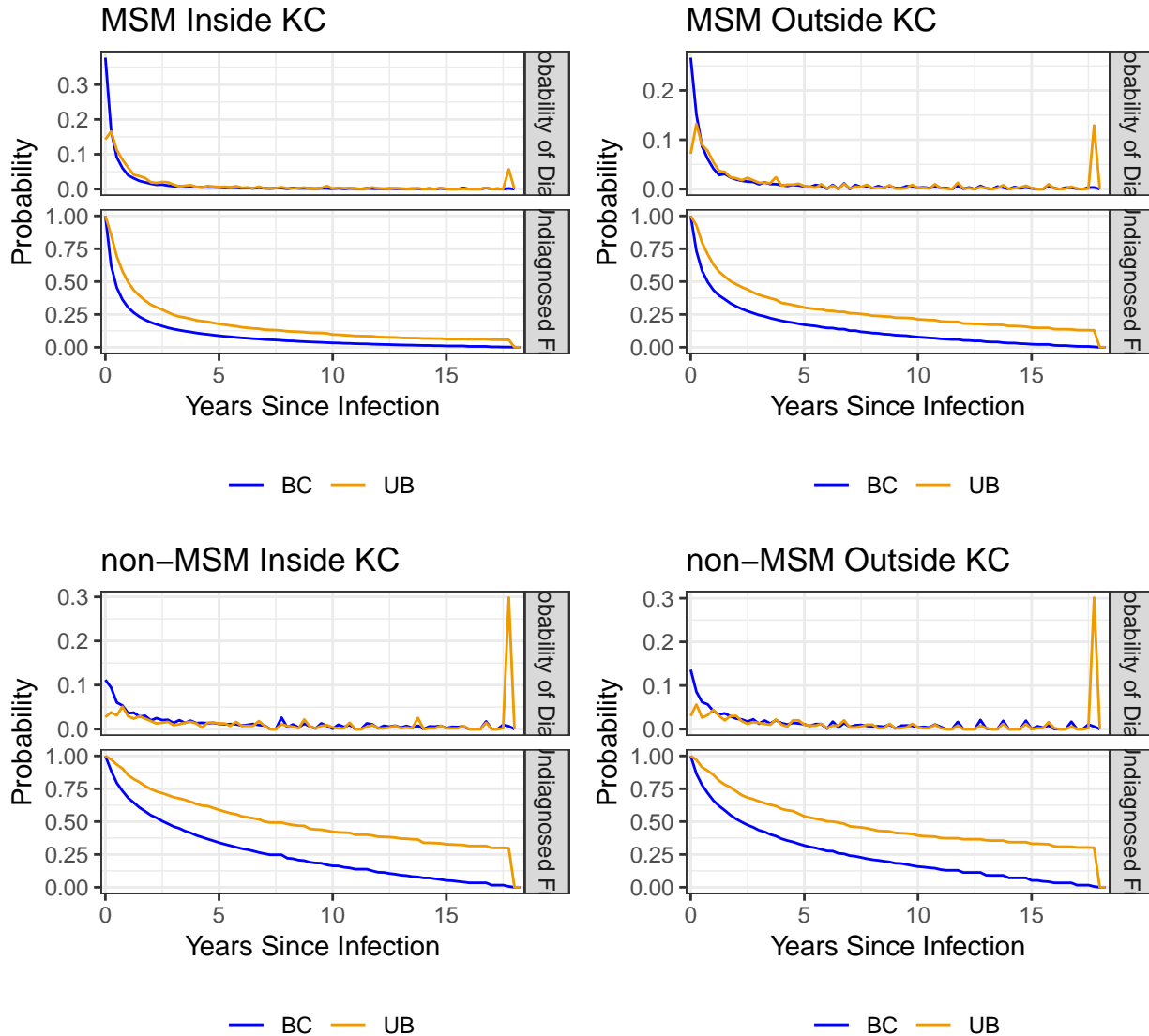
Mode	N	Column Percent	Percent Yes	Percent No	Percent Missing
All	6711	100	49	13	38
Inside KC					
MSM	2664	40	71	7	21
non-MSM	1070	16	29	22	49
Outside KC					
MSM	1701	25	46	13	41
non-MSM	1276	19	24	15	61

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 (Table 1). MSM outside of KC have much lower observed LNTs than MSM inside KC. 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).



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 slightly greater than 25% outside KC. The non-MSM TIDs are more similar, with about 50% of cases remaining undiagnosed at 2.5 years.

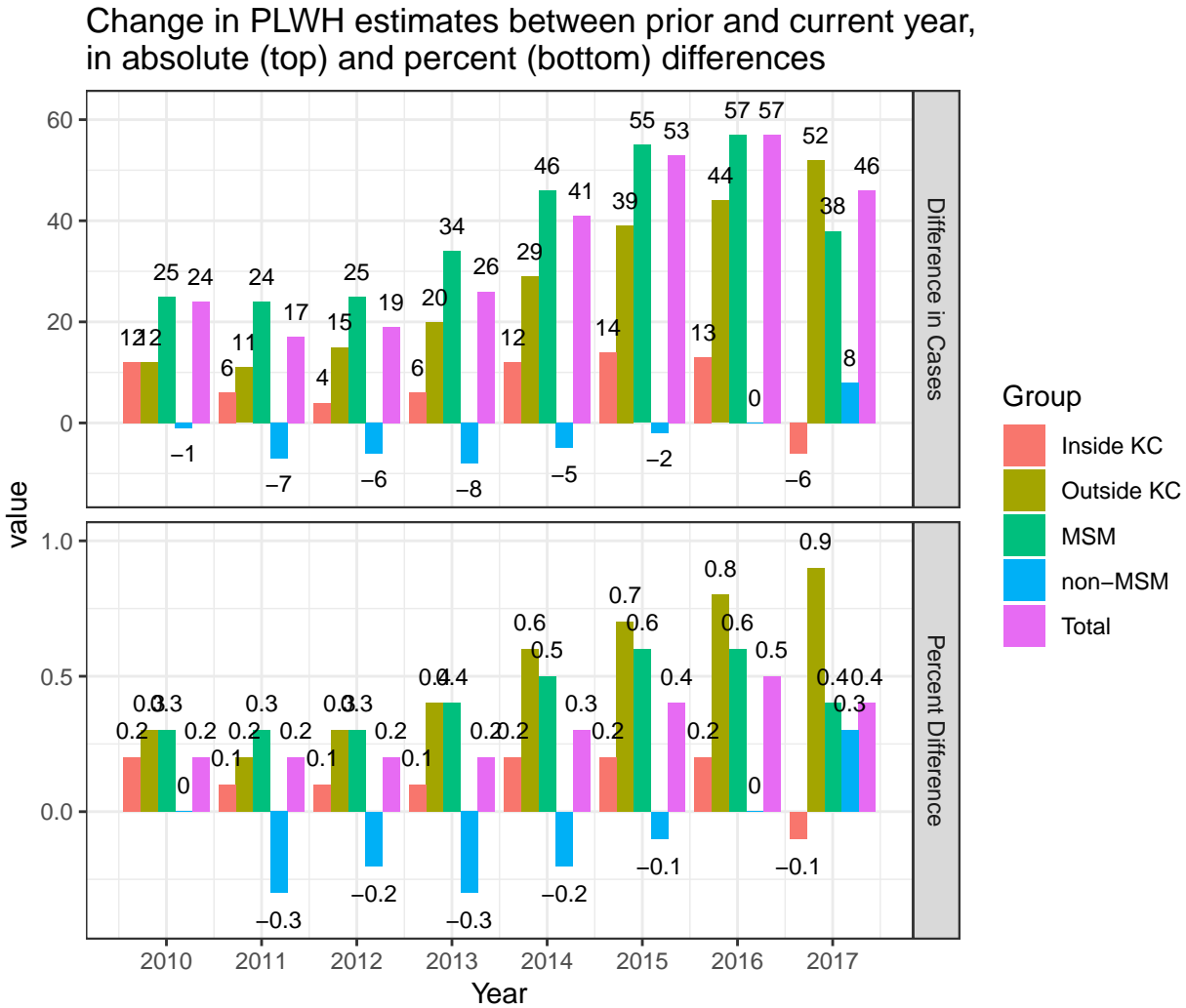


Figure 1: Absolute difference in HIV+ cases (top) and percent difference (bottom) between current and prior PLWH estimates, for 5 groups: Inside KC, Outside KC, MSM, non-MSM, and the Total. Note that Inside KC/Outside KC and MSM/non-MSM are separate marginal estimates.

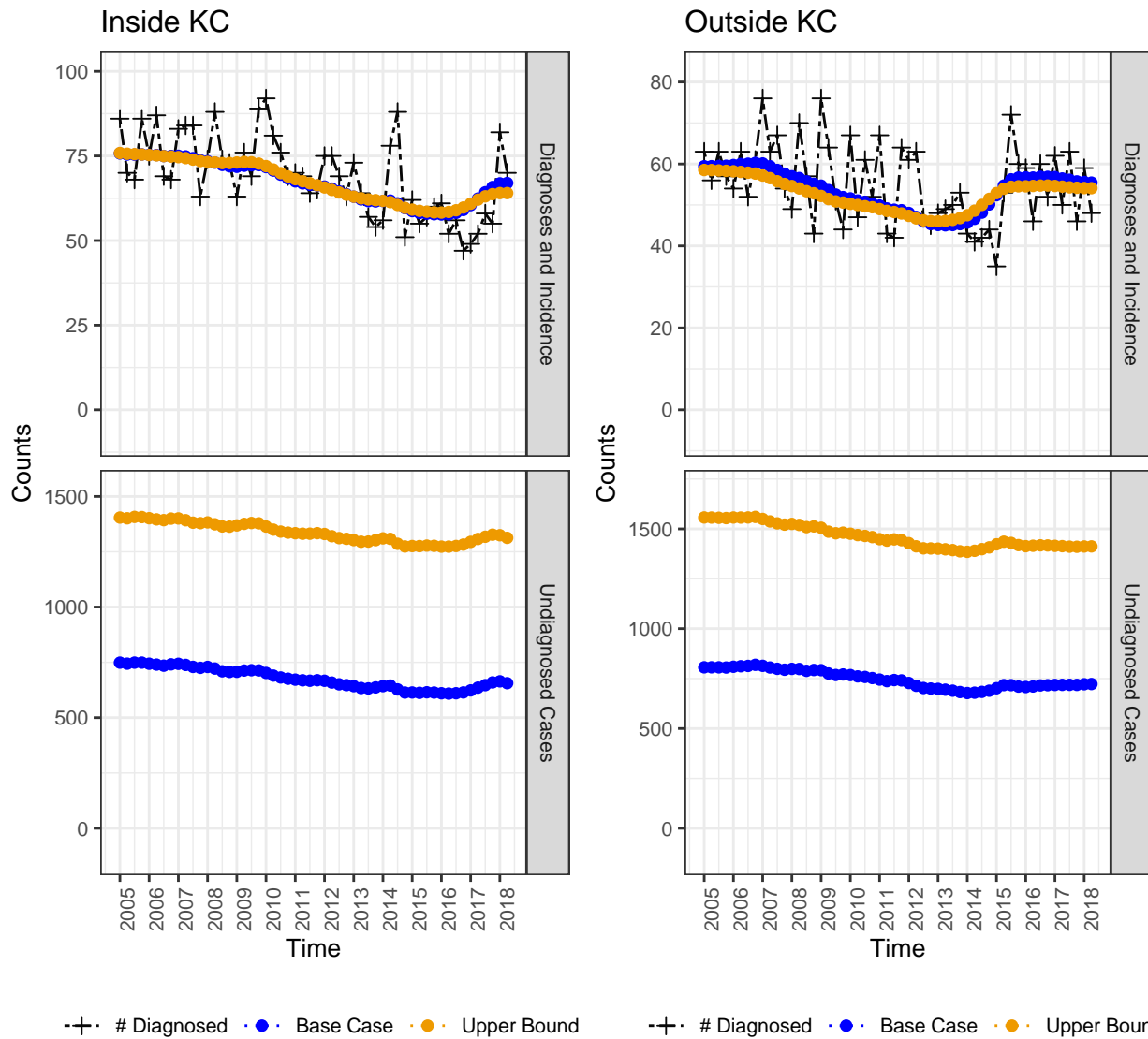
5 Prevalence estimates from DOH

We note here that the prevalence estimates for all years typically change at the annual update. The plot below shows the impact of year of estimation on the total and subgroup estimates. In 2018, we clarified that we historically have used the MI program to distribute the NIR category. When we do not, the heterosexual prevalence is substantially higher.

In the Figure, Current refers to the 2019 estimation. Prior refers to the 2018 estimates.

6 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.

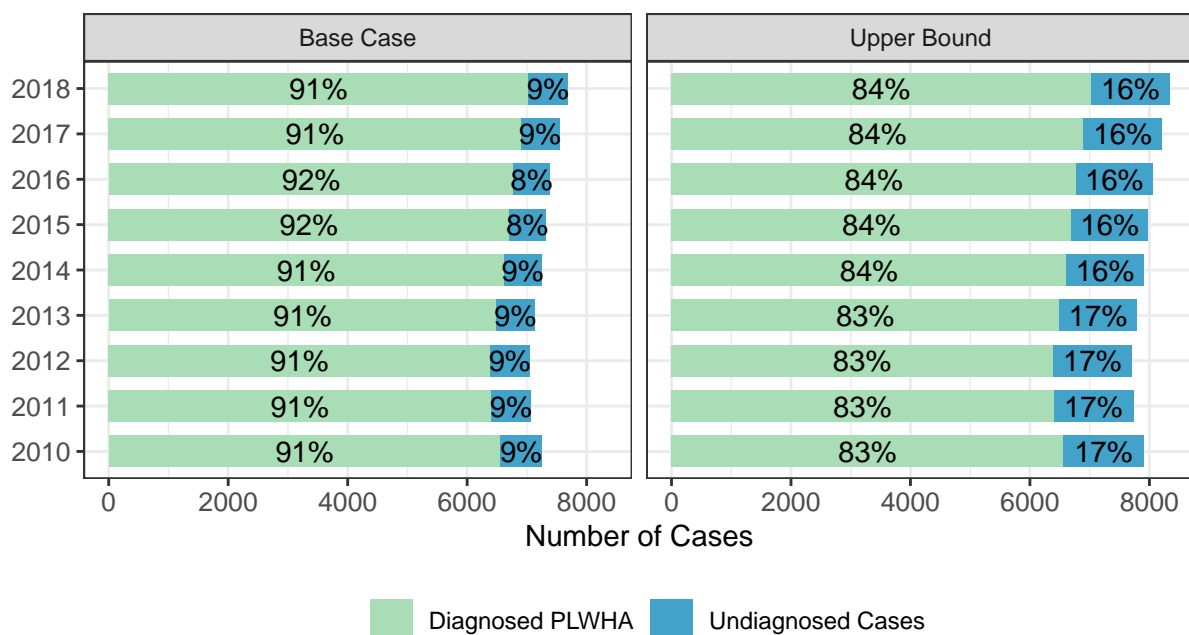


Taking the y-scales into account, you can see that the number of new diagnoses/cases each quarter is higher inside KC than outside, but the undiagnosed case counts are similar. This reflects longer times to diagnosis outside KC than inside KC.

7 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 the years. 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. Please note the different x-scales on the inside versus outside KC plots.

Inside KC



Outside KC

