WA State HIV Testing Histories - Comparison of MSM-WA and MSM-KC

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1 Samples

WA Sample

- N = 3135
- Years = 2005 to 2013
- everHadNegTest = TRUE for 1746 (55.69%), FALSE for 301 (9.6%), and NA for 1088 (34.7%)

KC Sample

- N = 1522
- Years = 2006 to 2012
- everTested = TRUE for 1151 (75.62%), FALSE for 101 (6.64%), and NA for 270 (17.74%)

Note on KC sample: in the Venn Diagram where I double-checked the revised Table 1 numbers, I found 1132 with a negative test and 289 with no testing history. I'm not sure why the data-cleaning.R file turns everTested=TRUE for 19 of those cases and we get 1151 flagged as having a negative test. Will have to investigate. Below when we look at the TID variable ('infPeriod'), it is NA for 289 cases, as we would expect. So, it looks like the everTested=TRUE flag is just wrong for those 19 cases, which shouldn't affect the results.

2 TIDs

```
summarize_infPeriod(all$infPeriod, bygroup = all$Population)

## $stats
##   Group Min. 1st Qu. Median  Mean 3rd Qu.  Max. IsNA    N Percent Missing
## 1    KC    0  0.4986  1.249 3.119   3.332 17.98  289 1522           18.99
## 2    WA    0  0.5110  1.419 4.002   4.729 17.98 1088 3135           34.70
##
## $oneway
##
##  One-way analysis of means (not assuming equal variances)
##
## data:  infPeriod and Group
## F = 25.1526, num df = 1.000, denom df = 2994.363, p-value = 5.606e-07
```

Figure 1 compares the TIDs for MSM in KC (red) versus MSM in WA (green). Both the Base Case (left) and Upper Bound (right) exclude those with TID=NA from the computation of TID, just as in the paper.

3 Incidence and Undiagnosed Cases

3.1 Summary across quarters, KC

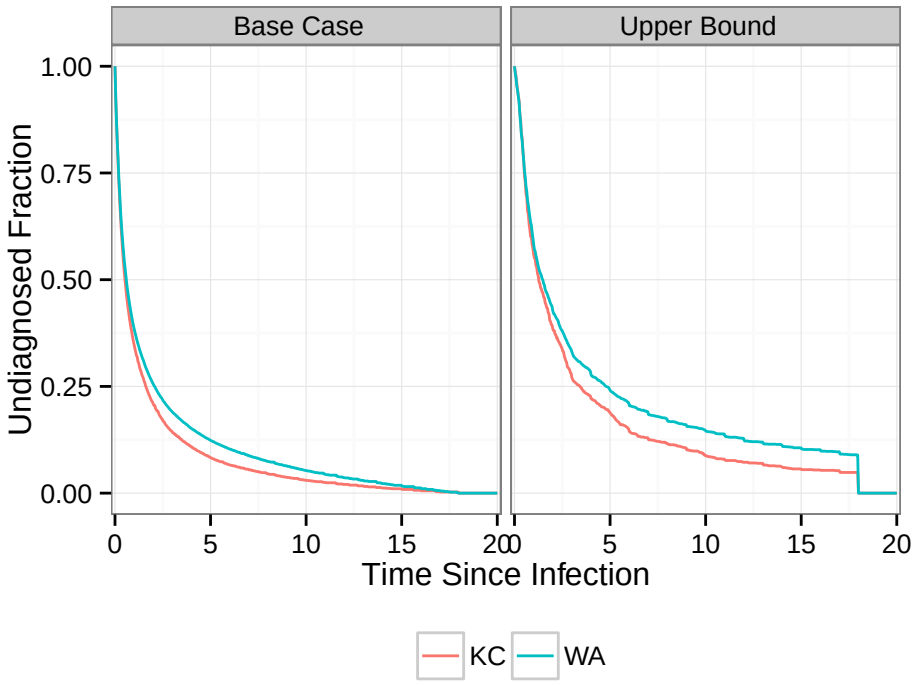

Figure 1: Time from infection to diagnosis (TID) for MSM, with panels representing difference cases (Base vs Upper Bound) and colors distinguishing populations (KC vs WA)

```
# KC - replicates paper
summaries_noimpute_KC[[1]]

##                          var   Min. 1st Qu. Median   Mean 3rd Qu.   Max.
## 1              # Diagnosed    36.00   50.00  54.00  54.36   60.00  70.00
## 2     Incidence (Base Case)    49.73   53.15  54.88  54.29   55.61  57.53
## 3   Incidence (Upper Bound)    49.63   52.10  55.29  54.11   55.81  56.83
## 4   Undiagnosed (Base Case)   333.50  340.30 344.60 346.80  351.00 367.80
## 5 Undiagnosed (Upper Bound)   662.20  674.40 682.90 684.00  690.80 713.30
```

Replication of the paper results confirms that the code is working correctly.

3.2 Summary across quarters, WA

```
# WA - using same code as the code that replicates the paper, this is what we get:
summaries_noimpute_WA[[1]]

##                          var    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 1              # Diagnosed     65.00   79.00   87.50   87.08   94.25  108.00
## 2     Incidence (Base Case)     75.75   81.27   87.99   85.40   89.94   90.47
## 3   Incidence (Upper Bound)     74.45   78.65   86.11   83.82   88.74   90.08
## 4   Undiagnosed (Base Case)    672.20  705.50  731.00  721.00  739.90  750.70
## 5 Undiagnosed (Upper Bound)   1341.00 1389.00 1445.00 1424.00 1459.00 1473.00
```

3.3 Reported prevalence, undiagnosed counts, true prevalence, and the undiagnosed fraction

In this table, UndiagQtrMin and UndiagQtrMax give the min-max range of quarterly undiagnosed counts across the quarters of one year, for a given Case and Population. TruePrevMin and TruePrevMax are the sum of ReportedPrev and the Min/Max UndiagQtr counts. UndiagPercMin and UndiagPercMax are the Min/Max of UndiagQtr divided by the Min/Max of TruePrev, converted to percents.

```
yearlys5
```

	Population	Category	Group	Year	Case	Reported_Prev	UndiagQtrMax	UndiagQtrAvg
1	KC	Mode-consolidated	MSM	2006	Base Case	5516	347.7	344.8
2	KC	Mode-consolidated	MSM	2007	Base Case	5516	351.5	343.9
3	KC	Mode-consolidated	MSM	2008	Base Case	5516	349.4	345.0
4	KC	Mode-consolidated	MSM	2009	Base Case	5516	367.8	361.0
5	KC	Mode-consolidated	MSM	2010	Base Case	5516	366.5	355.3
6	KC	Mode-consolidated	MSM	2011	Base Case	5516	344.0	342.1
7	KC	Mode-consolidated	MSM	2012	Base Case	5516	339.0	335.8
8	KC	Mode-consolidated	MSM	2006	Upper Bound	5516	687.3	683.4
9	KC	Mode-consolidated	MSM	2007	Upper Bound	5516	689.8	680.8
10	KC	Mode-consolidated	MSM	2008	Upper Bound	5516	693.7	687.1
11	KC	Mode-consolidated	MSM	2009	Upper Bound	5516	713.3	707.6
12	KC	Mode-consolidated	MSM	2010	Upper Bound	5516	707.3	691.2
13	KC	Mode-consolidated	MSM	2011	Upper Bound	5516	675.9	672.9
14	KC	Mode-consolidated	MSM	2012	Upper Bound	5516	668.4	664.9
15	WA	Mode-consolidated	MSM	2005	Base Case	7063	744.5	739.3
16	WA	Mode-consolidated	MSM	2006	Base Case	7373	747.6	743.6
17	WA	Mode-consolidated	MSM	2007	Base Case	7655	750.7	735.6
18	WA	Mode-consolidated	MSM	2008	Base Case	7871	740.2	733.3
19	WA	Mode-consolidated	MSM	2009	Base Case	8075	743.3	740.3
20	WA	Mode-consolidated	MSM	2010	Base Case	8308	739.8	727.8
21	WA	Mode-consolidated	MSM	2011	Base Case	8291	715.4	708.3
22	WA	Mode-consolidated	MSM	2012	Base Case	8367	699.0	686.1
23	WA	Mode-consolidated	MSM	2013	Base Case	8673	680.1	674.9
24	WA	Mode-consolidated	MSM	2005	Upper Bound	7063	1470.9	1465.4
25	WA	Mode-consolidated	MSM	2006	Upper Bound	7373	1473.0	1468.4
26	WA	Mode-consolidated	MSM	2007	Upper Bound	7655	1471.9	1452.8
27	WA	Mode-consolidated	MSM	2008	Upper Bound	7871	1458.4	1450.5
28	WA	Mode-consolidated	MSM	2009	Upper Bound	8075	1458.5	1452.9
29	WA	Mode-consolidated	MSM	2010	Upper Bound	8308	1444.2	1426.1
30	WA	Mode-consolidated	MSM	2011	Upper Bound	8291	1404.2	1393.5
31	WA	Mode-consolidated	MSM	2012	Upper Bound	8367	1376.2	1359.5
32	WA	Mode-consolidated	MSM	2013	Upper Bound	8673	1349.4	1343.8

	UndiagQtrMin	TruePrevMin	TruePrevAvg	TruePrevMax	UndiagPercMin	UndiagPercAvg	UndiagPercMax
1	339.5	5855.5	5860.8	5863.7	5.8	5.9	5.9
2	337.1	5853.1	5859.9	5867.5	5.8	5.9	6.0
3	342.1	5858.1	5861.0	5865.4	5.8	5.9	6.0
4	353.1	5869.1	5877.0	5883.8	6.0	6.1	6.3
5	345.7	5861.7	5871.3	5882.5	5.9	6.1	6.2
6	340.5	5856.5	5858.1	5860.0	5.8	5.8	5.9
7	333.5	5849.5	5851.8	5855.0	5.7	5.7	5.8
8	678.7	6194.7	6199.4	6203.3	11.0	11.0	11.1
9	674.9	6190.9	6196.8	6205.8	10.9	11.0	11.1
10	682.1	6198.1	6203.1	6209.7	11.0	11.1	11.2
11	700.3	6216.3	6223.6	6229.3	11.3	11.4	11.5
12	678.0	6194.0	6207.2	6223.3	10.9	11.1	11.4
13	671.2	6187.2	6188.9	6191.9	10.8	10.9	10.9
14	662.2	6178.2	6180.9	6184.4	10.7	10.8	10.8
15	735.6	7798.6	7802.3	7807.5	9.4	9.5	9.5
16	739.4	8112.4	8116.6	8120.6	9.1	9.2	9.2
17	723.9	8378.9	8390.6	8405.7	8.6	8.8	8.9
18	728.7	8599.7	8604.3	8611.2	8.5	8.5	8.6
19	737.5	8812.5	8815.3	8818.3	8.4	8.4	8.4
20	719.0	9027.0	9035.8	9047.8	8.0	8.1	8.2
21	705.2	8996.2	8999.3	9006.4	7.8	7.9	7.9
22	677.5	9044.5	9053.1	9066.0	7.5	7.6	7.7
23	672.2	9345.2	9347.9	9353.1	7.2	7.2	7.3
24	1460.8	8523.8	8528.4	8533.9	17.1	17.2	17.2
25	1464.5	8837.5	8841.4	8846.0	16.6	16.6	16.7
26	1440.0	9095.0	9107.8	9126.9	15.8	16.0	16.1

```
## 27       1446.7      9317.7      9321.5      9329.4          15.5          15.6          15.6
## 28       1449.8      9524.8      9527.9      9533.5          15.2          15.2          15.3
## 29       1412.3      9720.3      9734.1      9752.2          14.5          14.7          14.8
## 30       1386.7      9677.7      9684.5      9695.2          14.3          14.4          14.5
## 31       1349.1      9716.1      9726.5      9743.2          13.9          14.0          14.1
## 32       1340.7     10013.7     10016.8     10022.4          13.4          13.4          13.5
```

```
ddply(yearlys5, .(Population, Case), numcolwise(range))
```

```
##   Population          Case Year Reported_Prev UndiagQtrMax UndiagQtrAvg UndiagQtrMin TruePrevMin
## 1         KC   Base Case   2006          5516        339.0        335.8        333.5      5849.5
## 2         KC   Base Case   2012          5516        367.8        361.0        353.1      5869.1
## 3         KC Upper Bound   2006          5516        668.4        664.9        662.2      6178.2
## 4         KC Upper Bound   2012          5516        713.3        707.6        700.3      6216.3
## 5         WA   Base Case   2005          7063        680.1        674.9        672.2      7798.6
## 6         WA   Base Case   2013          8673        750.7        743.6        739.4      9345.2
## 7         WA Upper Bound   2005          7063       1349.4       1343.8       1340.7      8523.8
## 8         WA Upper Bound   2013          8673       1473.0       1468.4       1464.5     10013.7
##   TruePrevAvg TruePrevMax UndiagPercMin UndiagPercAvg UndiagPercMax
## 1      5851.8      5855.0           5.7           5.7           5.8
## 2      5877.0      5883.8           6.0           6.1           6.3
## 3      6180.9      6184.4          10.7          10.8          10.8
## 4      6223.6      6229.3          11.3          11.4          11.5
## 5      7802.3      7807.5           7.2           7.2           7.3
## 6      9347.9      9353.1           9.4           9.5           9.5
## 7      8528.4      8533.9          13.4          13.4          13.5
## 8     10016.8     10022.4          17.1          17.2          17.2
```

As in the paper, the undiagnosed fraction in KC MSM over 2006-2012 is 5.7-6.3 (BC) or 10.7-11.5 (UB). In MSM in WA over 2005-2013, the undiagnosed fraction is 7.2-9.5 (BC) or 13.4-17.2 (UB).