Recent detectable viral loads among adults living with HIV in the Asia-Pacific between 2015 to 2020


BACKGROUND
A proportion of people living with HIV (PLWH) continue to have detectable viral load (VL) while on robust antiretroviral therapy (ART) regimens and risk onward HIV transmission. We aimed to estimate the proportion and factors associated with having a detectable VL between 2015 and 2020 in two Asia-Pacific HIV observational cohorts.

RESULTS
Of the 20,765 PLWH included, the majority were male (64%) and had heterosexual contact as their mode of HIV exposure (72%). The median age was 36 (Table 1).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total PLWH</th>
<th>PLWH who never had detectable VL</th>
<th>PLWH who had detectable VL (≥50 copies/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>20,765 (100)</td>
<td>14,727 (71)</td>
<td>6,038 (29)</td>
</tr>
<tr>
<td>Sex, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male, %</td>
<td>12,805 (62)</td>
<td>9,290 (36)</td>
<td>3,515 (14)</td>
</tr>
<tr>
<td>Female, %</td>
<td>7,960 (38)</td>
<td>5,437 (22)</td>
<td>2,523 (10)</td>
</tr>
<tr>
<td>HIV Exposure, N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative, %</td>
<td>13,682 (66)</td>
<td>10,215 (49)</td>
<td>3,467 (16)</td>
</tr>
<tr>
<td>Positive, %</td>
<td>7,083 (34)</td>
<td>4,551 (22)</td>
<td>2,532 (11)</td>
</tr>
<tr>
<td>Other/Unknown, %</td>
<td>5,000 (25)</td>
<td>3,053 (14)</td>
<td>1,947 (9)</td>
</tr>
<tr>
<td>Time (years)</td>
<td>2015-2020</td>
<td>2015-2018</td>
<td>2016-2018</td>
</tr>
<tr>
<td>Ever positive</td>
<td>1,451 (7)</td>
<td>1,324 (6)</td>
<td>127 (1)</td>
</tr>
<tr>
<td>Ever negative</td>
<td>13,334 (65)</td>
<td>12,473 (56)</td>
<td>961 (4)</td>
</tr>
<tr>
<td>Time to detection of VL (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤1, 50-200</td>
<td>2,013 (10)</td>
<td>1,952 (9)</td>
<td>60 (3)</td>
</tr>
<tr>
<td>&gt;1, ≤500</td>
<td>9,290 (45)</td>
<td>8,708 (42)</td>
<td>582 (3)</td>
</tr>
<tr>
<td>&gt;500, ≤2000</td>
<td>5,451 (26)</td>
<td>5,249 (24)</td>
<td>192 (1)</td>
</tr>
<tr>
<td>&gt;2000, ≤50000</td>
<td>3,701 (18)</td>
<td>3,472 (16)</td>
<td>229 (1)</td>
</tr>
<tr>
<td>&gt;50000, ≤200000</td>
<td>1,104 (5)</td>
<td>1,073 (5)</td>
<td>31 (2)</td>
</tr>
<tr>
<td>World Bank income, N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Middle</td>
<td>10,215 (49)</td>
<td>9,290 (45)</td>
<td>925 (4)</td>
</tr>
<tr>
<td>Middle</td>
<td>7,960 (38)</td>
<td>6,545 (31)</td>
<td>1,405 (6)</td>
</tr>
<tr>
<td>High</td>
<td>2,590 (13)</td>
<td>2,540 (12)</td>
<td>50 (2)</td>
</tr>
</tbody>
</table>

During the study period, 6,038 (29%) had ≥1 detectable VL. Of these, 2,881 (48%) had VL measurements between 50 and <200 copies/mL, 684 (11%) between 200 and <1,000, 495 (8%) between 1,000 and <5,000, and 1,973 (33%) ≥5,000 copies/mL. The highest and lowest proportions with VL measurements ≥5,000 copies/mL were in years 2018 (37%) and 2015 (25%), respectively (Figure 2). The proportion with VL blips varied over time: 2015 (10%), 2016 (11%), 2017 (13%), 2018 (17%), 2019 (21%), and 2020 (14%).

Figure 2. Distribution of participants with detectable VL according to categories of VL measurements per calendar year

CONCLUSIONS
Almost one third of PLWH in our analysis had detectable VL between 2015 and 2020, of these, a third had VL measurements ≥5,000 copies/mL, indicating the need for strengthening lifelong adherence counselling and follow-up, particularly among those with increased odds of detectable VL.

METHODS
This analysis included available data from adult PLWH enrolled in two prospective observational cohort studies of ieDEA Asia-Pacific: the TREAT Asia HIV Observational Database (TAHOD) and TAHOD Low Intensity Transfer (TAHOD-LITE) cohorts (Figure 1). Eligible participants were on ART for ≥1 year, in follow-up between 2015 and 2020, and with ≥1 VL measurement during the follow-up period. Detectable VL was defined as having ≥50 copies/mL during 2015-2020. The proportion with detectable VL was estimated using repeated measures logistic regression.

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Figure 1. Asia-Pacific countries and territories included in TAHOD and TAHOD-LITE cohorts

Figure 2. Distribution of participants with detectable VL according to categories of VL measurements per calendar year

Table 1. Characteristics of PLWH with detectable VL

Table 2. Adjusted odds ratios for factors associated with detectable VL

Table 3. Distribution of participants with detectable VL according to categories of VL measurements per calendar year

Figure 3. Factors associated with having detectable viral load (≥50 copies/mL) using repeated measures analysis

Summary
- The factors associated with decreased odds of detectable VL included female sex compared to males; older age compared to ≤30; male-sex and injecting drug use compared to heterosexual contact as modes of HIV exposure; non-nucleoside reverse transcriptase inhibitor-based ART (NNRTI) compared to integrase strand transfer inhibitor (INSTI)-based regimens; hepatitis B or hepatitis C co-infection, higher CD4 count compared to CD4 <200 cells/µL; and higher country income compared to lower-middle. Detectable VL was more likely among those on protease inhibitor-based ART regimens compared to INSTI-based ART (Figure 3).

Table 2. Adjusted odds ratios for factors associated with detectable VL

Table 3. Distribution of participants with detectable VL according to categories of VL measurements per calendar year

Figure 3. Factors associated with having detectable viral load (≥50 copies/mL) using repeated measures analysis

Conclusion
- Almost one third of PLWH in our analysis had detectable VL between 2015 and 2020, of these, a third had VL measurements ≥5,000 copies/mL, indicating the need for strengthening lifelong adherence counselling and follow-up, particularly among those with increased odds of detectable VL.