Identifying significant indicators of unsuppressed viral load using client level data in the Boston EMA

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Introduction
As part of the National HIV/AIDS Strategy, the Ryan White HIV/AIDS Program plays an important role in reaching newly diagnosed PLWH and those not fully engaged in care. The goal of HIV services is to achieve and maintain HIV viral suppression, both to improve client health and reduce HIV transmission. Depending on the data source reported viral suppression rates in the Boston EMA range from 85% to 99%. The Boston Public Health Commission (BPHC) uses e2Boston, a cloud-based data system, to collect detailed client level data from Ryan White Part A funded providers. These data were analyzed in order to identify factors associated with lack of viral suppression.

Methods
BPHC funds 36 agencies for services. Agencies are required to report for clients served, including (but not limited to) ethnicity, race, age, HIV risk exposure, housing status, and last medical visit date.

Inclusion Criteria
The client received at least one instance of Part A services during FY15 (March 1, 2015 – February 29, 2016) and had a reported viral load during that period.

Definitions
• Viral Suppression: viral load < 200 copies/mL blood
• Mental Health Status: Client’s need, or lack thereof, for psychiatric and/or emotional support.
• Support Network Status: The need for a support network that may include family, friends, religious groups, or peer groups.
• Housing Status: Stability and affordability of a client’s living situation.
• HIV Risk Exposure - MSM: MSM+IDU were counted in the MSM exposure category. (MSM + IDU = 1% of the sample population.)
• HIV Risk Exposure - Heterosexual: Sexual contact with a partner of the opposite sex who is either HIV-positive or at high risk for HIV infection. This category did not include persons who also indicated MSM and/or IDU risk factors.

Statistics
• Chi square tests determined if outcome measure scores and demographic variables differed among suppressed and unsuppressed clients at alpha ≤ 0.05.
• Outcome variables with statistical significance and additional demographic variables were added into a logistic regression model.
• Backwards selection eliminated several variables from the initial model, including: Gender, Long-Term Survivor Status, MCM Status, and Care Engagement.
• Factors were retained in the model at alpha=0.2.
• Observations were omitted that were missing values for any variables included in the model.

Table 1: Comparing selected characteristics between suppressed and unsuppressed clients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unsuppressed</th>
<th>Suppressed</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>30%</td>
<td>70%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Age</td>
<td>37%</td>
<td>63%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>31%</td>
<td>69%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mental Health Status</td>
<td>45%</td>
<td>55%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Support Network Status</td>
<td>37%</td>
<td>63%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Housing Status</td>
<td>37%</td>
<td>63%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mental Health</td>
<td>45%</td>
<td>55%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Support Network Status</td>
<td>37%</td>
<td>63%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

Table 2: Multivariate regression analysis of factors related to HIV viral non-suppression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>Wald statistic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.02</td>
<td></td>
<td>16.94</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Housing Status</td>
<td>0.01</td>
<td></td>
<td>6.84</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Support Network Status</td>
<td>0.03</td>
<td></td>
<td>12.34</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mental Health Status</td>
<td>0.02</td>
<td></td>
<td>7.12</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

Conclusions and Next Steps for BPHC
Key findings:
• Analysis of client level data is important to identify unaddressed and emerging needs among people living with HIV (PLWH).
• In the Boston EMA, mental illness, unstable housing and lack of support networks were significantly associated with unsuppressed viral load.
• Additional results from this analysis, which are that, race, age and HIV risk exposure are linked to unsuppressed viral load, are consistent with other research, including an EMA unmet needs assessment.

Limitations
Data in this report are cross-sectional and do not address trends. Utilization of specific services is not factored into the analysis. Selection bias may have impacted results if clients with missing data were significantly different from clients with non-missing data. 431/542 observations were excluded from the analysis.

Who is less likely to be virally suppressed in the Boston EMA?

• Clients < 45 years old
• Incarcerated clients or those who no reported mental health problems
• Clients living in insecure housing or needs financial assistance
• Clients with strong support network

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How does BPHC use these data to inform Part A activities?

• BPHC updates the Boston EMA Planning Council annually on the current health status of PLWH served by Part A services. The Council uses these data to identify populations with unmet HIV service needs, persistent barriers to care (such as housing, mental health, & substance abuse), and other factors that hinder viral suppression.
• BPHC publishes e2Boston reports that allow stakeholders to better understand how Part A funds are contributing to the health of PLWH in the Boston EMA.
• BPHC is making strategic investments in agencies and services that focus on improving viral suppression and retention in care for PLWH.
• BPHC requires applicants competing for Part A funds to describe available viral suppression data and tailor staffing and program activities that maximize opportunities to improve client health outcomes.
• Agencies develop annual workplans that are realistic and data-driven by reviewing their past performance within e2Boston, identifying gaps and disparities within their own client population.

The data system allows funded providers to generate reports that can be used for program monitoring and evaluation. BPHC staff generate e2Boston reports and review them during monthly calls with their providers.

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• Authors also wish to thank the Ryan White Program providers who have contributed to this report.

References:
Valdiserri, R. O. (2014). Improving Outcomes along the HIV Care Continuum: Paying Careful Attention to the Non-Continuity of Care for Individuals Living with HIV/AIDS. JAMA internal medicine, 175(10), 1660-1661.