Adherence: where we are and where we are going?

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• We are doing much better at getting PLWH in care undetectable in more recent years than previously, mostly because we do a better job getting them on ART

• Even among those on ART there are improvements in proportion undetectable despite not necessarily doing a better job at adherence in the more recent era

• Important disparities still exist: we are not done

• Future: integrated into clinical care rather than intensive small interventions that are not generalizable, taking advantage of recent advances in EMRs to allow data collected outside the EMR to feed into it in real-time, targeted to those who need it, stepped care approaches, with broad scope, not just focused on adherence
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Consistently High ART Adherence

~75% of the population are 95% adherent or above
Factors associated with suppressed viral load among persons living with HIV on antiretroviral therapy in clinical care across the US in the CNICS cohort in 2010-2015 in adjusted models

<table>
<thead>
<tr>
<th>Covariate</th>
<th>OR</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrase strand transfer inhibitor use</td>
<td>2.4</td>
<td>2.2-2.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Male</td>
<td>1.3</td>
<td>1.1-1.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age (per decade)</td>
<td>1.9</td>
<td>1.8-2.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race (Black=ref)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2.4</td>
<td>2.1-2.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.5</td>
<td>2.1-2.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Other</td>
<td>2.5</td>
<td>2.0-3.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Years from 2010</td>
<td>1.4</td>
<td>1.3-1.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Different classes of antiretroviral medications demonstrated different best fitting break points for classifying participants as adherent.
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Age: 9% higher per older age category
Sex: 3% higher in males
Race: 8% lower in blacks compared to whites
Risk Factor: 3% lower in heterosexual compared to MSM, 6% lower in IDU compared to MSM
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Figure 1A. Common situation in routine clinical care

Structural barriers
Provider barriers
Patient barriers to assessment

System not aware

Adherence not assessed

No intervention

Continued poor adherence

Poor HIV outcomes

Poor adherence

Patient factors
* substance abuse
* mental illness
* other

Figure 1B. Situation with valid adherence measurement incorporated into clinical care

System aware

Intervention

Poor adherence

Adherence assessed

Good adherence

Better HIV outcomes

Adherence assessed

Poor adherence
Selected Findings FROM CNICS: >70,000 Assessments To Date

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate to severe depression</td>
<td>22%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>25%</td>
</tr>
<tr>
<td>Unsafe sex</td>
<td>29%</td>
</tr>
<tr>
<td>Any illicit drug use</td>
<td>70%</td>
</tr>
<tr>
<td>Current illicit drug use inc. marij.</td>
<td>34%</td>
</tr>
<tr>
<td>Current illicit drug use excl. marij.</td>
<td>20%</td>
</tr>
<tr>
<td>At-risk alcohol use</td>
<td>24%</td>
</tr>
<tr>
<td>Current smoker</td>
<td>36%</td>
</tr>
</tbody>
</table>
## Awareness and Actions Before vs. After PRO Delivery

<table>
<thead>
<tr>
<th>Condition</th>
<th>Before Feedback</th>
<th>During Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Adherence</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Inaccurate adherence*</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>At-risk alcohol*</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Substance use*</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>At-risk sexual behavior</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

**Bar Chart 1:**

- Bar 1: Depression
- Bar 2: Adherence
- Bar 3: Inaccurate adherence
- Bar 4: At-risk alcohol
- Bar 5: Substance use
- Bar 6: At-risk sexual behavior

Legend:
- Before feedback
- During feedback

**Bar Chart 2:**

- Bar 1: Depression
- Bar 2: Adherence
- Bar 3: At-risk alcohol
- Bar 4: Substance use
- Bar 5: At-risk sexual behavior

Legend:
- Before feedback
- During feedback
Much easier to collect PRO data such as adherence using tablets outside the EMR (avoiding the patient portal, language, password and numerous other issues) and still feed data back in real time to providers.

- Our first interface for provider reports with Fenway (Centricity) was via HL7 version 2.5 message (a PDF)
- Then we could do discrete data
- More recently, an interface was deployed from the Fenway Admission-Discharge-Transfer (ADT) system and the Consolidated-Clinical Document Architecture to enable automated real-time modification of the assessment instruments based on clinical information.

Can develop template pending recommended orders for providers to sign or reject
Can automate feedback messages to not just provider but case managers and other team measures to ensure appropriate multi-disciplinary team members
Summary

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• The future looks bright as incredible young researchers can build on the successes to date, the improved medications, and the advancements in EMRs, platforms, etc. to continue to improve care
Acknowledgements

• Data presented here from CNICS:
  • Fenway
  • UAB
  • UCSD
  • UCSF
  • UNC
  • UW
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• The smarter ideas from Drs. Mugavero, Simoni, Fredericksen, and other colleagues (the weaker ones are mine!)

• Too many lovely colleagues to name them all

• Funders include NIMH and NIAID

• If questions: my email is hcrane@uw.edu