Can single sample infant HIV test devices handle current test volumes in Ugandan health facilities?

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**KEY POINTS**
- The Center for Innovation in Global Health Technologies (CIGHT) at Northwestern University is developing single sample infant HIV test devices that can be used at or closer to the point-of-care and produce results in about 30 - 45 minutes.
- Because these devices are being designed to process one sample at a time, it is important to understand the number of infants presenting for HIV testing each day at various health facility types.
- We found that the majority of health facilities collect 1 to 2 infant samples per day ensuring these test devices can keep up with current test volumes.
- The total test volume throughout the year differs by facility type impacting consumable packaging, power source and shelf life requirements.

**BACKGROUND**
- In resource-limited settings, dried blood spot samples are collected in a variety of health facilities and sent to centralized reference laboratories for infant HIV testing.
- Result availability can take up to several weeks or months therefore increasing the likelihood that infants are lost to follow-up.
- CIGH researchers are currently developing infant HIV test devices that can be used at or near the point-of-care to produce same-day results.
- The devices can be used to perform one test at a time (single sample) and therefore same-day result availability may be hampered by high test volumes.
- It is therefore necessary to quantify the number of tests ordered per day at various health facilities.

**OBJECTIVES**
- We evaluate whether a single sample test device can accommodate the daily test volumes and total test volumes at health facilities throughout the year.

**METHODS**
- Study setting: Uganda
- Data sources: National test records for tests performed between July 2007 and July 2008 at a centralized laboratory serving 75 different health facilities
- We use the number of blood samples collected at the facility level as a proxy for test volume
- We assume that a daily threshold of 5 tests per 7 hour working day can be accommodated by a single sample test device

**RESULTS**
- Across health facilities, test volumes ranged from 1 to 14 tests per day
- Overall, health facilities had a median test volume of 1 test per day (IQR: 1, 2)
- Regional referral hospitals had a median test volume of 2 tests per day (IQR: 1, 3) while other types of health facilities each had a median test volume of 1 test per day (IQR: 1, 2)
- The majority of testing occurs in regional referral hospitals (Table 1. and Figure 1.)

**TEST VOLUME SUMMARY**

<table>
<thead>
<tr>
<th>Health facility type</th>
<th>No.</th>
<th>Total no. of tests</th>
<th>Dates tests performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Referral Hospitals</td>
<td>5</td>
<td>594</td>
<td>Nov 2007 - Jun 2008</td>
</tr>
<tr>
<td>District Hospitals</td>
<td>14</td>
<td>443</td>
<td>Jul 2007 - Jun 2008</td>
</tr>
<tr>
<td>County Hospitals†</td>
<td>29</td>
<td>385</td>
<td>Sep 2007 - Jun 2008</td>
</tr>
<tr>
<td>Other‡</td>
<td>5</td>
<td>84</td>
<td>Dec 2007 - Jun 2008</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>2041</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Total number of tests performed throughout the year by health facility type
† County hospitals represent health center IVs and health center IIIs
‡ Other hospitals represent dispensaries and military hospitals

**STRENGTHS AND LIMITATIONS**

**Strengths**
- Large number of test records
- Sample collection dates missing from < 3% of test records

**Limitations**
- The study does not reflect change in demand that may occur with introduction of the new device or with improved scale-up of testing
- The study does not capture practice patterns and other operational issues that may affect testing capacity
- Test records were available for different time periods per health facility

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