5th International HIV/Viral Hepatitis Co-Infection Meeting

Viral hepatitis elimination in Latin America and globally: How close are we?

Saturday - Sunday, 20-21 July 2019
Mexico City, Mexico
Technologies to support diagnosis and linkage to care: Knowing your status and getting care 2.0

Jilian A. Sacks, Ph.D.
Clinton Health Access Initiative (CHAI)
1. Setting the stage:
   a. Key challenges that hinder diagnostic scale up

2. Screening:
   a. Review current tests – integrate to reach the right individuals
   b. Technological innovations that may enable access to harder to reach clients

3. Diagnosis/Monitoring:
   a. Leverage existing nucleic acid testing (NAT) systems
   b. Current technologies for decentralization
   c. Pipeline products to enable increased scale up
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For countries to achieve ambitious elimination goals set by WHO, diagnostic and linkage activities must scale-up immediately.

**Challenges:**
- Diagnosis is complex and expensive
- Lack of funding and low volumes restrict ability for market shaping efforts or to take advantage of current access pricing
- Chronic disease, therefore requires ongoing services

**Source:** WHO Global Hepatitis Report 2017
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**HBV**
- 82% Dx Gap

**HCV**
- 70% Dx Gap

**Challenges:**
- Limited awareness of HCV
- Lack of public screening and treatment programs, and persistent high costs of care
- Limited financing

Source: WHO Global Hepatitis Report 2017
Path to Smart Scale: There is not a one-size fits all approach to increasing diagnosis and linkage

**Screening**
- How do we convince programs prioritize **active** screening?
- How do we **optimize** screening?
- How do we ensure use of **SRA-approved/accurate** screening tests?

**Linkage**
- How do we ensure patients **complete** the diagnostic cascade?
- How do we accelerate wide-scale, **affordable nucleic acid testing**?
- How do we ensure high rates of **treatment initiation**?

**Treatment**
- How do we achieve **decentralization of treatment** services?
- How do we accelerate access to **high quality, affordable generics**?

**Financing**
- How do we help MOHs secure the **financing** they need to scale up?
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Screening: Decentralize through use of SRA-approved RDTs

Modified from FIND
Screening: Decentralize through use of SRA-approved RDTs

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Screening: There are three anti-HCV RDTs approved by WHO PQ:

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<thead>
<tr>
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<th>IAs</th>
<th>Under Review</th>
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<td>Rapid Anti HCV (InTec)</td>
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<td>SD Bioline HCV (Standard Diagnostics, Abbott)</td>
<td>Monolisa HCV Ag-Ab Ultra V2 (BioRad)</td>
<td>Architect HCV Ag Assay (Denka Seiken)</td>
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Screening: There are few SRA-approved HBsAg RDTs, which is a formidable barrier to scale up of HBV programs.

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<td>Vikia HBsAg (Biomerieux) <strong>to be discontinued</strong></td>
<td>Bioelisa HBsAg 3.0</td>
<td>Determine HBsAg 2 (Alere, Abbott)</td>
</tr>
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<td>SD Bioline HBsAg WB (Standard Diagnostics, Abbott)</td>
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<td>Enzygnost HBsAg 6.0</td>
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Screening: Integrate within existing services

Example: HBV testing integration with existing MNCH/HIV systems to maximize the number of women who give birth in facility and Hep B BD coverage, including for at risk out-of-facility births

1st ANC Visit

Risk Reduction & Assessment

1. Counsel for in-facility birth, transmission risk & Hep BD
2. Assess mother for treatment eligibility (HBeAg, NAT, LFT)

Counsel for in-facility birth, & Hep BD

If at high risk of giving birth at home*

Home Outreach & Service Delivery

1. Link to relevant community services (midwife, CHW)

2. CHW monitors pregnancy and brings mother in within 24 hours of birth
   OR
   Have CHW provide the injection at home
Demand for services can be increased through active civil society to ensure service uptake and high quality of care.

Several activities are critical for effective community engagement...

- **Set up a community advisory board** for affected communities to be able to inform provision of service.
- **Connect with local leaders** to build demand for services.
- **Use surveys to determine barriers for patients** to influence service delivery platforms.

...leading to a number of benefits...

- **Providers continue to tailor care** to the needs of the community.
- **Demand for testing and treatment services improve**.
- **Service delivery** better meets the needs of patients.

Example:

**PKNI, Indonesia**: Network of drug user organizations supports activities to improve awareness of viral hepatitis and provides information on the availability and location of testing and treatment services.
Screening: Needed Innovations to enable further scale up

HCV Screening Innovations

- **HCV self testing:**
  - Enables increased availability
  - Learning from HIVST; requires good demand generation

- **HCV multi-analyte** tests (HIV/HCV) or (HIV/HCV/HBV):
  - Multiplex may be cheaper than multiple tests
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HBV Screening Needs
- **Sensitive** HBsAg RDTs for screening
- Simple, POC-based **assessment of liver health**, e.g. ALT RDT

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Diagnosis: Given limited funding, and existing investments in NAT platforms, diagnostic integration can be an efficient way to quickly initiate HCV and HBV VL testing.

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Diagnostic Network Optimization (DNO) to:

1. harmonize the testing system
2. break siloes between disease programs
3. maximize the cost effectiveness of the lab network.

- **Which instruments should be placed where?**
  To ensure testing demand is fully met and public health targets are maximized, across test types.

- **What is the optimal integrated referral network?**
  To allow for maximized instrument utilization, shorter TAT, and an efficient use of operational resources.

Example: Rwanda Biomedical Centre
Diagnosis: use existing systems to decentralize access, 1) DBS/PSC
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- **WHO recommends** use of DBS to expand access (2017 Testing Guidelines)
- Sufficient data demonstrating **high accuracy**

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<th>HBV DNA</th>
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<tr>
<td>Pooled Sensitivity</td>
<td>98% (95% CI:95-99)</td>
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- FIND collaborating with several suppliers to do multi-country evaluations to support **regulatory approval** of DBS or Plasma Separator Card (PSC) specimen type(s)
Diagnosis: use existing systems to decentralize access,
2) Near POC

Testing using Near POC Instruments
Diagnosis: use existing systems to decentralize access, 2) Near POC

Near-POC HCV RNA / HBV DNA assays available in the market

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<td>SAMPLE PREPARATION</td>
<td>Integrated</td>
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<td>Off-board (several pipetting steps)</td>
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<td>110 min</td>
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The current model may still have limitations requiring technological innovations to enable same-day clinical decision making.

There is a rich pipeline of device-based POC NAT and device-free/Lateral Flow HCV core Antigen Tests

1-Concept & Feasibility
   - Omni (Cepheid)

2-Development
   - Blink One (BlinkDx)
   - TrueNAT (Molbio Dx)
   - SAMBA II (DRW)
   - m-Pima (ARDx)

3-Validation
   - GeneDrive HCV (GeneDrive)
   - Xpert FS (Cepheid)

4-Regulatory

- Device-based tests, still require infrastructure
- Cost will still be > $5
- High sensitivity
- Can be used for diagnosis, monitoring and cure

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High sensitivity
Can be used for diagnosis, monitoring and cure

RDT format
Requires complex R&D and may take years to be available
Cost will still be < $2
75-85% sensitivity, cannot be used for test of cure

Modified from FIND
Conclusion: Designing the right system using existing technologies can meet the individual needs of many recipients of care, with future diagnostic innovation enabling full scale up

• There is not a one-size fits all approach

• **Existing technologies for HCV screening** and diagnosis are likely sufficient to reach a high proportion of individuals living with chronic HCV
  – Decentralize screening with **anti-HCV RDTs**, leverage existing NAT device footprint – considering **DBS** and **near-POC testing** to increase access, integrate with existing care services
  – To achieve elimination goals **simpler tests which minimize LTFU** will likely be required

• **Technological limitations** are formidable barriers for scale up of public health HBV programs in the majority of LMIC

• Require **accurate HBsAg RDTs**, appropriate **HBV DNA test pricing** and simple and accurate **assessment of liver function**