# Hepatitis B: the next big thing?

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# Things to take away from this talk:

1. Hepatitis B virus (HBV) causes substantial mortality and morbidity worldwide and in Zambia.
2. There is growing global recognition of HBV by multiple stakeholders.
3. CIDRZ has worked on HBV since 2013 and has the potential to become a leading African implementer of HBV research and programs.

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# Hepatitis B virus: an overview

- One of the ‘hepatitis viruses (A, B, C, D, and E)
- Spread via mother-to-child, blood, and body fluids (i.e., sex).
- An effective vaccine exists; however, vaccine use is far from universal.
- After infection, some develop cirrhosis (liver scarring), liver failure, and liver cancer.
- Easy to diagnose with rapid finger prick test.
- Treatment with antiviral drugs suppresses but rarely leads to cure (lifelong therapy often needed like in HIV)

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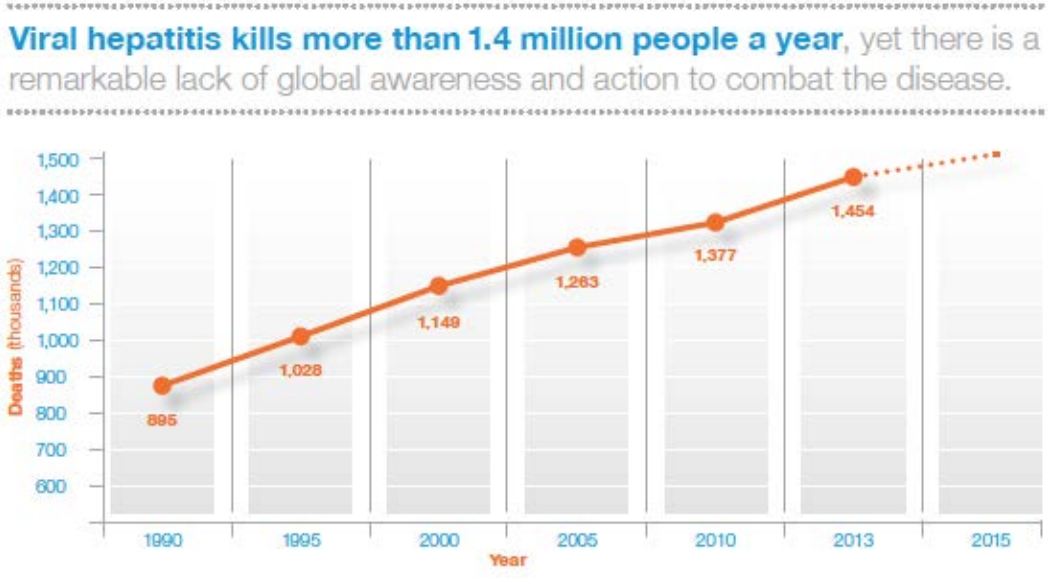
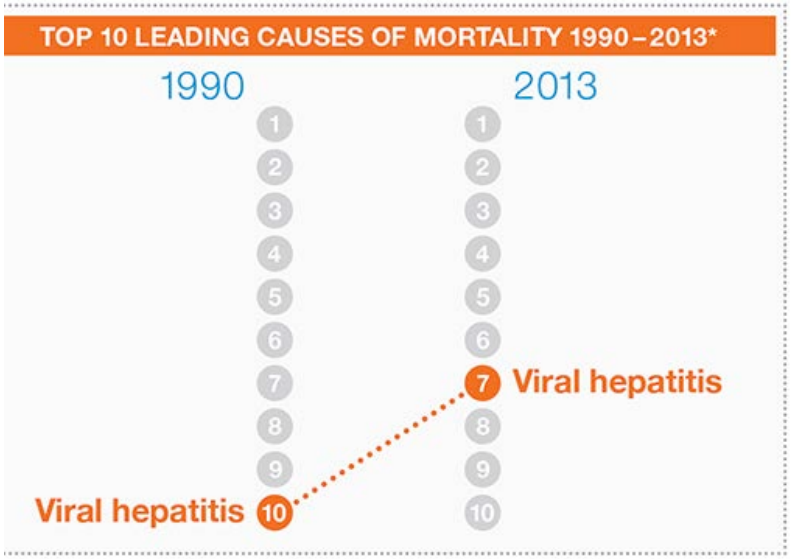
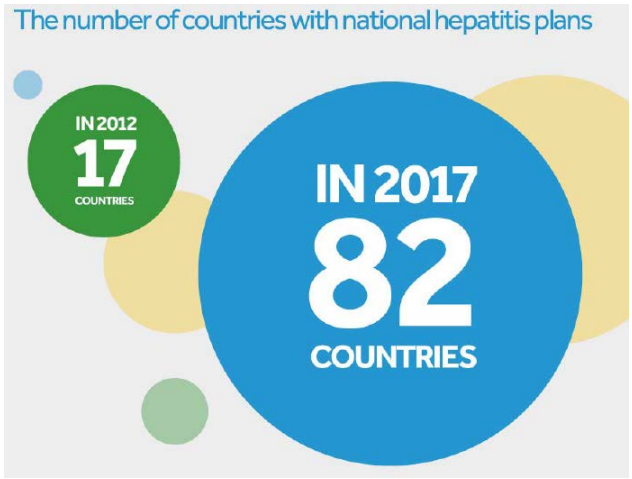
# From the Global Burden of Disease study



# Growing awareness of hepatitis





**Hepatitis**

## Publications on hepatitis

2016

Viral Hepatitis Strategic Information and Modelling Reference Group
Meeting report | 14–16 June 2016 | WHO headquarters, Geneva, Switzerland
6 December 2016

Monitoring and evaluation framework for HBV and HBC elimination
Poster: 10 core indicators: global and national levels
1 December 2016

Guidelines on hepatitis B and C testing
Policy brief
14 November 2016

Access to hepatitis C treatment - 2016
Infographic - November 2016
1 November 2016

Global report on access to hepatitis C treatment - Focus on overcoming barriers
27 October 2016

Technical considerations and case definitions to improve surveillance for viral hepatitis
Policy brief
11 August 2016

Global health sector strategy on viral hepatitis 2016-2021
30 June 2016

Tenofovir to prevent hepatitis B transmission in mothers with high viral load
Article published by New England Journal of Medicine
16 June 2016

Combating hepatitis B and C to reach elimination by 2030
Advocacy brief
27 May 2016

Guidelines for the screening, care and treatment of persons with chronic hepatitis C infection
Updated version, April 2016
13 April 2016

Monitoring and evaluation for viral hepatitis B and C: recommended indicators and framework
Technical report
1 April 2016

Prevalence and burden of HCV co-infection in people living with HIV
A global systematic review and meta-analysis
7 March 2016

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**Table 3.** Potential HBV Therapies in the Pipeline With Known Site of Action

| Site of Action | Drug | Company | Status |
|---|---|---|---|
| **Antiviral** | | | |
| Entry inhibitor | Myrcludex B | Hepatera/MYR GmbH | Phase 2 |
| cccDNA inhibitor | | | Preclinical |
| RNA silencers | ARC-520/-521 | Arrowhead | Terminated |
| | ARB-1467 | Arbutus | Phase 2 |
| | ARB-1740 | Arbutus | Preclinical |
| | ALN-HBV | Alnylam | Phase 1/2 |
| | GSK 3228836 | GlaxoSmithKline/Ionis | Phase 1 |
| Core protein inhibitors | AL-3778 | Alios/Johnson & Johnson | Phase 1/2 |
| | ABI-H0731 | Assembly Biosciences | Phase 1 |
| | BAY 41-4109 | AiCuris (Germany) | Phase 1 |
| | GLS4 | HEC | Phase 1 |
| | JNJ-56136379 | Johnson & Johnson | Phase 1 |
| | AB-423 | Arbutus | Preclinical |
| HBsAg release inhibitors | REP 2139 | Replicor | Phase 2 |
| | REP 2165 | Replicor | Phase 2 |
| **Immunomodulators** | | | |
| TLR-7 agonist | GS-9620 | Gilead Sciences | Phase 2 |
| Therapeutic vaccines | GS-4774 | Gilead Sciences | Complete phase 2 |
| | ABX 203 | ABIVAX (France) | Phase 2/3 |
| | AIC649 | AiCuris (Germany) | Phase 1 |
| | FB-02.2 | Altimmune | Phase 1 |
| | INO-1800 | Inovio | Phase 1 |
| | TG1050 | Transgene (France) | Phase 1 |
| Small molecules | | | |
| • RIG-1 NOD2 activator | SB 9200 | Spring Bank Pharmaceuticals | Phase 2 |
| • SMAC inhibitor | Birinapant | TetraLogic | Terminated |
| • Checkpoint inhibitors | PD-1/PDL-2 mAb | Merck Sharp and Dohme; Bristol-Myers Squibb | |
| | CTLA-4 mAb | | |

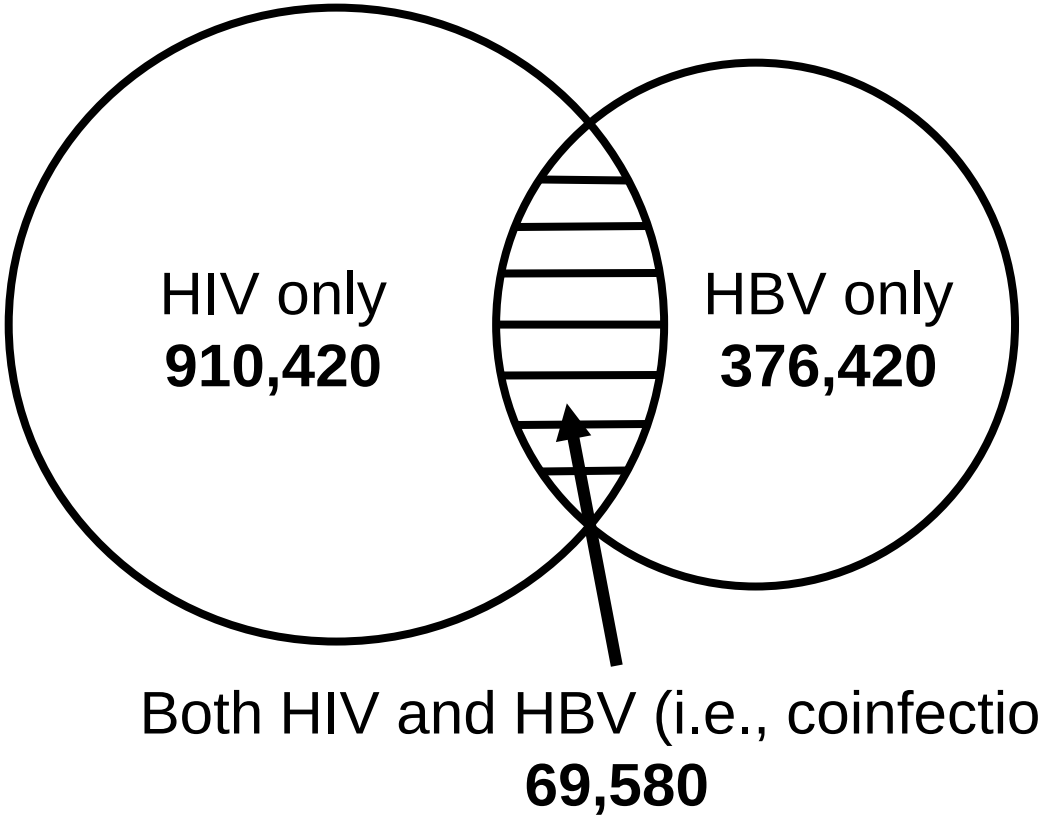
cccDNA, covalently closed circular DNA; CTLA-4, cytotoxic T-lymphocyte–associated protein 4; HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus; mAb, monoclonal antibody; PD-1, programmed cell death protein 1; PDL-2, programmed death-ligand 2; RIG-1 NOD2, retinoic acid-inducible gene I nucleotide-binding oligomerization domain-containing protein 2; SMAC, second mitochondrial activator of caspase; TLR, toll-like receptor.

**Pipeline of new HBV drugs is substantial:**

- 25 new drug candidates
- 16 pharmaceutical companies
- Nearly all in early phases

# HBV in Zambia

HIV
12%

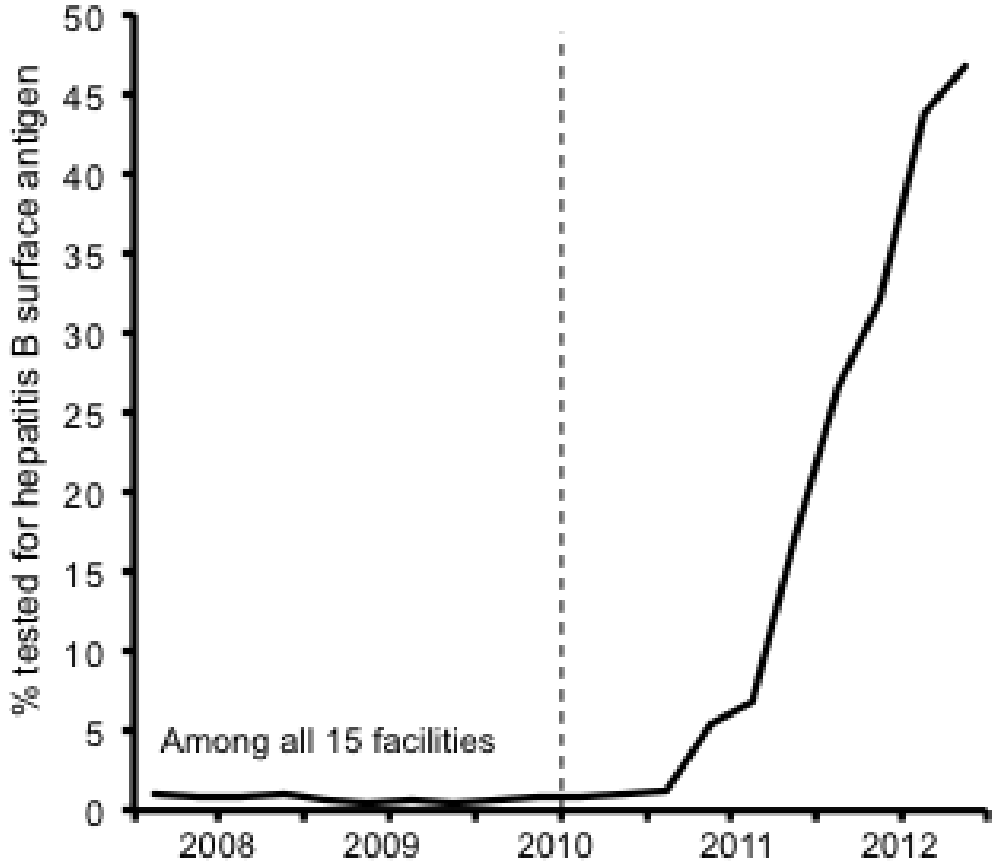



HBV
6%

Data from Zambia Population-Based HIV Impact Assessment, 2016

**Zambian adult population (15-59 years old) is estimated at 8,000,000**

# Growing awareness of HBV in Zambia

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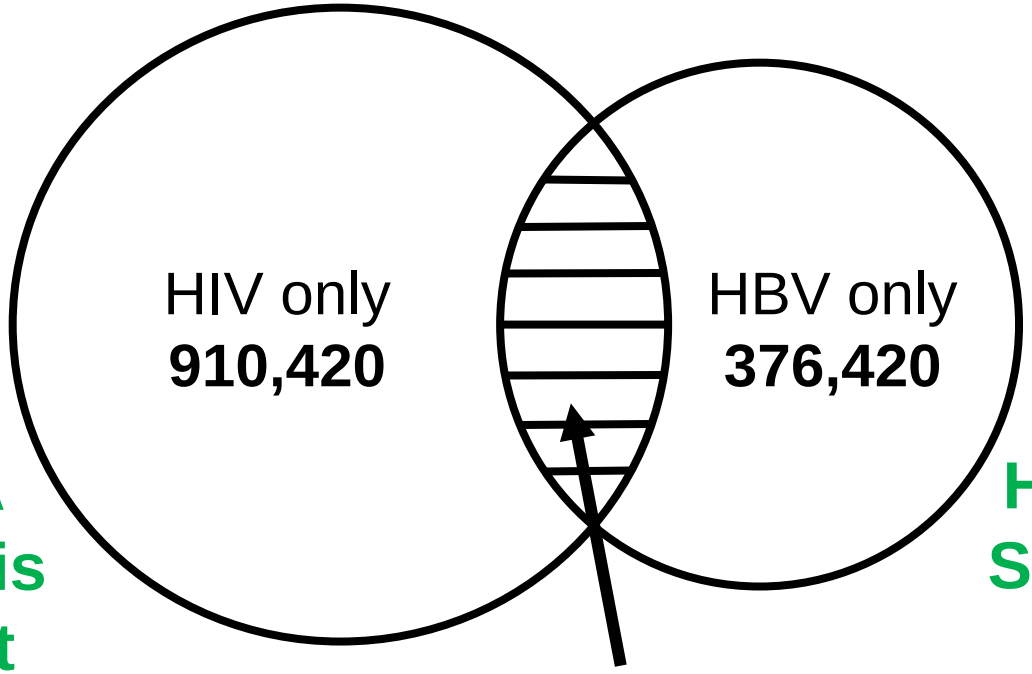
# 3 CIDRZ projects investigating HBV with and without HIV

HIV
12%

**IeDEA Hepatitis Cohort**




HBV
6%

**HUTCH Study at UTH**

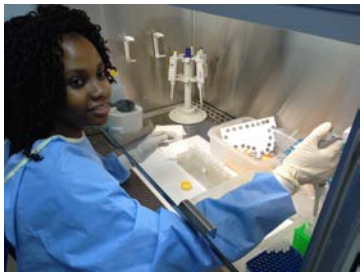
Both HIV and HBV (i.e., coinfection)
**69,580**

**Liver Fibrosis Study**

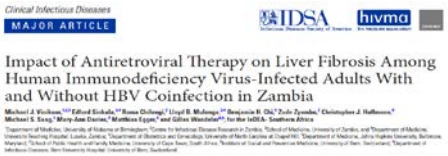
Data from Zambia Population-Based HIV Impact Assessment, 2016

**Zambian adult population (15-59 years old) is estimated at 8,000,000**

# Through these projects, what have we accomplished so far?



6,000
HBV tests performed




10 peer-reviewed articles published

14 abstracts at international meetings

The Zambian Ministry of Health

2 members of the Hepatitis Steering Committee

$$$

900,000
(USD) in funding

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# What we aspire to do

- Expand collaborations with international and regional HBV experts
- Strengthen laboratory capacity for HBV virology
  - Gain experience with novel tests for HBV functional cure
  - Evaluate new diagnostic tests that can be used at scale in places like Zambia
- Demonstrate the capacity to identify and enroll large numbers of HBV patients into studies and programs
- Raise HBV awareness at MoH, among health workers, in the community

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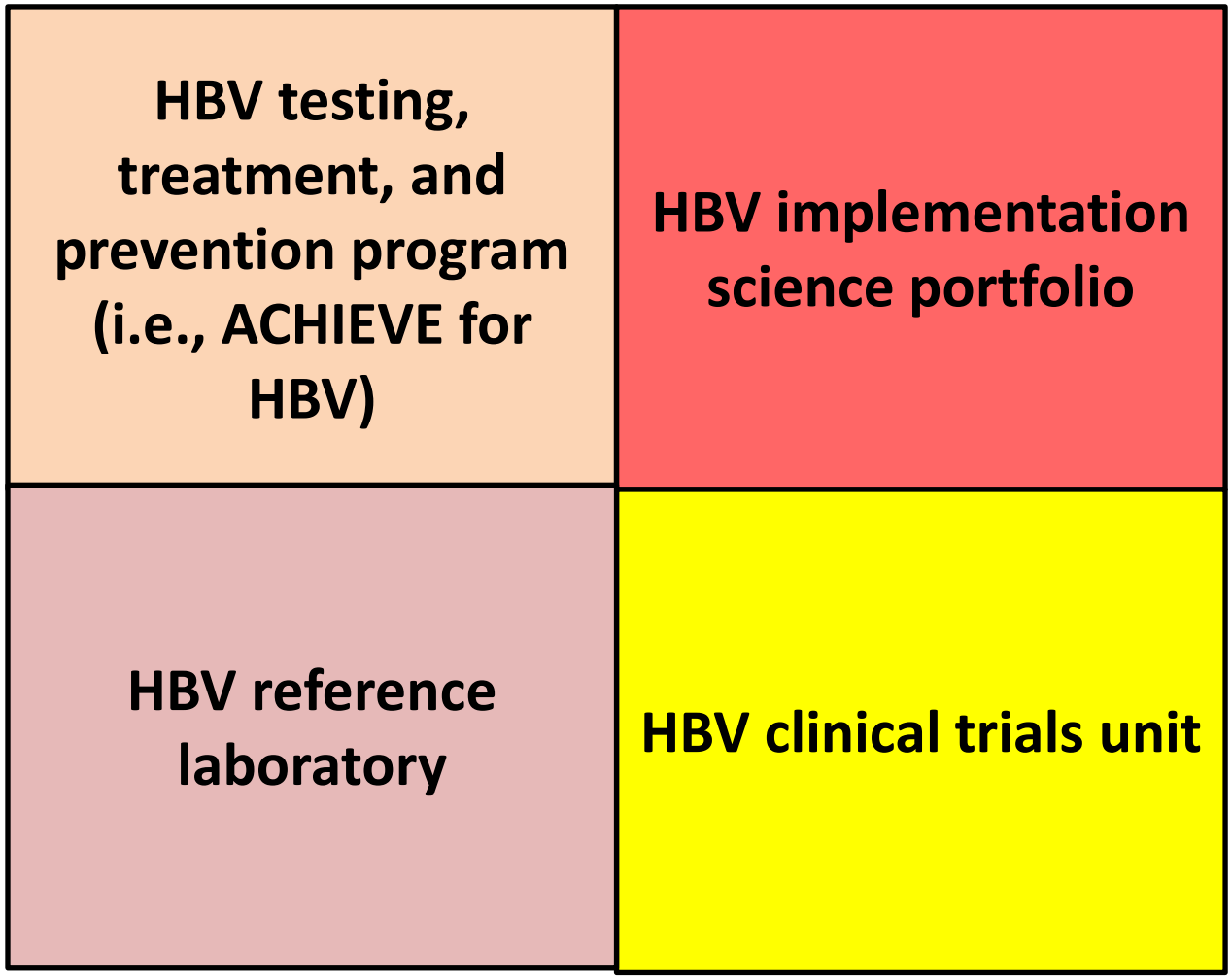
# CIDRZ Hepatitis Program 2027

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