HCV epidemiology:
Access to treatment and care on a global level

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- Gilead Science
- Abbvie
- BMS
Today’s - some things I will cover

• Why it is important to have access to treatment and care

• Setting the scene – a little bit of epidemiology

• Hepatitis C elimination – not just treatment “stupid”.

• But treatment is important – what is happening and where and barriers to treatment

• Summary
Why everyone who is infected with hepatitis C should be treated

- Treatment works
- People want treatment
- It can stop deaths
- It can stop transmission
- Treatment is cheap in many places, is getting cheaper and can be cheaper
Some epidemiology
HCV epidemiology – global prevalence

- Total global prevalence - anti-HCV 1.6% or 115 million past viraemic infections – mostly in adults

- RNA positive - 1.1% ~ 80 million viraemic infections

Gower et al., 2014

Thrift et al., 2017
HCV epidemiology – increasing burden

- Between 1990 and 2013, global viral hepatitis deaths increased (0.89 million to 1.45 million)

- Years of life lost and years lived with disability also increased

Stanaway., 2016

World Health Organisation, 2015
HCV epidemiology – liver related burden

- Hepatic fibrosis progresses to cirrhosis in 15–35% after 25–30 years accounting for most of the HCV-related morbidity and mortality

  *Thrift et al., 2017*

- HCV is a leading cause of liver transplant

- HCV liver related burden expected to increase

  *Thompson, 2016*
Hepatitis C Elimination
Post-2015 Development Agenda
Sustainable Development Goals (SDGs)

Goal 3. Ensure healthy lives and promote well-being for all at all ages

- 3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

Universal health coverage - another key component of the SDGs - achieved when all people receive the health services they need, which are of sufficient quality to make a difference, without those people incurring financial hardship.
WHO

Vision:
A world where viral hepatitis transmission is stopped and everyone living with hepatitis has access to safe, affordable and effective care and treatment.

Goal:
Eliminate viral hepatitis as a major public health threat by 2030.
Proposed WHO targets for reducing new infections and stopping deaths
Achieving the 2030 targets

Diagnosis
• 90% of chronic infections diagnosed

Treatment
• 80% of eligible persons with chronic HCV treated

Harm reduction
• Number of sterile needles and syringes provided per person who injects drugs per year - increase from 20 to 300. Estimated to be 75% coverage
• No specific number for increasing coverage for opioid substitution therapy
Prevention impact results: prevalence reductions at 10 years

Martin et al., 2011
HCV-related liver disease among current and former PWID in Australia
Projected outcomes 2015-2030 under different treatment scenarios

Achieving both targets:
Total cost $7.1B (95%CI 6.8—7.9B)
ICER $25,120 (95%CI 11—39k)
Why HCV elimination has become achievable

Treatment with direct acting antivirals without pegylated interferon

Simpler, safer and more effective
A multipronged approach
Prevention – high quality harm reduction
Opioid substitution therapy

Mathers et al 2010 (Lancet)
Needle and syringe distribution

Mathers et al 2010 (Lancet)
Many countries - epidemic is due to poor blood safety or infection control - formal and informal

**Priority actions for countries**

- Strengthen and sustain routine infection prevention and control practices in health care settings (public and private), including in laboratories.
- Implement the WHO injection safety policy, with the aim of reducing unnecessary injections and transitioning, where appropriate, to the exclusive use of safety-engineered injection devices.
- Ensure access to appropriate injection equipment for people who inject drugs that meet their needs, including low dead-space syringes.
- Provide health workers with free immunization against vaccine-preventable diseases, including, where appropriate, hepatitis B virus vaccine, and provide hepatitis B virus post-exposure prophylaxis as necessary.

**Priority actions for WHO**

- Update normative guidance on: standard precautions and effective disinfection and sterilization methods; safe injection practices and alternatives to injections; infection control services; and for specific procedures, including endoscopy, tattooing and
- Support countries to fully implement WHO’s injection safety policy, infection control measures, and monitor its implementation and impact.

WHO Global Strategy 2016-2021

**Priority actions for countries**

- Establish and implement national policies and practices on blood safety based on WHO guidance, which promotes the rational use of blood and blood products to prevent unnecessary blood transfusions and ensure reliable screening of blood for viral hepatitis B and C.
- Implement quality control measures for laboratory testing of viral hepatitis B and C to ensure a reliable supply of quality-assured screening assays.
- Establish systems of surveillance, haemovigilance and monitoring of the incidence and prevalence of viral hepatitis infections in blood donors and on post-transfusion hepatitis risk.

**Priority actions for WHO**

- Provide updated guidance to countries on the management of safe blood supplies and the strengthening of linkages between blood transfusion services and viral hepatitis services.
- Support countries, with tools and technical assistance, to establish systems of surveillance, haemovigilance and monitoring of supplies of blood and blood products.
Current care cascade

Fig. 8. Cascade of care for HCV infection, by WHO region, 2015

Source: WHO estimates, conducted by the Center for Disease Analysis. See Annex 2.
Need to increase HCV testing in people at risk

Dore et al., 2014
Regular testing is required

Annual HCV incidence

- Treatment scale-up only
- Treatment + rapid RNA + annual testing of PWID in OST
- Treatment + rapid RNA
- WHO target (80% reduction)

Scott et al – in press IDJP
Need better evidence as to what works and cost effectiveness of the various approaches.
Treatment - no one “best” model of care
Measures of fibrosis

- APRI
- Fibroscan - transient elastography
- Fibrotest
- FIB-4

\[
\text{FIB-4} = \frac{\text{Age (years)} \times \text{AST (U/L)}}{\text{Platelet Count (10}^9/\text{L}) \times \sqrt{\text{ALT (U/L)}}}
\]

\[
\text{APRI} = \frac{\text{AST Level}}{\text{AST (Upper Limit of Normal)}} \times 100
\]

Platelet Count (10^9/L)
Lest we forget – we need a hepatitis C vaccine

• Epidemic varies between countries – for some a vaccine will be vital

• In some countries – unlikely to have high quality harm reduction any time soon

• Even in countries with high treatment coverage – models show HCV vaccine would be effective in stopping reinfection.
Relative prevalence reduction of HCV after 15 years when treating 20/1000 PWID annually

A. Vaccinate after treatment
B. Vaccinate same number of people but randomly
C. Vaccinate everyone not infected
Treatment ACCESS globally – what is happening where.
Achieving elimination by 2030

Only possible if all people with HCV infection can access to DAAs
Pricing around the world

Listed price for a 12-week course of sofosbuvir/ledipasvir in selected countries

- USA (NADAC): $91,589
- Denmark: $72,232
- Latvia: $69,610
- Saudi Arabia: $66,441
- Norway: $61,709
- Germany: $61,662
- USA (Veteran): $56,700
- Argentina: $54,056
- United Kingdom: $50,285
- Canada (Quebec): $50,272
- Sweden: $48,793
- France: $31,292
- Spain: $15,264
- Australia: $5,799
- Egypt: $900
- India: $307

A Hill, and G Cooke and team
Georgia

- Around 3.7 million people; HCV prevalence ~5.16%
- Mixed epidemic
- April 2015 – Georgian government launched a plan to eliminate hepatitis C by 2020
- Sofosbuvir supplied by Gilead

Strategic plan

1. Raise awareness of viral hepatitis
2. Monitor health sector response to hepatitis
3. Prevent transmission of viral hepatitis in the community and health care settings
4. Reduce new infections and deaths due to viral hepatitis through expanded screening and treatment
Georgia

- 19,300 treated by September 2016

National Progress Toward Hepatitis C Elimination — Georgia, 2015–2016
Iceland

- Ministry of Health announces HCV elimination – 7th October 2015; sofosbuvir/ledipasvir provided by Gilead.
- HCV prevalence – 0.3%
- Approximately 800 – 1000 people with chronic HCV infection
- Mostly history of IDU
- Trap HepC - Aim of the program is to significantly reduce the rate of HCV transmission and disease burden and possibly eliminate the disease in Iceland
- More than half way there
Egypt

- Presidential initiative to treat all Egyptians infected with HCV by 2018!
- Many challenges
  - Fragmented health system and competing organisations and NGOs to take the upper hand in funding support to find and treat more patients
  - Screening strategies and finding undiagnosed cases
  - Quality assurance of generics
  - Over 1 million evaluated for treatment
  - Over 850,000 treated
Australia

- Available through PBS from 1 March 2016
  - Available to everyone regardless of level of fibrosis or how you became infected or whether you currently inject drugs
  - Treatment available in tertiary hospital, community settings and prisons
Estimated number of individuals initiating DAA treatment in Australia

Figure 1: The estimated number of individuals initiating DAA treatment (bar charts) and the proportion of individuals living with chronic HCV who initiated DAA treatment (pie charts) during March to September 2016, by jurisdiction.

NSW: New South Wales; VIC: Victoria; QLD: Queensland; SA: South Australia; WA: Western Australia; ACT: Australian Capital Territory; TAS: Tasmania; NT: Northern Territory
## DAAs in the Asian region

<table>
<thead>
<tr>
<th>Country</th>
<th>Sofosbuvir</th>
<th>Ledipasvir/sofosbuvir</th>
<th>Daclatasvir</th>
<th>Olysio®</th>
<th>Velpatasvir/sofosbuvir</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>Widely available</td>
</tr>
<tr>
<td>India</td>
<td>✓**</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>Widely available</td>
</tr>
<tr>
<td>Indonesia</td>
<td>✓**</td>
<td>x</td>
<td>x</td>
<td>✓*</td>
<td>x</td>
<td>Limited availability through referral hospitals as part of “special assistance scheme”</td>
</tr>
<tr>
<td>Myanmar</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>Widely available</td>
</tr>
<tr>
<td>Nepal</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>Widely available</td>
</tr>
<tr>
<td>Thailand</td>
<td>✓*</td>
<td>✓#</td>
<td>✓*</td>
<td>x</td>
<td>x</td>
<td>Widely available, except for Harvoni®</td>
</tr>
</tbody>
</table>

All DAAs are generic versions unless otherwise noted.

*Branded product  **Both branded and generic products  #Registered but not available

Provided by Giten Khwairakpam – Treat Asia
# DAAs in the Asia

<table>
<thead>
<tr>
<th>Country</th>
<th>Sofosbuvir</th>
<th>Ledipasvir/Daclatasvir</th>
<th>Viekira pak®</th>
<th>Velpatasvir/Sofosbuvir</th>
<th>Zepatier®</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>Widely available</td>
</tr>
<tr>
<td>Malaysia</td>
<td>✓*</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Widely available</td>
</tr>
<tr>
<td>Philippines</td>
<td>✓*</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>Widely available</td>
</tr>
<tr>
<td>Vietnam</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>Limited availability through referral hospitals as part of “special import quota”</td>
</tr>
</tbody>
</table>

*All DAAs are generic versions unless otherwise noted.*

*Branded product  **Both branded and generic products*
National treatment programs

- **Mongolia**
  - Coverage scheme: National health insurance covers 30-62% of medicine costs which are all oral DAAs
  - Rapid national registration process facilitated active price negotiations and promotion of generic competition

- **Indonesia**
  - National program for 6000 patients
  - Uses sofosbuvir, simeprevir, and ribavirin
  - Currently limited to Jakarta

- **Myanmar**
  - Government just about to start treatment for 2000 treatments this year
  - Extend to 10,000 treatments the following year
National treatment programs

- **Thailand**
  - Universal Health Care from 2012 for Thai citizens above 18 years
  - Restricted access
    - HIV co-infection: CD4 more than 350 if on ART and 500 if not on ART
    - Fibrosis stage of F2 and above by FibroScan®
  - Over 4000 treated in 2016

- **Pakistan**
  - Upscaled program over last few years
  - Treated 47 035 people August 2014 - January 2016
  - nearly 35 000 have started treatment February 2016 to April 2016

- **India**
  - Considerable variation between state
  - Some state based programs – others NGO
Restrictions on access to DAAs

• 88% (n=25) of patient groups surveyed reported some level of restrictions on access to DAAs in their country
• 72% cited fibrosis level (unspecified level), second only to restriction on people currently injecting drugs (13 patient groups, 48%)

Couple of countries doing well

**Portugal**
- Universal access to treatment
- Starting with 13 000 people per year
- 5449 people started treatment in first year

**France**
- 30 000 of the 500 000 people living with HCV in France had been treated by May 2016
- Universal access to treatment under national health insurance system as of September 2016

**Italy**
- Just negotiated good drug prices for a public health response
Brazil

- Current drugs - MOH: sofosbuvir, daclatasvir and simeprevir;
- Currently registered: Viekira accepted for Public Health but still not in the national Guideline
- Harvoni and MK-2 waiting for registration and regulatory agency
- Treatment access: all HIV/HCV, most extra-hepatic and HCV associated conditions, all transplant and above F3 or F2 for more than 3 years.
- Likely to extend to all F2 from July
- Increasing pressure to treat all because so far over 50,000 patients treated and most states without waiting list
- No generics – but prices around $5000/therapy
- Hoping to treat up to 50,000/per year
Countries not in the Paris climate change agreement – or about to withdraw
Neighbour of one of the countries in the previous group

- F2 or greater
- <F2 if DM, HIV/HBV, transplant (any organ), extra-hepatic manifestations, other liver disease (incl NAFLD), CKD, woman with plans to have a child in the next year.
- Retreatment - case by case basis.
- Cost is per regimen, not per pill - hence 8 weeks costs the same as 24 weeks
- Companies pay for retreatment if person doesn’t have SVR12.
- Likely to have complete open access for all by early 2018 in Ontario and BC (and probably many or maybe even all other Provinces).
- No details on price yet available
Think local, act global - the role of the social network in HCV elimination.
Egypt – targeting people with high number of injections and whole villages
Stigma and discrimination

“THE WAR ON DRUGS HAS BEEN AN UTTER FAILURE.”
- BARACK OBAMA 1/21/04

#ENDTHEWARONDRUGS
GlobalGrinal
In summary

• We have great drugs
• Elimination is achievable
• It requires a multipronged approach
• It requires universal access to prevention, testing and treatment
• The drugs are affordable and will become increasingly more affordable – other factors will be the issue
• Reduction in stigma and discrimination
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