Elimination of Hepatitis C

David L Thomas MD
Johns Hopkins Medicine
Progress toward elimination of hepatitis C

1. What is elimination
2. How to eliminate HCV
   - Modeling of the present
   - Models of success
   - Projections of failure
3. New tools to succeed
Elimination is not eradication

Control  Elimination  Eradication

Public health impact
Scales of elimination: the prefix cascade

- **Elimination**
  - **Micro-elimination**
    - HIV positive
  - **Nano-elimination**
    - National
  - **Pico-elimination**
    - Clinic
  - **Patient**
WHO Hepatitis Elimination Goals

90% reduction in incidence

2015: ~1.75 million
2020 (30%): ~1.23 million
2030: 175,000

WHO Global Hepatitis Report 2017
WHO Hepatitis Elimination Goals

65% reduction in mortality

2015: ~400,000
2020 (10%): ~360,000
2030: 140,000

WHO Global Hepatitis Report 2017
## Targets/tools to eliminate hepatitis C

<table>
<thead>
<tr>
<th>Intervention</th>
<th>2015</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe injection</td>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Donations screened</td>
<td>97%</td>
<td>97.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Harm reduction (syr/person/yr)</td>
<td>27</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>HCV diagnosed</td>
<td>20%</td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td>HCV treatment</td>
<td>1%</td>
<td>3 million</td>
<td>80%</td>
</tr>
</tbody>
</table>

**WHO Global Hepatitis Report 2017**
## Targets/tools to eliminate hepatitis C

<table>
<thead>
<tr>
<th>Intervention</th>
<th>2015</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe injection</td>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Donations screened</td>
<td>97%</td>
<td>97.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Harm reduction (syr/person/yr)</td>
<td>27</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>HCV diagnosed</td>
<td>20%</td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td>HCV treatment</td>
<td>1%</td>
<td>3 million</td>
<td>80%</td>
</tr>
</tbody>
</table>

**WHO Global Hepatitis Report 2017**
## Targets/tools to eliminate hepatitis C

<table>
<thead>
<tr>
<th>Intervention</th>
<th>2015</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe injection</td>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Donations screened</td>
<td>97%</td>
<td>97.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Harm reduction (syr/person/yr)</td>
<td>27</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>HCV diagnosed</td>
<td>20%</td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td>HCV treatment</td>
<td>1%</td>
<td>3 million</td>
<td>80%</td>
</tr>
</tbody>
</table>

**WHO Global Hepatitis Report 2017**
Declines in HCV incidence largely depend on expanding safe injection practices

Heffernan Lancet 2019
Declines in HCV incidence largely depend on expanding safe injection practices

Assume: 70% of new infections from unsafe medical injections/transfusions and 80% reduction by 2020 reduce by 58% in 2030

Heffernan Lancet 2019
Declines in HCV incidence largely depend on expanding safe injection practices

Assume: 29% of new infections from PWID and extending harm reduction to 40% reduces another 7% by 2030

Heffernan Lancet 2019
Declines in HCV incidence largely depend on expanding safe injection practices

Assume: Massive DAA treatment begins to impact incidence

Blood safety + infection control
PWID harm reduction
DAA after outreach screening

Heffernan Lancet 2019
Declines in HCV mortality largely depend on expanding testing and treatment

Heffernan Lancet 2019
Declines in HCV mortality largely depend on expanding testing and treatment
Doing it all soon nearly eliminates HCV by 2030

65% fewer cases (vs 90%)
61% fewer deaths (vs 65%)

Heffernan Lancet 2019
Progress toward elimination of hepatitis C

✓ What is elimination
✓ How to eliminate HCV
  – Modeling of present
  ❏ Models of success
  ❏ Projections of failure

❑ Tools to succeed
2.27 million persons are HIV/HCV coinfected
Elimination of HCV in HIV infected in Netherlands

- Athena cohort >98% of HIV pos in recognized in Netherlands
- 69% MSM, 15% PWID
- DAAs made available in 2015
- 15 months of data through Feb 2017
Elimination of HCV in HIV infected in Netherlands

<table>
<thead>
<tr>
<th>Status</th>
<th>Patients, No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained in care</td>
<td>187</td>
</tr>
<tr>
<td>Started Rx</td>
<td>92</td>
</tr>
<tr>
<td>Completed Rx</td>
<td>68</td>
</tr>
<tr>
<td>SVR</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Never treated
- Ongoing treat
- Treatment fail

Boerekamps CID 2018
Elimination of HCV in HIV infected in Netherlands

• Athena cohort >98% of HIV pos in recognized in Netherlands
• HCV incidence reduced from 11.2/1000 PY to 5.5/1000 PY
  – (Syphilis and gonorrhea incidence rose)
• Similar data from France and Switzerland
• Reinfection threatens elimination
Elimination of HCV in HIV infected in Switzerland

- Swiss HIV cohort study with yearly anti-HCV testing (MSM)
- Oct 2015-June 2016: one time RNA screening detected 8 infections
- SVR in 121 of 122 Rx elbasvir grazoprevir and 39 others of 177

Braun CID 2018; Braun CID 2018
Elimination of HCV in HIV infected in Switzerland

• 3722 retested HCV PCR from March to November 2017, 28 men (0.8%) positive
  – 16 (57%) as incident
  – 12 (43%) as chronic
• Reinfection sequences clustered from other EU countries
HCV Care Continuum among 594 HIV/HCV infected patients in an urban HIV clinic

- Chronic HCV: 594
- Referred: 547
- Evaluated: 517
- Prescribed: 457
- Initiated: 426
- Cured: 374
- Reinfection: 5
Progress toward elimination of hepatitis C

✓ What is elimination
✓ How to eliminate HCV
  – Modeling of the present
  – Models of success
  ❑ Projections of failure
❑ Tools to succeed
Ten of 91 Countries have >5 persons cured for every new infection

Database: CDA Foundation; Source: Hill J Vir Erad 2017
Twenty-three of 91 Countries have >5 new infections for every one cured

Database: CDA Foundation; Source: Hill J Vir Erad 2017
Hepatitis mortality will exceed that caused by TB + HIV + Malaria

Foreman et al Lancet 2018, IHME data downloaded Nov 14, 2018
New tools will help eliminate HCV infection

1. HCV vaccination
2. Better and more available harm reduction
New tools will help eliminate HCV infection

1. HCV vaccination
2. Better and more available harm reduction
3. Point of care confirmation
New tools will help eliminate HCV infection

1. HCV vaccination
2. Better and more available harm reduction
3. Point of care confirmation
4. Long acting or injectable treatment
   - Test and cure
New tools will help eliminate HCV infection

1. HCV vaccination
2. Better and more available harm reduction
3. Point of care confirmation
4. Long acting or injectable treatment
5. Funding
Public health response to eliminate HCV

• Elimination of HCV worldwide requires shifting to public health response

• HIV example is most fitting
  – ART given to >20 million persons (>240 million person months)
    • Cost of HIV ~20 billion USD/year

• Can build on HIV infrastructure for HIV/HCV elimination

• Need to address reinfection
Progress toward elimination of hepatitis C

✓ What is elimination
✓ How to eliminate HCV
  ✓ Modeling of the present
  ✓ Models of success
  ✓ Projections of failure
✓ New tools to succeed
Thanks!

JHU HIV
– Mark Sulkowski
– Seun Falade-Nwulia
– Kathleen Ward
– Richard Moore
– Shruti Mehta
– Risha Irvin

WHO
– Yvan Hutin
– Godfrey
– John Ward
Thank you for joining

Visit us at https://icap.columbia.edu/tools-resources/
for archived Grand Rounds webinars