Reaching Hepatitis C Virus Elimination Targets Requires Interventions to Enhance the Care Cascade

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What is a mathematical model?

- Acutely infected
- Mild liver fibrosis
  - Re-infection
  - Moderately infected
    - Re-infection
    - Compensated cirrhosis
      - Decompensated cirrhosis
        - Hepatocellular carcinoma
        - Post liver transplant
      - Susceptible (with advanced fibrosis)
        - Treatment
      - Susceptible (with moderate fibrosis)
        - Treatment
    - Susceptible (uninfected)/spontaneous clearance
      - Treatment

- Chronic infected

PWID
  - Cessation
  - Relapse

Former PWID
Other
Modelling: elimination is possible

- In Australia, treatment scale-up is required among PWID to reach the WHO’s incidence reduction target.

- Targeting treatments is necessary.

From theory to practice: treatment scale-up and the cascade of care

- Once infected, people require:
  - Antibody test (to determine Ab+)
  - PCR test (to determine RNA+, i.e. active infection)
  - Genotype test (to determine treatment protocol)
  - Liver disease test (to assess risks)
From theory to practice: treatment scale-up and the cascade of care

- Once infected, people require:
  - Antibody test (to determine Ab+)
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  - Genotype test (to determine treatment protocol)
  - Liver disease test (to assess risks)

Not required in future?

Not required in future for people with APRI < 1?

Projected impact of treatment scale-up: people living with HCV

- Based on current treatment uptake:
  - ~230,000 in 2015
  - ~24,000 by 2030

Scott et al. *IJD*P 2017
Treatment availability alone will not be enough to reach elimination targets

- Projected to reduce incidence by 45%
- The majority (74%) of remaining infections were undiagnosed and among PWID
  - Continued transmission

Improving retention in care

Complete follow-up after RNA testing can increase incidence reduction

- Rapid point-of-care antibody testing?
- Replacing antibody with RNA testing for screening?
Reaching our target

If 100% follow-up Ab→RNA testing were achieved:

- Without perfect coverage, annual testing of PWID required to reach WHO incidence target (80% reduction)

![Estimated incidence reduction in 2030](chart1.png)

Projected incidence reduction

Annual RNA testing of PWID is needed to:

- Improve diagnosis rates
- Reduce loss to follow-up
- Generate enough treatment demand for treatment-as-prevention

➢ 91% reduction in incidence by 2030
What about high prevalence settings, sub-populations or areas?

For areas of high prevalence (e.g. 75% prevalence among PWID; right):
- Testing is not enough
- Additional prevention required

Conclusions

- Treatment uptake in Australia is projected to:
  - Reduce the number of people living with HCV from ~230,000 to ~24,000 by 2030
  - Reduce incidence by 45%
- Majority of remaining infections undiagnosed and among PWID
  - Transmission can continue
- Increased testing frequency and retention in care are both required among PWID to achieve incidence reduction target
  - Annual RNA testing through OST and NSP services may be sufficient
  - Cannot forget about other prevention, or particular needs of people or settings of higher risk
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