Primary prevention: Hepatitis C

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Primary Prevention: Hepatitis C

Populations at increased risk of HCV infection

- Recipients of infected blood products or invasive procedures in healthcare facilities with inadequate infection control practices
- People who inject drugs (PWID)
- Children born to HCV infected mothers
- Sexual partners of HCV infected people (particularly HIV-infected men who have sex with men (MSM))
- People who have used intranasal drugs
- People who have had tattoos or piercings

Account for most HCV infections globally
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Healthcare associated transmission: country examples

The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt

Christine Frank, Mostafa K Mohamed, G Thomas Strickland, Daniel Lavanchy, Ray R Arthur, Laurence S Magder, Taha El Khoty, Yehia Abdel-Wahab, El Said Aly Ohn, Wagida Anwar, Ismail Sallam

Interpretation The data suggest that PAT had a major role in the spread of HCV throughout Egypt. This intensive transmission established a large reservoir of chronic HCV infection, responsible for the high prevalence of HCV infection and current high rates of transmission. Egypt’s mass campaigns of PAT may represent the world’s largest iatrogenic transmission of blood-borne pathogens.

Lancet 2000; 355: 887–891

Annals of Internal Medicine


Nicola D. Thompson, PhD, MS; Joseph F. Pez, DrPH, MA; Anne C. Moorman, BSN, MPH; and Scott D. Holmberg, MD, MPH

In the United States, transmission of hepatitis B virus (HBV) and hepatitis C virus (HCV) from health care exposures has been considered uncommon. However, a review of outbreak information revealed 33 outbreaks in nonhospital health care settings in the past decade: 12 in outpatient clinics, 6 in hemodialysis centers, and 16 in long-term care facilities, resulting in 448 persons acquiring HBV or HCV infection. In each setting, the putative mechanism of infection was patient-to-patient transmission through failure of health care personnel to adhere to fundamental principles of infection control and aseptic technique (for example, reuse of syringes or lancing devices).

Difficult to detect and investigate, these recognized outbreaks indicate a wider and growing problem as health care is increasingly provided in outpatient settings in which infection control training and oversight may be inadequate. A comprehensive approach involving better viral hepatitis surveillance and case investigation, health care provider education and training, professional oversight, licensing, and public awareness is needed to ensure that patients are always afforded basic levels of protection against viral hepatitis transmission.

For author affiliations, see end of text.

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WHO guidance on prevention of HCV infection in healthcare settings

- Access to safe and sufficient blood supply, through:
  - 100% voluntary blood donation
  - 100% quality-assured testing of donated blood
- Safe handling and disposal of sharps and waste
- Safe cleaning of equipment
- Hand hygiene, including use of gloves
- Training of health personnel
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Blood Safety: WHO data

- **Global blood donations**: increased from 80 million in 2004 to 108 million in 2012.

- **Countries achieving 100% voluntary unpaid donations**: increased from 50 countries in 2004 to 60 in 2012. Many countries still rely on family/replacement and paid blood donors.

- **Countries NOT able to screen all donated blood**: decreased from 41 countries in 2004 to 25 in 2012.

* Screening for HIV, hepatitis B, hepatitis C and syphilis.
In 2000, WHO estimated unsafe injections accounted for 40% of HCV infections in developing and transitional countries.

Since then, global effort to promote safe injection practices.

Many intervention success stories (SIGN, 2011).

New study (Pépin, 2014) estimates that unsafe injections caused 315,000 HCV infections in 2010, which translates to approx. 80% reduction from 1.9 million infections in 2000 (but based on limited data).
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Injection Safety

- At least 16 billion injections worldwide each year.
- Reused equipment poses a continued challenge.
- Previously, focus on promoting countries to use auto-disable (single use) syringes for vaccinating children.
- Now, spotlight on **new smart syringes** (safety-engineered injection devices with re-use prevention and sharps injury prevention) that can be used for a broader range of injection procedures.
- **WHO Goal**: Governments transition to the exclusive use, where appropriate, of the **new smart syringes**.
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Global estimates of the number of people who inject drugs (PWID) and with HCV antibodies (Nelson et al. Lancet 2011)

- At least 16 million PWID worldwide, reported in most countries (151/200)
- 10 million infected with HCV (>60%), compared to 3 million infected with HIV.
- HCV prevalence as high as 80% not uncommon in some parts of the world.
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**Effectiveness of interventions among PWID**

(Palmateer, Addiction 2010; MacArthur, IJDP 2014; Hagan, JID 2011)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Strong evidence that reduces Injecting risk behaviour</th>
<th>Strong evidence that reduces risk of HCV transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needle and Syringe Provision (NSP)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Paraphernalia Provision</td>
<td>✓</td>
<td><strong>Insufficient evidence</strong></td>
</tr>
<tr>
<td>Opiate Substitution Therapy (OST)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Information, Education, Counselling</td>
<td>✓</td>
<td><strong>Insufficient evidence</strong></td>
</tr>
<tr>
<td>Supervised Drug Consumption/Injecting Facilities</td>
<td>✓</td>
<td><strong>Insufficient evidence</strong></td>
</tr>
</tbody>
</table>
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Combining interventions to prevent HCV among PWID
(Turner et al. Addiction 2011)

Adjusted Odds Ratio of acquiring HCV

Combined Intervention Coverage

<table>
<thead>
<tr>
<th>LOW</th>
<th>Not on OST + Low NSP</th>
<th>MEDIUM</th>
<th>Not on OST + High NSP or On OST + Low NSP</th>
<th>HIGH</th>
<th>On OST + High NSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>(baseline)</td>
<td>~50%</td>
<td>reduced odds of acquiring HCV</td>
<td>~80%</td>
<td>reduced odds of acquiring HCV</td>
</tr>
</tbody>
</table>

~80% reduced odds of acquiring HCV
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National/International Guidelines recommending provision of interventions to PWID
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Estimated coverage of key interventions to PWID
(Mathers et al. Lancet 2010)

**NSP Coverage**
- Eastern Europe
- Western Europe
- East and SE Asia
- South Asia
- Central Asia
- Latin America
- Canada & US
- Australia & NZ
- Middle East & N Africa
- Sub-Saharan Africa

**Global (82/151*)**

![Bar chart showing NSP coverage across different regions]

**OST Coverage**
- Eastern Europe
- Western Europe
- East and SE Asia
- South Asia
- Central Asia
- Latin America
- Canada & US
- Australia & NZ
- Middle East & N Africa
- Sub-Saharan Africa

**Global (70/151*)**

![Bar chart showing OST coverage across different regions]

* Needles distributed per PWID per year

OST recipients per 100 PWID

* Number of countries reporting implementing intervention (NSP or OST), of those countries with data on injecting drug use
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Interventions to prevent HCV in Prisons

- At least 10 million people detained in prison/closed setting at any one time; 26% of prisoners with anti-HCV (64% in PWID-prisoners).

- HCV transmission in prisons:
  - All prisoners: 1.4 per 100 py
  - PWID prisoners: 16.4 per 100 py

- Evidence that NSP and OST in prison reduces injecting risk behaviour.

- UN/WHO advocate for NSP in prisons, but few worldwide have programmes.

- Survey of Scottish prisoners found low incidence of HCV (4 per 100 py among PWID) in context of high coverage of OST in prison (57% of PWID).
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### HCV Treatment as Prevention for PWID

<table>
<thead>
<tr>
<th></th>
<th>Past therapy: Pegylated Interferon + Ribavirin</th>
<th>Future therapy: Interferon-free DAAs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficacy</strong></td>
<td>40-80%</td>
<td>&gt;90%</td>
</tr>
<tr>
<td><strong>Dosing</strong></td>
<td>Injection (weekly) + oral (daily)</td>
<td>All oral (daily)</td>
</tr>
<tr>
<td><strong>Toxicity</strong></td>
<td>Significant</td>
<td>Minimal</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>24-48 weeks</td>
<td>8-24 weeks</td>
</tr>
<tr>
<td><strong>Uptake among PWID</strong></td>
<td>Very Low (&lt;1%)</td>
<td>Potentially High</td>
</tr>
</tbody>
</table>

*esp. with lower drug costs*
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HCV treatment as prevention for PWID (Martin et al. Hepatology 2013)

- Modest levels of treatment could potentially reduce HCV prevalence among PWID.
- Combining treatment with other interventions (OST & NSP) necessary to achieve maximum impact in preventing HCV transmission.
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HCV treatment as prevention for PWID (Innes et al. Gut 2015)

Scotland

(involving relatively high coverage of OST & NSP)

- Status Quo: 8 per 1,000 PWID treated per year
- 2.5-fold scale-up: 20 per 1,000 PWID treated per year
- 5-fold scale-up: 40 per 1,000 PWID treated per year

New chronic infections (modelled estimates)

WHO Global Targets (draft) on New Chronic HCV Infections:
- 80% reduction by 2030

WHO Target is theoretically possible among PWID, BUT can we afford it?
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In Summary

- Access to safe blood and blood products remains a challenge in many countries.
- New initiative to address unsafe injection practices (involving safety engineered injection devices)
- High standards of Infection Control required to prevent HCV transmission in the healthcare setting.
- PWID represent the core of HCV transmission in many settings, particularly high income countries but also increasing in low- and mid- income countries
- Strong evidence that combining interventions (OST & NSP) can achieve greater impact in preventing HCV transmission; but remains poor coverage of interventions globally
- INF-free DAAs could enable increased HCV treatment uptake among PWID
- Treatment to prevent onward transmission is a concept which, if translated into practice, could be rewarding in an interferon-free (particularly lower cost) antiviral era
- To measure progress in meeting WHO targets, we must have better data monitoring systems!!