Who is affected in Switzerland? The epidemiologist’s point of view

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Overview

• Basics: Prevalence & Incidence & Risk-groups

• HCV in PWIDS: Large but Declining

• MSM: Small but Sustained
Prevalence & Incidence
Hepatitis C, total

Inzidenz pro 100 000 Bevölkerung
Gleitender Mittelwert (5 Monate)

Jahr

Stand 11.10.2016
Hepatitis C, akut

Inzidenz pro 100 000 Bevölkerung
Gleitender Mittelwert (5 Monate)

Jahr

Inzidenz

92 94 96 98 00 02 04 06 08 10 12 14 16
HCV Prevalence and Incidence

Prevalent Cases

CLASSICAL EPIDEMIC

IDU

Other/Migration

MSM

Incident Cases

50/yr

20-30/yr

Brugmann et al., J. Vir. Hep. 2014
Wandeler & al., SMW, 2015
HIV Coinfection

- Low for IDU: ~10%
  - but 90% of HIV infected IDU are HCV+

- High for MSM: >75%

Enrolment in SHCS

<1-2 Years

Seroconversion
HCV in the Swiss HIV Cohort Study

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence-Rate (per 100 py)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>0.1</td>
</tr>
<tr>
<td>2002</td>
<td>1</td>
</tr>
<tr>
<td>2006</td>
<td>10</td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
</tbody>
</table>

Wandeler et al, CID 2012
PWIDS:
Large but Declining
or
Declining but Large
Long-term decline in HCV in PWID

10,000 Active PWIDS
Prevalence: 42%
Incident Cases: 55/year

Brugmann et al. (submitted)
Long-term decline in HCV in PWID

New Viremic HCV Infections (Primary and Secondary)

New Secondary Viremic Infections

Brugmann et al. (submitted)
Long-term decline in HCV in PWID

- Long-term decrease of the number of HCV positive PWID independent of increased treatment uptake

- High treatment rates (10%-15%/yearly)
  - Close to Elimination within 10 years
  - Short-term increase in number of new infections
  - Problem: Diagnosis!
MSM:
Small but Sustained
Increase of HCV Infections in HIV-infected MSM

Wandeler et al., CID 2012

→ Sexual Transmission of HCV in Swiss HIV-positive MSM.
Questions

→ Sexual Transmission of HCV in Swiss HIV-positive MSM.

• Sexual Transmission?

• HIV-positive?

• Swiss?

• (MSM?)
No increase of HCV in HIV-negative MSM

Prevalence of hepatitis C in a Swiss sample of men who have sex with men: whom to screen for HCV infection?

Axel J Schmidt1,2, Luis Falcato3, Benedikt Zahno1, Andrea Burri4, Stephan Regnass5, Beat Müllhaupt6 and Philip Bruggmann3

Table 1 Hepatitis C prevalence, socio-demographic, behavioural, and sexual health related sample characteristics, stratified by HIV diagnosis, in a sample of men who have sex with men from Zurich

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total n = 840</th>
<th>No known HIV infection n = 821</th>
<th>HIV diagnosed n = 19</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% 95%-CI</td>
<td>% 95%-CI</td>
<td>% 95%-CI</td>
</tr>
<tr>
<td>Hepatitis C prevalence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibody*</td>
<td>0.8 (0.4-1.7)</td>
<td>0.4 (0.12-1.1)</td>
<td>21.1 (8.5-43.3)</td>
</tr>
<tr>
<td>Antigen*</td>
<td>0.2 (0.1-0.9)</td>
<td>0.1 (0.02-0.7)</td>
<td>5.3 (0.9-24.6)</td>
</tr>
</tbody>
</table>

Conclusions: “In Switzerland, hepatitis C among MSM without diagnosed HIV is not more prevalent than in the general population. No evidence of elevated rates of sexual transmission of HCV among MSM without HIV–infection”
No increase of HCV in HIV-negative MSM

- Increase in HCV restricted to HIV-positive MSM

- Mechanism: Biological Susceptibility? Risk factors?

- Incidence vs Prevalence

- Existence of high-risk HIV-negative subgroups?— Knowledge Gap
  - Dutch HIV-PrEP Demonstration Project
Association with STIs & Risks

Sexual Risk Behavior

Incidence-Rate (pro 100 py)

Year

1998  2002  2006  2010

Syphilis

Consistent

Inconsistent

Condom Use

Wandeler et al, CID 2012
No Association with Non-Injection Drug Use

<table>
<thead>
<tr>
<th>Use of noninjection drugs</th>
<th>Univariate Analysis</th>
<th>Multivariate Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR (95% CI)</td>
<td>P Value</td>
</tr>
<tr>
<td></td>
<td>Ref.</td>
<td>.96</td>
</tr>
<tr>
<td>No</td>
<td>.99 (.65–1.51)</td>
<td>.74 (.47–1.17)</td>
</tr>
<tr>
<td>Yes</td>
<td>Ref.</td>
<td>.20</td>
</tr>
</tbody>
</table>

Wandeler et al, CID 2012
Broad HIV-transmission bottleneck associated with HCV incidence

High-Risk Sex/Behavior (Mucosal Breaches) plays an important role in the sexual transmission of HCV

Kouyos et al, JID, 2014
HCV Restricted to high-risk Subgroups

frequent receptive fisting, frequent anal bleeding, group sex and consumption of nasally administered drugs.

Vogel & al, COID, 2011
The Driver: Risk Behaviour?

Kouyos et al, OFID, 2015
Weak epidemiological linkage MSM-PWID for HIV

MSM (n=2541)  HET (n=1388)  IDU (n=1765)

(Kouyos et al, JID, 2010)
Origin of infections

- Alternatives:
  - Transmission within Switzerland
  - “Imported” Infections
Monophyletic clusters are shaded, country of origin coded: (●) England, (■) Netherlands, (◆) Germany, (▲) France, (▼) Australia. Australian MSM with reported IDU are marked IDU*. 

van der Laar, Gastroenterology (2009)
Considerable Domestic Transmission of HCV

<table>
<thead>
<tr>
<th></th>
<th>No. (%)</th>
<th>Odds Ratio [95% CI]</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HCV-Status von “Nachbar”</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCV-</td>
<td>2,047 (67.9)</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td>HCV+</td>
<td>966 (32.1)</td>
<td><strong>3.2 [2.2, 4.7]</strong></td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Adjusted for Transmission route, sex, geographical region, age, registration year

Kouyos et al, IJE, 2014
Sexual Transmission in Switzerland?

- Association with inconsistent condom-use at individual level
- Association with other STIs at individual level
- No association with non-injection drugs
- Consistent with Population-level changes in condom use
- Restricted to high-risk subgroup of MSM — Knowledge Gap
- Substantial Proportion of Domestic Transmission — Knowledge Gap
Projections

Size of High Risk Group

Growing

Stable

Decreasing

Incidence

Prevalence

Salazar, Kouyos, & al. Hepatology 2016
HCVrree Trial: Predicting the outcome

Salazar, Kouyos, & al. (in prep)
Acknowledgements

Huldrych Günthard, Alexandra Trkola, Peter Rusert, Wan-Lin Yang, Alex Marzel, Mohaned Shilaih, Sara Drescher, Claus Kadelka, Nadine Bachmann, Teja Turk, Sebastian Bonhoeffer, Viktor von Wyl, Trevor Hinkley, Tanja Stadler, Alexandra Trkola, Dominique Braun, Jan Fehr, Karin Metzner, Olivia Keiser, Luisa Salazar, Philip Bruggmann, Claude Scheidegger, Andri Rauch

Swiss HIV Cohort Study


Peter Reiss, Maria Prins, Elske Hoornborg
Appendix 1

Wandeler & al., SMW, 2015
**Table 1: Differences between classic and new HCV epidemics in Switzerland.**

<table>
<thead>
<tr>
<th>Predominant transmission group</th>
<th>Classic epidemic</th>
<th>New epidemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWID (~60%)*</td>
<td>MSM (&gt;80%)*</td>
<td></td>
</tr>
<tr>
<td>Role of HIV infection</td>
<td>Small (&lt;10% coinfected with HIV)</td>
<td>Important (&gt;90% coinfected with HIV)</td>
</tr>
<tr>
<td>Peak HCV transmissions</td>
<td>1980s</td>
<td>2005 onwards</td>
</tr>
<tr>
<td>Estimated number of individuals in Switzerland*</td>
<td>80,000</td>
<td>200</td>
</tr>
<tr>
<td>Estimated treatment uptake**</td>
<td>10%</td>
<td>75%</td>
</tr>
<tr>
<td>Re-infection incidence</td>
<td>Low (0.8–4.7 per 100 py)***</td>
<td>High (8.0–15.2 per 100 py)****</td>
</tr>
<tr>
<td>Preventive measures</td>
<td>Needle syringe programmes, opioid substitution treatment</td>
<td>Condom use, sexual behaviour campaigns</td>
</tr>
<tr>
<td>Impact on liver disease burden at the population level&amp;</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>Transmission rate per infected individual</td>
<td>Relatively small in countries with well-established drug substitution programmes</td>
<td>Relatively large due to continuous risk behaviour</td>
</tr>
</tbody>
</table>

MSM = men who have sex with men; PWID = persons who inject drugs

* from www.swisshcv.ch and Wandeler et al. [20]

** From Wandeler et al. [60] and Dore et al. [21]

*** from Grady et al. [61]

**** from Martin et al. [62] and Lambers et al. [63]

& Number of patients with hepatic decompensation, HCC and liver-related deaths

Wandeler & al., SMW, 2015
Appendix 3

OST / HAT (18,610)

NSP (7,790)

Total PWID (10,160)

PWID in OST / HAT (5,620)

PWID in OST / HAT & NSP (4,780)

Brugmann et al. (submitted)