Epidemiology of viral hepatitis infection and treatment in CEE countries

Miłosz Parczewski
Dept. of Infectious Tropical Diseases and Immune Deficiency,
Pomeranian Medical University in Szczecin, Poland
„Art is the elimination of the unnecessary”
- Pablo Picasso

Ma Jolie (1912)  Les Demoiselles d’Avignon (1907)
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.

Source: www.un.org/sustainabledevelopment/health
WHO elimination targets for hepatitis B and C

<table>
<thead>
<tr>
<th>Elimination impact indicators</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence</td>
<td>-90% by 2030</td>
</tr>
<tr>
<td>Mortality</td>
<td>-65% by 2030</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interventions with high impact</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Three dose HBV vaccine</td>
<td>90%</td>
</tr>
<tr>
<td>2. Prevention of HBV mother to child transmission</td>
<td>90%</td>
</tr>
<tr>
<td>3. Blood and injection safety</td>
<td>100% screened donations</td>
</tr>
<tr>
<td></td>
<td>100% safe injections</td>
</tr>
<tr>
<td>4. Harm reduction</td>
<td>300 injection sets / PWID</td>
</tr>
<tr>
<td>5. Testing and treatment</td>
<td>90% diagnosed</td>
</tr>
<tr>
<td></td>
<td>80% eligible treated</td>
</tr>
</tbody>
</table>

ECDC Guidance on integrated HIV and hepatitis B and C testing
### WHO 2030 target review: HBV and HCV

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Indicator</th>
<th>2015 baseline</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hepatitis B vaccination</td>
<td>HEPB3 coverage</td>
<td>84%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>2 HBV PMTCT(^{a})</td>
<td>HEP vaccine birth dose coverage</td>
<td>39%</td>
<td>50%</td>
<td>90%</td>
</tr>
<tr>
<td>3 Blood safety</td>
<td>Donations screened with quality assurance</td>
<td>97%</td>
<td>95%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Injection safety</td>
<td></td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>4 Harm reduction</td>
<td>Syringes &amp; needles distributed/PWID/year</td>
<td>27</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>5 Testing services</td>
<td>% HBV-infected diagnosed</td>
<td>9%</td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>% HCV-infected diagnosed</td>
<td>20%</td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td>Treatment</td>
<td>% diagnosed with HBV on treatment</td>
<td>8%(^{b})</td>
<td>-(^{c})</td>
<td>80%(^{d})</td>
</tr>
<tr>
<td></td>
<td>% diagnosed with HCV started on treatment</td>
<td>7%(^{b})</td>
<td>-(^{c})</td>
<td>80%(^{d})</td>
</tr>
</tbody>
</table>

HEPB3: three doses of hepatitis B vaccine; PMTCT: prevention of mother-to-child transmission; PWID: person who injects drugs.

Source: WHO, including commissioned work, United Nations, UNICEF and one published study (73)
Many people with undiagnosed infection in EU/EEA

- Estimated number
- living with the infection

- HIV: 0.8 mil
- HBV: 4.7 mil
- HCV: 3.9 mil

% undiagnosed
- HIV: 15%
- HBV: 40-85%
- HCV: 20-91%

HBV: hepatitis B virus; HCV: hepatitis C virus

ECDC Guidance on integrated HIV and hepatitis B and C testing
HCV - epidemiology
Surveillance of hepatitis B and C – epidemiological objectives

1. To monitor the incidence and routes of transmission of newly diagnosed cases of hepatitis B and C in the general and vulnerable populations

2. To monitor the prevalence of chronic hepatitis B and C virus infection to determine burden of infection (and estimate the proportion undiagnosed) in the general and vulnerable populations

3. To monitor the proportion of chronic cases that are engaged in care (continuum of care)

4. To monitor the proportion of newly diagnosed chronic cases presenting late

5. To determine genotype and sequence distributions of newly acquired infections to better follow transmission patterns, the emergence of resistance and vaccine escape mutants and potentially more virulent virus strains (priority on hepatitis C infections)

6. To determine and describe the proportion of co-infections (HIV/HBV/HCV/HDV)

7. To determine the proportion of HCV re-infections (especially among key risk groups with high incidence e.g. PWIDs)

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Hepatitis C in the EU/EEA

- 3.9 million estimated chronically infected (2016)
  - Prevalence 0.8% in general population
  - Very high prevalence in PWID, prisoners
- Incidence in general population unknown
- High incidence in some MSM sub-populations
- Migration
  - Estimated 14% of burden is among migrants (2016)

Hepatitis C data: distribution by disease status, EU/EEA, 2017

- 31 273 cases reported in 2017
- Acute: 861 (3%)
- Chronic: 6 805 (22%)
- Unknown: 23 311 (75%)*

- Overall rate (excluding countries that only report acute cases): 7.3 per 100 000.

* As acute hepatitis C is difficult to diagnose clinically or serologically, most ‘unknown’ cases are likely to be chronic infections. 296 cases (1%) could not be classified by disease status due to incompatible format of the data provided

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Rate of all reported hepatitis C cases across EU/EEA countries, 2008-2017

Source: Country reports from Austria, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, and the United Kingdom.

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Rate of reported hepatitis C cases per 100,000 population by country, 2017

Notification rate (N/100000)

- <5.0
- 5.0–14.9
- ≥15.0
- Not calculated
- No data reported
- Not included

Countries not visible in the main map extent
- Luxembourg
- Malta

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Hepatitis C: distribution by age, transmission and importation status, 2017

- 49% of cases were aged between 25 and 44
- 6% were aged under 25
- The overall male-to-female rate ratio was 2.0 to 1
- Transmission mode (26% complete):
  - Most common acute: injecting drug use (40%); nosocomial (17%); men who have sex with men (15%)
  - Most common chronic: injecting drug use (55%); nosocomial (15%); blood and blood products (11%)
- 8% of cases with complete information were classified as ‘imported’

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Rate of reported hepatitis C cases per 100 000 by age and gender, 2017

Source: Country reports from Austria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Reported transmission category for acute and chronic hepatitis C cases, 2017

Source: eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data

Acute cases: Country reports from Austria, Denmark, Estonia, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Chronic cases: Country reports from Austria, Cyprus, Denmark, Estonia, Iceland, Ireland, Latvia, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden.
HCV coinfection risk in HIV positive and HIV negative patients worldwide.

Platt L et al. Lancet Infect Dis. 2016 Jul;16(7):797-808
HCV coinfection negatively affects the survival probability in HIV infected patients.

**Figure 2.** A – Kaplan-Meier plots indicating probability of survival after HIV diagnosis among HIV monoinfected and HIV/HCV coinfected patients. B – Multivariate Cox regression plots presenting adjusted hazard ratios associated with mortality at the time point of 20 years follow-up with HIV. Squares represent adjusted hazard ratio (HR) for the parameters. Lines represent confidence intervals for the HR.
HBV - epidemiology
Hepatitis B in the EU/EEA

- 4.7 million estimated chronically infected (2016)
  - Prevalence 0.9% in general population
- Acute hepatitis B notification rates declining
- Migration is an important factor for chronic hepatitis B
  - Estimated 25% of burden is among migrants (2016)

Hepatitis B data: distribution by disease status, EU/EEA, 2017

• 26 907 cases reported in 2017
• Acute: 2 486 (9%)
• Chronic: 15 472 (58%)
• Unknown: 8 607 (32%)*

• **Overall rate (excluding countries that only report acute cases):** 6.7 per 100 000.

*An additional 342 (1%) could not be classified by disease status due to incompatible format of the data provided*
Rates of reported acute hepatitis B cases per 100 000 population by country, 2017

Notification rate (N/100000)
- < 0.5
- 0.5-0.9
- ≥1.0
- No data reported
- Not included

Countries not visible in the main map extent
- Luxembourg
- Malta

ECDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Rates of reported chronic hepatitis B cases per 100 000 population by country, 2017

Notation rate (N/100000)
- <3.0
- 3.0–8.9
- ≥9.0
- No data reported
- Not included

Countries not visible in the main map extent
- Luxembourg
- Malta

ECDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
HBV seroprevalence across CEE

- Belgium: 0.7% (0.5–0.8) N=1830 Standardised
- Croatia: 0.7% (0.4–1.2) N=2009
- Czech Republic: 0.6% N=2644 Standardised
- France: 0.7% (0.5–0.9) N=18230
- Germany: 0.4% (0.3–0.5) N=9303 Pooled
- Greece: 3.3% (2.2–4.7) N=876
- Hungary: 0.4% (0.1–1.0) N=1066
- Ireland: 0.1% (0.0–0.4) N=1478
- Italy: 0.7% (0.4–1.0) N=3982 Pooled
- Netherlands: 0.2% (0.1–0.4) N=6246
- Romania: 4.4% (4.0–4.8) N=13127
- Slovakia: 1.1% (0.7–1.6) N=1946
- Spain: 0.8% (0.6–1.1) N=5355 Pooled

Global hepatitis report, WHO, 2017
Rates of acute and chronic hepatitis B cases in EU/EEA countries, 2008–2017

**Acute cases:** Country reports from Austria, Czech Republic, Denmark, Estonia, Finland, France*, Germany, Greece, Hungary, Ireland, Latvia, the Netherlands, Norway, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom**.

**Chronic cases:** Country reports from Denmark, Estonia, Finland, Ireland, Latvia, Malta, the Netherlands, Norway, Portugal, Slovakia, Slovenia, Sweden, and the United Kingdom**.

* Underreporting of acute hepatitis B in France was estimated at 73% in 2016.
** UK data exclude Scotland as Scottish data have not been reported consistently.

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eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Hepatitis B data: distribution by age, transmission and importation status, 2017

- 30% of cases were aged between 25 and 34
- 12% of acute cases and 9% of chronic cases aged under 25
- Male-to-female rate ratio: 1.6 to 1
- Transmission mode (29% complete for acute cases, 13% for chronic):
  - Most common acute: Heterosexual transmission (27%); nosocomial (16%); transmission among men who have sex with men (13%);
  - Most common chronic: mother-to-child transmission (41%); nosocomial transmission (28%);
- Migration variables poorly reported but 31% of cases with complete information were classified as ‘imported’; 81% of ‘imported’ infections were chronic

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Rate of reported hepatitis B cases per 100 000 by age and disease status, 2017

Source:
Acute cases: country reports from Austria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France*, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

Chronic cases: Austria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, and the United Kingdom.

* Underreporting of acute hepatitis B in France was estimated at 73% in 2016.

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Reported transmission category for acute and chronic hepatitis B cases, 2017

Source: Acute reports from Austria, Cyprus, Denmark, Estonia, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Source: Chronic reports from Austria, Cyprus, Denmark, Estonia, Finland, Ireland, Latvia, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia and Sweden.

eCDC: Surveillance of hepatitis B and C in the EU/EEA – 2017 data
Elimination

„The end of the road” Pablo Picasso

https://www.guggenheim.org/artwork/3410
(Not so long) path to HCV elimination?

Fig. 1. Cascade of care for people living with HCV infection, by WHO region, 2016

Still only 13% treated in 2016, 80% undiagnosed

WHO Progress report on access to hepatitis C treatment, March 2018
Restrictions to DAA use in EEA (2018)

Active drug/alcohol dependence

Fibrosis stage

Marshall AD et al. *Lancet Gastroenterol Hepatol* 2018
Restrictions to DAA use in EEA (2018)

Prescriber restrictions (specialist/non specialist)

HIV as priority

Marshall AD et al. *The Lancet Gastroenterology & Hepatology* 2018
Example country policies for expansion of the HCV treatment in the region

<table>
<thead>
<tr>
<th>Country</th>
<th>Policy Details</th>
<th>Challenges</th>
<th>Access Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romania</td>
<td>A national HCV programme was created in April 2017. Criteria for treatment eligibility have been widened, increasing the number of eligible patients from 5000 to 12 000. In 2016, almost 6000 patients received treatment. Treatment is provided in the public sector. The government initially contemplated compulsory licensing, reported that prices were negotiated with pharmaceutical companies based on volumes. However, prices remained confidential.</td>
<td>High prices in the absence of generic competition. Only 1 of 4 registered products is currently available to patients.</td>
<td></td>
</tr>
<tr>
<td>Ukraine</td>
<td>The HCV programme was established in 2015. National treatment protocols were last updated in July 2016. 2000 patients received treatment in 2015 and 2500 in 2016. The government is negotiating with originators, and supports local and international NGOs that are operating treatment programmes.</td>
<td>Strong local NGOs are active in improving access to medicines. The Alliance for Public Health and Médecins Sans Frontières run treatment programmes and are strong advocates for universal access to treatment.</td>
<td></td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>A national hepatitis programme was established in July 2017. No information on treatment was reported. Generic versions of DAAs are available, but only in the private sector. There are plans to improve access to DAAs through the public sector.</td>
<td>Lack of access in the public sector, high prices of generic DAAs in the private sector with poor access in remote areas are major barriers. Medicine registration processes need to be accelerated and simplified. A pricing policy for essential medicines in the public sector would improve access.</td>
<td></td>
</tr>
</tbody>
</table>

WHO Progress report on access to hepatitis C treatment, March 2018
As prices decrease, goals are easier to be met

Fig. 3.3. Trends in the lowest reported prices for direct-acting antivirals per 28-day supply, 2016–2017

Note: Prices as reported by DAA producers and countries in the WHO 2016 and 2017 surveys.

WHO Progress report on access to hepatitis C treatment, March 2018
Modelling screening and cure effect on HCV mortality

- Universal screening will lead to a greater reduction in new infections
- We need to do more to reduce mortality

Flisiak R, Conference of Polish Association for the Study of Liver, 7–9 Jun 2018, abstracts in Clin Exp Hepatology 2/2018
Markov model for HCV elimination target
HCV treatment disparities – net cures

(a) Net cure percentages for various countries:
- Iceland: 35%
- Qatar: 26%
- Japan: 15%
- Australia: 12%
- Egypt: 9%
- Netherlands: 8%
- Spain: 7%
- United States: 7%
- France: 5%
- Germany: 5%

(b) Net cure percentage decreases for countries:
- Russia: -5.6%
- United Arab Emirates: -4.6%
- Kenya: -3.4%
- Uzbekistan: -3.3%
- Azerbaijan: -3.2%
- Georgia: -3.1%
- Syria: -2.7%
- China: -2.7%
- Afghanistan: -2.5%
- Philippines: -2.3%

Number of new infections in 2016
Acute HCV

HCV definition: review – from chronic to acute → recent

<table>
<thead>
<tr>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>Recent HCV seroconversion (prior negative test for hepatitis C in last 12 months) or Detection of hepatitis C virus nucleic acid (HCV RNA) or hepatitis C virus core antigen (HCV-core) in serum/plasma and no detection of hepatitis C virus antibody (negative result)</td>
</tr>
<tr>
<td>Chronic</td>
<td>Detection of hepatitis C virus nucleic acid (HCV RNA) or hepatitis C core antigen (HCV-core) in serum/plasma in two samples taken at least 12 months apart(^1)</td>
</tr>
<tr>
<td>UNK</td>
<td>Any newly diagnosed case which cannot be classified according the above description of acute or chronic infection</td>
</tr>
</tbody>
</table>

\(^1\) In the event that the case was not notified the first time
Acute infections and re-infections as a challenge

- Sexual transmission of HCV occurs predominantly amongst HIV-positive MSM in industrialized countries.
- Increasing cases of sexually transmitted HCV have been recognized amongst HIV-negative MSM accessing PrEP.
- Behavioural factors (high-risk sexual behaviours and sexualized drug use) appear to be driving this epidemic.
- In addition to the scale-up of DAA therapy, effective behavioural interventions and early identification of reinfections are essential to control the HCV epidemic amongst HIV-positive and HIV-negative MSM.

Polish PREP example:
In a group of 103 PreP patients, no patients were HCV positive at PreP initiation, however 9 (8.73%) acute HCV infections occurred after 6 months of follow-up.

(Personal communication dr I. Cielniak, Warsaw)

Acute HCV remains transmitted in networks

Temporal reconstruction of the acute HCV networks

Parczewski et al., EACS 2017.

Rose, MEEGID,
https://doi.org/10.1016/j.meegid.2019.02.025
# Example transmission clusters

<table>
<thead>
<tr>
<th>Cluster ID</th>
<th>Cluster size, number of seq</th>
<th>HCV genotype/clone</th>
<th>Observed NS3 mutations, (%)</th>
<th>Observed NS5 mutations, (%)</th>
<th>Transmission route (%)</th>
<th>City of diagnosis(%) *</th>
<th>Documented acute hepatitis C, (%)</th>
<th>Genetic distance within the cluster</th>
<th>Cluster bootstrap support</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>1a/I</td>
<td>0</td>
<td>28T (10%)</td>
<td>IDU (100%)</td>
<td>SZ (90%), WR (10%)</td>
<td>0%</td>
<td>6.26%</td>
<td>0.998</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>1a/I</td>
<td><strong>80K</strong> (75%)</td>
<td>0</td>
<td>MSM (100%)</td>
<td>WA (75%), WR (25%)</td>
<td>100%</td>
<td>13.71%</td>
<td>0.932</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>1b</td>
<td>0</td>
<td>0</td>
<td>MSM (100%)</td>
<td>WR (85.7%), WA (14.3%), SZ (7.1%), WR (7.1%)</td>
<td>100%</td>
<td>7.58%</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>1b</td>
<td>0</td>
<td>0</td>
<td>IDU (100%)</td>
<td>SZ (100%)</td>
<td>0%</td>
<td>7.7%</td>
<td>0.986</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>1b</td>
<td>0</td>
<td>0</td>
<td>IDU (75%), HET (25%)</td>
<td>SZ (100%)</td>
<td>0%</td>
<td>5.6%</td>
<td>0.865</td>
</tr>
</tbody>
</table>

Parczewski et al., JAIDS 2018
Universal treatment and acute HCV – Dutch example

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>2014 (n = 93)</th>
<th>2016 (n = 49)</th>
<th>PValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y</td>
<td>42 (9)</td>
<td>46 (9)</td>
<td>.06</td>
</tr>
<tr>
<td>Receiving cART, No. (%)</td>
<td>84 (90)</td>
<td>43 (94)</td>
<td>.53</td>
</tr>
<tr>
<td>CD4 cell count, median (IQR), cells/μL</td>
<td>610 (430–810)</td>
<td>620 (465–763)</td>
<td>.86</td>
</tr>
<tr>
<td>Reinfecion, No. (%)</td>
<td>21 (23)</td>
<td>12 (25)</td>
<td>.75</td>
</tr>
<tr>
<td>HCV genotype, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genotype 1</td>
<td>72 (77)</td>
<td>27 (55)</td>
<td>.02</td>
</tr>
<tr>
<td>Genotype 2</td>
<td>2 (2)</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>Genotype 3</td>
<td>0</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>Genotype 4</td>
<td>18 (19)</td>
<td>15 (31)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1 (1)</td>
<td>4 (8)</td>
<td></td>
</tr>
<tr>
<td>HCV genotype 1 subtype, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtype a</td>
<td>68 (73)</td>
<td>27 (55)</td>
<td>.57</td>
</tr>
<tr>
<td>Subtype b</td>
<td>4 (4)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Fall of acute HCV diagnoses among MSM after treatment initiation

Figure 2. *Left axis,* Acute hepatitis C virus (HCV) infections per 4 months and per genotype. *Right axis,* Percentage of HCV RNA–positive human immunodeficiency virus (HIV)–positive men who have sex with men (MSM) (*blue*) and number of HCV treatments (*red*) in the Netherlands per year (data for both obtained from Stichting HIV Monitoring; personal communication). T1: Jan–Apr; T2: May–Aug; T3: Sept–Dec.
Epidemiological data summary

- High numbers of newly diagnosed hepatitis B and C cases notified across Europe
  - Hepatitis C more commonly reported than hepatitis B
  - Chronic cases dominate across both diseases
  - Marked variation between countries

- Hepatitis B:
  - Decrease in acute cases

- Hepatitis C: strong north-south geographical trend

- Transmission routes for hepatitis B differ from hepatitis C, and for hepatitis B these routes vary by disease status

- Imported cases are significant, especially for hepatitis B
Key limitations of epi the data

- Due to the largely **asymptomatic** nature of hepatitis infections, data are strongly related to local testing practices.

- **Challenges relating to the case definitions:**
  - Different definitions used by countries
  - Some countries only report acute hepatitis cases
  - High proportion of cases coded as unknown

- Data **completeness** low for certain variables:
  - Transmission, Imported

- **Underreporting** major issue reported by some countries
Issues to be addressed for HBV/HCV elimination in CEE.

- Further drug price competition
- Surveillance over transmission networks and reinfections, including molecular
- Guided interventions
- Diagnostic roll-out and PreP HCV surveillance
- Exchange of experience
Acknowledgement

• Teymur Noori for the epidemiological data
Thank you

HCV sequencing for analysis of the transmission networks is set up in Poland.

We invite any CEE country to participate (most valuable contribution is for acute HCV infections, we perform Sangen NS3/NS5A seq for cluster reconstruction). Brief outline on request.

Contact: mparczewski@yahoo.co.uk