Hepatitis C burden of disease in Finland

Work in progress
Mika Salminen, Research Professor
National Institute of Health and Welfare
What is burden of disease?

- Not merely prevalence, incidence or mortality, but **more**
- An attempt to estimate the total effects of a disease to society in some generic, measurable and comparable manner
  - Disease burden to society can be caused by several factors
  - Depending on the outlook, can include direct or indirect burden
  - Can be expanded to include costs i.e. be monetized

- Important to take into account especially when a new and potentially costly intervention is planned
  - is the intervention cost effective?
    - I.e. are the potential savings in either alternative costs and/or gains in health or other added value **worth the investment**

- Especially important when choices have to be made
Some measures and components of disease burden

- Mortality due to the disease
- Disability caused by the disease
- Life-years lost due to disease
- Healthy life-years lost due to disability caused by the disease
- Costs of healthcare and treatment
- Loss of productivity & earnings
  - Direct
  - Indirect
- Cost of social support/benefits due to disability
- Cost of control measures (i.e. in food & waterborn disease)
Why do we need estimates of burden of disease for Hepatitis C?

• Current treatment of HCV relatively effective but still costly and difficult to manage
• New drugs with favourable tolerability profiles are coming
• Modelling studies show that even eradication of HCV *may* be possible
• However, costs of treatment will be high initially
• Current disease burden among IDUs is poorly understood and described in most countries
• There is controversy around the role of HCV as disease cause
• Demonstrating the burden and forecasting direct and indirect costs associated to it may better allow investment in prevention and eventually treatment for all
HCV treatment in Finland

• Active drug users are not treated for HCV infection
• Drug or alcohol addiction (abstinence less than 2 years) is contraindication to treatment
• In total of 400 people are treated / year
  – 30 % immigrants
  – former injectors
  – HIV positive IDU’s

• WE THINK WE COULD (SHOULD) DO MORE
Sources of data for disease burden estimation
- Finland

- Reporting of disease information and case linking is performed through comprehensive use of national personal social security number in various national health and welfare related registries/databases
  - NIDR – National Infectious Disease Registry – laboratory & physician reports (HCV reportable, disease stage classification mostly unknown, transmission group reported but underreported)
  - Mortality records – (national person registry; birth, place of living, gender, marital status, education, place of birth etc.)
  - Cancer registry: specialized registry for all malignancies
  - Hospital discharge records
HCV-infected individuals reported to NIDR
(total of 20,985 cases since 1995; followable cohort size 19,810)
### Prevalence estimates

<table>
<thead>
<tr>
<th>Category</th>
<th>Study n:</th>
<th>prev %</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDU</td>
<td>682</td>
<td>75</td>
<td>2009</td>
</tr>
<tr>
<td>Inmates</td>
<td>711</td>
<td>42,3</td>
<td>2006</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>2028</td>
<td>0,19</td>
<td>1985</td>
</tr>
<tr>
<td>Pregnant women (Helsinki)</td>
<td>5007</td>
<td>0,64</td>
<td>2010</td>
</tr>
<tr>
<td>Blood donors</td>
<td>154 038</td>
<td>0,006</td>
<td>2011</td>
</tr>
<tr>
<td>Immigrants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russian</td>
<td>434</td>
<td>3,2</td>
<td>2012</td>
</tr>
<tr>
<td>Somali</td>
<td>327</td>
<td>1,7</td>
<td>2012</td>
</tr>
<tr>
<td>Kurd</td>
<td>475</td>
<td>0,3</td>
<td>2012</td>
</tr>
</tbody>
</table>
HIV / hepatitis C antibody prevalence among PWID in Helsinki metropolitan area 1998-2009

Helsinki, Espoo, Vantaa

Antibody prevalence (%)

Hepatitis C

HIV

The causes of death among the 3021 (17 %) individuals who have died after HCV-infection from 1995 to 2011

<table>
<thead>
<tr>
<th>CAUSE OF DEATH</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISEASES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human immunodeficiency virus (HIV)</td>
<td>28</td>
<td>0,9</td>
</tr>
<tr>
<td>Diabetes</td>
<td>45</td>
<td>1,5</td>
</tr>
<tr>
<td>Ischemic heart diseases</td>
<td>99</td>
<td>3,3</td>
</tr>
<tr>
<td>Vascular syndromes of brain</td>
<td>73</td>
<td>2,4</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>35</td>
<td>1,2</td>
</tr>
<tr>
<td>Cancer</td>
<td>276</td>
<td>9,1</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>110</td>
<td>3,6</td>
</tr>
<tr>
<td>Diseases caused by alcohol and accidental poisoning by alcohol</td>
<td>505</td>
<td>16,7</td>
</tr>
<tr>
<td>ACCIDENTS AND VIOLENT DEATH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>accidental poisoning (not caused by alcohol)</td>
<td>479</td>
<td>15,9</td>
</tr>
<tr>
<td>Suicide</td>
<td>370</td>
<td>12,2</td>
</tr>
<tr>
<td>ALL DEATHS</td>
<td>3021</td>
<td></td>
</tr>
</tbody>
</table>

28.10.2013
Hepatitis C in Finland

- Average 1150 notified hepatitis C cases / year
  - 65 % men
- HCV antibody prevalence at least 65 % among PWID
- Number of PWID: 17 000
- 30 % of PWID have shared needles and syringes during the last month, 13 % every day
- HCV genotype distribution: 1a ->15 %, 1b -> 17 %, 2b ->16 %, 3a -> 46 % and others 2 %
- 400 people are treated / year, active drug users are not treated
- More than 11 000 PWID were in contact with LTHSCs year 2012
- 2400 PWIDs were on OST in 2011
- Less than 20 % PWID drink more than 16 alcohol portions / week
- Liver cancer has been the cause of death only in 3.6 % of individuals diagnosed to have HCV-infection

THL

TERVEYDEN JA HYVINVOINNIN LAITOS
ECDC work on Burden of Disease - DALY - Disability Adjusted Life Years (Lost due to disease)

- Mortality due to the disease
- Disability caused by the disease
- Life-years lost due to disease
- Healthy life-years lost due to disability caused by the disease
- Costs of healthcare and treatment
- Loss of productivity
  - Direct
  - Indirect
- Cost of social support/benefits due to disability
- Cost of control measures (i.e. in food & waterborn disease)
DALYs is one of several Summary Measures of population health (SMPH)

• Based on health gaps
  • DALY (Disability Adjusted Life Years)
  • PYLL (Potential Years of Life Lost)

• Based on health expectancies
  • QALY (Quality Adjusted Life Years)
  • DFLE (Disability Free Life Expectancy)
  • DALE (Disability Adjusted Life Expectancy)
  • QALE (Quality Adjusted Life Expectancy)
  • HALE (Health Adjusted Life Expectancy)
  • YHL (Years of Healthy Life)
  • HLA (Healthy Life Years)
  • ALE (Active Life Expectancy)

• Many others (Dementia-free Life Expectancy, Health Capital…)

THL

TERVEYDEN JA HYVINVOINNIN LAITOS
What are disability weights?

- common cold
- concussion
- depression
- paraplegia
- dementia
- moderate gastroenteritis
- inflammatory bowel disease
- kidney failure

Full health → Worst health state
Disability Adjusted Life Year

DALY = years of life lost (YLL) + years lived with disability (YLD)

= 20 years + 16 years = 36 years
Disability Adjusted Life Years (Lost due to disease)

\[ \text{DALY} = \text{YLL} + \text{YLD} \]

Years of life lost due to mortality

\[ = \sum (d \times e) \]
- \(d\) – sum of all fatal cases
- \(e\) – remaining life expectancy at age of death

Years of healthy life lost due to disability

\[ = \sum (n \times t \times w) \]
- \(n\) – number of cases
- \(t\) – duration of illness
- \(w\) – disability weight
How to estimate?

- Based on outcome-tree

HCC stands for Hepatocellular Carcinoma
BCoDE pilot study: disease pie changes according to the indicator

Figure: Relative burden of the seven selected diseases based on different indicators:
- incidence (mean number of reported new cases per year in the period 2003-2005)
- mortality (mean number of reported deaths per year in the period 2003-2004)
- disease burden (DALYs per year based on above-mentioned incidence and mortality), RIVM Study 2007

Based on data for twelve countries (data available for all seven diseases): Austria, Czech Republic, Germany, Ireland, Latvia, Lithuania, the Netherlands, Poland, Slovenia, Sweden, United Kingdom, Norway.