BCoDE – Burden of Communicable Diseases in Europe

Burden of healthcare-associated infections in Europe

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What is burden of disease?

A common definition:

**Disease burden** is the **impact** of a health problem

...as measured by financial cost, mortality, morbidity or other indicators.
Apples and pears

Choice of a **common currency** in order to compare impact of diseases and its sequelae

SMPH: summary measure of population health
CHM: composite health measure
Disability-adjusted life years (DALYs)
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An accident at 20 years old
Disability-adjusted life years (DALYs)

40 years lived with disability weighted 0.4 = 16 YLD
Disability-adjusted life years (DALYs)

Death at 60 years old (80 is standard life expectancy)
20 years of life lost due to premature death (YLL)
Disability-adjusted life years (DALYs)

\[16 \text{ YLD} + 20 \text{ YLL} = 36 \text{ DALYs}\]
Is it possible to estimate the burden of HAIs?

• The burden of HAIs has not been studied adequately despite a significant proportion being preventable

**BUT**

• HAIs are always associated with comorbidities that contribute to morbidity and mortality

• Administrative hospital discharge data do not accurately reflect the burden of HAIs
Burden of disease: methodology builds on a number of studies


- **Incidence data:** Age-group and sex prevalent number of HAIs from the PPS converted into annual incidence rates applying the Rhame and Sudderth formula. Point prevalence survey of Healthcare-associated infections and antimicrobial use in European acute care hospitals. Stockholm: ECDC; 2013.


- **Adjusting for impact of co-morbidities on life expectancy:** Standard life expectancy table. McCabe score stratification of cases according to remaining life expectancy; comparison with standard life expectancy (Murray CJ et al. GBD 2010: design, definitions, and metrics. Lancet. 2012 Dec 15;380(9859):2063-6.)
Comparing number of cases and burden of disease

- Age-group and sex prevalent number of HAIs from the PPS was converted into annual incidence rates applying the Rhame and Sudderth formula
- 2.6 million annual number of cases of HAIs estimated in the EU/EEA (95% UI: 1,624,140 - 4,084,550)

(estimated from ECDC point prevalence survey 2011-2012)
Calculating DALYs: the BCoDE toolkit

Number of cases by age group and gender

Life expectancy adjusted based on underlying disease

Outcome probabilities

Comparing number of cases and burden of disease

- 2.6 million annual number of cases of HAIs are associated with more than 91,000 deaths (76,000 to 108,000)
- Incidence and prevalence do not provide the full picture
Contribution of incidence and mortality to the burden of HAIs

Burden of HAIs in EU/EEA Member States – 2011-2012
Diameter of bubble reflects DALYs per 100,000.

Comparing the burden of HAIs with other infectious diseases (BCoDE project 2015)

HAIs account for **twice the burden** of **31 other infectious diseases**

**Burden of HAIs – 2011-2012** *
**Burden of 5 top ranking infectious diseases from BCoDE 2009-2013** **

What is the full picture of the burden of HAIs?

Addressing only:

- HAIs in acute care hospitals and not long-term care facilities
- the six most common HAIs that account for almost 80% of HAIs
What is the full picture of the burden of HAIs?

Number of studies reporting health-care-associated infection in developing countries, 1995–2008. Size of dots indicates number of studies.


PPS in EU/EEA: Weighted prevalence of HAIs 5.7% (95 CI: 4.5-7.4)

Meta-analysis in low resource countries:
- Double prevalence
- Triple in ICUs
Health and economic burden of AMR and HAI

Under construction:

- EARS-Net as main data source for resistant BSI
- For HAI, PPS data provides information on other infection sites and on severity of co-morbidity
- For non-HAI, literature reviews fill the gaps on non-BSI
- Literature reviews also help design outcome trees

In collaboration with OECD for the Economic burden of AMR
Take home messages

• Significant challenges in measuring burden of HAIs
  – Data source, co-morbidities, health outcomes

• 2.6 million HAIs associated to more than 91,100 deaths
  – Conservative estimate (70% of HAIs from under-estimated PPS)

• 2.5 million DALYs, $\frac{3}{4}$ lost to premature mortality
  – Remaining are days lived in disability

• Burden of HAIs was higher than other CDs in EU/EEA
  – Composite measures (e.g. DALYs) allow comparisons

• 30 to 50% of the HAIs under study are preventable
  – Lowering the burden in the EU/EEA is an achievable goal
  – Hospitals can become a safer place
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Questions

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Thank you!