Antimicrobial use in humans

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“If you cannot measure it, you cannot improve it”

Lord Kelvin
1824-1907
Importent research questions

- What is the **quantity and quality of antibiotic use**
  - Geographical distribution and ranges
  - Outpatient – inpatient use
  - Adults – children
  - ....

- What are the **determinants of inappropriate antibiotic use**?
  - Patient related (diagnosis, age, underlying disease, ....)
  - Prescriber related (training)
  - Institutional factors (national/local policy, availability of drugs on market, existing guidelines, hospital type, ....)
  - Cultural factors, customs, ....
Collection of antibiotic use data

We need:

- Valid, representative and comparable data
- Interpretable units of measurement to express volumes of antibiotic use
- Longitudinal data to analyze trends over time
- Evaluation methods to assess impact of interventions aiming at optimizing antibiotic use

Common methodology
How measuring human antibiotic use

WHO ATC/DDD classification method = gold standard measuring unit for international human drug utilization research:

- Anatomical Therapeutic Chemical (ATC) classification system (5 levels up to substance level)
- Defined Daily Doses (DDD) = assumed average maintenance dose per day for a drug used for its main indication in adults.

➤ Drug specifications needed: unit strength & pack size

http://www.whocc.no/
How measuring human antibiotic use

**Nominators**

- N packages
- N prescriptions
- N persons
- N defined daily doses
- N days of therapy

**Denominators**

- All inpatients
- All prescriptions
- All persons
- All persons insured
- All days of therapy
- All full courses
- Total population
- All prescribed daily doses
- All admissions
- ...
Measure and compare

HOW TO INTERPRET?

Golden standard?
Interpretation of antibiotic use data

**Critical factors:**

- Dosage (strength of active ingredient)
- Duration of therapy and time interval
- Clinical justification
- Targeted / empirical treatment
- Choice of drug (availability on market)
- Indication (community acquired – hospital acquired infection)
- Guidelines
- Local resistance patterns
- ......
Total outpatient antibiotic use in 33 European countries in 2009 in DID (2004 data for Switzerland).


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Outpatient use of penicillins in 33 European countries in 2009 in DID (2004 data for Switzerland).

Assessing impact of interventions

Campaigns

Antibiotic consumption

Antibiotic resistance

• DDD
• persons

Time

• packages

Prescriptions

PrID

PID

DID

PersonsID
Belgian National Public Campaigns

• **When:** since November 2000, annually during winter season

• **Organised by** BAPCOC (Belgian Antibiotic Policy Coordination Committee)

• **Budget:** € 400,000 /annual campaign

• **Interventions targeting the public & professionals:**
  - TV, radio and newspaper
  - Information booklets
  - Folders
  - Posters
  - Internet campaigns: www.antibiotics-info.be
Outpatient antibiotic use in Belgium 1997-2010 in Packages per 1000 Inhabitants per Day

- Other J01 classes
- Sulfonamides and trimethoprim (J01E)
- Quinolones (J01M)
- Macrolides, lincosamides and streptogramins (J01F)
- Tetracyclines (J01A)
- Cephalosporins and other beta-lactams (J01D)
- Penicillins (J01C)
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- Penicillins (J01C)
Key message: obtain meaningful comparisons

☑ Uniformity of data collection - Use similar study designs, standardized protocol and data collection templates

☑ SIMPLE protocol = feasible & achievable surveillance

☑ Quality assurance approach – implementation of data validation process

☑ Continuous work on data accuracy

☑ Central support towards data collection or other (helpdesk)

☑ Mutual cooperation/feedback is highly motivating

“sustained awareness”
Conclusion

• Implementation of a **common methodology** to collect valid, representative and comparable antimicrobial consumption data
• Employ **different outcome measurement units** enabling an in-depth interpretation of antimicrobial consumption data

• Creation of reference database at national and international level
• Potential of scientific output
• Potential to link with antimicrobial resistance data
• Potential to link with other research projects
• Networking
• Sustainability
If you want to go Fast, go alone.
If you want to go Far, go together.