

Utilisation of antibiotics – within and across countries

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First Training Workshop and
Symposium MURIA Group 27 – 29 July
2015



Outline

- ATC/DDD methods for antibiotics
- Choices of appropriate denominators (and challenges that are particular to developing countries)
- Examples of national and regional surveillance systems
- Potential sources of data

Basic concepts

- **Medicines utilisation:** The marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences (WHO 1977)
- "An eclectic collection of descriptive and analytical methods for the quantification, the understanding and the evaluation of the processes of prescribing, dispensing and consumption of medicines, and for the testing of interventions to enhance the quality of these processes." (Wettermark et al. 2008)
- **Pharmacoepidemiology** is the study of the use, and effects, of drugs and other medical devices in large numbers of people (Strom 2013)



What would be wrong with these measures of “utilisation”?

- Number of prescriptions for antibiotic A issued per year in hospital X
- Number of prescriptions for antibiotic A issued per year in city Y
- Number of prescriptions for antibiotic A issued per year in country Z



Some questions

- Is “antibiotic A” a brand name?
- Does antibiotic A come in different strengths and dosage forms?
e.g. 250mg and 500mg capsules; 125mg/5ml and 250mg/5ml oral liquids; 500mg IV injection
- Do all patients get the same quantity of antibiotic A (the same duration)?

Navigation menu: Home, ATC/DDD application form, Order publications, WHO Centre, Contact us, Log in, Search

WHO Collaborating Centre for Drug Statistics Methodology

Norwegian Institute of Public Health

International language for drug utilization research 

The Anatomical Therapeutic Chemical (ATC) classification system and the Defined Daily Dose (DDD) as a measuring unit have become the gold standard for international drug utilization research.

The ATC/DDD system is a tool for exchanging and comparing data on drug use at international, national or local levels.

Welcome to the WHO Collaborating Centre for Drug Statistics Methodology

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Last updated: 2015-05-05

News

- Updates of the list of DDDs for combined products [Read](#)
- ATC/DDD course in Oslo 11-12 June 2015 [Read](#)
- New ATC/DDDs and alterations from the March 2015 meeting [Read](#)
- List of DDDs for three years revision [Read](#)
- New ATC/DDDs and alterations from the October 2014 meeting [Read](#)



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The WHO Collaborating Centre for Drug Statistics Methodology

- Established in 1982 as a European WHO Collaborating Centre; became a global WHO Collaborating Centre in 1996
- Located in the Department of Pharmacoepidemiology at the Norwegian Institute of Public Health



Two linked concepts

- ATC: Anatomical Therapeutic Chemical classification
- DDD (Defined Daily Dose): The assumed average maintenance dose per day for a drug used for its main indication in adults

ATC -classified according to their main therapeutic use

- A - Alimentary tract and metabolism
- B - Blood and blood forming organs
- C - Cardiovascular system
- D - Dermatologicals
- G - Genito urinary system and sex hormones
- H - Systemic hormonal preparations, excl. sex hormones and insulins
- **J - Antiinfectives for systemic use**
- L - Antineoplastic and immunomodulating agents
- M - Musculo-skeletal system
- N - Nervous system
- P - Antiparasitic products, insecticides and repellents
- R - Respiratory system
- S - Sensory organs
- V - Various



A structured code

A ALIMENTARY TRACT AND METABOLISM (1st level, **anatomical** main group)

A10 DRUGS USED IN DIABETES (2nd level, **therapeutic** subgroup)

A10B BLOOD GLUCOSE LOWERING DRUGS, EXCL. INSULINS (3rd level, pharmacological subgroup)

A10BA BIGUANIDES (4th level, **chemical** subgroup)

A10BA02 METFORMIN (5th level, chemical substance)



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ATC/DDD Index 2015

A searchable version of the complete ATC index with DDDs is available below. The search options enable you to find ATC codes and DDDs for substance name and/or ATC levels. In your search result you may choose to show or hide the text from the Guidelines for ATC classification and DDD assignment linked to the ATC level. The text in the Guidelines will give information related to the background for the ATC and DDD assignment.

Search query

or

ATC code

- All ATC levels are searchable.
- A search will result in showing the exact substance/level and all ATC levels above (up to 1st ATC level).

Name

- "Name" is defined as the name of the substance (normally the INN name) or the name of the ATC level. Note that trademarks are not searchable.
- A minimum of three letters must be entered in the name box. Select a query that contain part of or a query that start with the letter entered.
- For ATC combination levels, please note that all active ingredients would normally not be searchable.

DDD

The DDDs, which will be reviewed in 2015 (3 year revision), are listed [here](#) and in the annex I in the printed ATC Index. See also [Guidelines](#): Part III; D Principles for reviewing and changing DDD and Part V; D Requests for changes to DDDs.

To express the DDD several abbreviations are used for units and routes of administration.

Units **Route of administration (Adm R)**

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[New search](#)

Found 11 entries containing 'amoxicillin'.

- J01CA04 [amoxicillin](#)
- J01CA04 [amoxicillin](#)
- J01CR02 [amoxicillin and enzyme inhibitor](#)
- J01CR02 [amoxicillin and enzyme inhibitor](#)
- A02BD06 [esomeprazole, amoxicillin and clarithromycin](#)
- A02BD07 [lansoprazole, amoxicillin and clarithromycin](#)
- A02BD10 [lansoprazole, amoxicillin and levofloxacin](#)
- A02BD03 [lansoprazole, amoxicillin and metronidazole](#)
- A02BD05 [omeprazole, amoxicillin and clarithromycin](#)
- A02BD01 [omeprazole, amoxicillin and metronidazole](#)
- A02BD04 [pantoprazole, amoxicillin and clarithromycin](#)

Last updated: 2013-12-19

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[New search](#) [Show text from Guidelines](#)

- J ANTIINFECTIVES FOR SYSTEMIC USE**
- J01 **ANTIBACTERIALS FOR SYSTEMIC USE**
- J01C **BETA-LACTAM ANTIBACTERIALS, PENICILLINS**
- J01CA **Penicillins with extended spectrum**

ATC code	Name	DDD	U	Adm.R	Note
J01CA04	amoxicillin	1	g	O	
		1	g	P	

[List of abbreviations](#)

Last updated: 2013-12-19

- J Antiinfectives for Systemic Use
- J01 Antibacterials for Systemic Use
- J01c Beta-lactam Antibacterials, Penicillins
- J01CA Penicillins With Extended Spectrum
- J01CA04 Amoxicillin



Caution

- “ATC” is also used to describe the classification system used by the European Pharmaceutical Market Research Association (EphMRA) and the Pharmaceutical Business Intelligence and Research Group (PBIRG), and in turn by IMS Health for marketing research statistics for the pharmaceutical industry

Defined daily dose

- The assumed **average maintenance** dose per day for a drug used for its **main indication** in **adults**

ATC code	Name	DDD	U	Adm.R	Note
J01CA04	<u>amoxicillin</u>	1	g	O	
		1	g	P	

Abbreviations

Unit (U)

g	=	gram
mg		milligram
mcg	=	microgram
U	=	unit
TU	=	thousand units
MU	=	million units
mmol	=	millimole
ml	=	milliliter (e.g. eyedrops)

Route of administration (Adm.R)

Implant	=	Implant
Inhal	=	Inhalation
Instill	=	Instillation
N	=	nasal
O	=	oral
P	=	parenteral
R	=	rectal
SL	=	sublingual/b uccal
TD	=	transdermal
V	=	vaginal

Expressing “exposure”

- **DDDs/1000 inhabitants/day**
- **e.g. 100 DDDs/1000 inhabitants/day** means that 10% of the population are receiving a certain treatment continuously (*i.e. daily*), if the DDD is the same as the actual dose used – can be seen as akin to the point prevalence



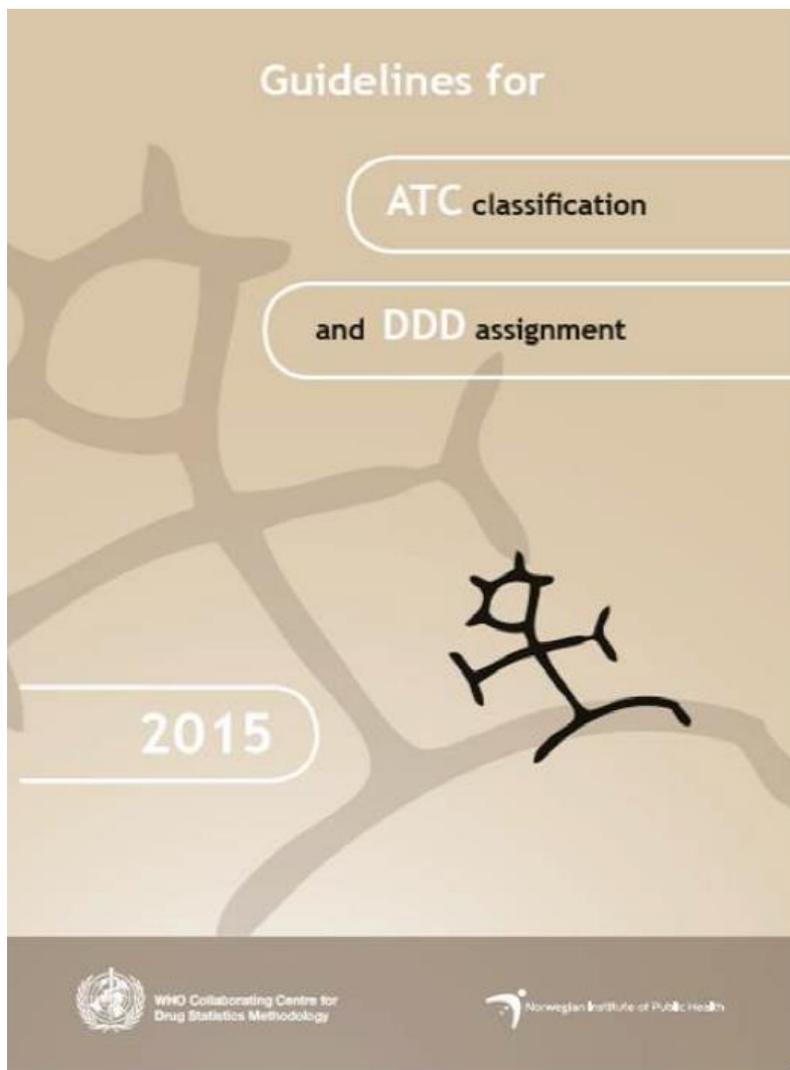
Questions

- What if the consumption data (the count of units sold or prescribed) does not represent the whole population (“inhabitants”)?
 - e.g. public vs. private sector data



Alternatives

- In-patient medicines use drug use –
DDD per 100 bed days per unit time
- Ambulatory care –
DDD per 100 patient encounters per unit
time



http://www.whocc.no/filearchive/publications/2015_guidelines.pdf

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Surveillance of community antimicrobial use in resource-constrained settings – experience from five pilot projects

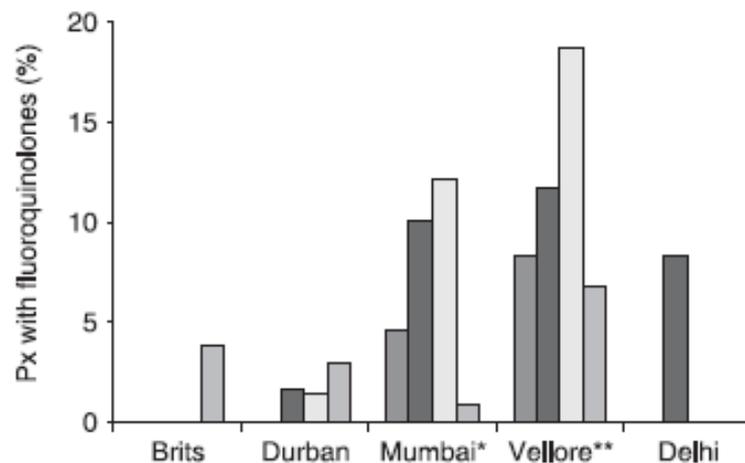
Kathleen Holloway¹, Elisabeth Mathai² and Andy Gray³ on behalf of the Community-Based Surveillance of Antimicrobial Use and Resistance in Resource-Constrained Settings Project Group*

1 WHO Regional Office for South East Asia, New Delhi, India

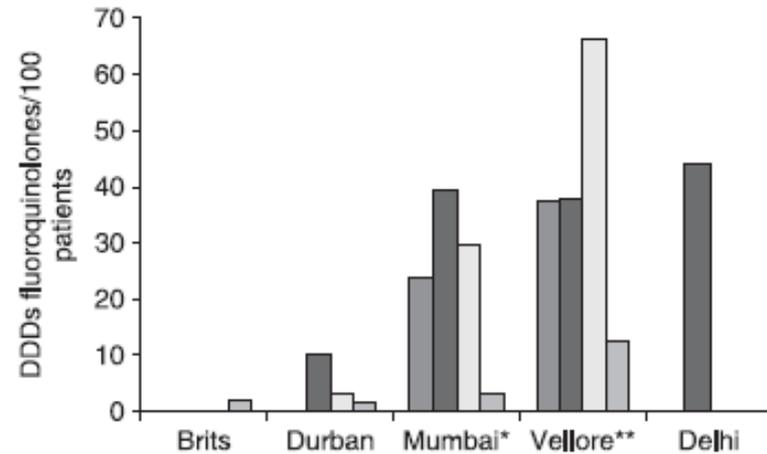
2 Patient Safety Programme, World Health Organisation, Geneva, Switzerland

3 Department of Therapeutics and Medicines Management, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa

(e1) Prescriptions (Px) with fluoroquinolones (%)

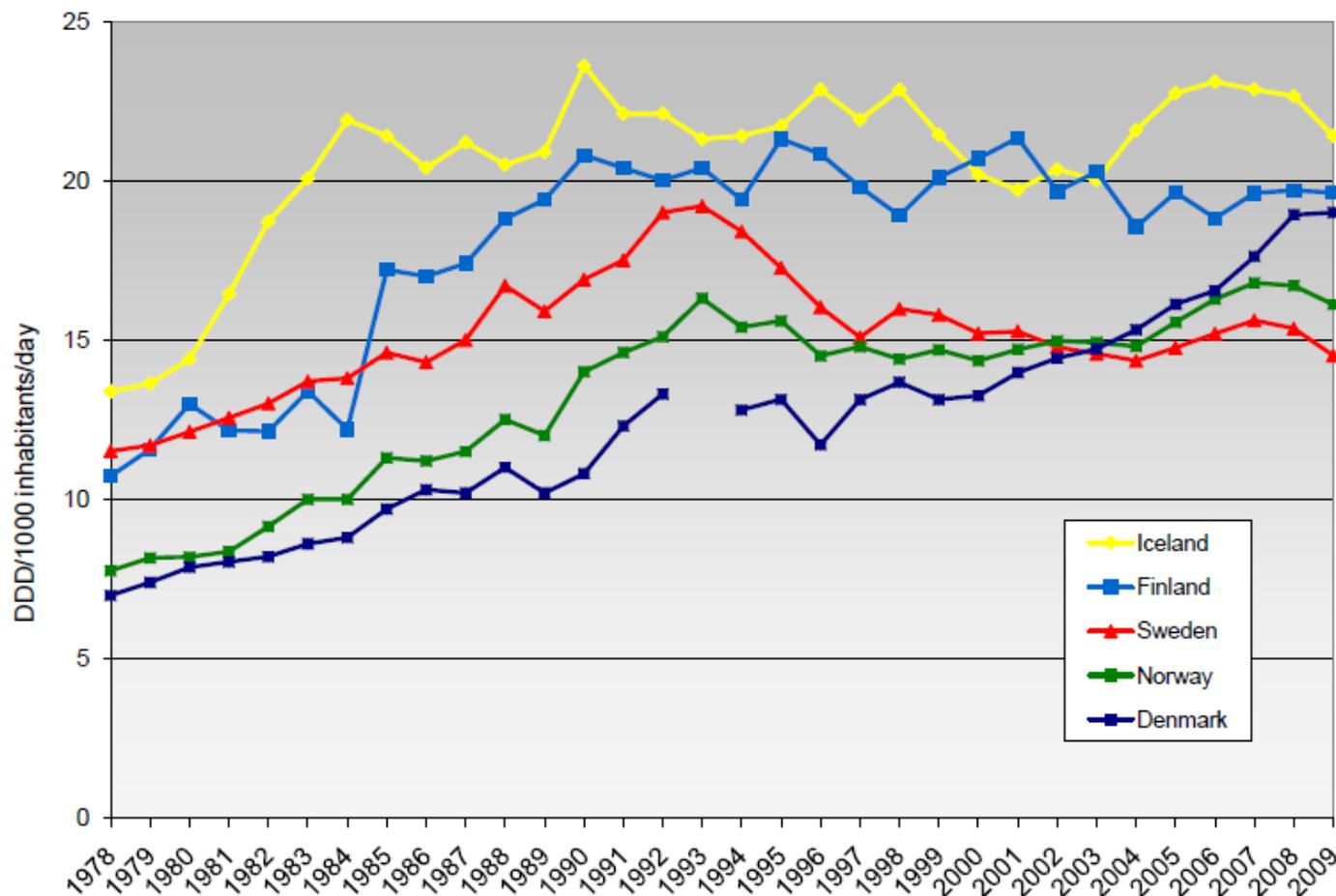


(e2) DDDs fluoroquinolones/100 patients



■ Pub*/priv** Hosp ■ Private pharmacy □ Private doctor □ Public PHC ■ Pub*/priv** Hosp ■ Private pharmacy □ Private doctor □ Public PHC

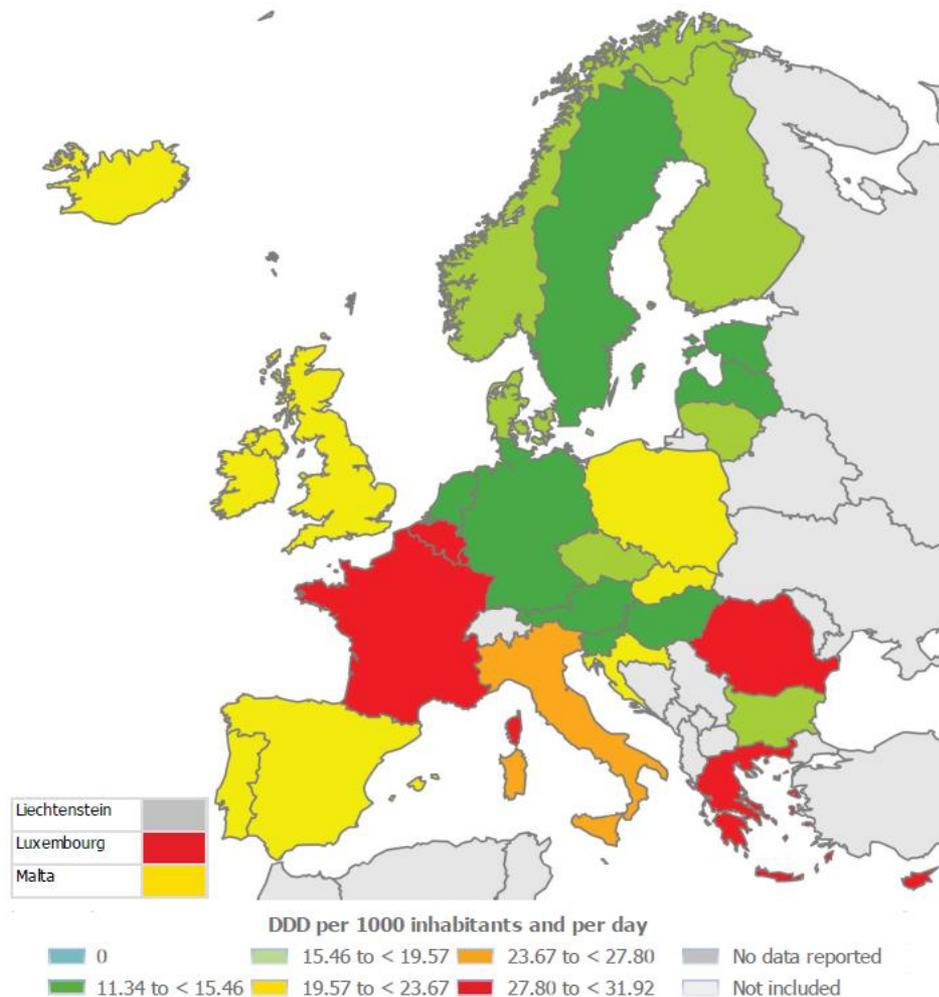
Antibiotic (1978-2009) in Nordic countries 1978-2009* total sales, DDD/1000 inhabitants and day



* Befor 1998, figures from Denmark do not include hospital use



Figure 3.2. Consumption of antibacterials for systemic use (ATC group J01) in the community, EU/EEA countries, 2012, expressed as DDD per 1 000 inhabitants and per day



Cyprus, Iceland and Romania provided total care data, i.e. including the hospital sector.
 Spain provided reimbursement data, i.e. not including consumption without a prescription and other non-reimbursed courses.
 For more information on the map scales, see Chapter 2.3.

European Surveillance of Antimicrobial Consumption Network (ESAC-Net)

Potential sources of data

■ Consumption

- Importation figures
- Public sector procurement or issues to health facilities
- Private sector wholesale level sales
- Prescription claims from insurers
- Surveys

■ Population

- Census and annual mid-year projections
- Estimates of public sector dependent population
- Numbers of insurance beneficiaries (lives covered)
- Hospital midnight census
- Head counts at health facilities



Conclusions

- The ATC/DDD methodology provides a useful way to STANDARDISE consumption figures
- BUT, it is critical to choose the right denominator to match the source of consumption data
- BE CONSISTENT AND CAREFUL