World Health Organization

Monitoring antimicrobial consumption in hospitals

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HANDLE ANTIMICROBIALS WITH CARE

Antibiotics
Antivirals
Antifungals
Antiparasitics

Why monitor antimicrobial consumption at hospital level?

- Major part of antimicrobial consumption (AMC) is attributable to outpatient care
- Still, the density of antimicrobial use is much higher in hospital setting and highly vulnerable patients are harboured in narrow spaces.
  - This contributes to the high risk of development and spread of resistant microbial pathogens in hospitals
- About 20%-60% of inpatients receive antibiotic treatment, and about 30%-50% are inappropriate or unnecessary.
- **Monitoring of AMC is essential tool to guide & support antimicrobial stewardship efforts in hospitals**

Monitoring AMC/AMU at hospital level

2 approaches: Facility-level data (AMC) v.s. Patient-level data (AMU)

- Different objectives - different methodologies - different data sources – different resources

Facility-level aggregated data
"Antimicrobial consumption"

vs

Patient-level individual data
"Antimicrobial use"

Facility-based surveillance for AMC data

Estimates – quantities and types of consumed antimicrobials

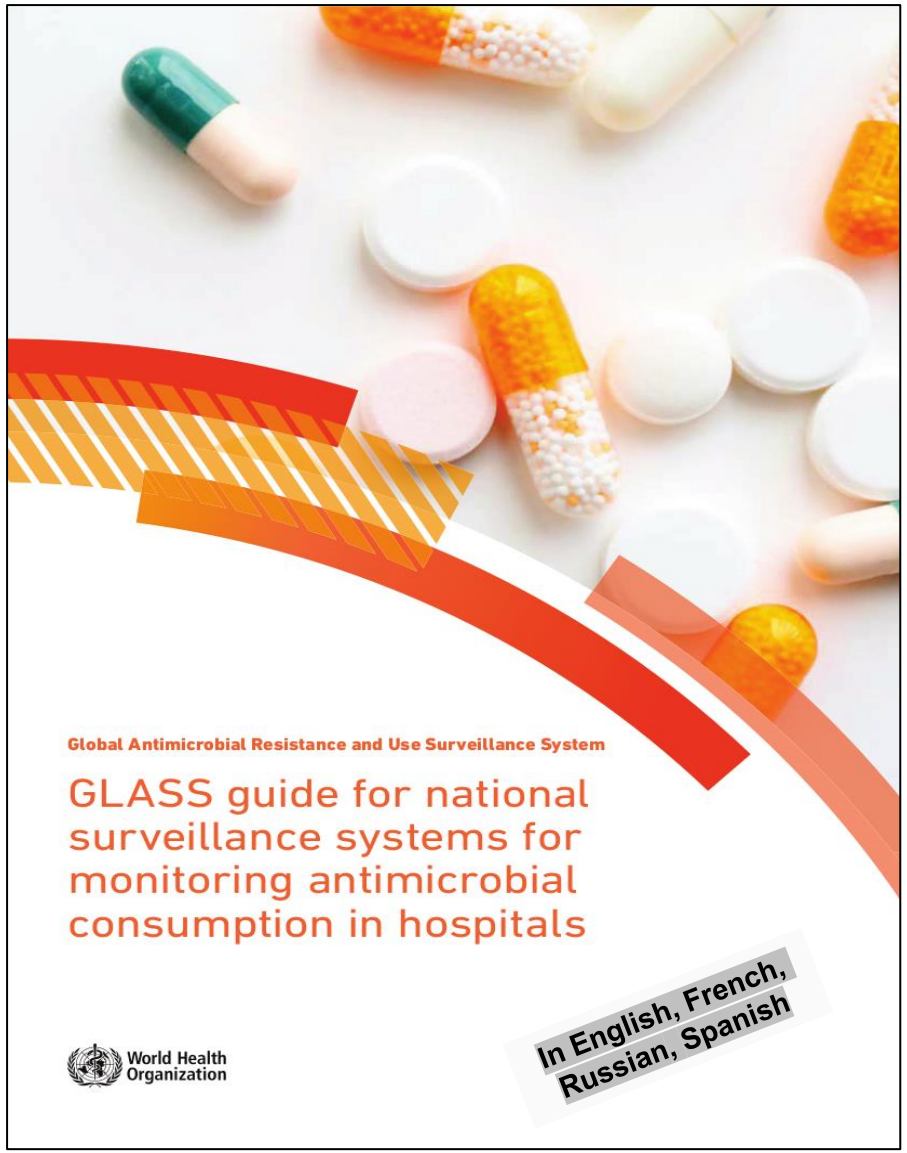
– no details on patients' characteristics and diagnoses

- Procurement data from central pharmacy (AMC for the whole hospital)
- Dispensing data from wards (AMC by specialty)

Good for routine surveillance

Can do comparisons on AMC by hospital over time or between hospitals at same level / same specialties

Can be misleading if substantial % of medicines are obtained outside hospital



https://apps.who.int/iris/bitstream/handle/10665/336182/9789240000421-eng.pdf

2	PRODUCT_I	LABEL	PACK	PACKS	PAED	FORM	RO	STREN	STR	INBA	INBA	ATC5	SA
12	J01B SIM	Chloramphenicol 250mg	100	PCS		CAP	O	250	MG			J01BA01	
13	J01B REG	Chlorocide 125 mg/5ml, 100 mL	100	ML	YES	PWD/SUSP	O	125	MG	5	ML	J01BA01	
14	J01B ELY	Elycetin 250 mg	100	PCS		CAP	O	250	MG			J01BA01	
15	TZ 16 H 0015	Phenicol - 250mg	100	PCS		CAP	O	250	MG			J01BA01	
16	01H MEP	Ampicillin 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
17	J01H KOP	Ampik 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
18	TZ 15 H 0318	AMPILIN 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
19	TZ 15 H 0319	AMPILIN DRY 125 mg/5ml, 100 mL	100	ML	YES	SUSP	O	125	MG	5	ML	J01CA01	
20	TZ 14 H 0214	Ampimax - 500 mg	1	PCS		PWD/NJ	P	500	MG			J01CA01	
21	J01H AST	Ascillin 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
22	J01H LAA	Lacillin 125 mg/5ml, 100 mL	100	ML	YES	SUSP	O	125	MG	5	ML	J01CA01	
23	TAN 00,1870 J01H LAA	Lacillin 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
24	J01H MIL	Milcillin 125 mg/5ml, 100 mL	100	ML	YES	SUSP	O	125	MG	5	ML	J01CA01	
25	J01H SPA	Spamcil 125 mg/5ml, 100 mL	100	ML	YES	SUSP	O	125	MG	5	ML	J01CA01	
26	TZ14H083	Spamcil Capsules 250 mg	100	PCS		CAP	O	250	MG			J01CA01	
27	TZ 14 H 0295	Alphamox 125mg/5ml	100	ML	YES	PWD/SUSP	O	125	MG	5	ML	J01CA04	

National and Hospital AMC: same approach

The WHO methodology for surveillance of AMC at hospital level **follows the same principles** as the surveillance at national level:

- Be part of a national program for surveillance of AMC
- Same standardized methodology for calculation and same metrics (ATC/DDD)
- Same approach: data collection ⇨ validation ⇨ analysis ⇨ reporting

But adapted to the context of hospitals

Elements for facility AMC surveillance

- The structure and functions of facility AMC surveillance depends on:
  - the surveillance scope,
  - the availability of the data,
  - the participation in a national surveillance system

Organisational level

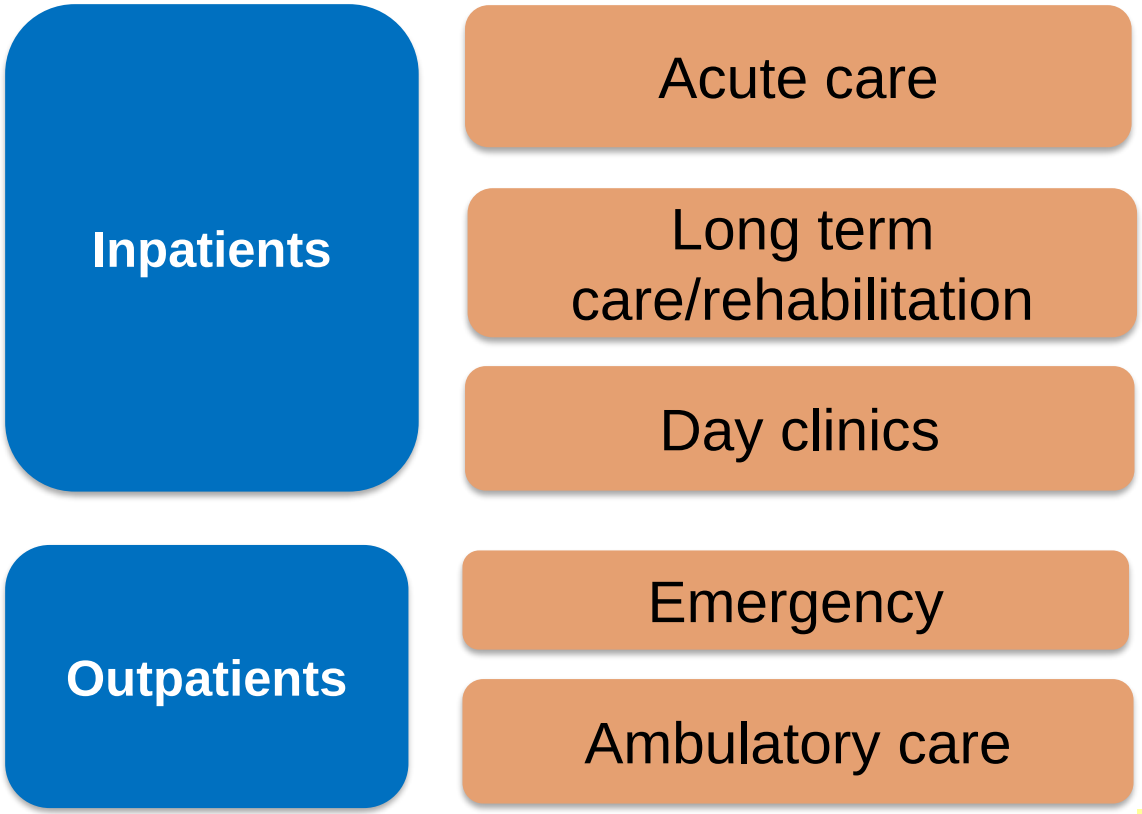
Time intervals of data collection and analysis

Hospital sector

Antimicrobial groups

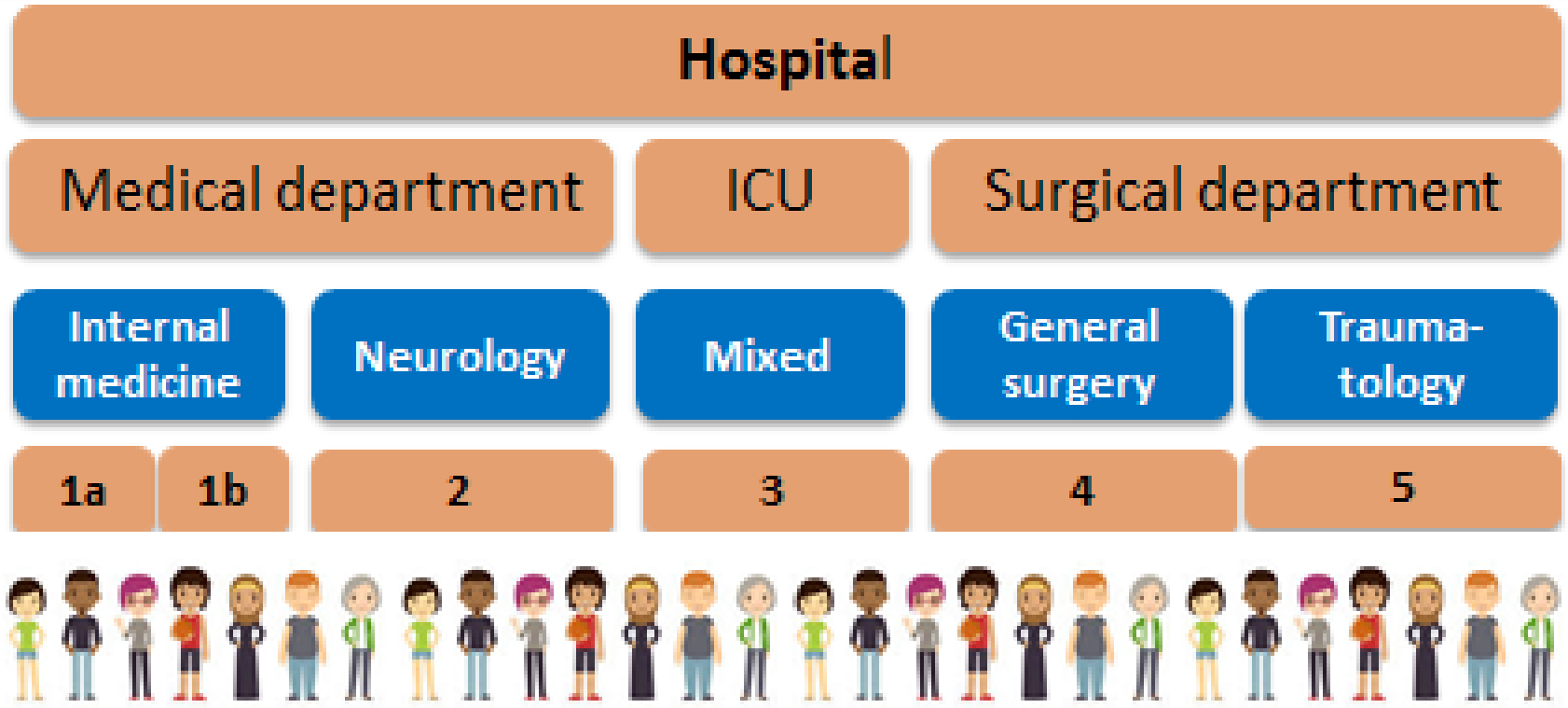
Hospital organisational sectors for monitoring

Aim - monitor AMC of the whole hospital (inpatients) including all relevant departments



Q: Can you separate inpatient and outpatient records in your faciility?

Hospital organisational levels for monitoring



Level of details

Data coverage

Complexity for data collection

semi-annual
semi-annual

Frequency for data collection

Frequency and time intervals of data collection and analysis

Data can be aggregated**:**

- Monthly
- Quarterly
- Semi-annually
- Annually

Minimum standard:
The surveillance should be performed **at least once a year**.

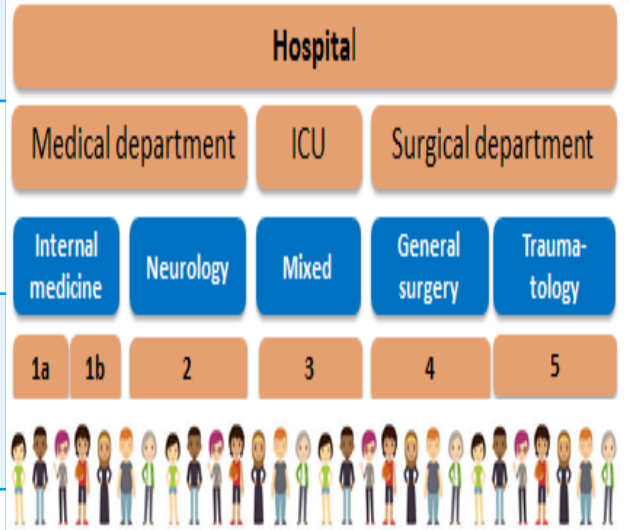
In order to validate the effect of intervention measures or for other antibiotic stewardship purposes it can be meaningful to gather and analyse data in **shorter time intervals** e.g. quarterly or monthly.

Antimicrobial groups under surveillance

Antimicrobial group	ATC-Code
Antibacterials for systemic use	J01
Antimycotics for systemic use	J02
Antimycobacterials	J04
Antivirals for systemic use	J05
Intestinal antiinfectives	A07A
Antifungals for systemic use	D01B
Nitroimidazol derivatives	P01AB
Antimalarials	P01B

Sources for consumption data

Source of consumption data	Description
Purchase data	Procurement data of the hospital administration/hospital pharmacy
Unit-based dispensing data	Dispensing data to wards/departments by the pharmacy
Patient-based dispensing/billing data	Dispensing data or purchase data of antimicrobials to individual patients
Prescription data	Data on the prescription of antimicrobials (e.g. electronic data records)



Hospital activity indicators

- Patient days
- Occupied bed days
- Admissions /discharges

Recommended standard indicators for measuring hospital activity

If not available, other indicators can be used

- bed days
- days present
- billing days

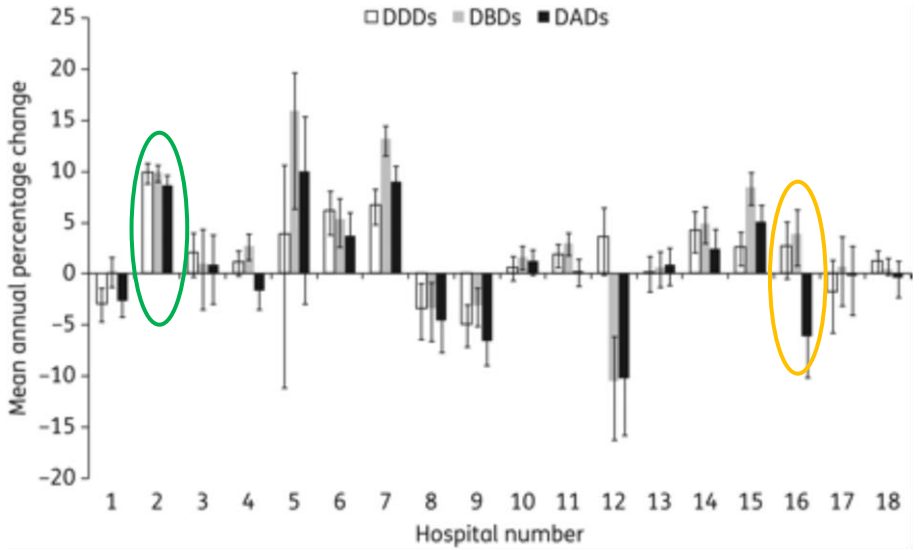
Q: What hospital activity indicators can you obtain?

Considerations

- Data availability and ease of data acquisition
- Specifications provided by a national or supranational surveillance system
- The indicators used by other hospitals or surveillance systems – possibility for comparison

Metrics for reporting AMC at hospital level

- **ATC/DDD-System**
- **Hospital activity indicators**
  Consumption volume (DDD) has to be adjusted by measures representing hospital activity during the period of surveillance.
  It is recommended to use 2 complementing activity indicators to facilitate interpretation of the data.
- **Metrics**
  - Number of DDD
  - Number of DDD per 100 admissions
  - Number of DDD per 100 patients days
  - Number of DDD per 100 beds
  - Number of DDD per 100 bed days



Main types of analysis at hospital level

- Assessment of the actual situation (total antimicrobials, subgroups, substances)
- Analysis og AWaRe categories, pharmacological subgroups, oral/parenteral forms etc.
- Assessment of trends in antimicrobial consumption over time
- Comparison between different units within the hospital
- Comparison between different hospitals (benchmarking)

National programme for monitoring AMC at hospital level

Same principles as for monitoring AMC at national level

- National center responsible for the programme under the responsibility of the Ministry of Health

Specific points for hospitals:

- Challenge: support individual hospitals for data collection and reporting (lack of expertise in facilities)
- Challenge: consider if hospital records can be separate for inpatients and outpatients
- Build up the hospital network
  - Nationwide coverage – participation of all hospitals
  - Sample of hospitals
    - Definition of the samples (random, convenient…)
    - Inclusion of additional hospitals over the years

    ↳ Need to define a strategy how to build up a hospital network

Surveillance of hospital AMC - Norway

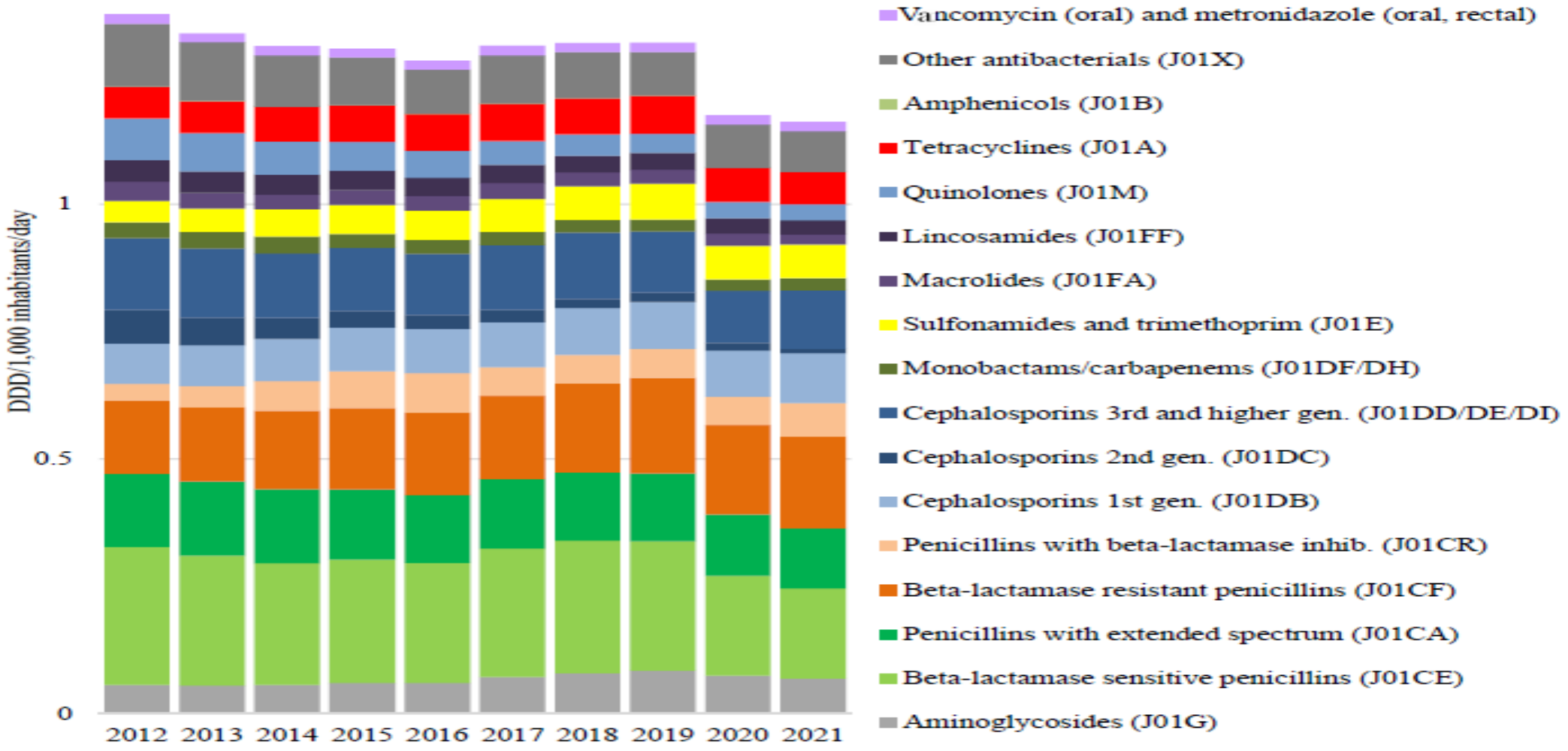


FIGURE 25. Proportions of antibacterial agents for systemic use (J01), vancomycin (A07AA09), and metronidazole (P01AB01) in Norwegian hospitals 2012-2021, measured in DDD/1,000 inhabitants/day.

Surveillance of hospital AMC - Norway

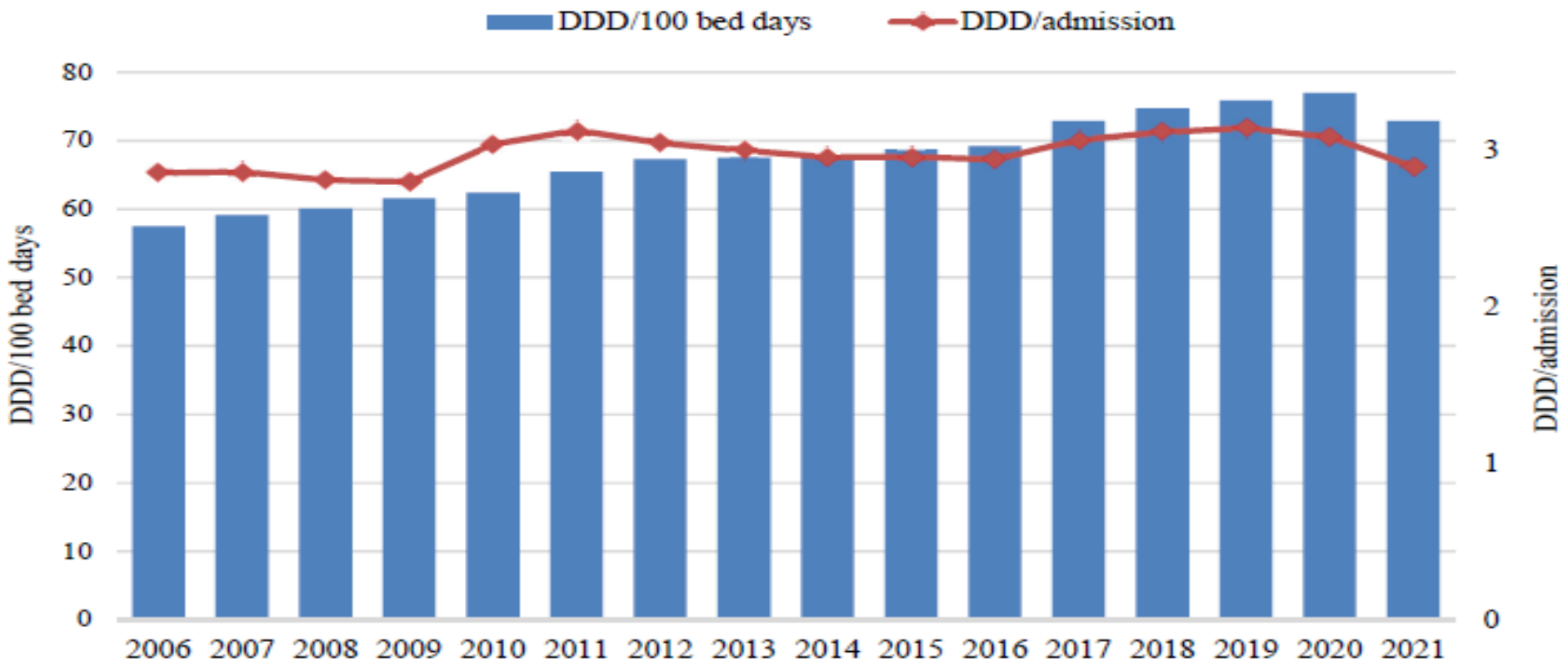


FIGURE 28. Total use of antibiotics in Norwegian hospital (somatic) 2006-2021, measured in DDD/100 bed days (blue bars) and DDD/admission (red line). Antibiotics are defined as J01 antibacterials for systemic use, A07AA09 vancomycin (oral), A07AA12 fidaxomycin and P01AB01 metronidazole (oral and rectal).

Surveillance of hospital AMC - Norway

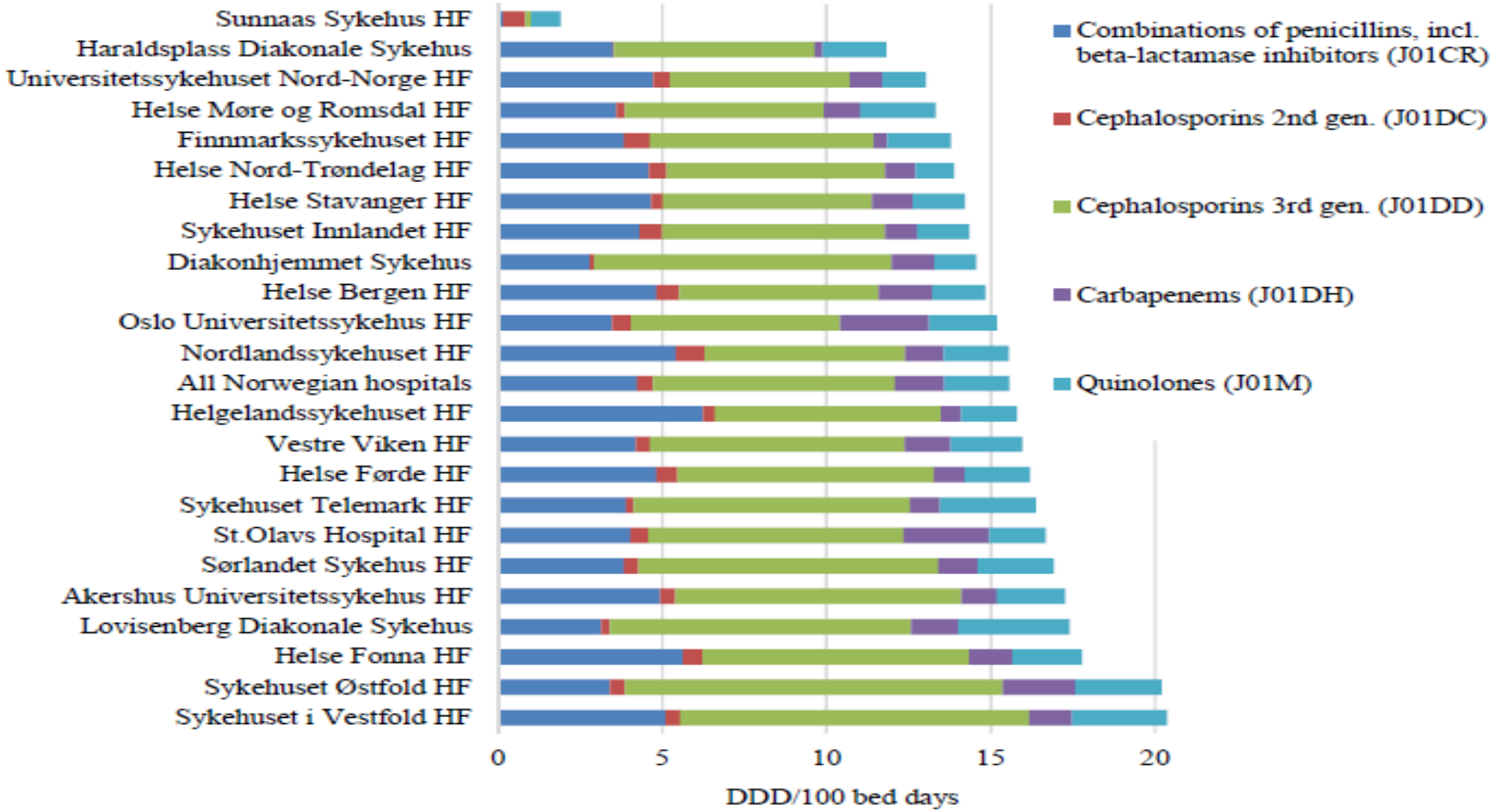


FIGURE 32. Consumption of selected antibacterial agents for systemic use (belonging to ATC groups J01CR, J01DC, J01DD, J01DH and J01M) in Norway, presented per hospital/health trust, in 2021, measured in DDD/100 bed days. All hospitals, except one (Sunnaas Sykehus) are acute care hospitals.

Surveillance of hospital AMC - Norway

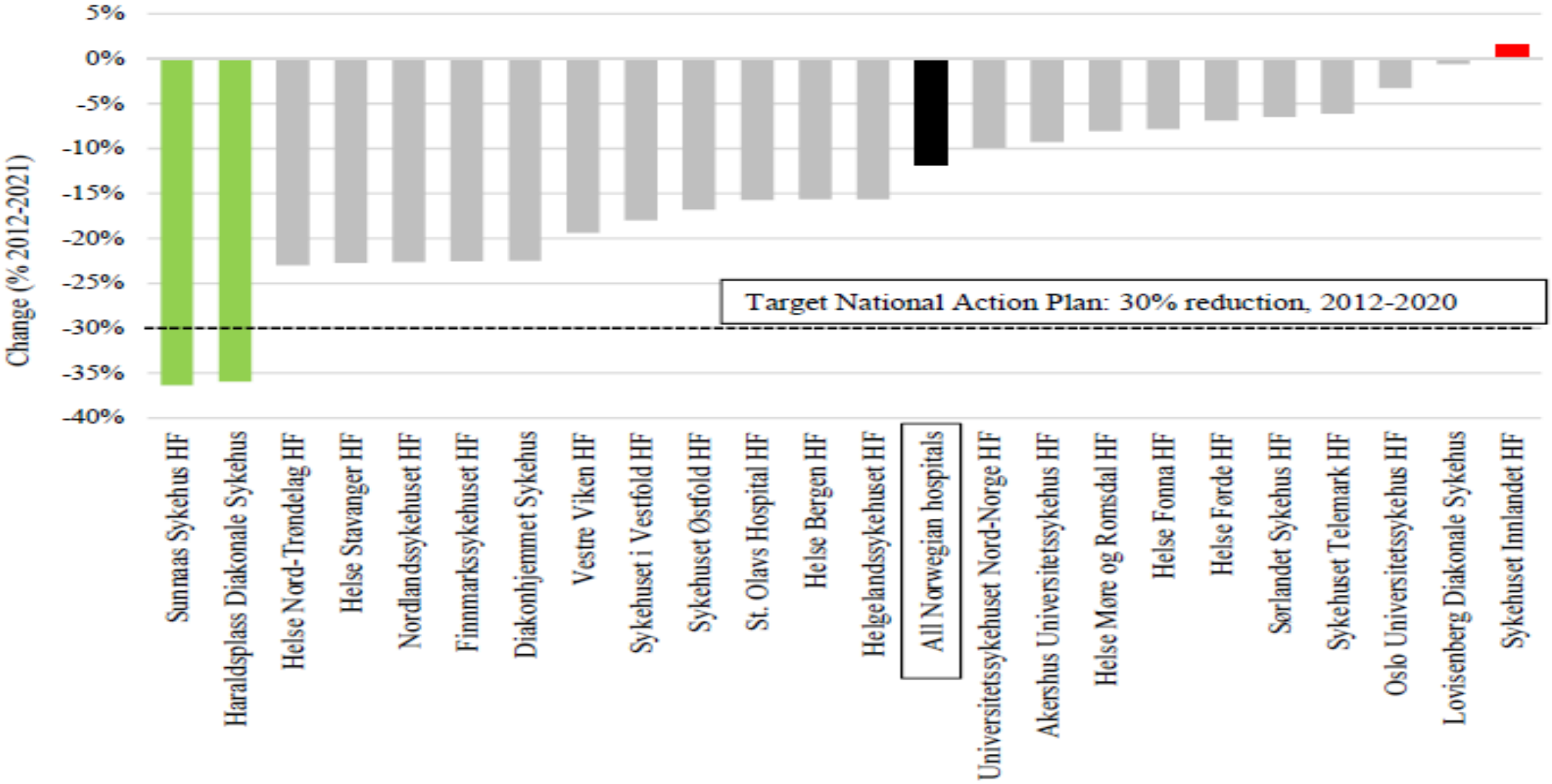
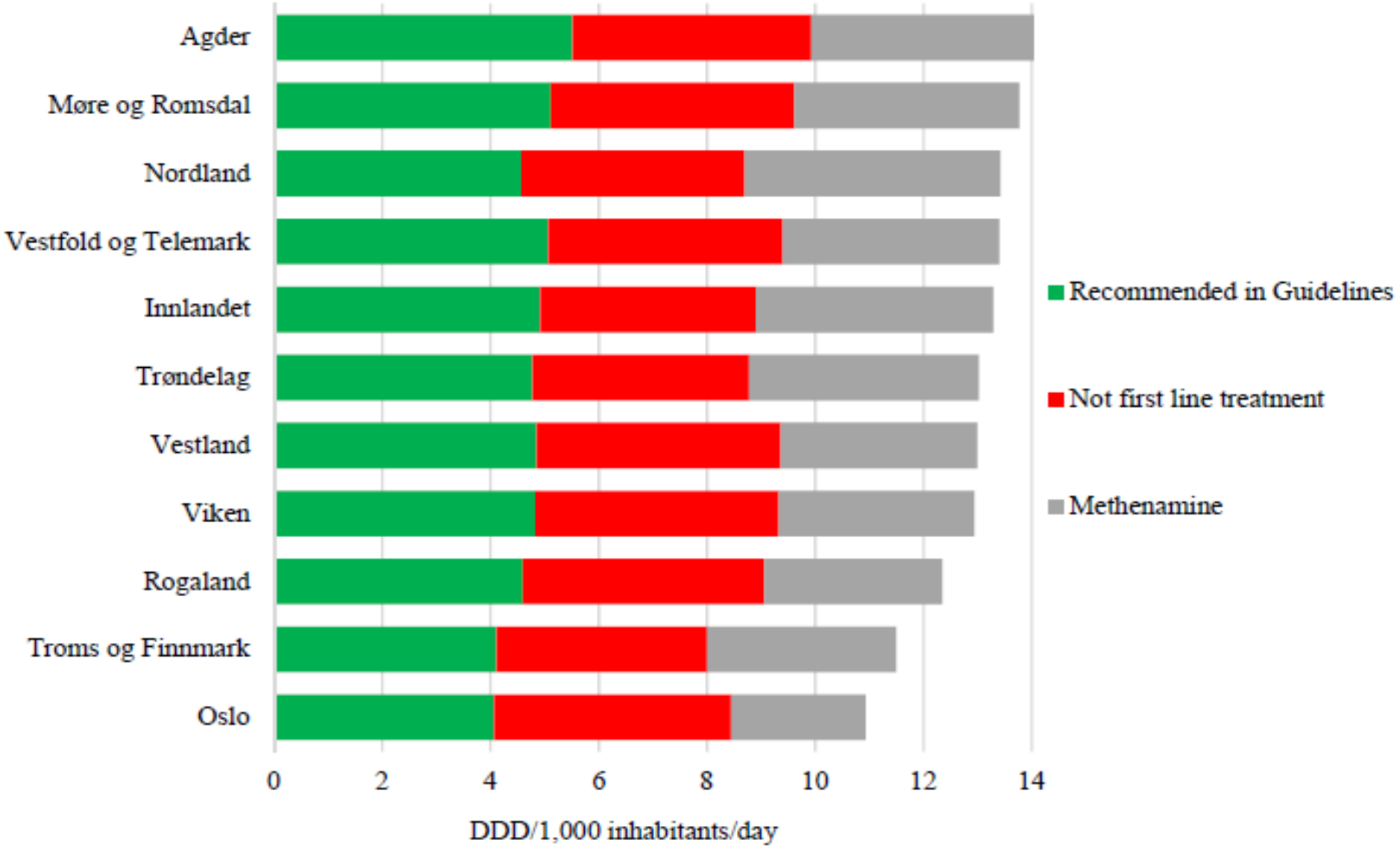


FIGURE 37. Change in consumption of selected antibacterials for systemic use (belonging to ATC groups J01CR, J01DC, J01DD, J01DH and J01M) in Norway, 2012-2021. The data are presented per hospital/health trust as measured in DDD/100 bed days.

Surveillance of hospital AMC - Norway



World Health Organization

Thank you for your attention!

contact: glass-amc@who.int

PREVENTING ANTIMICROBIAL RESISTANCE TOGETHER

Antibiotics
Antivirals
Antifungals
Antiparasitics