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ESAC European Surveillance of Antimicrobial Consumption

REPORT ON POINT PREVALENCE SURVEY OF ANTIMICROBIAL PRESCRIPTION IN EUROPEAN NURSING HOMES, November 2009

ESAC-3: Nursing Home Subproject Group

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and the ESAC management team

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EUROPEAN SURVEILLANCE OF ANTIMICROBIAL CONSUMPTION (ESAC)

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NOVEMBER 2009

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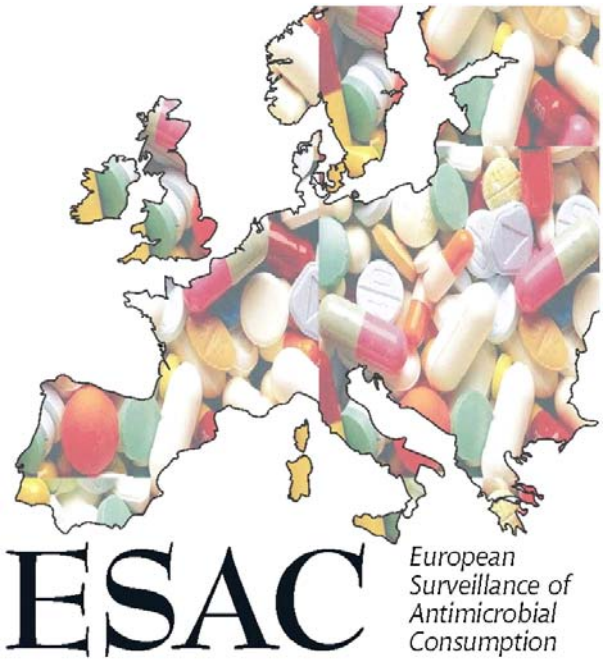

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LIST OF ABBREVIATIONS

In text

AB	Antibiotic
ATC	Anatomical Therapeutic Chemical classification system
BSI/SEP	Bloodstream infection/septicaemie
CI (95% CI)	Confidence interval
ER	Eligible residents
ESAC	European Surveillance of Antimicrobial Consumption
GII	Gastro-intestinal infection
GP	General practitioner
HALT	Healthcare Associated Infections in European Long-Term Care Facilities
IPSE	Improving Patient Safety in Europe
NH	Nursing home
OR	Odd ratio
PPS	Point prevalence survey
RTI	Respiratory tract infection
SSI	Surgical site infection
UTI	Urinary tract infection

Countries in tables

BE	Belgium
BG	Bulgaria
CZ	Czech Republic
DE	Germany
DK	Denmark
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LV	Latvia
LT	Lithuania
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
RU	Russian Federation
SI	Slovenia
SW	Sweden
UK EN	United Kingdom England
UK N-IE	United Kingdom Northern Ireland

INTRODUCTION

The European Surveillance of Antimicrobial Consumption (ESAC) Nursing Home (NH) sub-project aims to collect data on antimicrobial use and determinants for antibiotic (AB) use in long-term care facilities in European countries.

The most important goal of the ESAC NH sub-project was to create a European network of NHs regarding antimicrobial consumption in order to actively engage NHs to consider (determinants of) AB use within their institutions. Furthermore, aims were to create a standardized methodology for measuring AB use in NHs and to describe the determinants, on both institutional and resident level, of AB prescriptions in NHs.
It is important to stress that the aim of the project was neither to collect representative data for a country nor to perform benchmarking between countries.

In 2007 a pilot point prevalence survey (PPS) was performed. Subsequently, in 2008 a general questionnaire on national characteristics of nursing home (NH) care was send to participating national representatives. Based on these results it was possible to obtain a global image of what NH care encompasses in a country. The results clearly demonstrated wide heterogeneity between European countries with respect to NH care *(1)*. The first PPS measuring AB use was performed in April 2009. A total of 304 NHs from 20 countries participated. The results gave a first insight into the magnitude of AB consumption and into determinants of antimicrobial prescription. Also, the wide variation between European NHs was corroborated *(2)*.

In order to explore seasonal variations, a second PPS was performed in November 2009. The results of this second PPS are presented in this report.

METHODS

National representatives of European countries were invited to select 'high skilled NHs' to participate on voluntary basis in the PPS. High skilled NHs (definition by IPSE work group 7) are institutions where elderly stay temporarily or permanently and where various types of residents are treated. Furthermore, the residents within these institutions are in need of constant supervision (24/24h) and high skilled nursing care (which goes beyond basic nursing care and assistance with activities of daily living) but they are not in need of invasive medical procedures or constant specialized medical care since they are medically stable. Lastly, a qualified nursing staff is mostly available during 24 hours.
Institutions offering specialized care or residential care and hospital wards offering long term care were excluded from participation.

Participating countries had to include at least 5 NHs and at least 250 eligible residents in or they had to recruit a randomly selected representative (either national or regional) sample of NHs. However, countries that did not meet these criteria were not excluded since the main goal of the ESAC NH sub-project was to initiate activity in a European network and since benchmarking was not an aim of the study.
Countries that collected data during the first PPS in April 2009 were requested to include the same NHs in the PPS of November 2009.

The data collection was performed by either an internal, a person working in the NH, or an external surveyor. The data had to be collected on one single day between the 1st and 30th of November, chosen by the NH or by the surveyor.
Data were transferred by means of optical readable forms or through web-based forms (developed by the ESAC IT Team at the University of Antwerp) to the Institute of Public Health in Brussels for analysis.
The study documents and tools were approved by an ethical committee. Furthermore, for both PPSs eligible residents or their proxy had to complete a written consent form for inclusion in the study.

An institutional questionnaire as well as resident questionnaires had to be completed. In order to support the collection of aggregated denominator data a ward list was distributed.
The institutional questionnaire contained questions with respect to:

- General NH data: e.g. information on ownership and total number of beds within the facility
- Denominator data: characteristics of all eligible residents (i.e. residents living 24/24h in the NHs who were present at 8 a.m. on the day of the survey and who were present since at least 24 hours), for instance the number of residents with a urinary catheter and/or suffering from impaired mobility
- Medical care and coordination: information on organization of medical and nursing care, e.g. who the main care giver was
- Infection control practices: information on the organization concerning infection control, e.g. the presence of certain protocols
- Antibiotic policy: information on the organization of AB policy, e.g. who the main prescriber of ABs within the facility was.

Since the results for 'medical care and coordination', 'infection control practices' and 'AB policy' showed great overlap with the 1st PPS and since these results were already extensively discussed in the report of the 1st PPS *(2)* it was decided not to include results on these topics in the current report.
A resident questionnaire had to be completed for each resident using a systemic antimicrobial treatment on the day of the PPS. The resident questionnaire contained questions on:

- Resident data: demographic data like gender, age and data on for example the presence of a wound and/or disorientation

- Antibiotic treatment data: data of the AB prescription including the name of the drug and the administration route
- Isolated microorganisms (optional)

Appendix 1 contains the study tools, the resident and institutional questionnaire, for the PPS of November 2009.

The institutional questionnaire from the 1st PPS remained the same as for the 2nd PPS. In the resident questionnaire a question was added with regard to recent surgery. The list of possible indications was adjusted by changing 'abdominal infection/peritonitis' into 'gastro-intestinal infection' and by adding a category for empirical and documented treatment of skin or wound (other than surgical wounds) infections. Also, a question was added with respect to dipstick tests for urinary tract infections. With respect to microorganisms, several microorganisms with specific AB resistances were added to the list of microorganisms.

Only antibacterials, antimycotics and tuberculostatics for systemic use were included. Locally administered antimicrobials, including nasal application of mupirocin, as opposed to the 1st PPS, were excluded. In addition, antivirals for systemic use were excluded. However, because of the attention for the pandemic flu in November 2009, an exception was made regarding inclusion of two antivirals i.e. oseltamivir and zanamivir.

Results were analysed by means of Stata 10.0 (Stata Corp, College Station, Texas).
Prevalences of AB use, risk factors, care load indicators and types of antimicrobials were calculated per 100 eligible residents. First, analysis was performed on the level of the institution. Global overall results are based upon the results per NH. For the sake of presenting the data, results were also considered on national level. However, the results are not representative for a country or for European NHs.

Also, a comparison was made between data from the 1st and 2nd PPS. The aim of this comparison was to observe evolution in general, on national level and on institutional level. In order to perform a fair comparison only NHs that participated in both PPSs were included in this comparison. Countries and/or NHs participating in only the 1st or only in the 2nd PPS were excluded for comparison. Variables that were changed or added in the 2nd PPS were also excluded from the comparing analysis.

RESULTS

This chapter contains the results of the 2nd PPS. General results and remarkable results on country level are presented. Results are presented in more detail in Appendix 2. Appendix 3 summarizes the most important results for each country separately.

1. Participating countries

During the second ESAC NH PPS, a total of 22 countries participated, more specifically: Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, the Russian Federation, Slovenia, Sweden and two countries from the United Kingdom (UK): England and Northern Ireland.
Bulgaria, Hungary, Lithuania, the Netherlands and the Russian Federation participated with less than the five required NHs. Furthermore, Bulgaria and UK England did not meet the requirement of including at least 250 eligible residents per country. However, data from these countries were included since the aim of the study was neither to give a representative image of a country nor to compare countries but to describe European NHs.

2. Participating nursing homes

A total of 266 NHs representing 30641 NH beds participated in the 2nd ESAC NH PPS. The number of participants varied between 2 and 103 NHs per country and the amount of beds per country ranged from 47 to 11527 beds. Specific information on the number of NHs and beds per country is depicted in Table A1 in Appendix 2.

Nursing home size

Overall, the mean size of a NH (*n*=266) was 115.2 (median 90.0, range: 17-650) [95%CI: 113.9-116.5]. On average, NHs in Bulgaria, Denmark, Malta, Sweden, UK England and UK Northern Ireland were (relatively) small, with a mean of less than 70 beds per NH, while NHs in Croatia, Finland, Latvia, Lithuania, the Netherlands, Poland, the Russian Federation and Slovenia were large with a mean of more than 150 beds. The various NH sizes are shown in Figure 1 and in Appendix 2 Table A2.
Small NHs (considering only NH with less than 50 beds) comprise 17.3% of all NHs and the large NHs (>150 beds) comprise 21.4% of all participating NHs (Figure 2).

Figure 1 NH size (number of available beds) per country

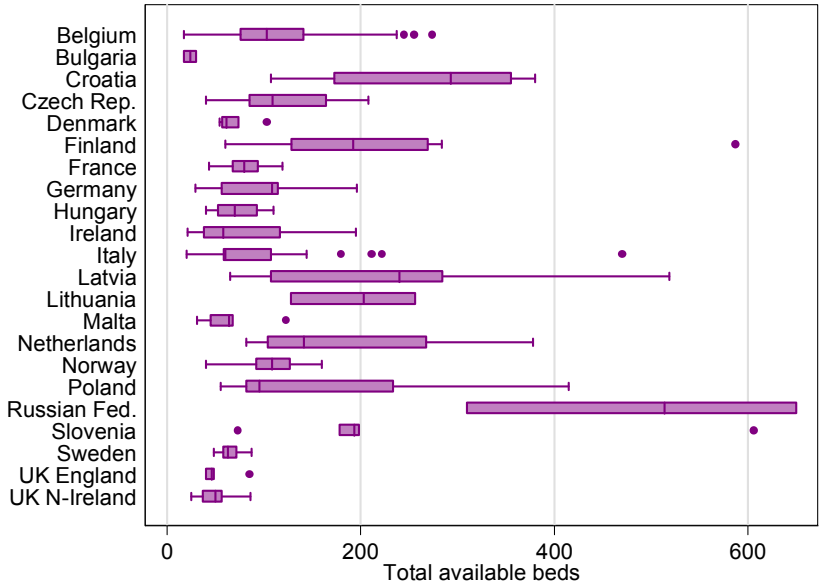
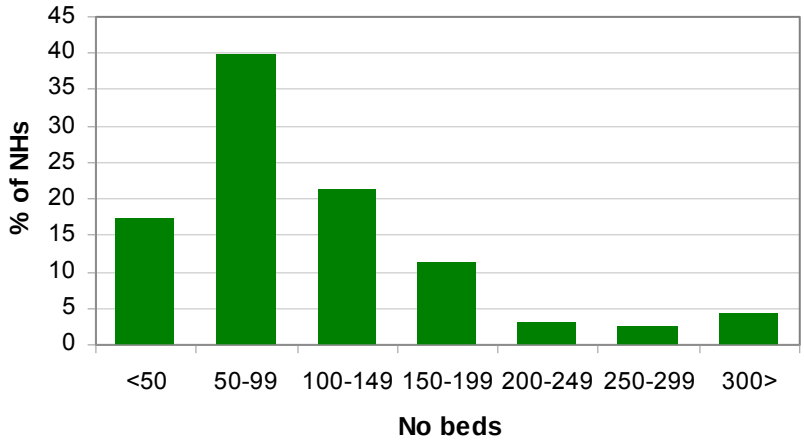


Figure 2 Distribution of NHs by size (bed capacity)



Ownership

Information on ownership was missing for 3 NHs. In Bulgaria, Hungary, UK England and UK Northern Ireland all NHs that participated were privately owned. Participating NHs from Croatia, Denmark, Finland, Ireland, Latvia, Lithuania, Malta, the Netherlands and Poland were all subject to public ownership. In the remaining countries (Belgium, Czech Republic, Germany, France, Italy, Norway, the Russian Federation, Slovenia and Sweden) both types of ownership were seen among the participating NHs. (Appendix 2 Table A3)

Presence of a qualified nurse 24/24h

In 14 of the 22 participating countries a qualified nurse was present 24/24h in all of the participating NHs in that country (n=266). The presence of a qualified nurse 24/24h was seen in the majority of the participating NHs in Belgium (101/103 NHs), Italy (26/28), the Netherlands (3/4) and Poland (6/8) and in only some NHs in Denmark (1/5), France (1/8), Malta (1/5), and Sweden (3/7). (Appendix 2 Table A3)

Bed occupancy

Overall, on average 95.7% (median 97.5%) of the available beds in NHs were occupied on the day of the PPS. The median bed occupancy rate by country ranged from 80.6% to 99.2%. Of the 264 NHs for which bed occupancy was known 43 (16.3%) had a bed occupancy rate of 100%. In contrast, the lowest mean bed occupancy rate of 68.0% was seen in a NH in UK Northern Ireland. The number of occupied beds, and consequently the bed occupancy rate, was unknown for 2 NHs. (Appendix 2 Table A3)

Hospitalization rate

Overall 347 residents were hospitalized on the day of the PPS which corresponds to a mean of 1.3% hospitalized residents (median 1.0%, range between NHs: 0-8.7%) [95%CI: 1.2-1.5%]. The highest median hospitalization rate on country level was found in UK Northern Ireland (2.0%). The number of hospitalized residents was missing for 20 NHs. (Appendix 2 Table A3)

3. Characteristics of the eligible nursing home population

On the day of the PPS in total there were 28569 eligible residents (n=265 NHs). The eligible residents comprised 95.9% of all occupied beds on average (median 100%, range on NH-level: 25.7-100%) [95%CI: 94.7-97.1%]. On country level, the lowest median rate of eligible residents on occupied beds was found in UK Northern Ireland (72.2%). All other countries showed median rates of more than 99%. (Appendix 2 Table A4)

The case-mix of residents can vary between institutions. Moreover, the composition of the population of a NH can influence the level of AB consumption. The case-mix is determined, amongst others, by several care load indicators and risk factors.

3.1. Care load indicators among the eligible NH residents

In the PPS three care load indicators were measured among the eligible NH population: incontinence, disorientation and impaired mobility.

Incontinence

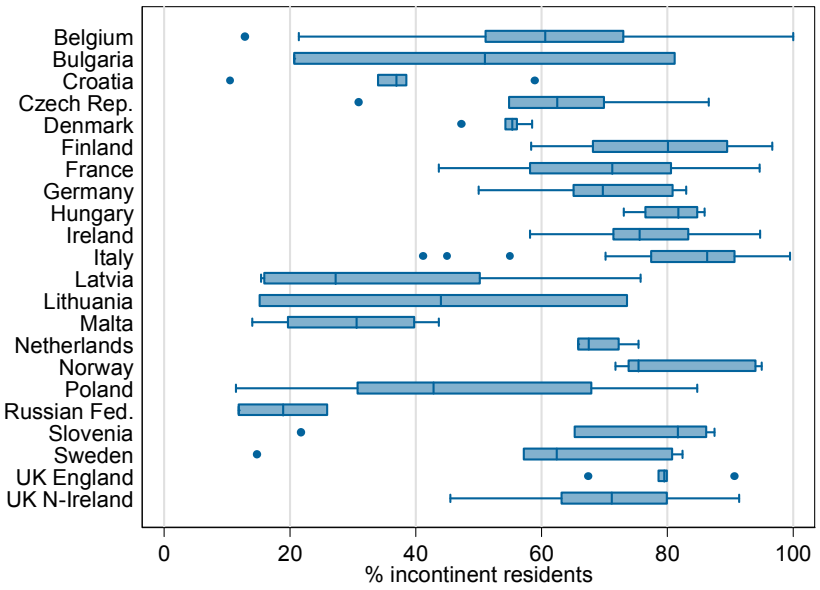
Urinary and/or faecal incontinence were both defined as incontinence. Data on the number of incontinent residents was known for 255 NHs. On average 64.9% of all eligible residents were incontinent (median 67.4%, range on NH level: 10.5-100%) [95%CI: 64.0-65.9%].

The lowest mean prevalence (18.9%) of incontinence was found in the Russian Federation (median 18.9%, range: 11.8-26.0%) [95%CI: 13.4-26.1%]. Furthermore relatively low proportions of incontinent residents were found in Malta (mean 29.7%) [95%CI: 24.6-35.6%], Croatia (mean 35.8%) [95%CI: 30.7-41.4%], Latvia (mean 36.9%) [95%CI: 31.7-42.5%], Lithuania (mean 44.3%) [95%CI: 37.1-52.5%] and Poland (mean 49.1%) [95%CI: 44.0-54.5%].

The highest proportions of incontinent residents were found in Italy (mean 82.0%, median 86.3%) [95%CI: 78.7-85.4%] and in Norway (mean 82.0%, median 75.4%) [95%CI: 74.3-90.3%].

More information regarding prevalence of incontinence, i.e. median values and ranges per country, are shown in Figure 3 and in Appendix 2 Table A5.

Figure 3 Prevalence of incontinence among all eligible residents per country



Disorientation

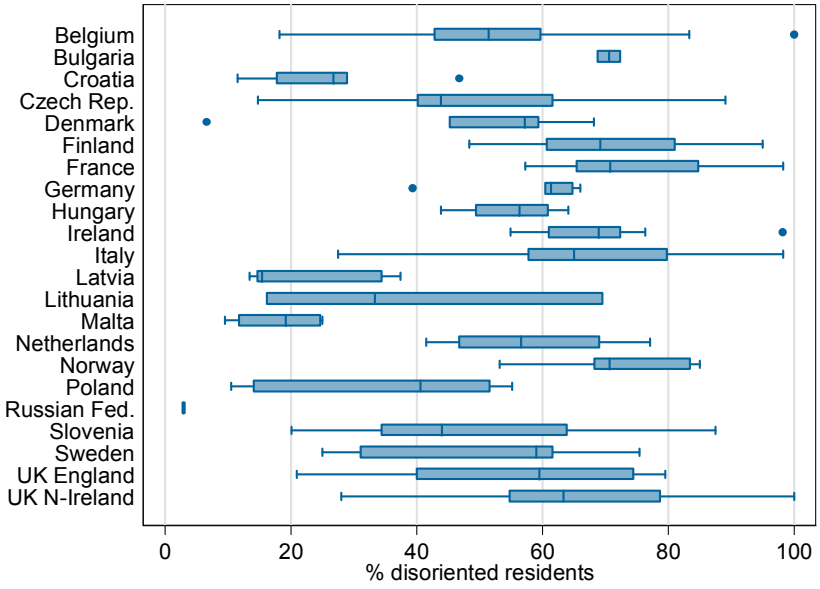
The proportion of eligible residents suffering from disorientation in time and space (*n*=256 NHs) was on average 54.5% (median 56.1%, range on NH level: 2.7-100%) [95%CI: 53.6-55.4%].

In the Russian Federation (2.9%) [95%CI: 1.1-6.5%], Malta (18.2%) [95%CI: 14.3-22.9%], Latvia (23.1%) [95%CI: 19.0-27.6%] and Croatia (26.4%) [95%CI: 22.1-31.3%].

The highest proportions of disoriented residents were seen in Bulgaria (mean 70.6%) [95%CI: 59.3-83.1%], Norway (mean 72.1%) [95%CI: 64.8-79.8%] and France (mean 74.7%) [95%CI: 68.8-80.9%] the mean prevalence of disorientation was relatively low.

Median values and the range per country of the prevalence of disoriented residents are shown in Figure 4 and Appendix 2 Table A5.

Figure 4 Prevalence of disorientation among all eligible residents per country



Impaired mobility

Information on the mobility of residents was known for 254 NHs. A resident being ambulant was defined as a resident who is able to move around with minimal aid. Impaired mobility was defined as being dependent on a wheelchair for movements or being bedridden.

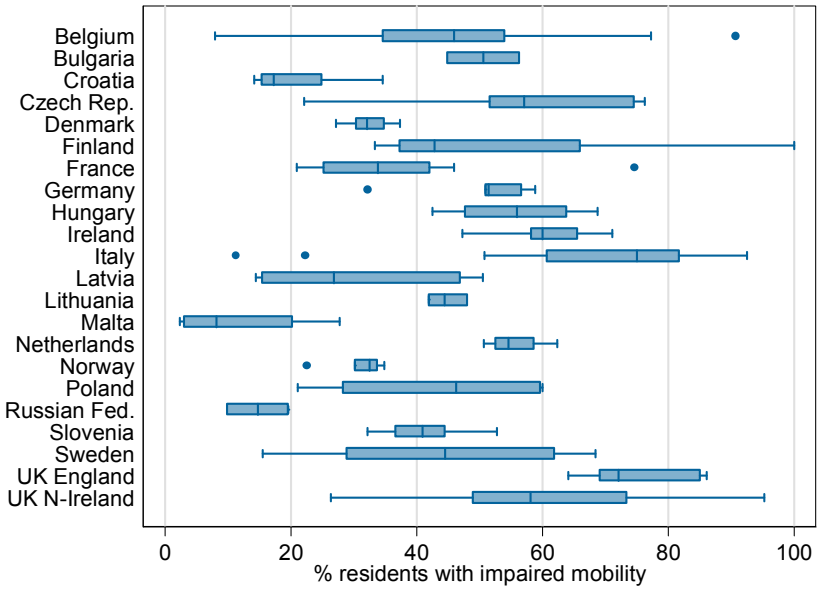
A mean of 48.7% of the eligible residents suffered from impaired mobility (median 50.0%, range on NH level: 2.3-100%) [95%CI: 47.9-49.6%].

The prevalence of impaired mobility was relatively low in Malta (mean 11.6%) [95%CI: 8.4-15.4%], the Russian Federation (mean 14.7%) [95%CI: 9.7-20.8%] and in Croatia (mean 21.2%) [95%CI: 17.4-25.6%].

High mean proportions of impaired mobile residents were found in UK England (75.3%) [95%CI: 67.8-83.2%] and Italy (69.5%) [95%CI: 66.4-72.7%].

Specific information with respect to median values and the range on country level are shown in Figure 5 and Appendix 2 Table A5.

Figure 5 Prevalence of impaired mobility among all eligible residents per country



Classification of NHs based on care load indicators

In order to have an indication of the case-mix in the participating NHs countries were divided in categories. For each care load indicator the overall median value was used as reference point. The median prevalence of incontinence, disorientation and impaired mobility of each country was compared to this reference median value. Then, for each care load indicator it was determined whether the country either fell below or above this median.

Table 1 depicts the result of this comparison to reference values. The median values for Belgium, Croatia, Czech Republic, Latvia, Lithuania, Malta, Poland and the Russian Federation were lower than the overall median value for all care load indicators and were therefore considered to have a low care load. In contrast, the median values for Germany, Hungary, Ireland, Italy, the Netherlands, UK England and UK Northern Ireland were higher than the overall median value for all care load indicators and the NHs in these countries were therefore considered to offer care with high care load in the participating NHs.

Table 1 gives and overview of this classification according tot care load indicators.

Table 1 Classification of NHs per country by care load indicators			
Country (n NHs)	**Incontinence**	**Disorientation**	**Impaired mobility**
Belgium (103)	-	-	-
Croatia (5)	-	-	-
Czech Rep. (6)	-	-	-
Latvia (5)	-	-	-
Lithuania (3)	-	-	-
Malta (5)	-	-	-
Poland (8)	-	-	-
Russian Fed. (3)	-	-	-
Denmark (5)	-	+	-
Slovenia (6)	+	-	-
Sweden (7)	-	+	-
Bulgaria (2)	-	+	+
Finland (8)	+	+	-
France (8)	+	+	-
Norway (5)	+	+	-
Germany (5)	+	+	+
Hungary (4)	+	+	+
Ireland (11)	+	+	+
Italy (28)	+	+	+
Netherlands (4)	+	+	+
UK England (5)	+	+	+
UK N-Ireland (30)	+	+	+
-: value below overall median	+: value above overall median		

Importantly, Table 1 is only representative for the NHs included in this PPS and not for the care load level of these countries in general.

3.2. Risk factors among the eligible NH residents

The presence of a urinary catheter, vascular catheter or a wound are considered as risk factors for infection and are therefore likely to be related to antimicrobial consumption.

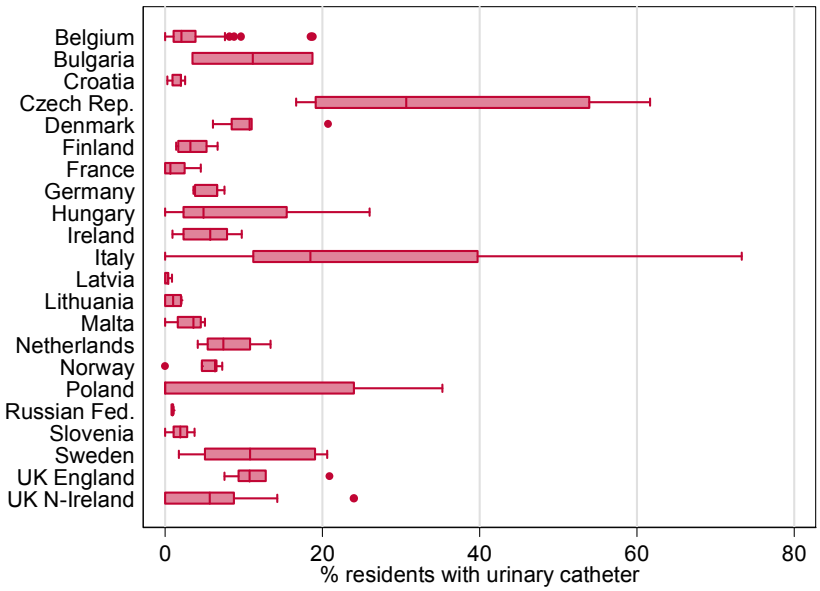
Urinary catheter

Among all eligible residents (n=257 NHs) a mean of 7.5% had a urinary catheter (median 3.2%, range on NH level: 0-73.3%) [95%CI: 7.2-7.8%].

Low mean proportions of residents with a urinary catheter were found in Latvia (0.3%) [95%CI: 0.05-1.4%] and the Russian Federation (0.9%) [95%CI: 0.1-3.6%], whereas the highest mean proportions were seen in Italy (26.1%) [95%CI: 24.2-28.0%] and Czech Republic (35.5%) [95%CI: 30.9-40.6%].

Median values and the range per country are shown in Figure 6 and Appendix 2 Table A6.

Figure 6 Prevalence of urinary catheters among all eligible residents per country



Vascular catheter

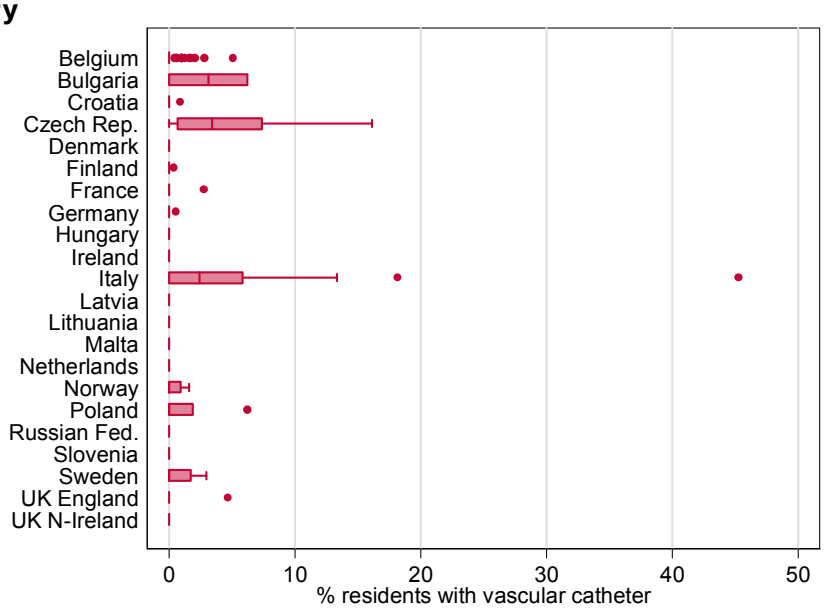
Overall, a mean of 0.9% of all eligible residents had a vascular catheter (median 0.0%, range on NH level: 0-45.2%) [95%CI: 0.8-1.0%].

Nineteen countries had a median prevalence of 0.0%. Furthermore, half of the participating countries had a mean proportion of 0.0% and hence no use of vascular catheters at all.

The highest proportions of vascular catheter use were found in Bulgaria (mean 3.1%) [95%CI: 1.1-6.5%], Czech Republic (mean 5.2%) [95%CI: 3.5- 7.3%] and Italy (mean 5.5%) [95%CI: 4.6-6.4%]. The number of residents with a vascular catheter was missing for 11 NHs.

Figure 7 and Appendix 2 Table A6 depict median values and ranges on country level regarding the prevalence of vascular catheters.

Figure 7 Prevalence of vascular catheters among all eligible residents per country



Wounds

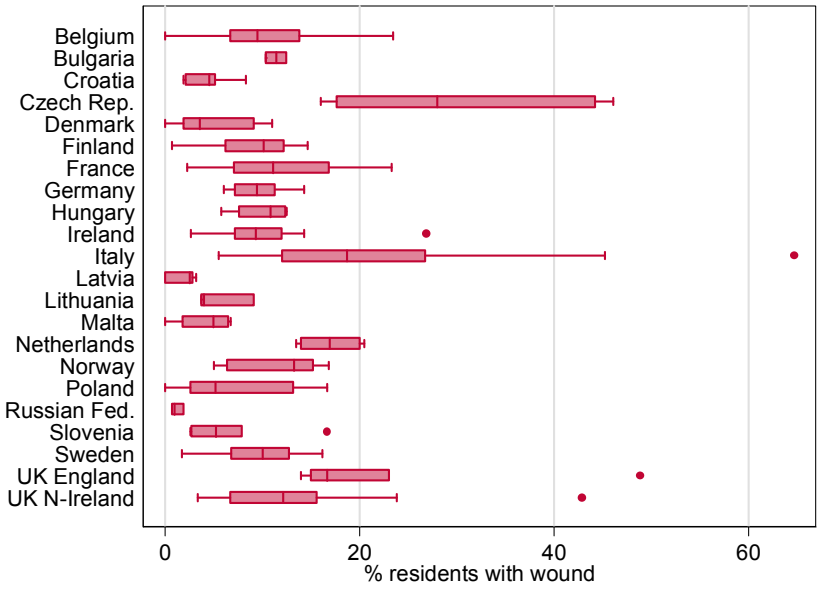
Information on the number of residents with a wound was known for 257 NHs. A percentage of 11.8% of all eligible residents on average had a wound (median 10.0%, range on NH level: 0-64.7%) [95%CI: 11.4-12.3%].

Low proportions of residents with a wound were seen in the Russian Federation (mean 1.2%) [95%CI: 0.4-3.4%] and Latvia (mean 1.7%) [95%CI: 0.7-3.2%].

Higher mean proportions of eligible residents with a wound were found in Italy (21.9%) [95%CI: 20.2-23.7%], UK England (23.5%) [95%CI: 19.5-28.3%] and Czech Republic (30.0%) [95%CI: 25.8-34.7%].

The median values and the ranges on country level are depicted in Figure 8 and Appendix 2 Table A6.

Figure 8 Prevalence of wounds among all eligible residents per country



4. Prevalence of antimicrobial consumption and characteristics of antibiotic users

In the participating NHs (*n*=266) there were 1435 residents that consumed one or more antimicrobials. These residents used in total 1486 antimicrobial treatments.

4.1. Gender and age, care load indicators and risk factors among antibiotic users

Information on several characteristics of AB users was collected in the 2nd PPS.

Gender and age

Data on gender were known for 1427 residents. Overall, 73.2% of the AB users were female. The lowest proportions of females were found in Latvia (50.0%) and Czech Republic (51.9%) and the highest proportions in Finland (82.0%), Norway (83.3%) and Bulgaria (100%).

The overall mean age of residents using antimicrobials (*n*=1404) was 83.0 years (median 84.0, range on NH level: 31-106) [95%CI: 82.5-83.5]. The on average youngest AB using residents were found in Lithuania (69.6) and Latvia (71.6) and the oldest in Norway (86.6).

The male AB users (*n*=371) had a mean age of 79.0 (median 81.0, range: 31-99) while the female AB using residents were on average 84.4 years old (median 86.0, range: 32-106).

Detailed information on median age and proportion of females per country are shown in Appendix 2 Table A7.

Length of NH stay

Data on length of stay (either shorter than one year or one year or more) were known for 1422 residents. Of all residents consuming an antimicrobial 30.9% was institutionalized for less than one year in the NH. All of the AB using residents of the participating NHs in Czech Republic were admitted in the NH less than one year. In contrast, in the Russian Federation 92.3% of the AB users was admitted since one year or longer in the NH. (Appendix 2 Table A7)

Recent hospital admission and surgery

An average of 21.0% of AB users was admitted to a hospital in the past 3 months (n=1413). Low proportions (or absence) of hospitalized residents were observed in Malta (0%), the Netherlands (3.6%), Denmark (4.6%) and the Russian Federation (7.7%), whereas high proportions of hospitalization among AB users were seen in Sweden (40.9%), UK England (53.9%) and the Czech Republic (85.2%).

Data on recent surgery, i.e. during the past 30 days, were known for 1304 residents. Overall, 3.2% of the AB using residents had undergone a recent surgery. None of the AB users had recent surgery in Bulgaria, Croatia, Denmark, Hungary and Poland. The highest proportions of residents recently undergoing surgery were observed in Latvia (16.7%) and Lithuania (20.0%). (Appendix 2 Table A7)

Care load indicators: incontinence, disorientation and impaired mobility

Regarding incontinence, disorientation and impaired mobility data were known for 1422, 1417 and 1397 AB using residents, respectively.

Of all AB users 76.7% suffered from faecal and/or urine incontinence. In the Russian Federation 15.4% of the AB users was incontinent in contrast to a percentage of 92.1% among Slovenian NHs.

A proportion of 64.8% among residents using antimicrobials suffered from disorientation in time and/or space. In Croatia 31.6% of the residents were disoriented while in France 94.1% were disoriented.

An overall percentage of 65.3% among AB using residents were suffering from impaired mobility. Among these 912 residents with impaired mobility, 253 were bedridden and 659 were dependent on the use of a wheelchair. (Appendix 2 Table A7)

Risk factors: urinary catheters, vascular catheters and wounds

Among the AB using residens, a total of 15.8% residents had a urinary catheter. Absence (0.0% proportion) of urinary catheters among AB users was seen in participating NHs from France, Hungary, Latvia and the Russian Federation. The highest proportion of urinary catheter use was observed in Czech Republic (50.0%).

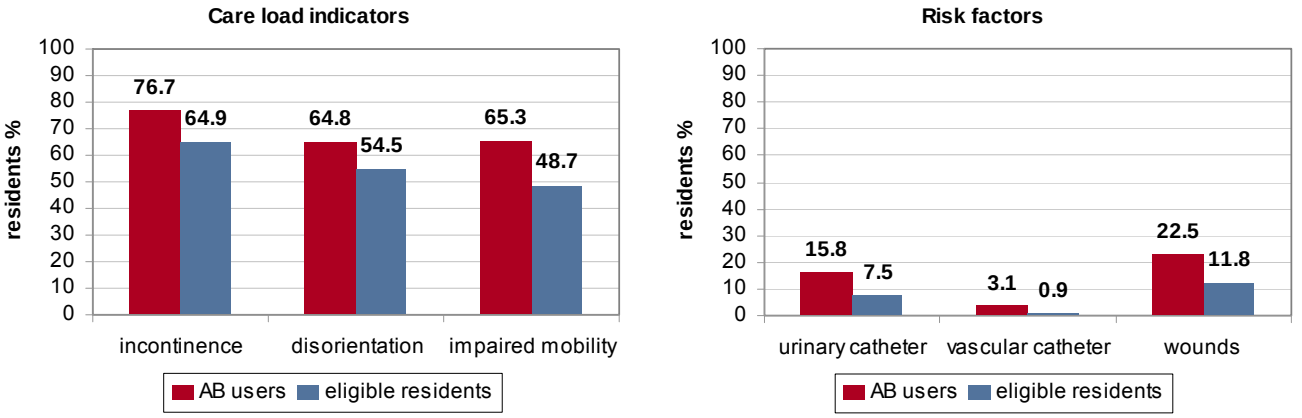
In general 3.1% of the AB users had a vascular catheter. In thirteen countries the prevalence of vascular catheters was zero. In contrast, in Poland 25.0% and in Bulgaria 33.0% of the AB users had a vascular catheter.

Among the AB users, a total of 22.5% of the residents had a wound. No wounds were present among AB users in Bulgaria. Also in French NHs the prevalence of wounds was relatively low (5.9%), whereas in Latvia 58.3% of the residents using an antimicrobial treatment had a wound. (Appendix 2 Table A7)

Figure 9 shows a comparison of the proportions of care load indicators and risk factors among all eligible residents (i.e. including the AB users) and the AB using residents.

Out of the 1435 residents using Abs, data were missing for 19, 25 and 14 residents with regard to the presence of a urinary catheter, vascular catheter and wound, respectively.

Figure 9 Presence of care load indicators and risk factors in the total NH population and among AB users

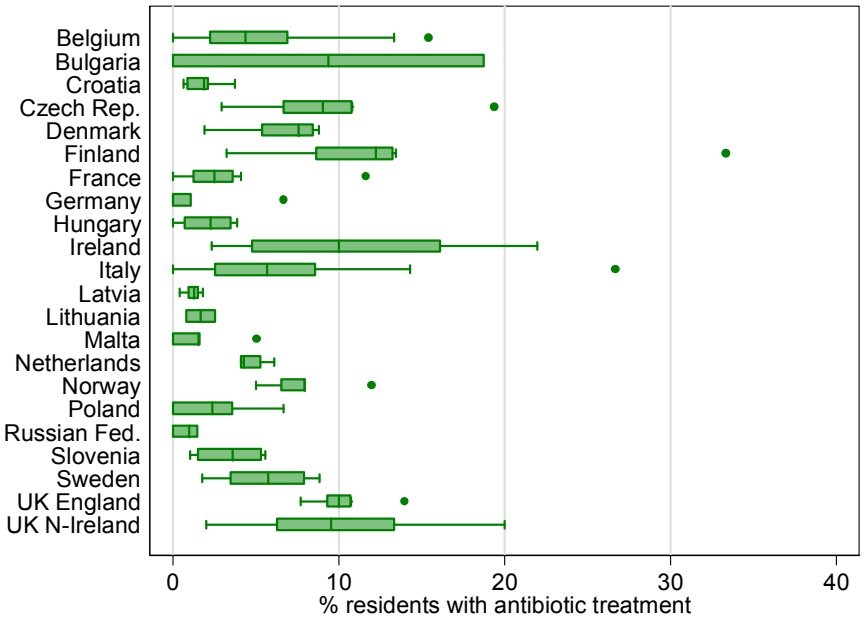


4.2. Prevalence of antimicrobial treatments

The number of eligible residents was known for 265 NHs. In these NHs 1433 residents out of 28569 eligible residents were treated with antimicrobials. The crude mean prevalence of antimicrobial use was 5.8% and the median prevalence was 5.0% (range on NH level: 0.0-33.3%) [95%CI: 5.6-6.1%]. Fairly low prevalences (mean and median below 2.0%) were seen in Germany (*n*=5 NHs), the Russian Federation (*n*=3), Malta (*n*=5), Latvia (*n*=5), Lithuania (*n*=3) and Croatia (*n*=5 NHs). High prevalences (mean and/or median above 10.0%) of antimicrobial consumption were observed in UK Northern Ireland (*n*=30), Ireland (*n*=11), UK England (*n*=5) and Finland (*n*=8).
More specific data for each participating country on the prevalence of antimicrobial use (mean, median, range, 95% confidence interval) are depicted in Appendix 2 Table A8.

In 26 of 265 NHs (9.8%) there were no antimicrobials used on the day of the PPS. The NHs with no antimicrobial use were from Belgium (9/103 NHs), Bulgaria (1/2), France (1/8), Germany (3/5), Hungary (1/4), Italy (5/28), Malta (2/5), Poland (3/8) and the Russian Federation (1/3).
Figure 10 shows the prevalence of AB consumption per country.

Figure 10 Prevalence of antimicrobial consumption (number of AB using residents per 100 eligible residents) per country



Prevalence of antimicrobial use in relation to general NH characteristics

The prevalence of AB use was compared for several characteristics of NHs in order to determine whether the presence or absence of these characteristics were associated with the magnitude of AB use (Table 2).

The prevalence of residents using antimicrobial treatment was significantly higher in NHs were a qualified nurse was present 24/24h. Furthermore, in NHs where the percentage of residents suffering from incontinence, disorientation and/or impaired mobility and residents with a urinary catheter and/or a wound was higher than the overall median value showed significantly higher AB prevalences. The latter results show that AB consumption in NHs is likely to be related with the presence of care load indicators and risk factors among residents.

Table 2 Prevalence of antimicrobial and institutional determinants						
		Prevalence of AB use (residents with AB/100 eligible residents)				Statistical significance
NH characteristics	Number of NHs	Mean %	Median %	Min-Max %	Poisson 95%-CI	Kruskal-Wallis test
Private/Public NHs						
Private	119	6.29	5.56	0-20.00	5.84-6.75	0.078
Public	144	5.49	4.45	0-33.33	5.12-5.89	
Qualified nurse present 24/24h						
Yes	240	6.10	5.14	0-33.33	5.79-6.42	0.005
No	26	3.48	2.50	0-11.63	2.78-4.25	
NH size						
<75 beds	105	7.00	6.12	0-33.33	6.50-7.52	0.096
75-149 beds	104	5.18	4.31	0-20.00	4.75-5.64	
≥150 beds	57	4.90	4.11	0-16.22	4.34-5.50	
Number of hospitalized residents on PPS-day						
None	97	6.03	4.76	0-33.33	5.55-6.54	0.445
At least one	149	5.61	5.04	0-18.52	5.24-6.00	
Incontinent residents (%)						
≤ median	128	4.51	3.82	0-20.00	4.15-4.89	0.0001
> median	127	7.36	6.45	0-33.33	6.90-7.85	
Disoriented residents (%)						
≤ median	128	4.75	3.93	0-20.00	4.38-5.14	0.0002
> median	128	7.07	6.32	0-33.33	6.62-7.55	
Residents with impaired mobility (%)						
≤ median	132	4.70	3.82	0-20.00	4.33-5.08	0.0001
> median	122	7.20	6.22	0-33.33	6.73-7.69	
Residents with urinary catheter (%)						
≤ median	129	4.55	3.70	0-17.78	4.19-4.93	0.0001
> median	128	7.25	6.32	0-33.33	6.79-7.73	
Residents with vascular catheter (%)						
None	207	5.77	4.95	0-33.33	5.45-6.10	0.469
At least one	49	6.42	5.42	0-26.67	5.74-7.18	
Residents with wounds (%)						
≤ median	130	5.14	4.22	0-33.33	4.76-5.54	0.005
> median	127	6.67	5.88	0-26.67	6.23-7.13	

5. Characteristics of antimicrobial prescriptions

5.1. Number of molecules per resident

Since 1435 residents received an antimicrobial treatment and 1486 molecules were prescribed some residents received more than one molecule at the day of the PPS. A total of 1386 residents (96.6%) received only one molecule, 48 received 2 molecules and one resident received 4 molecules simultaneously. Among the residents with more than one molecule (data known for 46 residents) 36 received treatment for one single infection with different molecules. Furthermore, 11 residents received different molecules for different types of infection at the same time.

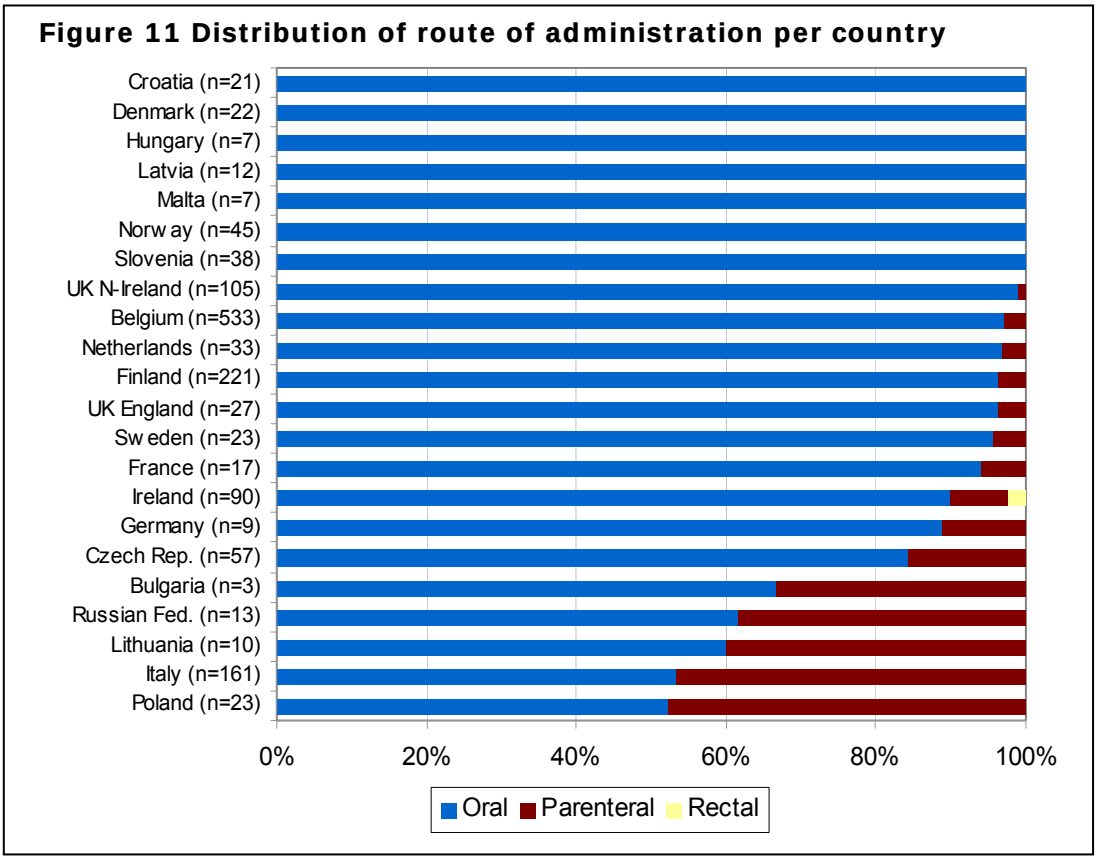
Information on the number of molecules divided over AB using residents and on the number of infections treated with combination therapies is depicted in Table 3. Data on the number of residents with a treatment consisting of more than one molecule per country is shown in Appendix 2 Table A9.

Table 3 Number of molecules per resident and type of treatment			
Prescribed molecules / resident	**1 molecule for single infection**	**>1 molecule for same infection**	**>1 molecule for different infections**
Only one molecule	1386	-	-
2 molecules	-	35	11
4 molecules	-	1	-

5.2. Route of administration of antimicrobial treatments

Data on the route of administration were known for 1477 treatments. A proportion of 90.3% of the treatments was administered orally, 9.6% was administered parenterally and 0.1% rectally. The latter consisted of 2 treatments offered in one NH in Ireland.
In seven countries parenteral antimicrobials were not used. The use of parenteral antimicrobials was high in Poland (47.8%), Italy (40.0%), Lithuania (40.0%), the Russian Federation (38.5%) and Bulgaria (33.3%). In the remaining countries where parenteral antimicrobials were used, the use was relatively rare (range: 1.0-15.8%) (Figure 11). Appendix 2 Table A10 shows the distribution of administration routes of antimicrobial treatments per country.

Figure 11 Distribution of route of administration per country



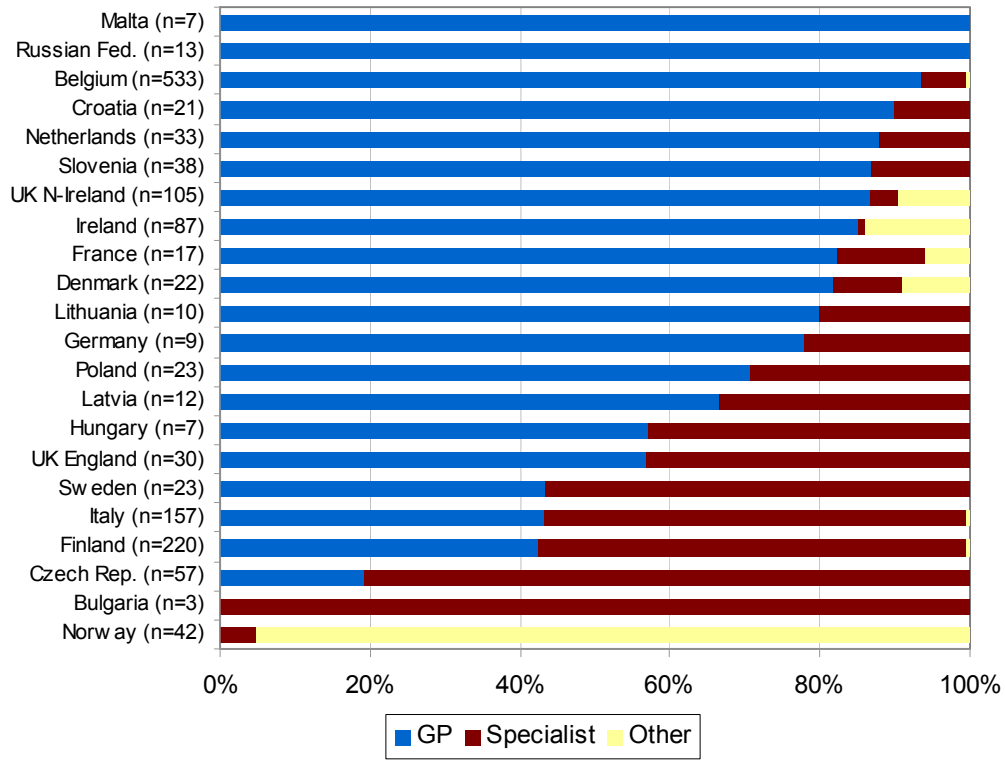
5.3. Place of prescription and type of prescriber of antimicrobial treatments

Data on the place of prescription and the type of prescriber of antimicrobial treatments were known for 1476 and 1469 treatments, respectively.
A proportion of 89.2% of all AB treatments was prescribed in the NH, 7.7% in the hospital and 3.1% was prescribed elsewhere.

In all countries, except Germany (11.1%), the majority of the ABs was prescribed in the NH (range on NH level: 55.7-100%).
Relatively large proportions of prescriptions in the hospital were observed in Sweden (17.4%), Lithuania (20.0%), Latvia (25.0%) and UK England (43.3%). In Germany 77.8% were prescribed elsewhere.

Overall, 70.7% (range on NH level: 0-100%) of the antimicrobials were prescribed by a general practitioner (GP). Furthermore, 24.6% was prescribed by a specialist and 4.7% by another person. The wide variation in type of prescriber can be attributed to the organisation of medical care in the NHs in a country. In different countries medical care in NHs is organised in a different way, causing various type of doctors to deliver medical care, and hence prescribe antimicrobial treatments, to NH residents. In some countries the majority of antimicrobial treatments is, as a result, prescribed by a specialist. This is the case in Bulgaria (100%), Czech Republic (80.7%), Finland (57.3%), Sweden (56.6%) and Italy (56.1%). In most countries there is no "other" type of prescriber whilst in Norway 95.2% of all ABs were prescribed by another prescriber than a GP or specialist. (Figure 12)
In-depth information on the distribution of place of prescription and the type of prescriber per country is shown in Appendix 2 Table A11 and A12.

Figure 12 Distribution of type of prescriber per country



5.4. Microbiological sampling and urine dipstick tests

For 1400 of the antimicrobial treatments information was known on whether a culture sample was taken. For 32.3% of the treatments diagnosis by means of a culture sample was performed. No culture samples were taken in Bulgaria (*n*=3 molecules), Germany (*n*=9), Hungary (*n*=7) and Malta (*n*=8). Culture samples were taken for more than half of the AB

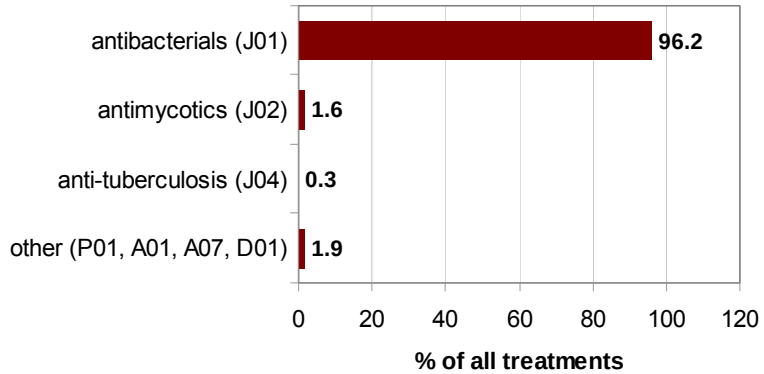
treatments in Norway (55.6%; *n*=27), Czech Republic (63.2%; *n*=57), Denmark (63.6%; *n*=22) and UK England (68.0%; *n*=25).
The question on type of isolated microorganism was filled for approximately 16% of the included residents, therefore these results are not presented in this report.
Data on whether a dipstick test for urine was performed was known for 583 of 718 urinary tract infection (UTI) indications. For 49.2% of the UTI indications a dipstick test (urine test strip) was performed. In Germany (*n*=2 UTIs), Hungary (*n*=1) and UK England (*n*=5) a dipstick test was performed for all the UTI indications. A high percentage of dipstick tests was also observed in Denmark (93.3%; *n*=15) and Croatia (90.0%; *n*=10). The proportion of performed dipstick tests was low in Belgium (30.2%; *n*=215).
Information on country level regarding culture samples and dipstick tests performed can be found in Appendix 2 Table A13.
In a substantial number of countries the performance of a dipstick test was also confirmed for other treatment indications than UTI, this result seems odd and therefore this was not included in the results mentioned above.
A possible explanation for the absence of a dipstick test is the presence of a culture sample for the same signs and symptoms of infection. For 25.0% (74/296) of the antimicrobials indicated for a UTI without performance of a dipstick test a culture sample was taken. Among these, 47 were documented treatments for a UTI of which for 45 (95.7%) a culture sample was performed.

6. Drug utilization

6.1. Antimicrobial treatments on ATC level 2

Antimicrobial compounds from the ATC1-class[1] of *antibacterials for systemic use* (J01) comprised 96.2% of all prescribed molecules (*n*=1486). Of the other types of *antiinfectives for systemic use* (J-class), *antimycotics for systemic use* (J02) covered 1.6% and *antimycobacterials* (J04) 0.3% of all prescribed molecules. Other molecules, such as *antiprotozoals* (P01), *antidiarrheals, intestinal, anti-inflammatory antiinfective agents* (A07), *antifungals for dermatological use* (D01) and *stomatological preparations* (A01) comprised 1.1%, 0.5%, 0.2% and 0.1% of the prescribed treatments, respectively. (Figure 13)

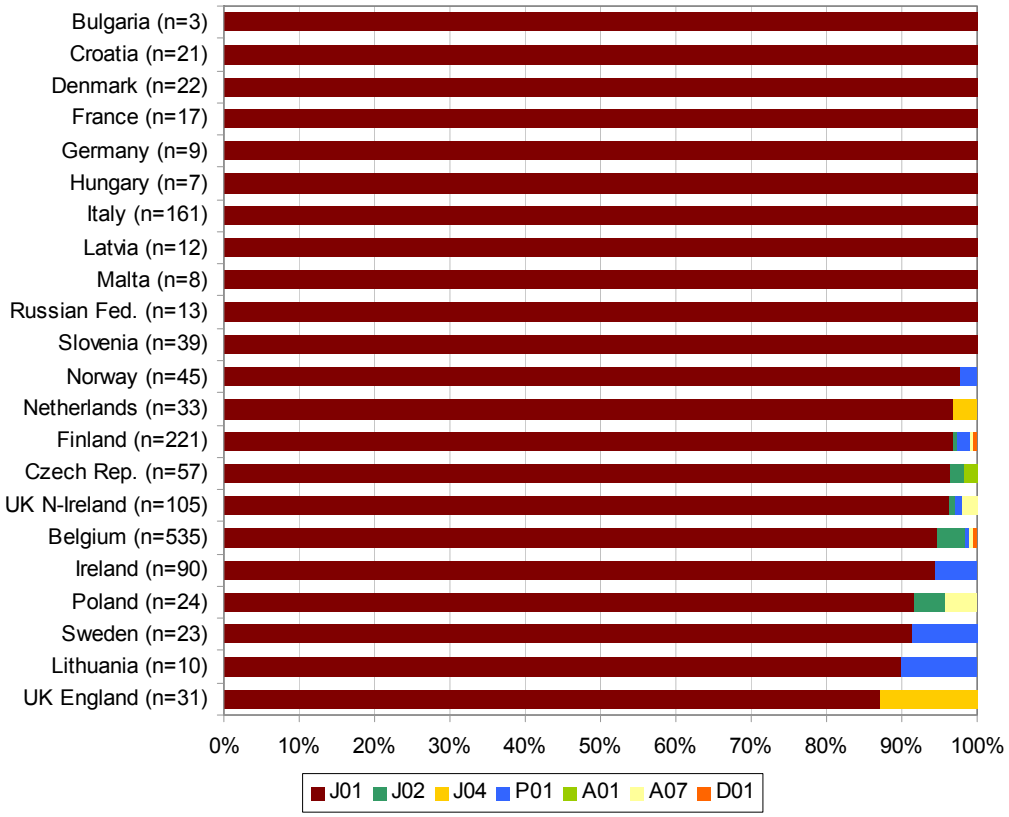
Figure 13 Distribution of antimicrobial types on ATC level 2



[1] WHO Collaborating Centre for Drug Statistics Methodology – ATC/DDD index 2010. http://www.whocc.no/atc_ddd_index

In all countries the majority of molecules belonging to ATC level 2 consisted of *antibacterials for systemic use* (J01) (range per country: 87.1-100%). In half of the countries all of the prescribed compounds belonged to the J01-class. *Antimycotics* (J02) were only prescribed in Belgium (20/535), Czech Republic (1/57), Finland (1/221), the Netherlands (1/33), Poland (1/24), UK England (4/31) and UK Northern Ireland (1/105). The distribution of all antimicrobial compounds on ATC level 2 for each country can be found in Figure 14.

Figure 14 Distribution of antimicrobial types on ATC level 2 per country



6.2. Antibacterials for systemic use (J01) on ATC level 3

Among a total of 1486 molecules the vast majority, 1429, consisted of a molecule belonging to the ATC group of *antibacterials for systemic use* (J01).
Regarded on ATC level 3, the largest groups among the prescribed J01 molecules were *beta-lactam antibacterials, penicillins* (J01C; *n*=412) and *other antibacterials* (J01X; *n*=384).
Other relatively large groups were formed by *quinolone antibacterials* (J01M; *n*=229), *other beta-lactam antibacterials* (J01D; *n*=164) and *sulfonamides and trimethoprim* (J01E; *n*=116). (Figure 15)

The distribution of utilization of different types of molecules within the J01-class varied between countries. Detailed information on this distribution per country is depicted in Appendix 2 Table A14 and Figure 16 (for countries with a minimum of 15 J01 molecules).

Figure 15 Distribution of antibacterials for systemic use (J01) on ATC level 3

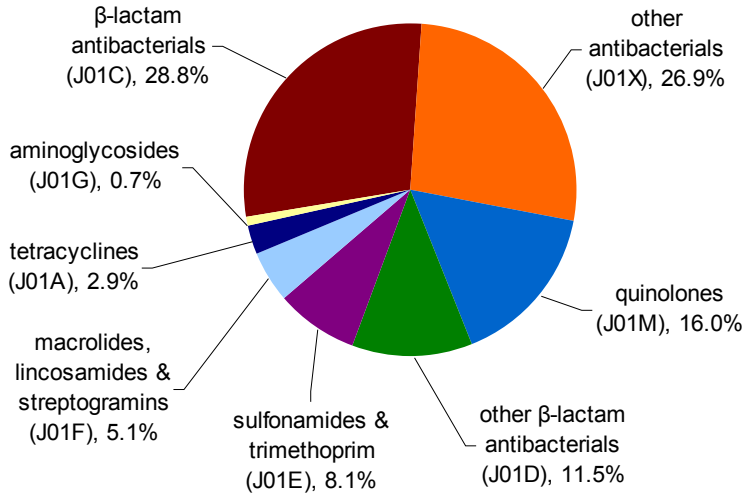
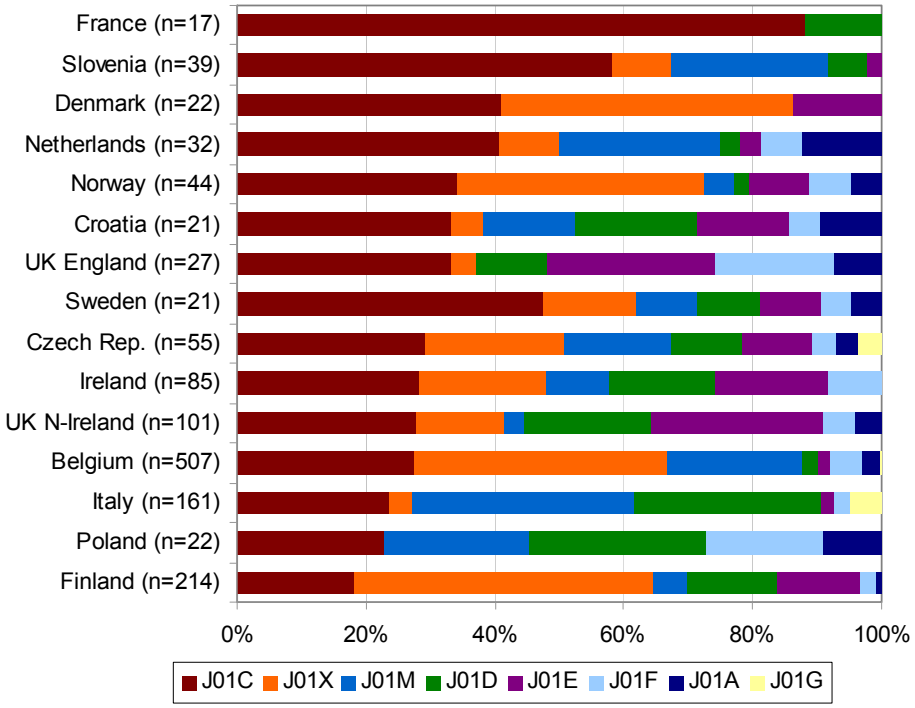


Figure 16 Distribution of antibacterials for systemic use (J01) on ATC level 3 per country with at least 15 J01 molecules

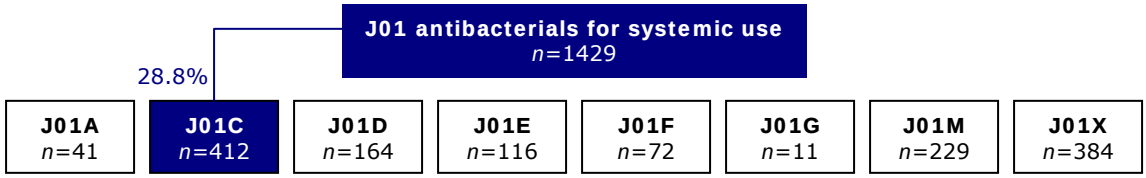


The amount of each type of molecule was also regarded per 100 eligible residents (100ER). *Beta-lactam antibacterials, penicillins* (J01C) were most common with 1.72 molecules per 100 eligible residents. Other molecules followed with 1.4/100ER of *other antibacterials* (J01X), 0.9/100ER of *quinolone antibacterials* (J01M), 0.7/100ER of *other beta-lactam antibacterials* (J01D), 0.6/100ER of *sulfonamides and trimethoprim* (J01E), 0.4/100ER of *macrolides, lincosamides and streptogramins* (J01F), 0.2/100ER of *tetracyclines* (J01A), 0.04/100ER of *aminoglycosides* (J01G) and 0.2/100ER of other ATC-classes (A01A, A07A, D01B, J02A, J04A and P01A).

Detailed information for each sub-class of antimicrobials is discussed in the following paragraphs in order of the size of the proportion among all treatments.

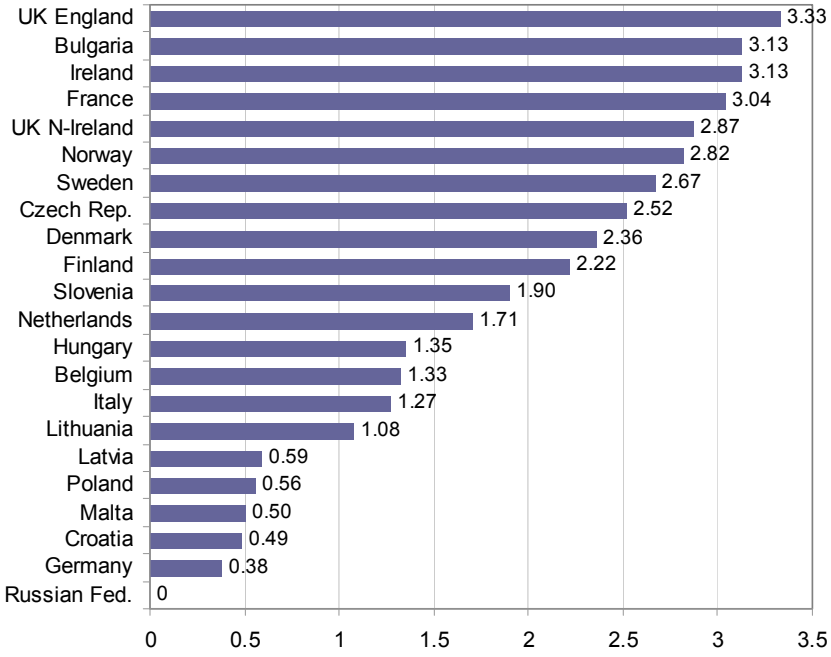
6.2.1. Beta-lactam antibacterials, penicillins (J01C)

Among all molecules belonging to the class of J01, 412 comprised beta-lactam antibacterials (J01C).

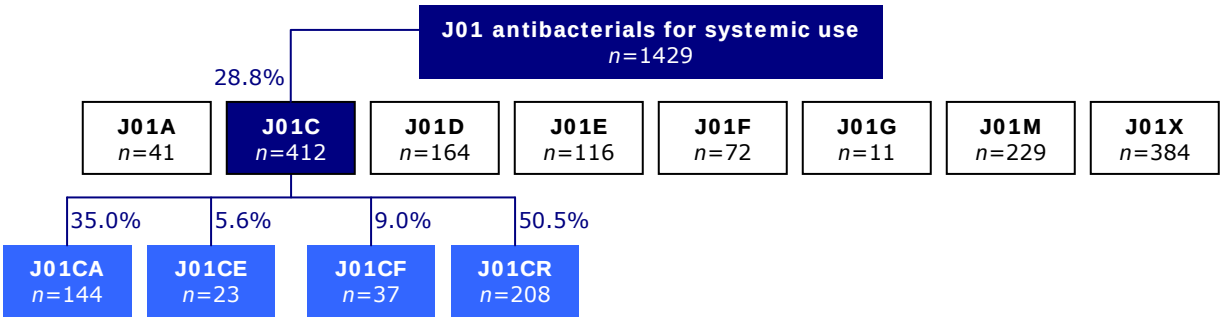


The proportion that molecules from the J01C-group formed in a country ranged from 0.0% in the Russian Federation up to 88.2% in France. (Appendix 2 Table A14)
On country level the number of prescribed molecules per 100ER varied from 0-3.33 (Figure 17).

Figure 17 Number of J01C molecules per 100 eligible residents per country



At ATC level 4, 50.5% of all *beta-lactam antibacterials* (J01C) were *combinations of penicillins, including beta-lactamase inhibitors* (J01CR). Furthermore, 35.0% were *penicillins with extended spectrum* (J01CA), 9.0% *beta-lactamase resistant penicillins* (J01CF) and 5.6% *beta-lactamase sensitive penicillins* (J01CE).



Combinations of penicillins, including beta-lactamase inhibitors (J01CR), overall the largest group, were not prescribed in Bulgaria, Denmark, Lithuania and Norway. In contrast, J01CR represented 84.2% of J01C in Slovenia (*n*=19), 94.7% in Italy (*n*=38) and 100% in Germany (*n*=2) and Malta (*n*=3). A proportion of 92.8% of J01CR was formed by *amoxicillin with enzyme inhibitor* (J01CR02).

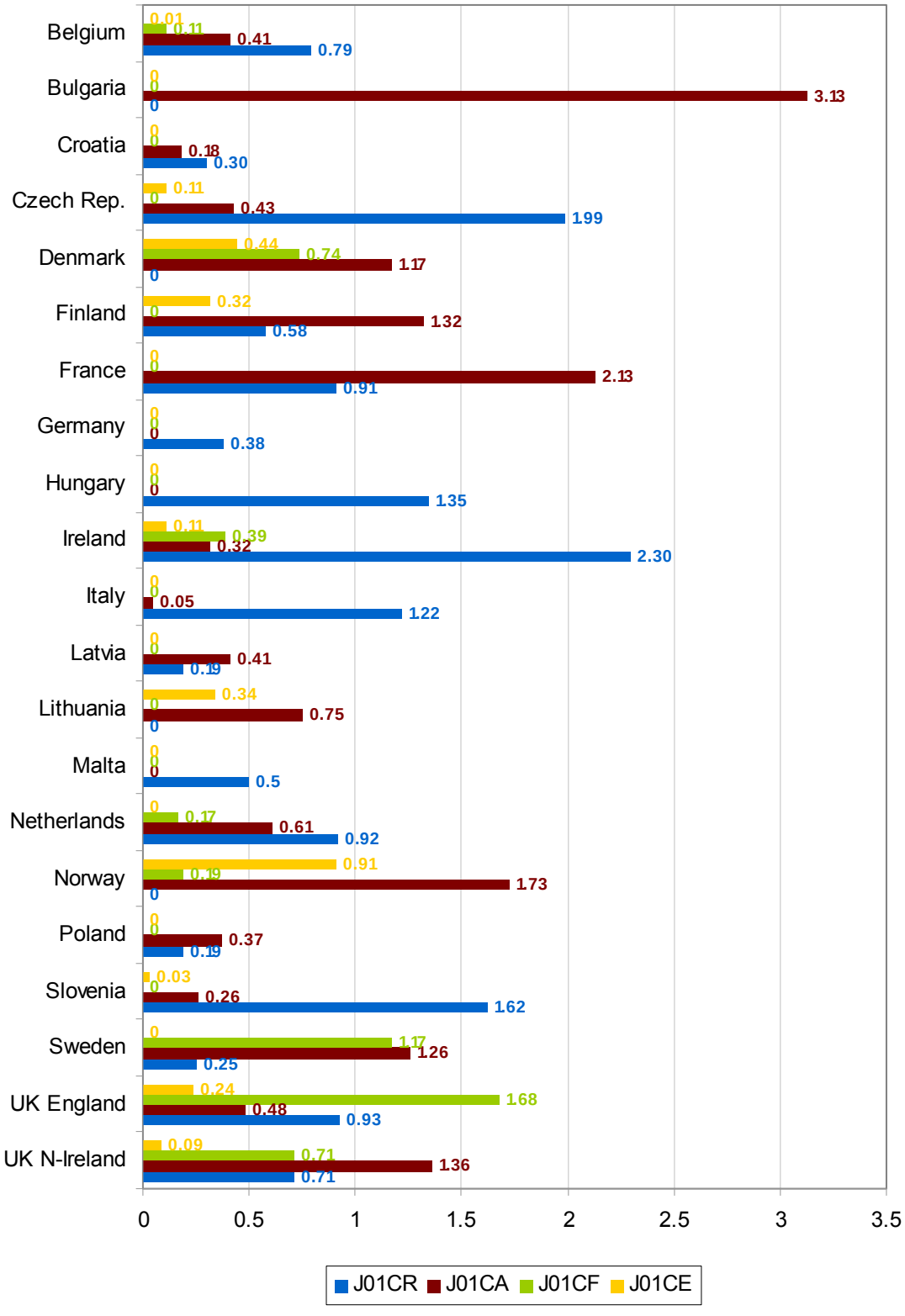
Penicillins with extended spectrum (J01CA) were not prescribed in Germany, Hungary and Malta. Among the J01CA molecules 68.8% was *amoxicillin* (J01CA04) and 28.5% *pivmecillinam* (J01CA08). *Pivmecillinam* was only prescribed in Finland (27/28), Norway (7/8), Denmark (3/4) and UK Northern Ireland (1/13).

Beta-lactamase resistant penicillins (J01CF) were not applied in most of the countries. Among the J01CF molecules 89.2% were *flucloxacillin* (J01CF05).

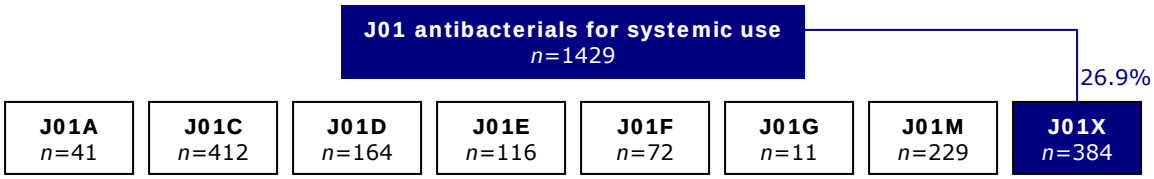
Among the b*eta-lactamase sensitive penicillins* (J01CE) 69.6% consisted of *phenoxy-methylpenicillin* (J01CE02).

The type of prescribed *beta-lactam antibacterials* (J01C) at ATC4 level per country is shown in Appendix 2 Table A16 and the specific molecules used in each country in Appendix 2 Table A17-A20.
The number of each sub-class of *beta-lactam antibacterials* (J01C) at ATC level 4 prescribed in each country per 100 eligible residents is shown in Figure 18.

Figure 18 Number of prescribed antimicrobials of J01CR, J01CA, J01CF and J01CE (J01C ATC level 4) per 100 eligible residents per country

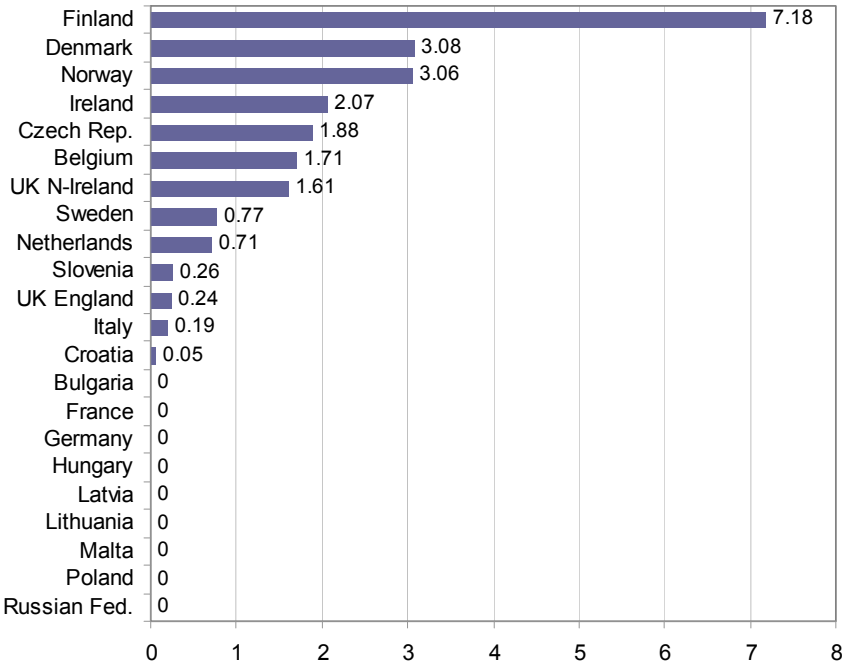


6.2.2. Other antibacterials (J01X)

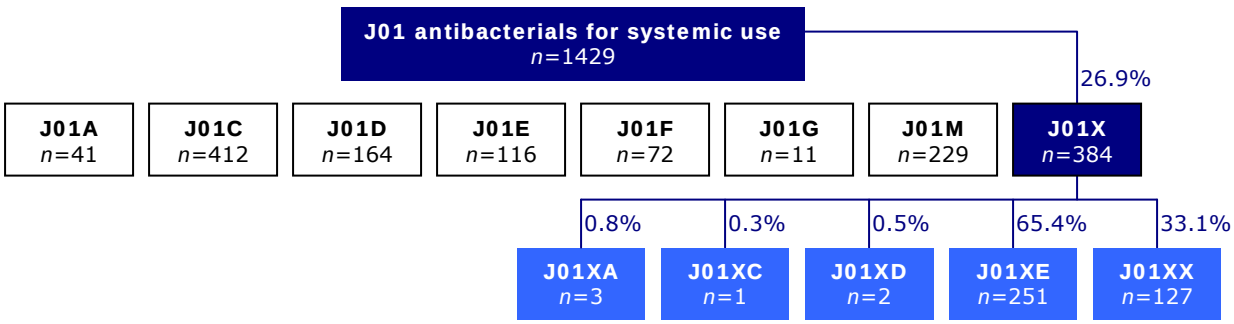


Other antibacterials (J01X) represented between 3.7% and 46.3% of all antimicrobial treatments in the countries were J01X molecules were prescribed. This minimum and maximum percentage was observed in Italy and Finland, respectively. No use was seen in Bulgaria, France, Germany, Hungary, Latvia, Lithuania, Malta, Poland and the Russian Federation.
The number of prescribed *other antibacterials* per 100ER ranged from 0-7.18% (Figure 19).

Figure 19 Number of J01X molecules per 100 eligible residents per country



At ATC level 4 *nitrofuran derivatives* (J01XE; 65.4%) and *other antibacterials* (J01XX; 33.1%) were most frequently prescribed among the J01X-molecules. Other types of J01X molecules, i.e. *glycopeptides antibacterials* (J01XA), *steroid antibacterials* (J01XC) and *imidazole derivatives* (J01XD) were rare.

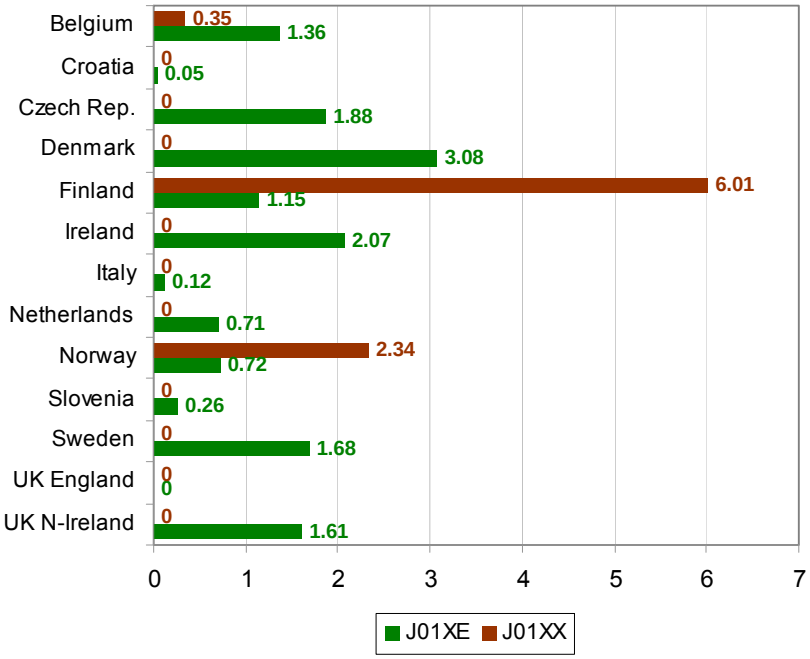


Regarding utilization of *other antibacterials* on country level showed that *nitrofuran derivatives* (J01XE) were not prescribed in UK England but comprised half or more of all J01X-molecules in most countries. The proportion of J01XE among J01X was less than 50.0% only in Finland (24.2%) and Norway (23.5%). *Nifurtoinol* (J01XE02) was mainly prescribed in Belgium (80 of 81 nifurtoinol treatments).

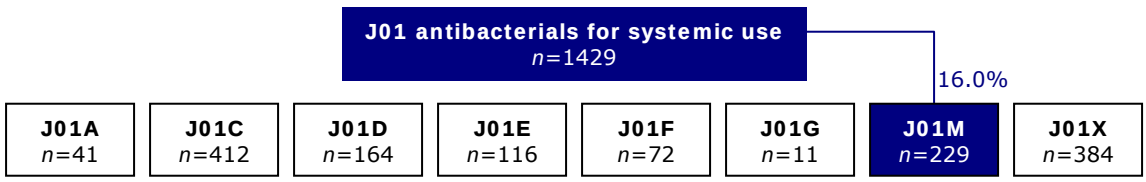
Other antibacterials (J01XX) were only prescribed in Belgium, Finland and Norway of which *fosfomycin* (J01XX01) was prescribed mainly in Belgium (39/40) and *methenamine* (J01XX05) mainly in Finland (73/86).

The distribution of *other antibacterials* (J01X) at ATC level 4 in each country and the specific molecules are depicted in Appendix 2 Table A32 and Table A33-A35, respectively.
The number of molecules of each sub-group per 100ER per country is shown in Figure 20.

Figure 20 Number of prescribed antimicrobials of J01XE and J01XX (J01X ATC level 4) per 100 eligible residents per country

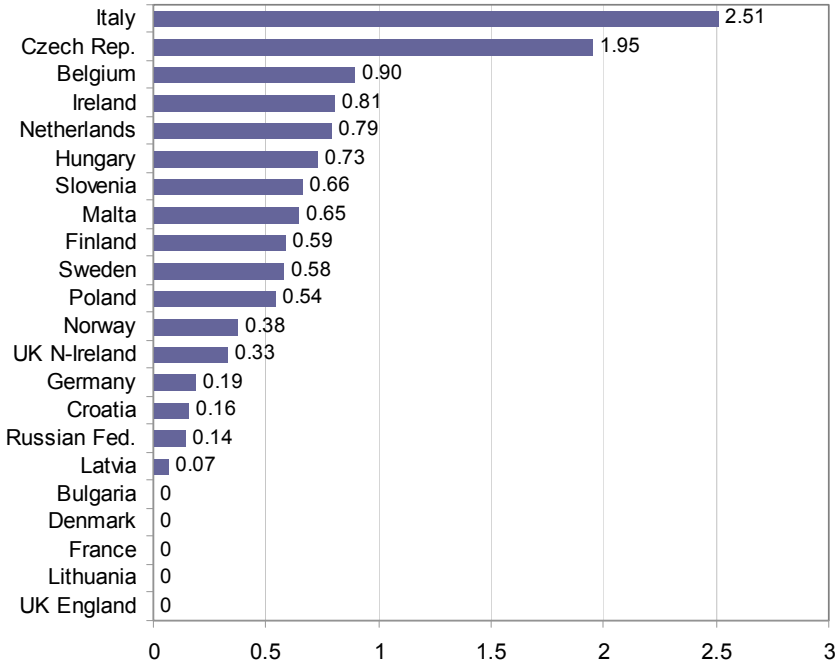


6.2.3. Quinolone antibacterials (J01M)



Quinolone antibacterials (J01M) were not used in Bulgaria, Denmark, France, Lithuania and UK England. In the remaining countries the proportion of J01M-molecules ranged from 3.0% in UK Northern Ireland to 37.5% in Malta. Per 100ER the number of *quinolones* ranged from 0-2.51 (Figure 21).

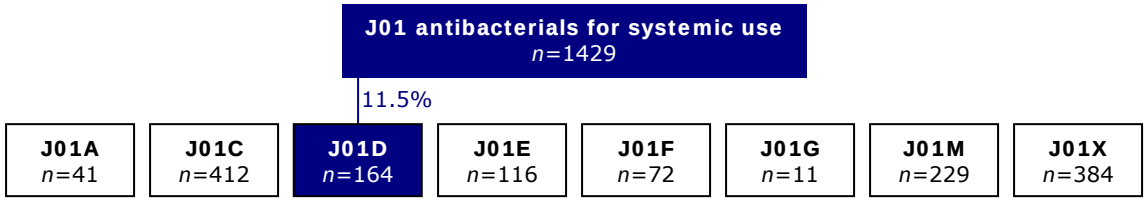
Figure 21 Number of J01M molecules per 100 eligible residents per country



All prescribed J01M-molecules belonged to the sub-group of *fluoroquinolones* (J01MA). Among these, *ciprofloxacin* (J01MA02) was most prescribed (47.6%). Other molecules were less prescribed (between 6.6% and 18.3% of all J01M-molecules). (Appendix 2 Table A31)

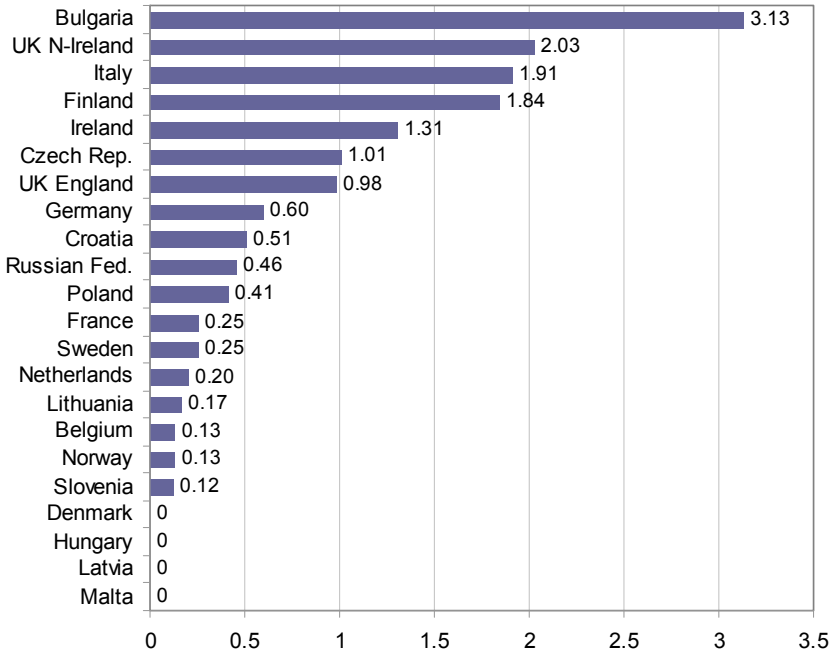
In most countries where *fluoroquinolones* were prescribed the majority was formed by *ciprofloxacin* (J01MA02). *Levofloxacin* (J01MA12) was only used in Belgium, Germany, Finland and Italy. In Italian NHs 40.0% of all *fluoroquinolones* was *levofloxacin*. *Moxifloxacin* (J01MA14) was only administered in Belgium and Italy and *ofloxacin* (J01MA01) was only used in Belgium, Czech Republic and Italy.

6.2.4. Other beta-lactam antibacterials (J01D)

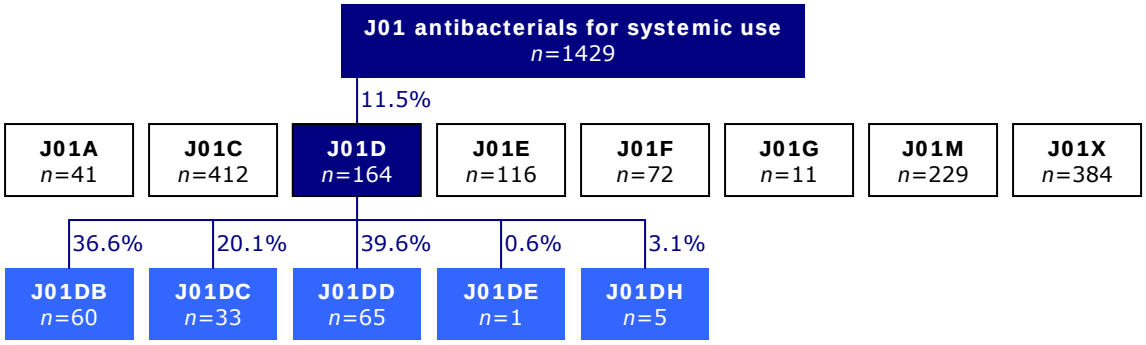


A relatively large proportion of all antimicrobials consisted of *other beta-lactam antibacterials* (J01D) in the Russian Federation (53.9%) and Germany (44.4%). A small proportion of J01D-molecules was observed in Norway (2.3%), Belgium (2.6%), the Netherlands (3.1%), Slovenia (5.1%) and Sweden (6.3%). The number of *other beta-lactam antibacterials* (J01D) per 100ER ranged from 0-3.1% in the different countries (Figure 22).

Figure 22 Number of J01D molecules per 100 eligible residents per country



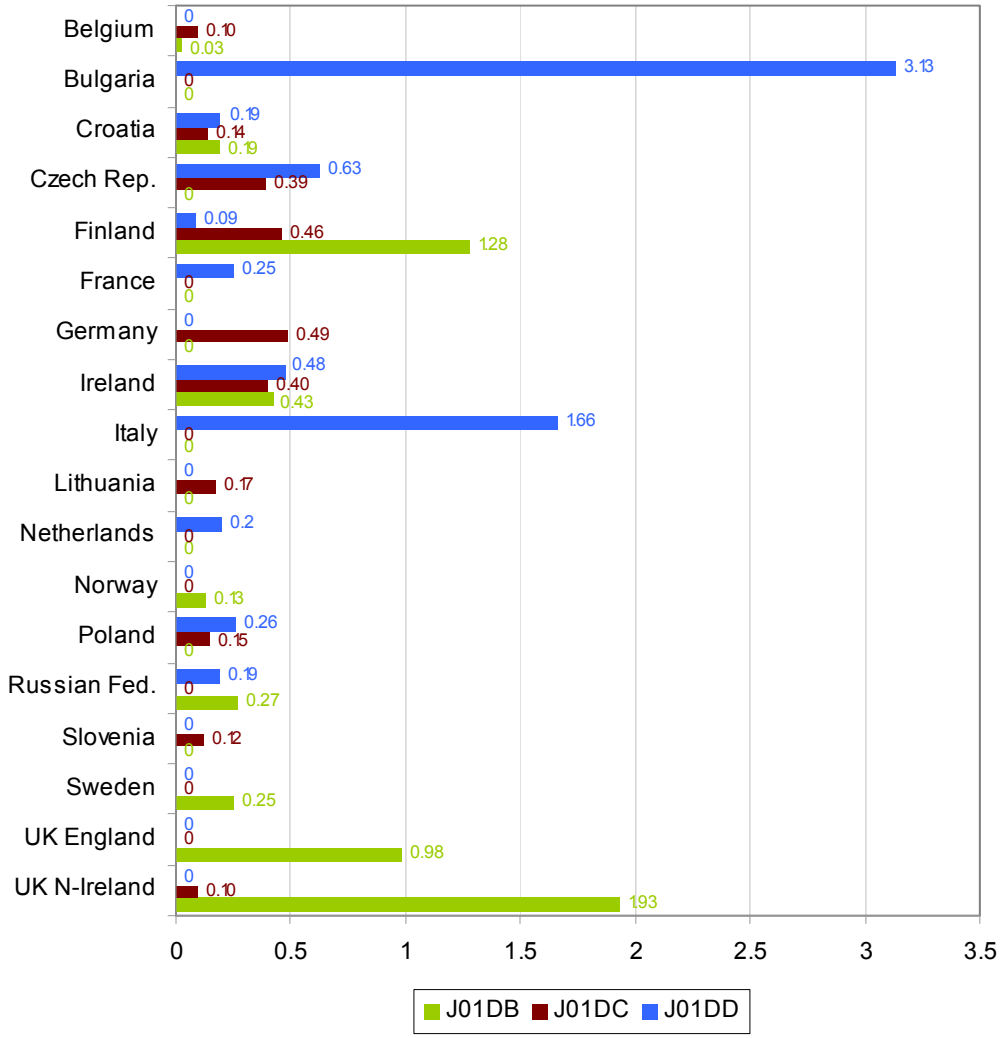
The largest groups of J01D-molecules were formed by *third-generation cephalosporins* (J01DD; 39.6%), *first-generation cephalosporins* (J01DB; 36.6%) and *second-generation cephalosporins* (J01DC; 20.1%). (Appendix 2 Table A21)



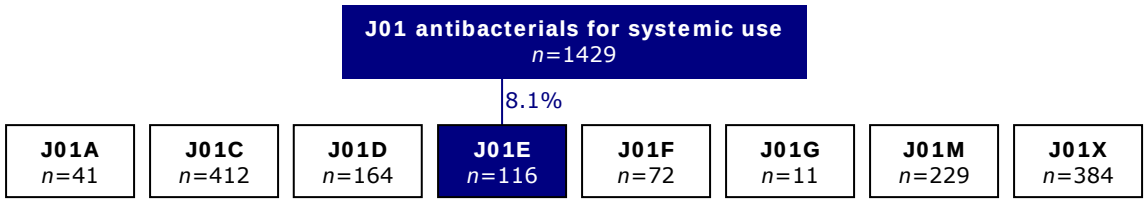
Among the *first-generation cephalosporins* (J01DB) 88.3% consisted of *cefalexin* (J01DB01). In Finland, all (*n*=25) the *first-generation cephalosporins* were *cefalexin*. Among the *second-generation cephalosporins* (J01DC) a majority of 84.9% was formed by *cefuroxime* (J01DC02).

The *third-generation cephalosporins* (J01DD) were mainly *ceftriaxone* (J01DD04) and most of them were prescribed in Italy (37/42). The specific distribution of the different J01D-molecules for each country can be found in Appendix 2 Table A22-A25.
The number of prescribed *first*, *second* and *third-generation cephalosporins* per 100ER per country is shown in Figure 23.

Figure 23 Number of prescribed antimicrobials of J01DB, J01DC and J01DD (J01D ATC level 4) per 100 eligible residents per country

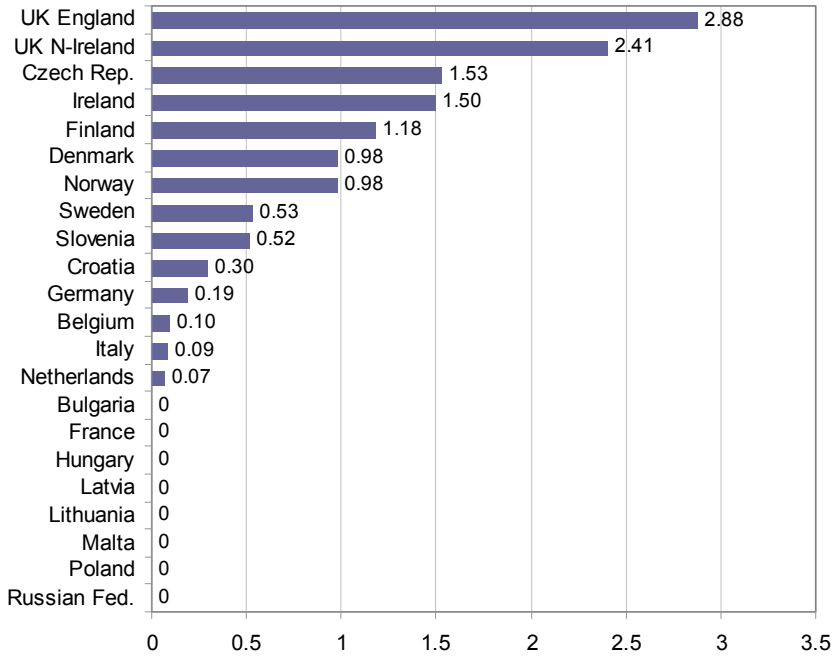


6.2.5. Sulfonamides and trimethoprim (J01E)

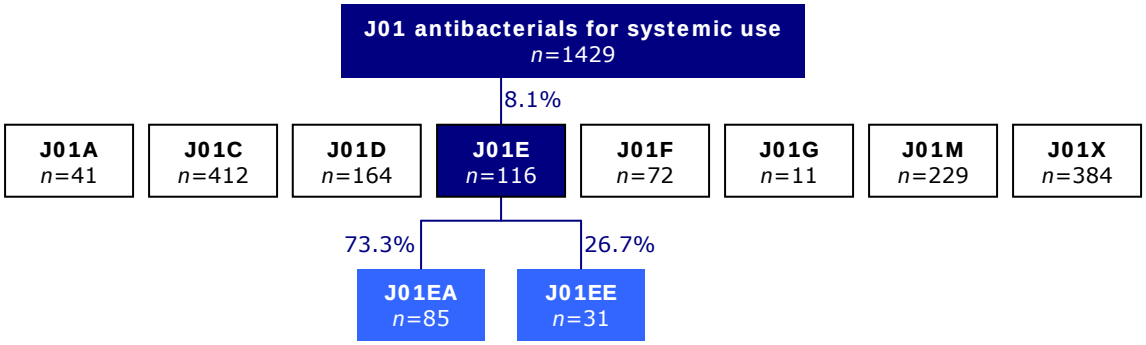


Molecules from the group of *sulfonamides and trimethoprim* (J01E) were not prescribed in Bulgaria, France, Hungary, Latvia, Lithuania, Malta, Poland and the Russian Federation. In the other countries the percentage of J01E-molecules among all treatments ranged from 1.8% to 26.7% in Belgium and UK Northern Ireland, respectively.
The number of *sulfonamides and trimethoprim* (J01E) per 100ER ranged from 0-2.9% per country (Figure 24).

Figure 24 Number of J01E molecules per 100 eligible residents per country

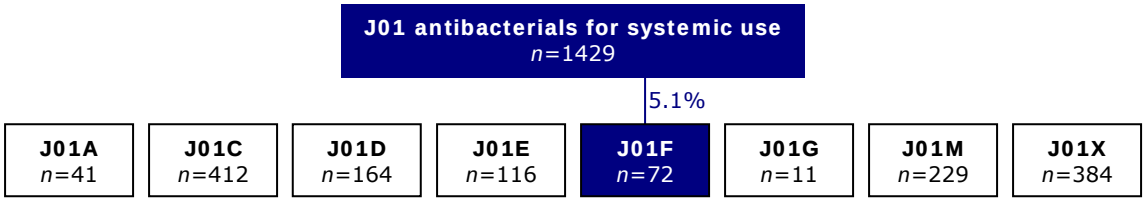


Two sub-groups, *trimethoprim and derivatives* (J01EA) and *combinations of sulfonamides and trimethoprim incl. derivatives* (J01EE), formed the group of J01E-molecules.



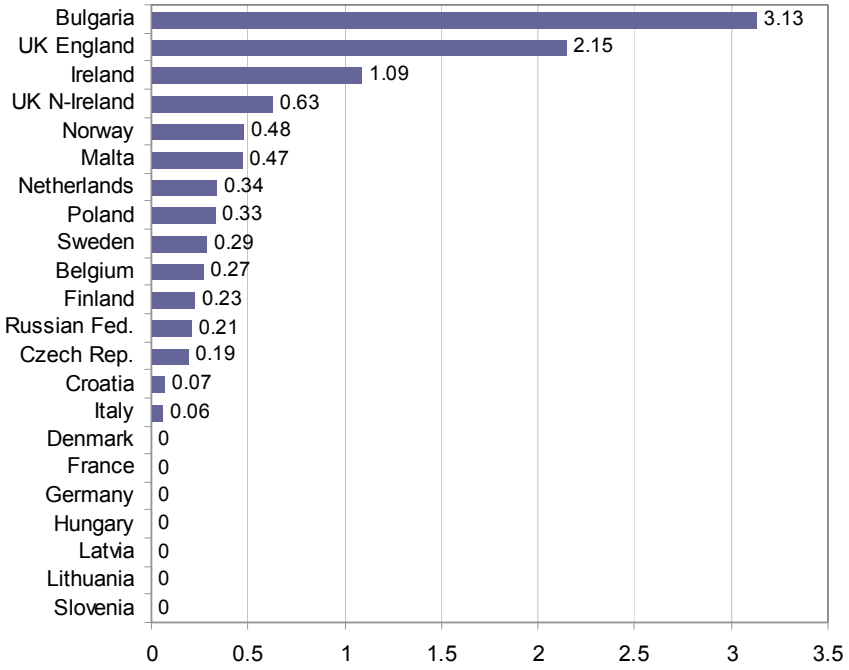
All molecules of the sub-group of J01EA-molecules were *trimethoprim* (J01EA01) and all of the J01EE-molecules were *sulfamethoxazole and trimethoprim* (J01EE01). In most countries either J01EA01 or J01EE01 was prescribed. (Appendix 2 Table A26)

6.2.6. Macrolides, lincosamides and streptogramins (J01F)

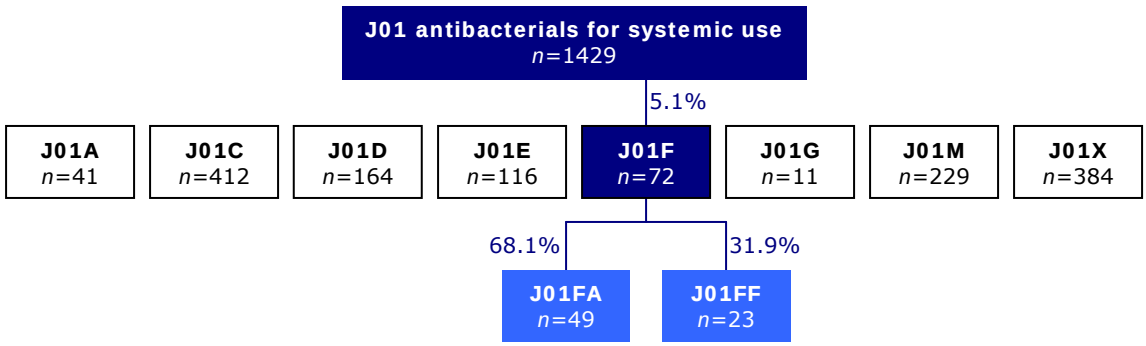


In the countries where *macrolides, lincosamides and streptogramins* (J01F) were used the proportion among all molecules varied between 2.3% in Finland and 33.3% in Bulgaria. In Denmark, France, Germany, Hungary, Latvia, Lithuania and Slovenia this group of molecules was not prescribed in the participating NHs. The number of J01F-molecules per 100ER varied from 0-3.1% per country (Figure 25).

Figure 25 Number of J01F molecules per 100 eligible residents per country



Two groups of J01F-molecules were prescribed: *macrolides* (J01FA) and *lincosamides* (J01FF). Mainly *macrolides* (J01FA) were administered (68.1% of all J01F molecules). In many countries either *macrolides* or *lincosamides* were used. Additionally, in Ireland and Belgium mainly *macrolides* were used (85.7% and 69.2%, respectively), whereas in Poland and Norway mainly *lincosamides* were used (75.0% and 66.7%, respectively). (Appendix 2 Table A27)

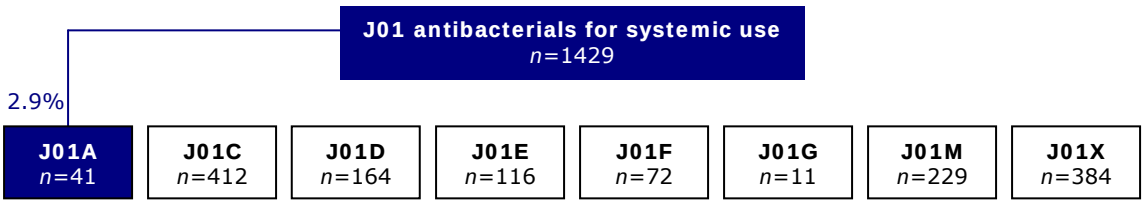


Among the group of *macrolides* (J01FA), *clarithromycin* (J01FA09) formed the largest proportion (37.5%). Another reasonably large part was represented by *azitromycin* (J01FA10; 13.9%). In Belgium (9/18), Ireland (5/6) and UK England (4/5) the majority and in Italy all (4/4) of the *macrolides* used were *clarithromycin*. In the Belgian NHs another important part of

the *macrolides* was formed by *azithromycin* (J01FA10; 7/18). *Midecamycin* (J01FA03) was only prescribed in NHs from the Russian Federation (*n*=4).

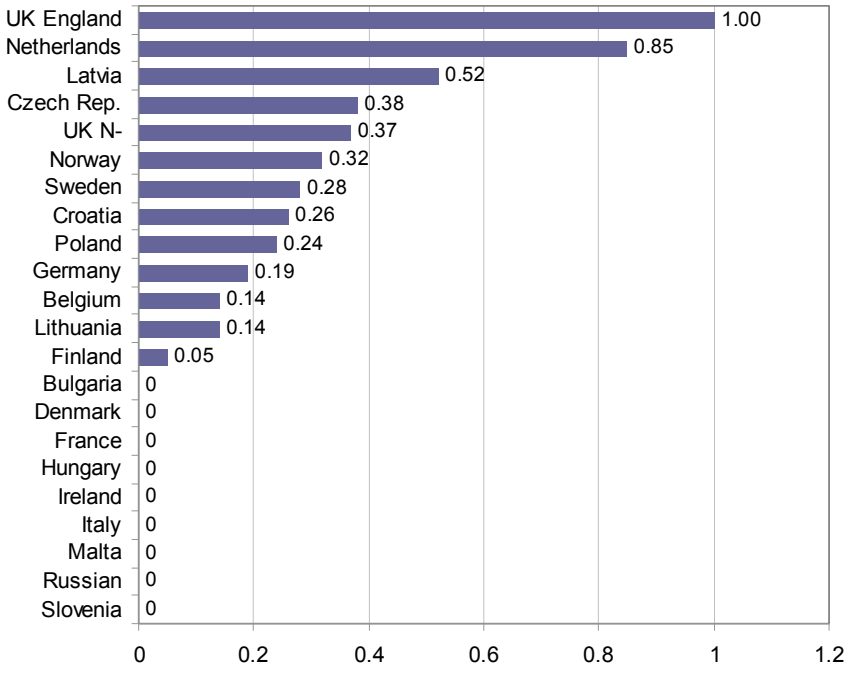
Among *lincosamides* (J01FF) the majority consisted of *clindamycin* (J01FF01; 82.6%). Among the 19 *clindamycin* treatments 6 were observed in Belgium and 5 in Finland. *Lincomycin* (J01FF02) was prescribed only in Belgium and Poland. (Appendix 2 Table A28 and A29)

6.2.7. Tetracyclines (J01A)



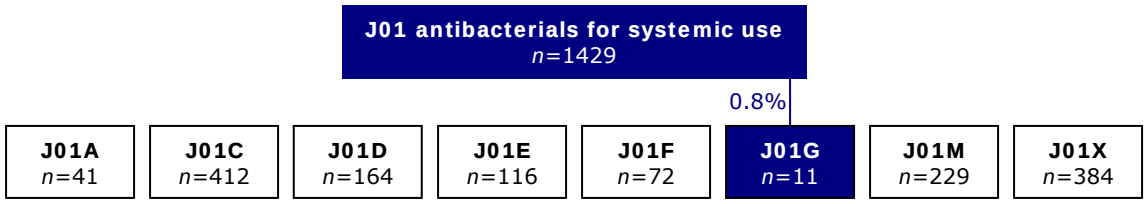
In the participating NHs from thirteen countries *tetracyclines* (J01AA) were prescribed with a proportion among all treatments varying between 0.9% in Finland and 33.3% in Latvia.
The number of *tetracyclines* per 100ER ranged from 0-1.0 per country (Figure 26).

Figure 26 Number of J01A molecules per 100 eligible residents per country



Doxycycline (J01AA02) was the most administered antimicrobial (82.9%) of the class of *tetracyclines*. Other molecules of this class were only used in Belgium and UK Northern Ireland. (Appendix 2 Table A28 and A29)

6.2.8. Aminoglycoside antibacterials (J01G)



Aminoglycoside antibacterials (J01G) were only prescribed in Italy (*n*=8/161), Czech Republic (*n*=2/55) and Belgium (*n*=1/507). The number of *aminoglycosides* was 0.31/100ER in Italy, 0.25/100ER in Czech Republic and 0.01/100ER in Belgium.
Only molecules belonging to the group of *other aminoglycosides* (J01GB) were used. In Italy only *amikacin* (J01GB06; *n*=7), in Czech Republic *gentamicin* (J01GB03; *n*=2) and in Belgium *netilmicin* (J01GB07; *n*=1) was used.

6.3. Antimycotics for systemic use (J02)

The 24 antimicrobial treatments with *antimycotics for systemic use* (J02A) were prescribed in Belgium (*n*=20), Czech Republic (*n*=1), Finland (*n*=1), Poland (*n*=1) and UK Northern Ireland (*n*=1). The antimicrobial administered in Czech Republic belonged to the sub-group of *imidazole derivatives* (J02AB) and consisted of *ketoconazole* (J02AB02). In Belgium, Finland, Poland and UK Northern Ireland the *antimycotics* used belonged to the sub-group of *triazole derivatives* (J02AC). In Finland, Poland and UK Northern Ireland the antimicrobials were *fluconazole* (J02AC01). In Belgium 17 molecules were *fluconazole* and in addition 3 treatments of *itraconazole* (J02AC02) were prescribed.

6.4. Antimycobacterials (J04)

Four treatments in UK England and one in the Netherlands consisted of *antimycobacterials* (J04). All belonged to the class of *drugs for treatment of tuberculosis* (J04A). In England four different molecules were administered: *rifampicin* (J04AB02) from the class of *antibiotics* (J04AB), *isoniazid* (J04AC01) from the class of *hydrazides* (J04AC), *protionamide* (J04AD01) from the class of *thiocarbamide derivatives* (J04AD) and *pyrazinamide* (J04AK01) from the class of *other drugs for treatment of tuberculosis* (J04AK). In the Netherlands the only *antimycobacterial* treatment used was *rifampicin*.

Appendix 3 summarizes the antimicrobial prescriptions per ATC level (level 2-4).

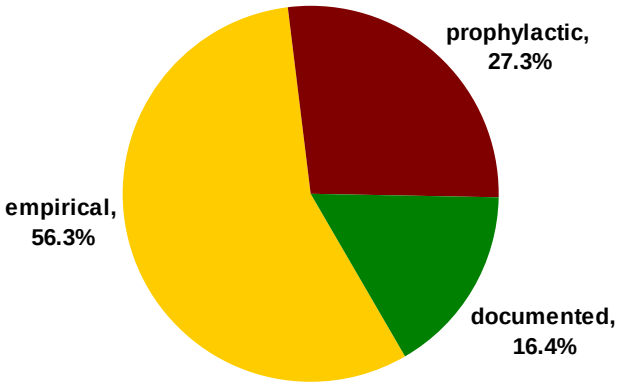
7. Indications for antimicrobial therapy and type of treatment

Data on the type of indication was known for 1441 antimicrobials. Data on at least one treatment was lacking for 23 NHs.

Several treatment types could be prescribed to NH residents:
- Prophylactic treatments are prescribed in order to prevent the onset of an infection.
- An empirical treatment is prescribed to treat an infection without having microbiological results.
- A documented treatment is prescribed to treat an infection when microbiological results are known.

Empirical treatments formed the majority of all treatments (Figure 27).

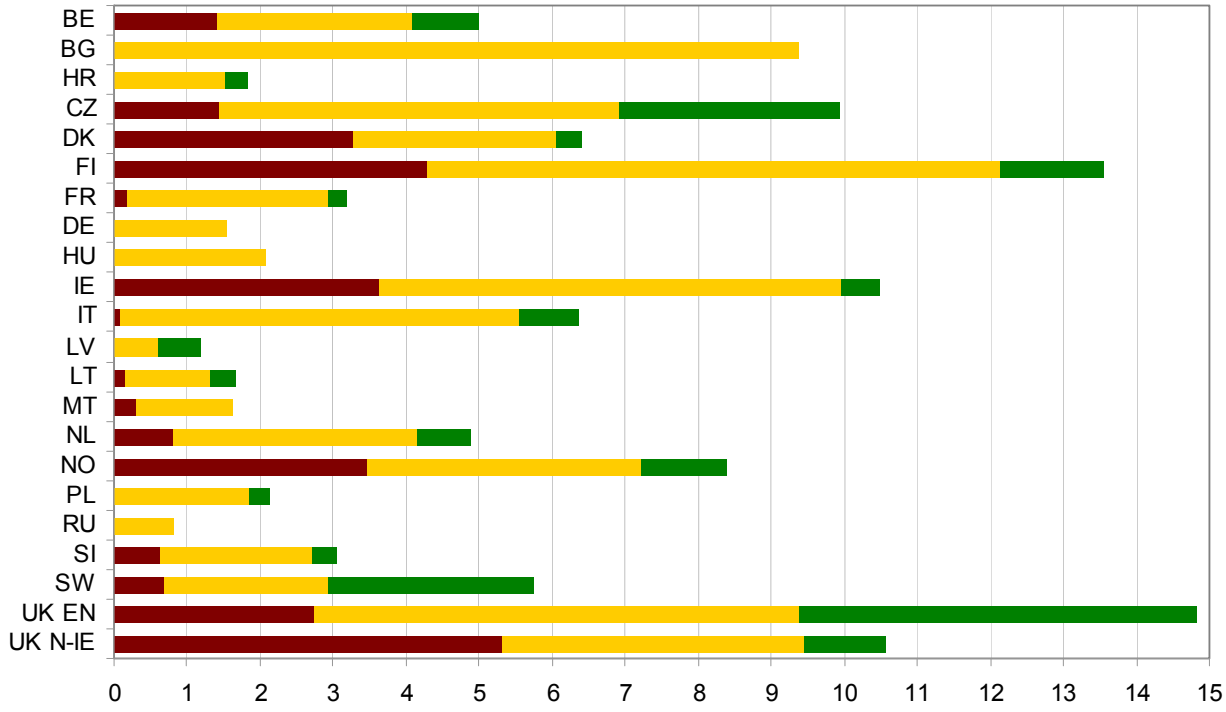
Figure 27 Proportions of type of indication by treatment type



The proportion of empirical treatments among all treatments ranged between countries from 38.1% in UK Northern Ireland to 100% in Bulgaria, Germany, Hungary and Russian Federation. The proportion of prophylactic treatments ranged from 0.0% in the countries with only empirical treatments and in Croatia, Latvia and Poland to 51.4% in UK Northern Ireland. The proportion of documented treatments ranged from 0.0% in the countries with only empirical treatments as well as in Malta to 45.0% in Sweden. Detailed information on the proportions per country is available in Appendix 2 Table A36.

For the calculation of the number of treatments per 100 eligible residents the assumption was made that if for a NH more than 80% of the indications of treatments were known data regarding indication on NH level was not missing. Therefore data from 5 NHs of which information on one treatment was missing were included in the analysis. Data were still missing for 18 institutions.
The number of prescribed prophylactic regimes per 100 eligible residents per country ranged from 0.0 in Bulgaria, Croatia, Germany, Hungary, Latvia, Poland and the Russian Federation to 5.3/100ER in UK Northern Ireland. The number of empirical treatments per 100 eligible residents ranged from 0.6 in Latvia to 9.4/100ER in Bulgaria. Lastly, the number of documented treatments per 100 eligible residents varied from 0.0 in Bulgaria, Germany, Hungary, Malta and the Russian Federation to 5.4 in UK England. (Figure 28)

Figure 28 Number of prophylactic, empirical and documented treatments per 100 eligible residents on country level



	UK N-IE	UK EN	SW	SI	RU	PL	NO	NL	MT	LT	LV	IT	IE	HU	DE	FR	FI	DK	CZ	HR	BG	BE
documented	1.10	5.44	2.83	0.31	0	0.27	1.17	0.72	0	0.34	0.57	0.79	0.54	0	0	0.23	1.42	0.36	3.02	0.31	0	0.91
empirical	4.13	6.64	2.25	2.09	0.81	1.85	3.74	3.34	1.33	1.18	0.62	5.48	6.32	2.09	1.55	2.76	7.87	2.80	5.46	1.52	9.38	2.67
prophylactic	5.33	2.74	0.68	0.63	0	0	3.47	0.82	0.30	0.14	0	0.08	3.63	0	0	0.19	4.27	3.26	1.45	0	0	1.42

Of all treatments, 49.5% was used for the treatment of UTIs and 30.0% for RTIs. The majority of both prophylactic and documented treatments were used for the treatment of UTIs (87.1% and 60.2%, respectively). The majority of the empirical treatments was used for RTIs. Table 4 shows all amounts and proportions of each infection, distributed by the type of treatment.

Table 4 Indications for type of infections by type of treatment

			Prophylactic *n*=394		Empirical *n*=811		Documented *n*=236	
Infections	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
SSI	33	2.3	3	0.8	20	2.5	10	4.2
RTI	432	30.0	13	3.3	399	49.2	20	8.5
UTI	714	49.5	343	87.1	229	28.2	142	60.2
GII	19	1.3	0		12	1.5	7	3.0
BSI/SEP	14	1.0	2	0.5	4	0.5	8	3.4
Not specified	38	2.6	11	2.8	24	3.0	3	1.3
Other	76	5.3	22	5.6	39	4.9	15	6.4
Skin or non-surgical wound	115	8.0	-		84	10.4	31	13.1

7.1. Prophylactic antimicrobial treatments

In seven countries prophylaxis was not used. The smallest proportion, besides 0.0%, was observed in Italy (5.0%). High proportions of prophylaxis were observed in Norway (40.0%; 18/45), Finland (40.9%; 90/221) and in UK Northern Ireland (51.4%; 54/105).

In most countries the majority of prophylactic treatments was used for the treatment of UTIs, except for Italy where 6 of 8 prophylactic treatments were used to treat 'other' infections. Prophylaxis for bacteremia/septicaemia was only seen in the Netherlands (*n*=2). (Appendix 2 Table A37)

Prescribed antimicrobials (all prophylactic regimens)

The type of molecules prescribed for prophylaxis were mainly *other antibacterials* (J01X; 59.6%, range on country level: 0-85.1%) followed by *sulfonamides and trimethoprim* (J01E; 18.0%, range: 0-75.0%). Specific details of AB treatments on ATC level 3 for each country are depicted in Appendix 2 Table A38. Within the J01E-class the majority consisted of *trimethoprim and derivatives* (J01EA; 67/71 J01E). Among the J01X-molecules most treatments comprised *nitrofuran derivatives* (J01XE; 157/235 J01X).

Uroprophylaxis

Regarding countries with relatively high proportions of prophylactic treatments for UTI it was observed that mainly *nitrofuran derivatives* (J01XE) were prescribed in Belgium (101/131 uroprophylaxis treatments) and Ireland (16/27), mainly *other antibacterials* (J01XX) were prescribed in Finland (40/81) and Norway (13/18) and mainly *trimethoprim and derivatives* (J01EA) in Northern Ireland (21/50) (Appendix 2 Table A39).

All *other antibacterials* (J01X) for prophylactic treatment were used for uroprophylaxis, specific molecules are shown in Appendix 2 Table A40. The majority of the J01X-molecules (43.4%, 102/235) were *nitrofurantoin* (J01XE01) compounds. In Czech Republic, Denmark, Ireland, the Netherlands, Slovenia and UK Northern Ireland all J01X-molecules were *nitrofurantoin*. All *nifurtoinol* (J01XE02; *n*=55) and all *fosfomycin* (J01XX01; *n*=25) molecules were prescribed in Belgium. All *methenamine* (J01XX05) treatments were prescribed in Finland (*n*=40) and Norway (*n*=13).

Prophylaxis of respiratory tract infections

Only relatively few (*n*=13) prophylactic treatments were indicated for RTIs (Appendix 2 Table A41).

7.2. Empirical antimicrobial treatments

Empirical treatments comprised the majority of all antimicrobial treatments. Moreover, in four countries all treatments were empirical.
In most participating countries the largest proportion of empirical treatments was used for treatment of RTIs. The lowest proportion of empirical RTI treatments (9.1%) was observed in Denmark (1/11 empirical treatments) and the highest proportion (100%) in Bulgaria (3/3). Also, a large part of empirical treatments was prescribed for UTIs. In France and Bulgaria no empirical UTI treatments were seen while in the remaining countries the percentage ranged from 5.0% (Poland) to 59.0% (Finland) (Appendix 2 Table A42).

Prescribed antimicrobials (all empirical regimens)

Mainly *beta-lactam antibacterials, penicillins* (J01C) were prescribed for empirical treatments (38.0%, range by country: 0-83.3%). In addition, a comparatively large group consisted of

quinolone antibacterials (J01M; 19.0%, range: 0-42.9%) and *other beta-lactam antibacterials* (J01D; 15.3%, range: 0-53.9%) (Appendix 2 Table A43).

Empirical treatment of respiratory tract infections

Regarding RTIs (*n*=399) mainly *beta-lactam antibacterials* (J01C) were administered (46.9%). At ATC level 4, *combinations of penicillins, including beta-lactamase inhibitors* (J01CR) were prescribed most often (27.6%; 110/399) for RTI treatment. Among these, 98/110 were *amoxicillin and enzyme inhibitor* (J01CR02). Also *fluoroquinolones* (J01MA) comprised a large proportion (19.3%; 77/399) of empirical RTI treatments, of which *levofloxacin* (J01MA12; 22/77), *moxifloxacin* (J01MA14; 26/77) and *ciprofloxacin* (J01MA02; 27/77) represented almost equal proportions. A third fairly large proportion (17.3%; 69/399) of empirical RTI treatments was composed by *penicillins with extended spectrum* (J01CA) of which the majority consisted of *amoxicillin* (J01CA04; 66/69). In most countries J01CR-molecules formed the majority, however in Italy a notable amount (27/46) of empirical treatments for RTIs were third-generation cephalosporins (J01DD), next to J01CR- and J01MA-compounds.

Empirical treatment of urinary tract infections

For empirical treatments of UTI (*n*=229) mainly *other antibacterials* (J01X; 35.4%) and *quinolones* (J01M; 27.5%) were prescribed. Among the *quinolone antibacterials* (J01M) mainly *fluoroquinolones* (J01MA; 27.5%, 63/229) were used, of which the largest proportion (31/63) was formed by *ciprofloxacin* (J01MA02). Among *other antibacterials* (J01X) the largest parts consisted of *nitrofuran derivatives* (J01XE; 17.9%, 41/229) and *other antibacterials* (J01XX; 17.5%, 40/229) of which *nitrofurantoin* (J01XE01; 29/41) and *methenamine* (J01XX05; 33/40) comprised the largest proportions, respectively.

Molecules at ATC level 4 on country level for empirical treatments for RTI and UTI can be found in Appendix 2 Table A44 and A45, respectively.

7.3. Documented antimicrobial treatments

The percentage of antimicrobials prescribed as documented treatment was the smallest in comparison with prophylactic and empirical treatments.
An important part of documented treatments was generally aimed at UTIs (60.2%). In most countries the majority of documented treatments was indicated for UTIs. The second and third largest proportions among documented treatments were represented by skin and non-surgical wound infections (13.1%) and RTIs (8.5%). In thirteen countries the majority (or a shared majority) of documented treatments was indicated for UTIs. In Latvia (2/3 documented treatments) the majority was taken by surgical wound infections, in Lithuania (2/2) by skin or non-surgical wound infections and in UK England by 'other' infections (5/8) (Appendix 2 Table A46).

Prescribed antimicrobials (all documented regimens)

Among documented treatments the three largest proportions of molecules consisted of *other antibacterials* (J01X; 23.7%, 56/236), *beta-lactam antibacterials, penicillins* (J01C; 23.3%, 55/236) and *quinolone antibacterials* (J01M; 22.0%, 52/236). All 4 *drugs for treatment of tuberculosis* (J04A) were part of a combination treatment for one resident in a NH from UK England.
More information on applied molecules for documented treatment at ATC level 3 for each country is shown in Appendix 2 Table A47.

Documented treatment of urinary tract infections

With respect to documented UTI treatments the most administered compounds, at ATC level 4, were *nitrofuran* derivatives (J01XE; 30.3%, 43/142) and *fluoroquinolones* (J01MA; 25.4%,

36/142) of which *nitrofurantoin* (J01XE01; 35/43) and *ciprofloxacin* (J01MA12; 24/36) were most often chosen (Appendix 2 Table A48).

Documented treatment of skin – or non-surigical wound infections

For documented treatment of skin or non-surgical wound infection most often *fluoroquinolones* (J01MA; 25.8%, 8/31) were administered followed by *tetracyclines* (J01AA; 12.9%, 4/31) and *beta-lactamase resistant penicillins* (J01CF; 12.9%, 4/31). All of the latter consisted of *flucloxacillin* (J01CF05) and 7 out of 8 J01MA-molecules were *ciprofloxacin* (J01MA02) (Appendix 2 Table A49).

Documented treatment of respiratory tract infections

Of the 20 documented RTI treatments the largest proportion was formed by *combinations of penicillins, including beta-lactamase inhibitors* (J01CR; *n*=5), all of which were *amoxicillin and enzyme inhibitor* (J01CR02) (Appendix 2 Table A50).

7.4. Characteristics of (residents with) prophylactic, empirical or documented treatment

As mentioned earlier, data on the type of treatment (i.e. whether an antimicrobial was prescribed as prophylactic, empirical or documented treatment) was known for 1441 of 1486 molecules.

Table 5 shows the proportions of several resident characteristics and characteristics of the treatment distributed by the different types of indication. Importantly, residents receiving more than one treatment are included more than once since analysis was performed on treatment level.

Table 5 Resident- and treatment characteristics by type of indication

	Route of administration		
Resident characteristics	**Prophylactic**	**Empirical**	**Documented**
Number of treatments (%)	394 (27.3%)	811 (56.3%)	236 (16.4%)
Gender: % women	80.9% *(*n*=393)	70.5% *(*n*=804)	68.2%
Age: mean (median, range)	83.8 (85.0, 44-102) *(*n*=392)	82.7 (84.0, 31-106) *(*n*=792)	81.4 (84.0, 32-102) *(*n*=227)
% NH stay ≥ 1 year	77.6% *(*n*=392)	67.5% *(*n*=803)	56.2% *(*n*=233)
% recent hospital admission	13.0% *(*n*=392)	22.6% *(*n*=797)	30.3% *(*n*=231)
% surgery	2.7% *(*n*=372)	3.5% *(*n*=743)	3.1% *(*n*=196)
% incontinent	79.4% *(*n*=389)	75.6% *(*n*=806)	77.7% *(*n*=233)
% disoriented	65.7% *(*n*=391)	65.4% *(*n*=804)	61.5% *(*n*=231)
% impaired mobility	64.0% *(*n*=378)	64.2% *(*n*=799)	71.4% *(*n*=224)
% urinary catheter	13.4% *(*n*=389)	16.0% *(*n*=802)	22.8% *(*n*=233)
% vascular catheter	0.5% *(*n*=390)	3.7% *(*n*=795)	5.2% *(*n*=232)
% wound	12.3% *(*n*=391)	25.2% *(*n*=803)	35.5% *(*n*=234)
% parenteral administration	2.1% *(*n*=391)	13.3% *(*n*=806)	10.2%
% hospital prescription	8.2% *(*n*=390)	5.1% *(*n*=808)	16.7% *(*n*=234)
% prescribed by specialist	22.9% *(*n*=388)	23.0% *(*n*=806)	35.8%*(*n*=232)
% culture sample taken	35.3% *(*n*=351)	14.6% *(*n*=783)	92.0%*(*n*=226)
% dipstick taken of UTI-indication	40.0% (*n*=265)	57.1% (*n*=203)	56.9% (*n*=109)

*(n) missing data (known *n*)

With respect to gender, the proportion of women among each type of indication varied significantly ($P<0.001$). Mainly the proportion of women receiving prophylactic treatments was significantly higher compared to the other indications ($P<0.001$).
Also length of NH stay was significantly different among the various types of indication ($P<0.001$), although the proportion of residents being in the NH since one year or longer among residents with empirical treatments was not significantly different compared to the other indications ($P=0.40$).
A recent hospital admission was least common among residents receiving prophylactic treatments and most common among residents receiving documented ABs ($P<0.001$). The difference in proportion of recent hospital admission was insignificant between empirical treatments and the other indication types ($P=0.15$).
All of the risk factors (i.e. having a urinary catheter, a vascular catheter or a wound) were observed in significantly different proportions among residents with different types of treatment ($P=0.008$, $P=0.001$ and $P<0.001$, respectively).
The presence of a urinary catheter was significantly higher among residents receiving documented treatments compared to residents receiving any other type of indication ($P=0.004$).
The presence of a vascular catheter was highly significantly lower among residents with prophylactic treatments compared to residents receiving other treatment types ($P=0.001$).
The presence of a wound was significantly lower among residents receiving prophylactic treatments compared to other indication types and was significantly higher among residents with a documented treatment in comparison to any other indication (both: $P<0.001$).

With respect to treatment characteristics the proportion of parenterally administered antimicrobials was significantly different among the three indication types ($P<0.001$). This proportion was not significantly different when comparing documented to the other treatment types ($P=0.79$).
The proportion of AB treatments prescribed in a hospital also differed significantly among prophylactic, empirical and documented treatments ($P<0.001$). However, no significance was observed in the comparison of prophylactic treatments to the two other types ($P=0.74$).
The difference in percentage of treatments prescribed by a specialist also significantly varied between the three indication types ($P<0.001$). Highly significant was the higher proportion of treatments prescribed by a specialist among the documented treatments compared to the other treatment types ($P<0.001$).
The percentage of culture samples taken varied widely between prophylactic, empirical and documented treatments ($P<0.001$), although when comparing prophylactic to the two other indication types no significance was observed ($P=0.24$). A remarkable result was that the percentage culture samples taken was higher among prophylactic treatments than among empirical treatments.
Regarding the proportion of dipsticks performed for treatments for UTIs only, the difference was also significant between indication types ($P=0.001$).

Regarding age, care load indicators (i.e. incontinence, disorientation and impaired mobility) and whether a recent surgical procedure was performed the differences between groups of indication types were not significant. Only the proportion of residents suffering from impaired mobility was significantly higher among residents receiving a documented treatment compared to residents with any other type of treatment ($P=0.04$).

8. Characteristics of (residents with) parenteral antimicrobial therapy

The administration route was known for 1426 of the 1435 residents and 1477 of the 1486 AB treatments.

8.1. Relation of resident characteristics and route of administration

In order to compare resident characteristics the most aggressive route of administration (i.e. parenteral) was chosen as reference if a resident received both an oral and parenteral treatment (*n*=5). According to this method, 1288 residents received oral and 138 received parenteral treatment.

Gender and age

Data on gender was missing for 8 residents receiving oral treatment of the 1426 residents for whom the administration route was known. Among residents receiving parenteral AB treatment 74.5% (*n*=84) were female in contrast to residents receiving oral treatments of which only 60.9% were female (*P*=0.001).

Data on age was missing for 27 residents from the oral and 3 residents from the parenteral treatment sub-group. In the sub-group of residents receiving parenteral treatments the mean age was 81.3 (median 83.0, range: 31-104). A mean age of 83.2 (median 84.0, range: 32-106) was observed among residents receiving oral treatments (*P*=0.16).

Length of NH stay, hospital admission and recent surgery

A proportion of 39.1% of residents receiving parenteral administration of antimicrobials was admitted to the NH less than one year compared to 30.0% (*P*=0.03) of the residents receiving oral treatments (data lacking for 13 residents from the oral treatment sub-group).

Significantly more residents receiving parenteral ABs were recently admitted to a hospital (28.2%) than residents receiving oral ABs (20.1%; *P*=0.03) (oral *n*=1269, parenteral *n*=135).

Data on recent surgery was absent for 111 residents with oral treatments and for 18 residents with parenteral treatments. Among residents receiving parenteral and oral treatments 2.5% and 3.3% recently underwent surgery (*P*=0.63), respectively.

Care load indicators and risk factors

All care load indicators and risk factors were significantly more often present among residents receiving parenteral AB treatments compared to residents receiving orally administered antimicrobial compounds (all variables: *P*<0.001, except for disorientation, *P*=0.003, and incontinence, *P*=0.03).

All care load indicators and risk factors were entered into a multivariate logistic regression model. Subsequently, stepwise backward regression was applied. This resulted in significantly different proportions among residents receiving oral compared to parenteral AB treatments with respect to urinary catheters, vascular catheters, wounds and disorientation.

The proportions of all care load indicators and risk factors among both residents receiving oral and parenteral antimicrobials as well as the results from the multivariate regression are depicted in Table 6.

Table 6 Presence of care load indicators and risk factors among residents with oral and parenteral antimicrobial treatments

	Residents with				
	Parenteral ABs (*n*=138)	Oral ABs (*n*=1288)	Multivariate regression OR	95% CI	*P*-value
Incontinence (p.[1] *n*=137, o.[2] *n*=1276)	83.9%	75.9%	-	-	-
Disorientation (p. *n*=136, o. *n*=1275)	77.9%	63.3%	1.79	1.16-2.78	0.009
Impaired mobility (p. *n*=136, o. *n*=1252)	80.9%	63.4%	-	-	-
Urinary catheter (p. *n*=136, o. *n*=1275)	41.9%	13.1%	3.04	1.97-4.67	<0.001
Vascular catheter (p. *n*=134, o. *n*=1271)	20.2%	1.3%	9.79	4.83-19.86	<0.001
Wound (p. *n*=135, o. *n*=1279)	43.0%	20.2%	1.91	1.26-2.89	0.002

[1] p.=residents with parenteral ABs
[2] o.=residents with oral ABs

Constructing a model including all resident characteristics, i.e. all care load indicators and risk factors and also gender, age, length of NH stay, recent hospital admission and recent surgery, results in a significant association of parenteral administration with gender (OR 1.79; 95%CI 1.2-2.7; *P*=0.005), disorientation (OR 1.9; 95%CI 1.2-2.9; *P*=0.006), presence of a urinary catheter (OR 2.6; 95%CI 1.7-4.1; *P*=0.001), presence of a vascular catheter (OR 11.0; 95%CI 5.4-22.6; *P*<0.001) and presence of a wound (OR 1.9; 95%CI 1.3-2.9; *P*=0.003).

8.2. Relation of treatment characteristics and route of administration

On treatment level, data was known for 1334 orally and 141 parenterally administered antimicrobial compounds.

Place of prescription and type of prescriber

Data on the place of prescription and type of prescriber was known for 1326 and 1320, respectively, of the oral treatments and for 140 and 139, respectively, of the parenteral treatments.

The majority of parenteral treatments (n=140) was prescribed in the NH (90.0%). A slightly higher percentage (P=0.3) of parenteral antimicrobial compounds was prescribed in the hospital (10.0%) compared to oral ABs (7.5%, n=1326).

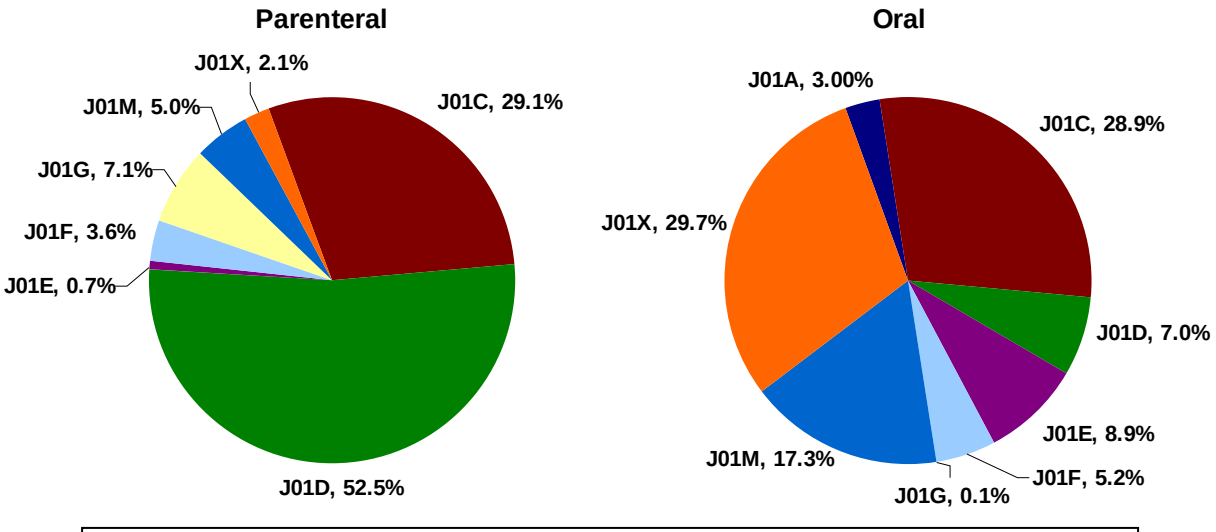
A much larger percentage (P<0.001) of parenteral treatments (44.6%) were prescribed by a specialist in contrast to oral treatments (22.7%). In Appendix 2 Table A51 and A52 detailed information on place of prescription and type of prescriber for orally and parenterally administrated antimicrobials for each country can be found.

Antimicrobial molecules

All parenteral antimicrobial compounds belonged to the class of *antibacterials for systemic use* (J01) while 96.0% of the oral ABs belonged to this group.

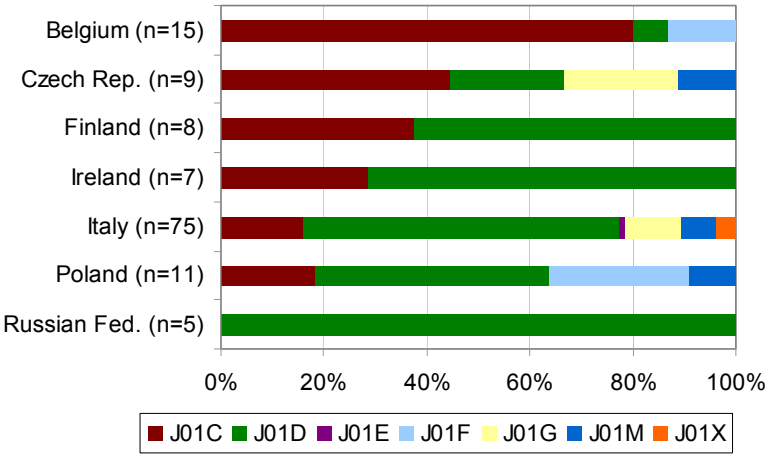
The three largest classes of parenteral administered molecules were *other beta-lactam antibacterials* (J01D; 52.5%), *beta-lactam antibacterials, penicillins* (J01C; 29.1%) and *aminoglycoside antibacterials* (J01G; 7.1%). In comparison, the most common J01-molecules among oral treatments were *other antibacterials* (J01X; 29.7%), *beta-lactam antibacterials, penicillins* (J01C; 28.9%) and *quinolone antibacterials* (J01M; 17.3%) (Figure 29).

Figure 29 Distribution of antibacterials for systemic use (J01) on ATC level 3 for parenteral and oral antimicrobials



Other beta-lactam antibacterials (J01D) represented the largest group of parenteral treatments in Ireland (71.4%), Finland (62.5%), Italy (61.3%) and Poland (45.5%) while in these countries the largest proportion of oral treatments were formed by *beta-lactam antibacterials* (J01C; 27.2%), *other antibacterials* (J01X; 46.5%) and *quinolone antibacterials* (J01M; 58.1% and 33.3%), respectively. *Beta-lactam antibacterials* (J01C) formed the largest proportion of parenteral treatments in Belgium (80.0%) and Czech Republic (44.4%) in contrast to a majority of *other antibacterials* (J01X) among oral treatments (38.2% and 25.0%, respectively) (Appendix 2 Table A53). Figure 30 shows the distribution of *antibacterials for systemic use* (J01) at ATC level 3 for the countries with at least 5 parenteral treatments.

Figure 30 Distribution of antibacterials for systemic use (J01) on ATC level 3 for parenteral antimicrobials (in countries with 5 or more parenteral treatments)



At ATC level 4, among the parenterally administered *other beta-lactam antibacterials* (J01D; *n*=74) mainly *third-generation cephalosporins* (J01DD; 61/74) were prescribed. In Italy, 41 *third-generation cephalosporins* were used. In addition, only in Italy *fourth-generation cephalosporins* (J01DE) were administered and 4 of the 5 *carbapenems* (J01DH). Among the parenteral treatments with *beta-lactam antibacterials* (J01C; *n*=41) most treatments comprised *combinations of penicillins, including beta-lactamase inhibitors* (J01CR; 18/41). Twelve of these 18 treatments were prescribed in Italy. The second largest proportion among J01C-molecules was formed by *penicillins with extended spectrum* (J01CA; 41/41). Eleven of these were prescribed in Belgium.
Information on country level for J01C- (Table A54), J01D- (Table A55) and other type of molecules (A56) can be found in Appendix 2.

9. Comparison of the results of PPS-2 to PPS-1

In April 2009 the first PPS was performed. Only few variables were adjusted or added in the 2nd PPS and therefore comparison was possible between both studies.

Participating countries and nursing homes

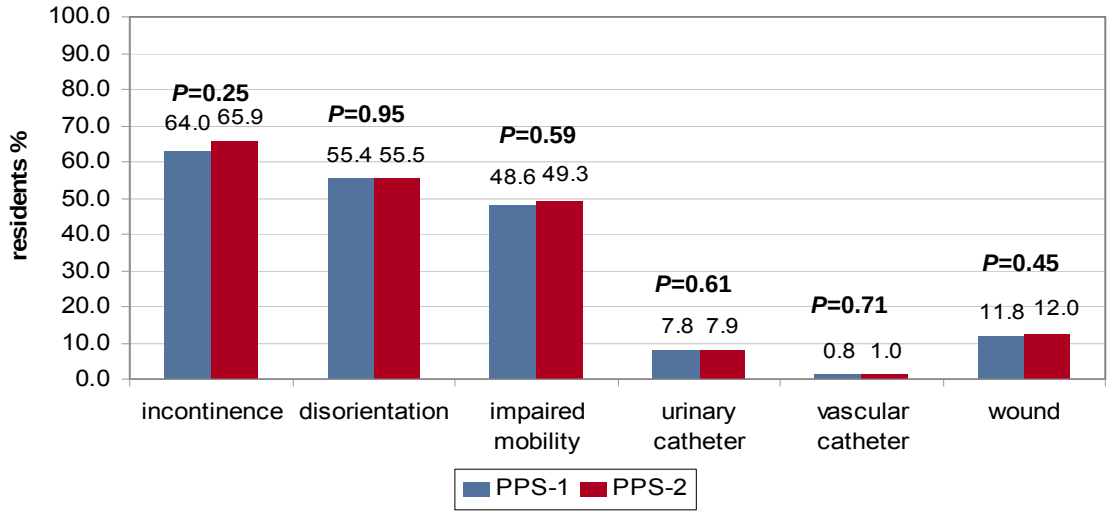
The total amount of participating NHs was larger (57 more) during the first PPS, therefore the total number of eligible residents decreased in the 2nd PPS (4116 eligible residents less). However, the number of participating countries increased. Bulgaria and Hungary were new participants for the 2nd PPS while Scotland only participated in the first PPS.

For a total of 236 NHs, comparative data were available.
The proportion of NHs in which a qualified nurse was present 24/24h remained nearly equal (89.4% vs. 89.8%; *P*=0.88). Close observation, however, revealed some changes. Three NHs (2 from Italy, one from the Netherlands) changed from presence of a qualified nurse to absence while four institutions (2 from Latvia, and one from Poland and Sweden) reported a change the other way around.

Characteristics of the eligible nursing home population

The difference in presence of certain risk factors and care load indicators among the total number of eligible NH residents between the two PPSs was negligible. Figure 31 shows the comparison of the mean proportions in NHs participating in both PPSs.

Figure 31 Mean proportion of care load indicators and risk factors among the eligible residents of NHs participating in both PPS-1 and PPS-2



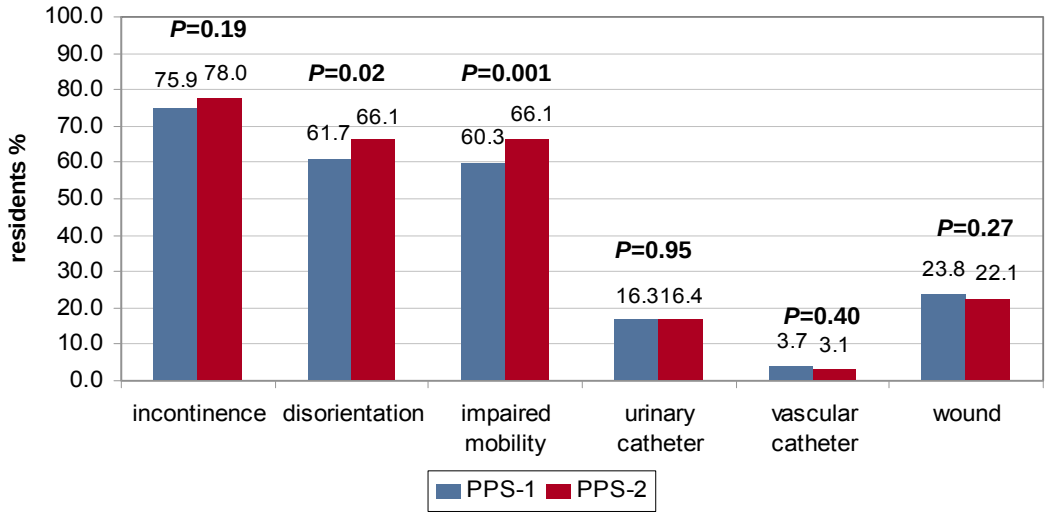
The classification of NHs into high and low care load shifted considerably for Poland (from 3 high care load to 3 low care load indicators), Germany, Ireland (both from 2 low care load and one high care load to 3 high care load indicators) and Sweden (from 3 high care load to 3 low care load indicators). For some other countries (Czech Republic, France and UK England) one of the care load indicators changed.

Characteristics of residents with antimicrobial therapy

For residents of NHs participating in both PPSs (*n*=1540 in PPS-1 and *n*=1330 in PPS-2) the mean (83.1 in PPS-1 vs. 83.0 in PPS-2) and median age (84.0 for both) were not significantly different between the two measurements (*P*=0.69). The proportion of females was somewhat higher in the 2nd PPS (71.5% vs. 72.9%; *P*=0.43). Both the proportions of residents with a NH stay shorter than one year (32.9% vs. 31.2%) and with a recent hospital admission (22.9% vs. 20.6%) were not significantly lower in the 2nd PPS compared to the 1st PPS (*P*=0.34 and *P*=0.14, respectively).

The proportion of all care load indicators increased when comparing the first to the second PPS. Of these, only the proportion of disoriented residents and the proportion of residents suffering from immobility increased significantly. Regarding risk factors differences between PPS-1 and PPS-2 were not significant. Figure 32 gives a representation of the comparison of AB using residents in NHs participating in the 1st and 2nd PPS with regard to care load indicators and risk factors.

Figure 32 Mean proportion of care load indicators and risk factors among the AB using residents of NHs participating in both PPS-1 and PPS-2



Comparing the prevalence of antimicrobial consumption in the 2nd PPS to the 1st a decrease from a mean of 7.1% to a mean of 6.1% was seen. The median showed a smaller decrease from 5.7% (range: 0.0-30.0%) to 5.3% (range: 0.0-33.3%) (*P*=0.058).

A proportion 5.5% (*n*=13) of the NHs had registered no antimicrobial users while in the 2nd PPS this proportion had increased to 9.3% (*n*=22) of the NHs (*P*=0.11).

Characteristics of antimicrobial prescriptions

In the NHs participating in both the 1st and the 2nd PPS, a total of 1604 antimicrobial treatments were used in the 1st and 1379 in the 2nd PPS.

The proportions of oral and parenteral prescription were more or less equal in both PPSs (90.3% vs. 90.0% oral and 9.0% vs. 9.9% parenteral; *P*=0.48). Investigating on country level

showed for most countries no significant differences between both studies. However, in Poland the majority of treatments in the 1st PPS was administered orally (65.7% of 35 treatments) while in the 2nd PPS the majority was administered parenterally (78.6% of 14 molecules).

With respect to the place of prescription no large variation was seen between proportions of each place between the 1st and 2nd study. On country level a significant shift was observed in UK England were the proportion of prescriptions in the hospital changed from 11.1% (n=27) to 43.3% (n=30; P=0.007). Also in Germany it was noteworthy that in the 1st PPS all molecules were prescribed in the NH while in the 2nd PPS the majority (77.8%) was prescribed elsewhere, however the number of molecules was small in both studies (n=4 in PPS-1 and n=9 in PPS-2).

Also the proportions of each type of prescriber were comparable in the 1st and 2nd PPS. Investigating results for all countries separately revealed some important results. In Czech Republic a proportion of 13.2% of all AB treatments (n=53) was prescribed by another person and no treatments were prescribed by a GP in the 1st PPS while in the 2nd PPS 19.3% of all molecules (n=57) was prescribed by a GP and there were no prescriptions by another person (P<0.001). In UK England a shift in place of prescription was seen, which was likely to be related to a shift in type of prescriber. In the 1st PPS 88.9% of all ABs (n=27) was prescribed by the GP while in the 2nd PPS this was only for 55.7% of all ABs (n=30) while the percentage of prescriptions by a specialist increased from 7.4% to 43.3% (P=0.006). Also in Finland an important change was noticeable. In the 1st PPS the proportion of prescriptions by a GP, specialist and other person were 61.2%, 32.3% and 6.5%, respectively in comparison to 42.3%, 57.3% and 0.5%, respectively, in the 2nd PPS (P<0.001). In France the vast majority of molecules were prescribed by the GP (82.4% of 17 ABs) in the 2nd PPS while prescriptions were more spread between GPs and specialists in the 1st PPS (53.6% and 46.4% of 28 treatments, respectively) (P=0.03). In Ireland the proportion of prescriptions by a specialist diminished from 15.8% (n=114) to 1.2% (n=87) from the 1st to the 2nd PPS (P=0.001). In the Netherlands the proportion of GP prescriptions increased substantially (64.7% of 34 ABs in PPS-1 to 87.9% in PPS-2 of 33 ABs; P=0.03). In Norwegian NHs the results from the 1st PPS showed that almost all antimicrobials (95.7% of 47 antimicrobials) were prescribed by the GP and none were prescribed by another person, whereas in the 2nd PPS (n=42) no antimicrobials were prescribed by the GP and 95.2% where prescribed by another person (P<0.001). According to the National Survey, preceding the two PPSs, most ABs in Norway are prescribed by a 'medical doctor employed by the NH' *(1)*. The high proportion of 'other' prescriber in the 2nd PPS is likely to be an attempt to indicate that the prescriber is neither a GP nor a specialist but a NH doctor. For Finland, France, Ireland, the Netherlands and Norway, the shift in results was not reflected in data on the place of prescription.

The proportion of culture samples significantly increased between the 1st and 2nd PPS (28.9% vs. 33.2%, respectively, P=0.015). In twelve countries the proportion increased. The increase was significant in Italy (P=0.02), UK England (P=0.006) and UK Northern Ireland (P=0.001).

Regarding the type of molecules at ATC level 2, level 3 and level 4 results on each proportion of type of antimicrobial from PPS-1 and PPS-2 were more or less equal. Only few countries showed noticable changes when investigating antimicrobials at ATC level 3. In Germany the proportions of each type of molecule at ATC level 3 changed remarkably between the 1st and 2nd PPS from a majority of *quinolones* (J01M) to a majority of *other beta-lactam antibacterials* (J01D), respectively, but the number of molecules were small in both PPSs (n=4 and n=9, respectively). In the Netherlands the majority of antimicrobials in the 1st PPS (n=34) were *other antibacterials* (J01X) while in the 2nd PPS (n=33) the majority were *beta-lactam antibacterial* (J01C) molecules. In Poland the majority of antimicrobials were from the J01C class in the 1st (n=35) and from the J01D class in the 2nd PPS (n=15). In the Russian Federation *tetracyclines* (J01A) formed the majority in the first study in contrast to *other beta-lactam antibacterials* (J01D) in the second.

The distribution of indication types was comparable between both studies. Though numbers per category in some countries were small the overall image of comparison on country level was that in most countries (Belgium, Czech Republic, France, Malta, Norway, Sweden, UK England and UK Northern Ireland) the proportion of prophylactic treatments increased in the 2nd PPS.
Regarding infection types, for those indications for which comparison was possible (keeping in mind that some indication categories were changed or added in the 2nd PPS) the proportion of each infection type was more or less similar. As expected, the proportion of surgical wound infections and other infections decreased because of the addition of the category 'non-surgical wound infections' since these were likely to have been registered under surgical wound infections or other infections during the first study.
Looking at specific indications, the distribution between the proportions did not change largely, except for the changed categories. The amount of each indication was for some countries small. Most apparent was that for quite some countries the proportion of empirical treatments of RTI decreased during the 2nd PPS while for a substantial amount of countries the proportion of prophylactic treatments of UTI increased.

DISCUSSION & CONCLUSION

The aim of creating a European network of NHs and to raise awareness for antimicrobial consumption in NHs was already achieved by the first PPS in April 2009. The second PPS, including 266 NHs from 22 countries, further supported the existence of this network. Even though there is large heterogeneity in the organization and the characteristics of NH care between countries they share a mutual interest in tackling the topic of (appropriate) AB consumption.
The fact that the results of the 1st and 2nd PPS pointed towards the same direction showed that the PPS methodology is reproducible and that the results from both PPSs were sound.

Previous European studies including antimicrobial use in NHs showed that 6% of NH residents in Italian nursing and residential homes and 15% of NH residents in Norway received a systemic antimicrobial treatment *(3;4)*. In the United States prevalence rates of 8% up to 42% of systemic AB consumption were found *(5;6)*.
The prevalence rate of antimicrobial consumption, with a mean of 5.8% and a median of 5.0%, observed in this study was lower compared to the above mentioned studies. However, a wide variation of AB prevalence was observed on NH level (0.0-33.3%) and as well on country level (mean 0.8-13.1%). The prevalence of the 2nd PPS was also lower than that of the 1st PPS. However, the data do not allow stating a reason for this decrease. One line of thought can be that in November 2009 there was large attention for the pandemic flu which might have resulted in more awareness for appropriate and prudent use of antimicrobials. Secondly, it also needs to be kept in mind that residents of NHs might be hospitalized in case of an infection that can not be treated properly within the NH. This can have an impact on the estimation of AB consumption within the NHs in general since some residents with a severe infection receiving ABs might be hospitalized and therefore not counted on the PPS day as AB user. Importantly, these possible explications are speculatative since they can not be proven by the current data.
Again, it is important to underline that the results presented were not representative for a country or for European NHs in general. The number of participants per country was (in most countries) too small to be representative. Furthermore, the NHs participated on a voluntary basis which might result in a bias.

The heterogeneity between NHs in different European countries is reflected in several parts of this study: the varying ownership, the fact that not in all countries in all NHs there is a qualified nurse present 24/24h, the varying lengths of stay and most importantly in the varying case-mix. The European NHs also showed some similarities with respect to a high bed occupancy rate and a relatively low hospitalization rate.
Observing the heterogeneity of NHs in relation to the AB prevalence it was remarkable that the presence of a qualified nurse during 24 hours influenced the amount of ABs consumed significantly. The fact that the AB prevalence was higher in NHs where qualified nurses were present might be the result of more opportunity for attention to signs and symptoms of infection. Also, results showed that a nurse was more often 24/24h present in NHs with a high care load case-mix among the NH population. Any relation between the presence of a nurse and antimicrobial consumption is likely to be biased by the characteristics of the NH population.

The dissimilarities in case-mix were seen in the wide ranging proportions of care load indicators and risk factors among the total NH population on country level. The mean proportion of incontinent residents varied between 18.9% and 82.0%, whereas the percentage disoriented residents ranged from 2.9% and 74.7%. Moreover, the average proportion of residents suffering from impaired mobility varied from 11.6% to 75.3%m and the mean proportion of residents with a urinary catheter varied between 0.3% and 35.5%. Also, some countries had no vascular catheter use on average while the maximum mean percentage observed was 5.5%. Finally, the mean proportion of wounds among residents ranged from 1.2% to 30.0%. The ranges on NH level show much higher ranges indicating that each NH or each country is likely to have different target populations. The case-mix is one of the many factors related to AB

consumption. Moreover, the case-mix is hard to influence since of not all risk factors and care load indicators the presence can be prevented.

All care load and risk factors were clearly more common among AB using residents compared to the total NH population. Some of the risk factors and care load indicators are markers for more severely ill residents and for co-morbidity. Prescription of ABs is likely to be related to the presence of risk factors and care load indicators. This was also seen in the fact that in NH with proportions of risk factors and care load indicators among residents above the European median having significantly higher antimicrobial consumption (except in relation to vascular catheter use) .

Even though the ABs appeared to be mainly orally administered (90.3%), also the distribution of administration routes showed variation between countries and between NHs. The administration route partially depends on the state of the resident (parenteral AB users are mostly more severely ill) and also depends on the prevailing standards and methods of care.
The NH was the most common place (89.2%) of prescription for AB therapies and the majority was prescribed by a GP (70.7%). In some countries the place of prescription and the type of prescriber were linked (for example GP's in NHs and specialists in hospitals). However, for quite some countries the prescriber and the place of prescription did not show signs of a relation at all. The differences in type of prescriber and place of prescription can be explained by the different structures of NH care in the participating countries. Also, different interpretations might have caused differences. For example, in some countries the NH-physician is considered as a specialist while in other countries he/she is regarded as GP.

The fact that only 32.3% of antimicrobial treatments were supported by results from microbiological samples is likely to be a consequence of the lack of resources available in NHs for screening and diagnostics *(5)*. The higher proportion (49.2%) of dipstick test among UTIs results most likely from the fact that these tests are easier to perform and there is no need for an external laboratory. However, dipstick tests and culture samples are not necessarily mutually exclusive. A positive dipstick test (and a positive urine culture) does not by definition confirm the presence of an infection since microorganisms can be present in urine without causing an infection. Additionally, a negative dipstick test is not necessarily an indication for the absence of an infection since dipsticks only indicate presence of Gram-negative bacteria.
Sampling practice is promoted because it allows to choose the best AB to be prescribed. Based on the antibiogram, prescription of small spectrum ABs can be indicated. The adverse effect of culture sampling is that when a micro-organism is found the physician will be inclined to prescribe an antimicrobial regimen without taking the clinical state of the resident into account.
An important remark on the results of the proportion of dipstick tests performed is that the results might be biased by the definition of a dipstick. Other tests for urine exist which in some countries or NHs are called "dipsticks". Therefore dipstick test was explained differently by different responders. As a result the magnitude of dipstick test use can be either over- or underestimated.
It was also seen that dipstick tests were performed while indications other than UTI were registered. Possibly a dipstick test was performed to exclude the presence of a UTI, however there is no data available to support this explanation.

The vast majority of antimicrobial compounds consisted of *antibacterials for systemic use* (J01). The three largest groups of J01-molecules comprised *beta-lactam antibacterials* (J01C), *other antibacterials* (J01X) and *quinolone antibacterials* (J01M). Observing results on country level showed that in many countries *other beta-lactam antibacterials* (J01D) and *sulfonamides and trimethoprim* (J01E) were among the three largest groups as well. The variation between countries regarding the prescribed type of molecules can depend on prevalent infection types, case-mix, standards of care and guidelines.

In all countries empirical treatments comprised the largest proportion of AB therapies. Nevertheless, the percentages of prophylactic, empirical and documented treatments varied widely between countries. Most antimicrobial treatments were indicated for empirical treatment of RTIs followed by prophylactic and empirical treatments of UTIs. The proportion of documented treatments is related to the availability of resources for microbiological diagnosis, though not all positive cultures or even culture samples taken should result in a treatment. Also, the ease of performing culture samples from elderly plays a role. For example, it is difficult to take sputum and stool samples for elderly, moreover sputum samples are often of low quality *(5)*. Additionally, the proportions of prophylactic and empirical treatments depend on the need for treatment or prevention but also on the attention raised in a NH or country for prudent AB use.

In conclusion, our results clearly show that variation within the results can largely be explained by the variation in NH systems, in case-mix and in care practices (institutional factors like AB stewardship resources) that exist throuhgout Europe. Healthcare associated infections and antimicrobial surveillance in NHs needs an adapted approach taking into account these differences and the specific resident- and institutional risk factors.
The ESAC NH sub-project will be integrated in the Healthcare Associated Infections in European Long-Term Care Facilities (HALT) project. HALT is built on the PPS method for measuring antimicrobial consumption and its determinants and additionally collects data on signs and symptoms of infection. The ESAC NH-subproject did real pioneerswork in these care settings.
The big merit of the ESAC-project is that a strong European network of NHs had been created and that a standardised and feasible methodology was set up for care settings whose AB resistance and specific infectious problems were often underestimated or ignored for many years. Another merit is that within countries and individual institutions, awareness has been raised for AB misuse. It is important to maintain this network and the awareness by organizing regular PPSs, to develop better adapted AB prescribing practices and antibiotic stewardships for NHs and long-term care facilities and to promote appropriate AB use and infection control in NHs.

REFERENCES

(1) Broex E, Jans B, Latour K, Goossens H, and the ESAC management team. European Surveillance of Antimicrobial Consumption (ESAC):Results from the national survey of the characteristics of nursing homes. 2010 Aug.

(2) Jans B, Latour K, Broex E, Goossens H, and the ESAC management team. European Surveillance of Antimicrobial Consumption (ESAC): Report on point prevalence survey of antimicrobial prescription in European nursing homes, 2009. 2010 Aug.

(3) Moro ML, Mongardi M, Marchi M, Taroni F. Prevalence of long-term care acquired infections in nursing and residential homes in the Emilia-Romagna Region. Infection 2007 Jun;35(4):250-5.

(4) Blix HS, Bergman J, Schjott J. How are antibacterials used in nursing homes? Results from a point-prevalence prescription study in 44 Norwegian nursing homes. Pharmacoepidemiol Drug Saf 2010 Oct;19(10):1025-30.

(5) Nicolle LE, Bentley DW, Garibaldi R, Neuhaus EG, Smith PW. Antimicrobial use in long-term-care facilities. SHEA Long-Term-Care Committee. Infect Control Hosp Epidemiol 2000 Aug;21(8):537-45.

(6) Benoit SR, Nsa W, Richards CL, Bratzler DW, Shefer AM, Steele LM, et al. Factors associated with antimicrobial use in nursing homes: a multilevel model. J Am Geriatr Soc 2008 Nov;56(11):2039-44.

LIST OF FIGURES

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APPENDICES

Appendix 1 Study tools: Resident questionnaire and Institutional questionnaire

40997

European Surveillance of Antimicrobial Consumption
ESAC 3 - Nursing Home sub-project

INSTITUTIONAL QUESTIONNAIRE
PPS - November 2009

IMPORTANT

In order to allow fast data input, these documents will be scanned.
Therefore it is important to:

- **work only on the original questionnaire (never use a photocopy)**
- **fill the circle completelly and not to tick or circle the answers**
- **avoid the use of staples to attach sheets, do not fold the questionnaire**
- **avoid changing the black markers (4 corners) and recognition marker (left corner)**
- **use capital letters**

Remark: Each Nursing Home (**NH**) enrolled in the point prevalence survey (**PPS**) on antibiotic use **(AB)** has to complete an institutional questionnaire.
Response to this questionnaire is essential for the study as this document collects important structural & functional characteristics, denominator data and information on AB policy in the participating NHs.

NH STUDY- NUMBER |_|_|_|_|_|_|_|_|

PPS STUDY DATE
(dd/mm/yy) |_|_| - |_|_| - |_|_|

A - GENERAL NURSING HOME INFORMATION

OWNERSHIP OF THE NH ○ Private ○ Public

TOTAL NUMBER OF NEW ADMITTED RESIDENTS IN THE NH
(Between 01/01/2008 and 31/12/2008) |_|_|_|

TOTAL NUMBER OF AVAILABLE BEDS IN THE NH
(on 31/12/2008) |_|_|_|_|

QUALIFIED NURSES PRESENT 24/24h IN THE NH ○ Yes ○ No

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B - DENOMINATOR DATA

		On PPS DAY in the ward, total number of			On the PPS DAY in the ward, Total number of eligible residents with:							
WARD STUDY NUMBER	Ward type	Available beds	Hospitalised residents	Occupied beds	Eligible residents	Antibiotic therapy	Urinary catheter	Vascular catheter	Urinary / fecal incontinence	Wounds	Disoriented in time and/or space	Wheelchair user or bedridden
	*	1		2	3	4	5	6	7	8	9	10
NH Total												

* F (*only physical*), M (*only mental*), R (*only rehabilitation/revalidation*), C (*only convalescent*), P (*only palliative*), **A** (*mixed : all or some previously mentioned*)

C - MEDICAL CARE AND COORDINATION

1. How is the medical care organised in the Nursing Home?
   Is medical care to residents provided by the:

   - ○ Personal general practitioner (GP) only
   - ○ Medical staff employed by the NH only (if 'yes', go to Q. 3)
   - ○ Both: personal practitioner and/or medical doctor employed by the NH (if 'yes', go to Q. 4)

2. If only the personal general practitioners take care of the residents, how many different GPs in total currently visit your NH?

   Total number of general practitioners visiting the Nursing Home ___ ___ ___ *Persons*

3. If only the medical staff employed by the NH take care of the resident:

   *How many Full Time Equivalent **(FTEQ)** medical doctors are employed?* ___ ___ , ___ ___ *FTEQ*

   *How many different employed medical doctors **(persons)** ?* ___ ___ ___ *Persons*

4. Are medical activities in the NH coordinated by a coordinating medical doctor/physician (CP)?

   - ○ No, there is no coordination of the medical activity (if 'no', go to Q. 9)
   - ○ Yes, a CP is designated amongst the GPs
   - ○ Yes, a CP is designated amongst the employed NH medical doctors

5. If there is a medical coordinating physician in the NH:

   *How many **FTEQ** coordinating physicians are employed in the NH?* ___ ___ , ___ ___ *FTEQ CP*

   *How many different **persons**?* ___ ___ ___ *Persons*

6. If so, what is the medical speciality of this designated coordinating physician?

   - ○ General practice
   - ○ Internal medicine
   - ○ Geriatrics - Gerontology
   - ○ Other

7. How many hours a month, does this coordinating physician/do these coordinating physicians carry out medical coordination in the NH?

   Total number of hours of medical coordination/month ___ ___ ___ *hours/month*

8. What kinds of tasks are performed (not only theoretically) by the coordinating physician?

- O Medical resident care
- O Organising the medical on-call service in the NH (continuity of medical care)
- O Supervising the medical records of all residents (even for residents treated by other GPs)
- O Training of medical doctors in the NH
- O Training of nursing staff in the NH
- O Development of an antibiotic policy in the NH
- O Development of care strategies in the NH
- O Development of infection prevention policy in the NH
- O Coordinating resident vaccination policy in the NH
- O Organising meetings with the GPs in order to harmonise medical care practices/policies
- O Peer review of medical activities in the NH
- O Other

9. In the NH, during the day, is there a medical doctor

Physically present ?	O Yes	O No
Who can be called by phone ?	O Yes	O No

10. In the NH, during the night, is there a medical doctor

Physically present ?	O Yes	O No
Who can be called by phone ?	O Yes	O No

D - INFECTION CONTROL PRACTICE IN THE NH

1. Is an infection control pratitioner (ICP) present in the NH ?

O Yes O No (if 'no', go to Q. 9)

2. If there is an infection control practitioner present in the NH:

*How many **FTEQ** ICPs are employed in the NH?* |__|__|,|__|__| *FTEQ ICP*

*How many different **persons** are employed?* |__|__|__| *Persons*

3. Which infection control practitioner(s) is/are present in the NH ?

O A nurse O A doctor O An IC doctor + IC nurse

4. If an 'Infection control doctor' is present in the NH, what is his/her medical specialty?

- O Pharmacist
- O Microbiologist
- O Infection control doctor (hospital hygiene specialist)
- O Infectiologist
- O Epidemiologist
- O Other

5. How many hours a month is this 'infection control doctor' actively involved in infection control in the NH?

Total number of hours of <u>medical</u> infection prevention/control per month ? ___ *hours/month*

6. If an 'Infection control nurse' is present in the NH, what is his/her nursing specialty?

- O Nurse without specific infection prevention training
- O A specially trained Infection control nurse
- O Others

Specify

7. How many hours a month is this 'infection control nurse' actively involved in infection control in the NH?

Total number of hours of <u>nursing</u> infection prevention/control per month ? ___ *hours/month*

8. Which of the following tasks are the infection prevention experts in charge of (not only theoretically)?

- O Surveillance (registration and follow-up) of infections in the NH
- O Infection prevention training of the Nursing and paramedical staff
- O Infection prevention training of the GPs and medical staff
- O Developing care protocols
- O Registration of residents colonised/infected with multi-resistant microorganisms
- O Investigation of outbreaks
- O Feedback on surveillance results to the nursing/medical NH-staff
- O Formulation of recommendations/advice for good AB use, developing the NH AB policy
- O Supervision of disinfection and sterilisation of medical and care material
- O Deciding isolation & additional precautions for residents colonised with resistant microorganisms
- O Supervision and development of vaccination policy in the NH
- O Feedback to GPs on AB consumption in the NH
- O Organisation, control, feedback on hand hygiene in the NH
- O Other

specify:

9. In the NH, is an 'Infection control committee' responsible for infection prevention policies in the NH?

O Yes O No

10. Has the NH an official connection (for advice with a 'Hospital Infection Control team'?

O Yes O No

11. In the NH, a written protocol for:

Management of MRSA carriers available? O Yes O No

Hand hygiene available? O Yes O No

E - ANTIBIOTIC POLICY

1. Which types of physicians prescribe antibiotics in the NH?

	ESTIMATED % OF TOTAL NR. AB PRESCRIPTIONS	NR. OF DIFFERENT PERSONS
○ General practitioner	___ %	___ *Persons*
○ Infectious disease specialist	___ %	___ *Persons*
○ Geriatrician	___ %	___ *Persons*
○ Internal medicine specialist	___ %	___ *Persons*
○ Other	___ %	___ *Persons*

2. Does the NH use a 'restrictive list' of ABs to be prescribed? (*Is there a limitation for the types of ABs that can be prescribed?)*

○ Yes ○ No (if 'no', go to Q. 4)

3. If a restrictive list exists, what kind of ABs are restricted ?(*Requiring motivated prescription or not to be used)*

- ○ Carbapenems
- ○ 3th gen. Cephalosporins
- ○ Fluoroquinolones
- ○ Vancomycin
- ○ Mupirocine
- ○ Glycopeptides
- ○ Broad-spectrum AB
- ○ Intravenously administered antibiotics
- ○ Other

Specify

4. Which of following elements are present/available in the NH?

- ○ An 'antibiotic committee'
- ○ Regular training of prescribers on appropriate AB prescription practice (at lest 1/year)
- ○ Written guidelines for appropriate AB use (good practice) in the NH (if 'no', skip Q. 5 and Q. 6)
- ○ Data available on annual AB consumption by AB class
- ○ Microbiological samples taken for guidance of best AB choice
- ○ Drug resistance profiles in the NH
- ○ Mandatory use of a 'motivation form' for prescription of ABs not included in local formulary list
- ○ Pharmacist providing advice on AB prescription/choice in the NH
- ○ NH therapeutic formulary including a specific chapter on Antimicrobial therapy

5. If written therapeutic guidelines are present in the NH, are they on:

- ○ Respiratory tract infections
- ○ Urinary tract infections
- ○ Wound and soft tissue infections
- ○ Other

6. If available, are these written guidelines implemented/used in the NH?

- ○ Always
- ○ Very often
- ○ Often
- ○ Sometimes
- ○ Never

7. Are antibiotics delivered to the NH by a:

- ○ Public pharmacy
- ○ Hospital pharmacy
- ○ Wholesaler
- ○ By the family
- ○ Other

WE KINDLY THANK YOU FOR YOUR PARTCIPATION TO THIS PROJECT

ESAC European Surveillance of Antimicrobial Consumption

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European Surveillance of Antimicrobial Consumption
ESAC 3 - Nursing Home sub-project

RESIDENT QUESTIONNAIRE

IMPORTANT

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- **avoid the use of staples to attach sheets, do not fold the questionnaire**
- **avoid changing the black markers (4 corners) and recognition marker (left corner)**
- **use capital letters**

***Remark:** This questionnaire needs ONLY to be completed for residents receiving antibiotics on the day of the survey in the facility.*

NH STUDY- NUMBER ☐☐☐☐

WARD STUDY- NUMBER ☐☐☐☐☐

RESIDENT DATA

RESIDENT STUDY- NUMBER ☐☐☐☐

PPS STUDY DATE (dd/mm/yy) ☐☐ - ☐☐ - ☐☐

GENDER
- ☐ *Male*
- ☐ *Female*

BIRTH YEAR (yyyy) ☐☐☐☐

LENGTH OF STAY IN THE NH less than 1 year/ 1 year or longer
- ☐ *less than 1 year*
- ☐ *1 year or longer*

ADMISSION IN THE HOSPITAL (during the past 3 months)
- ☐ *Yes*
- ☐ *No*

SURGERY IN THE PREVIOUS 30 DAYS
- ☐ *Yes*
- ☐ *No*

PRESENCE OF:

- URINARY CATHETER	☐ *Yes*	☐ *No*
- VASCULAR CATHETER	☐ *Yes*	☐ *No*
- INCONTINENCE (urinary and/or faecal)	☐ *Yes*	☐ *No*
- WOUNDS:		
- *PRESSURE WOUNDS*	☐ *Yes*	☐ *No*
- *OTHER WOUNDS*	☐ *Yes*	☐ *No*
- DISORIENTED (in time and/or space)	☐ *Yes*	☐ *No*

- MOBILITY
  - ☐ *Ambulant*
  - ☐ *Wheelchair*
  - ☐ *Bedridden*

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ANTIBIOTIC TREATMENT DATA

	Antibiotic - 1	Antibiotic - 2	Antibiotic - 3	Antibiotic - 4
ANTIBIOTIC NAME (capital letters)				
TOTAL PRESCRIBED DAILY DOSE				
UNIT	☐ *gr./ day* ☐ *mg./ day* ☐ *I.U. / day*	☐ *gr./ day* ☐ *mg./ day* ☐ *I.U./ day*	☐ *gr./ day* ☐ *mg./ day* ☐ *I.U./ day*	☐ *gr./ day* ☐ *mg./ day* ☐ *I.U./ day*
ADMINISTRATION ROUTE	☐ *Oral* ☐ *IM or IV* ☐ *Nasal (mupirocin)* ☐ *Inhalation* ☐ *Rectal*	☐ *Oral* ☐ *IM or IV* ☐ *Nasal (mupirocin)* ☐ *Inhalation* ☐ *Rectal*	☐ *Oral* ☐ *IM or IV* ☐ *Nasal (mupirocin)* ☐ *Inhalation* ☐ *Rectal*	☐ *Oral* ☐ *IM or IV* ☐ *Nasal (mupirocin)* ☐ *Inhalation* ☐ *Rectal*
INDICATIONS (please use code-list)				
WHERE PRESCRIBED ?	☐ *In this NH* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this NH* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this NH* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this NH* ☐ *In the hospital* ☐ *Elsewhere*
WHO PRESCRIBED?	☐ *GP* ☐ *Specialist* ☐ *Pharmacist* ☐ *Nurse* ☐ *Other*	☐ *GP* ☐ *Specialist* ☐ *Pharmacist* ☐ *Nurse* ☐ *Other*	☐ *GP* ☐ *Specialist* ☐ *Pharmacist* ☐ *Nurse* ☐ *Other*	☐ *GP* ☐ *Specialist* ☐ *Pharmacist* ☐ *Nurse* ☐ *Other*
CULTURE SAMPLE TAKEN BEFORE AB-THERAPY ?	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*
FOR URINE: DIPSTICK BEFORE AB-THERAPY ?	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*

ISOLATED MICROORGANISMS (Optional)

NAME OF ISOLATED MICROORGANISM (please use code-list)				

TO BE FILLED IN BY THE HALT NATIONAL STUDY COORDINATOR

ATC - CODE (please use capital letters)				

Appendix 2 Detailed information of results on country level

Table A1 Number of nursing homes and eligible residents per country

Country	Number of NHs (*n*)	Number of eligible residents (*n*)
Belgium	103	11160
Bulgaria	2	45
Croatia	5	1281
Czech Republic	6	607
Denmark	5	325
Finland	8	1765
France	8	599
Germany	5	474
Hungary	4	281
Ireland	11	843
Italy	28	2610
Latvia	5	1193
Lithuania	3	566
Malta	5	319
Netherlands	4	713
Norway	5	516
Poland	8	885
Russian Federation	3	1383
Slovenia	6	1419
Sweden	7	352
UK England	5	249
UK Northern Ireland	30	984
TOTAL	266	28569

Table A2 NH size in number of available beds per country

	Available beds				
Country (*n* NHs)	Total	Mean	Median	Minimum	Maximum
Belgium (103)	11527	111.91	103	17	274
Bulgaria (2)	47	23.50	23.5	17	30
Croatia (5)	1309	261.80	293	107	380
Czech Rep. (6)	715	119.17	109	40	208
Denmark (5)	349	69.80	61	54	103
Finland (8)	1827	228.38	192.5	60	587
France (8)	643	80.38	79.5	43	119
Germany (5)	504	100.80	108	29	196
Hungary (4)	290	72.50	70	40	110
Ireland (11)	948	86.18	58	21	195
Italy (28)	2695	96.25	60	20	470
Latvia (5)	1216	243.20	240	65	519
Lithuania (3)	587	195.67	203	128	256
Malta (5)	331	66.20	64	31	123
Netherlands (4)	743	185.75	141.5	82	378
Norway (5)	527	105.40	108	40	160
Poland (8)	1292	161.50	95	55	415
Russian Fed. (3)	1474	491.33	514	310	650
Slovenia (6)	1442	240.33	193.5	73	606
Sweden (7)	457	65.29	63	48	87
UK England (5)	259	51.80	46	40	85
UK N-Ireland (30)	1459	48.63	50	25	86
TOTAL (266)	30641	115.19	90	17	650

Table A3 Ownership, presence of qualified nurse, bed occupancy and hospitalization per country

Country (*n* NHs)	Proportion (%)			
	Publicly owned	With qualified nurse 24h	Median bed occupancy rate	Median hospitalization rate
Belgium (103)	43.14 *(*n*=102)	98.06	97.82 *(*n*=102)	1.37 *(*n*=99)
Bulgaria (2)	0.00	100	95.39	0.00 *(*n*=1)
Croatia (5)	100	100	99.16	0.84
Czech Rep. (6)	66.67	100	80.55	0.00 *(*n*=1)
Denmark (5)	100	20.00	96.72	1.49
Finland (8)	100	100	98.63	0.18 *(*n*=6)
France (8)	37.50	12.50	94.31	0.54 *(*n*=4)
Germany (5)	60.00	100	94.64	0.94
Hungary (4)	0.00	100	97.90	0.77
Ireland (11)	100	100	93.16	0.00 *(*n*=10)
Italy (28)	85.71	92.86	98.07	0.00
Latvia (5)	100	100	98.60	0.71
Lithuania (3)	100 *(*n*=2)	100	97.66	0.50
Malta (5)	100	20.00	96.75	0.00
Netherlands (4)	100	75.00	98.28	0.14
Norway (5)	60.00	100	99.21	0.00
Poland (8)	100	75.00	95.66	0.00 *(*n*=7)
Russian Fed. (3)	66.67	100	96.92	0.92 *(*n*=2)
Slovenia (6)	66.67	100	98.64	1.47
Sweden (7)	66.67 *(*n*=6)	42.86	98.96 *(*n*=6)	0.00 *(*n*=6)
UK England (5)	0.00	100	97.50	1.18
UK N-Ireland (30)	0.00	100	94.20	1.98
TOTAL (266)	54.75 *(*n*=263)	90.23	97.50 *(*n*=264)	0.96 *(*n*=246)

*(n) missing data (known *n*)

Table A4 Number of eligible residents and proportion of eligible residents on occupied beds per country

Country (*n* NHs)	Eligible residents (*n*)	% of total proportion occupied beds on PPS day		
		Mean %	Median %	Min.-Max.
Belgium (102)	11160	99.48	100	81.82-100
Bulgaria (2)	45	100	100	100-100
Croatia (5)	1281	99.06	100	96.32-100
Czech Rep. (6)	607	99.89	100	99.36-100
Denmark (5)	325	99.27	100	97.85-100
Finland (8)	1765	99.25	99.29	97.51-100
France (8)	599	99.78	100	98.25-100
Germany (5)	474	99.60	100	98.91-100
Hungary (4)	281	100	100	100-100
Ireland (11)	843	98.63	100	87.57-100
Italy (28)	2610	98.79	100	89.47-100
Latvia (5)	1193	99.86	100	99.29-100
Lithuania (3)	566	99.56	99.50	99.18-100
Malta (5)	319	100	100	100-100
Netherlands (4)	713	99.07	100	96.29-100
Norway (5)	516	100	100	100-100
Poland (8)	885	79.68	99.72	25.74-100
Russian Fed. (3)	1383	97.83	99.68	93.81-100
Slovenia (6)	1419	99.77	100	98.63-100
Sweden (7)	352	100	100	100-100
UK England (5)	249	99.11	100	95.56-100
UK N-Ireland (30)	984	73.94	72.23	61.82-92.59
TOTAL (265)	28569	95.90	100	25.74-100

Table A5 Prevalence of care load indicators per country

	Median proportion of eligible NH residents with:					
	Incontinence		Disorientation		Impaired mobility	
Country (*n* NHs)	**%**	**min-max**	**%**	**min-max**	**%**	**min-max**
Belgium (99)	60.54	12.82-100	51.41	18.18-100	45.90 *(*n*=97)	7.87-90.63
Bulgaria (2)	50.97	20.69-81.25	70.58	68.75-72.41	50.54	44.83-56.25
Croatia (5)	36.94	10.45-58.88	26.75	11.50-46.74	17.24	14.16-34.58
Czech Rep. (6)	62.47	30.88-86.54	43.86	14.71-89.10	57.06	22.06-76.28
Denmark (5)	55.36	47.26-58.49	57.14	6.59-68.18	32.08	27.11-37.36
Finland (8)	80.06	58.30-96.67	69.13	48.33-95.00	42.84	33.33-100
France (8)	71.23 *(*n*=7)	43.64-94.64	70.73	57.27-98.21	33.87	20.91-74.60
Germany (5)	69.78	50.00-83.02	61.32	39.29-66.04	51.43	32.14-58.79
Hungary (4)	81.78	73.08-85.94	56.35	43.84-64.06	55.89	42.50-68.75
Ireland (9)	75.61	58.14-94.74	68.92	54.95-98.15	60.00	47.22-71.05
Italy (28)	86.31	41.18-99.51	65.00	27.50-98.29	75.00	11.25-92.47
Latvia (5)	27.22	15.38-75.74	15.38	13.41-37.38	26.81	14.40-50.47
Lithuania (3)	44.03	15.15-73.60	33.33	16.16-69.60	44.44	41.92-48.00
Malta (4)	30.56	13.95-43.70	19.16	9.52-25.00	8.13	2.33-27.73
Netherlands (4)	67.52	65.84-75.41	56.61	41.46-77.05	54.57	50.68-62.30
Norway (5)	75.40	71.74-95.00	70.65	53.17-85.00	32.45	22.50-34.78
Poland (7)	42.86	11.43-84.75	40.57	10.48-55.13	46.23	21.05-60.00
Russian Fed. (2)	18.87	11.78-25.96	2.93	2.71-3.16	14.71	9.82-19.59
Slovenia (6)	81.68	21.71-87.50	43.96	20.11-87.50	40.93	32.12-52.78
Sweden (6)	62.41	14.71-82.46	58.97	25.00-75.44	44.48	15.52-68.42
UK England (5)	79.49	67.44-90.70	59.52	20.93-79.49	72.09	64.10-86.05
UK N-Ireland (30)	71.20	45.45-91.43	63.30	28.00-100	58.12	26.32-95.24
TOTAL	67.44 *(*n*=255)	10.45-100	66.13 *(*n*=256)	2.71-100	50.00 *(*n*=254)	2.33-100

*(n) missing data (known *n*)

Table A6 Prevalence of risk factors per country

	Median proportion of eligible NH residents with:					
	Urinary catheter		Vascular catheter		Wounds	
Country (*n* NHs)	**%**	**min-max**	**%**	**min-max**	**%**	**min-max**
Belgium (99)	2.06	0.00-18.75	0.00	0.00-5.08	9.50	0.00-23.44
Bulgaria (2)	11.10	3.45-18.75	3.13	0.00-6.25	11.42	10.34-12.50
Croatia (5)	1.98	0.27-2.55	0.00	0.00-0.85	4.53	1.87-8.28
Czech Rep. (6)	30.67	16.67-61.67	3.43	0.00-16.13	27.96	16.03-46.08
Denmark (5)	10.71	6.06-20.75	0.00	0.00-0.00	3.57	0.00-10.99
Finland (8)	3.17	1.41-6.67	0.00	0.00-0.35	10.12	0.71-14.63
France (8)	0.68	0.00-4.55	0.00	0.00-2.74	11.09	2.27-23.29
Germany (5)	6.59	3.57-7.55	0.00	0.00-0.55	9.43	6.04-14.29
Hungary (4)	4.84	0.00-26.03	0.00	0.00-0.00	10.85	5.77-12.50
Ireland (11)	5.75	0.93-9.76	0.00	0.00-0.00	9.30	2.63-26.83
Italy (28)	18.45	0.00-73.33	2.43	0.00-45.24	18.71	5.47-64.71
Latvia (5)	0.36	0.00-0.85	0.00	0.00-0.00	2.51	0.00-3.16
Lithuania (3)	1.01	0.00-2.06	0.00	0.00-0.00	4.00	3.70-9.09
Malta (5)	3.57	0.00-5.04	0.00 *(*n*=4)	0.00-0.00	4.96 *(*n*=4)	0.00-6.72
Netherlands (4)	7.40	4.11-13.41	0.00	0.00-0.00	16.95	13.50-20.49
Norway (5)	6.35	0.00-7.28	0.00	0.00-1.59	13.25	5.00-16.82
Poland (7)	0.00	0.00-35.24	0.00	0.00-6.21	5.19	0.00-16.67
Russian Fed. (3)	0.92*(*n*=2)	0.80-1.05	0.00*(*n*=2)	0.00-0.00	0.96	0.70-1.91
Slovenia (6)	1.93	0.00-3.70	0.00	0.00-0.00	5.21	2.59-16.67
Sweden (6)	10.77	1.72-20.59	0.00	0.00-2.94	10.03	1.72-16.18
UK England (5)	10.71	7.50-20.93	0.00	0.00-4.65	16.67	13.95-48.84
UK N-Ireland (30)	5.64	0.00-24.00	0.00	0.00-0.00	12.13	3.33-42.86
TOTAL	3.17 *(*n*=257)	0.00-73.33	0.00 *(*n*=255)	0.00-45.24	10.00 *(*n*=257)	0.00-64.71

*(n) missing data (known *n*)

Table A7 Characteristics of residents receiving antimicrobial treatment per country

Country (*n* NHs)	Residents with antimicrobial therapy on the PPS day: total no. of residents with AB	median age	% females	% NH stay < 1 yr	% recent hospital admission	% recent surgery <30 days	% incontinence	% disoriented	% impaired mobility	% urinary catheter	% vascular catheter	% wounds
BE (103)	523	85*	77.8*	22.6*	18.8*	3.2*	72.6*	57.6*	65.8*	8.2*	0.0*	17.1*
BG (2)	3	83	100	33.3	33.3	0.0	66.7	66.7	33.3	33.3	33.3	0.0
HR (5)	21	82.5*	61.9	14.3	9.5	0.0	61.9	31.6*	28.6	14.3	0.0	9.5
CZ (6)	54	81	51.9	100	85.2	-	79.6	72.2	75.9	50.0	9.3	42.6
DK(5)	22	86	70.0*	28.6*	4.6	0.0	81.8	59.1	45.5	14.3*	0.0	13.6
FI (8)	207	85*	82.0*	32.5*	14.4*	2.5*	85.9*	73.2*	57.2*	7.4*	0.5*	15.8*
FR (8)	17	86	64.7	29.4	11.8	0.0	70.6	94.1	47.1	0.0	5.9	5.9
DE (5)	9	80	55.6	44.4	25.0*	0.0*	77.8	77.8	44.4	11.1	11.1	44.4
HU (4)	7	81	71.4	42.9	14.3	0.0	71.4	57.1	71.4	0.0	0.0	28.6
IE (11)	85	82*	63.9*	34.5*	17.7	4.8*	80.0	71.4*	64.7	12.9	0.0*	15.7*
IT (28)	158	86*	66.2*	36.3*	22.9*	2.6*	88.5*	79.6*	85.9*	47.1*	16.1*	39.1*
LV (5)	12	75*	50.0	25.0	33.3	16.7	41.7	33.3	41.7	0.0	0.0	58.3
LT (3)	10	73	70.0	20.0	20.0	20.0	50.0	50.0	50.0	10.0	0.0	50.0
MT (5)	8	87	62.5	12.5	0.0	12.5	37.5	37.5	37.5	12.5	0.0	42.9*
NL (4)	32	82*	65.6	30.0*	3.6*	3.5*	67.7	58.1*	56.7*	6.3	0.0	37.5
NO (5)	42	87.5	83.3	28.6	16.7	2.4	88.1	61.9	57.1	11.9	0.0	23.8
PL (8)	24	81	69.6*	20.8	20.8	0.0*	70.8	52.2*	78.3*	37.5	25.0	29.2
RU (3)	13	80	76.9	7.7	7.7	-	15.4	38.5	15.4	0.0	0.0	15.4
SI (6)	38	82.5	79.0	27.0*	18.4	7.9	92.1	65.8	63.2	15.8	0.0	13.2
SE (7)	22	84*	63.6	68.2	40.9	-	45.5	45.5	59.1	31.8	9.1	45.5
UK EN (5)	26	77	53.9	60.0*	53.9	4.2*	88.0*	56.5*	88.5	27.3*	4.6*	54.2*
UK N-IE (30)	102	86	74.5	20.6	14.7	2.0	75.5	76.5	69.6	9.8	0.0	15.7
TOTAL	1435	84*	73.2*	30.9*	21.0*	3.2*	76.7*	64.8*	65.8*	15.8*	3.1*	22.5*

* Data missing for some residents
- Data missing for all residents

Table A8 Prevalence of antimicrobial treatment per country

Country (*n* NHs)	Eligible residents (*n*)	Residents with ABs (*n*)	Prevalence of AB use per 100 residents (%)				
			Mean	Median	Min.	Max.	Poisson 95%CI
Belgium (103)	11160	523	4.73	4.35	0.00	15.38	4.32-5.17
Bulgaria (2)	45	3	9.38	9.38	0.00	18.75	5.72-14.84
Croatia (5)	1281	21	1.83	1.86	0.64	3.74	0.82-3.42
Czech Rep. (6)	607	54	9.63	9.02	2.94	19.35	7.34-12.50
Denmark (5)	325	22	6.42	7.58	1.89	8.79	4.38-9.03
Finland (8)	1765	207	13.10	12.24	3.23	33.33	10.74-15.89
France (8)	599	17	3.29	2.50	0.00	11.63	2.12-4.76
Germany (5)	474	9	1.55	0.00	0.00	6.67	0.69-3.15
Hungary (4)	281	7	2.09	2.25	0.00	3.85	0.86-3.94
Ireland (11)	843	85	10.12	10.00	2.33	21.95	8.30-12.15
Italy (28)	2610	158	6.19	5.65	0.00	26.67	5.29-7.17
Latvia (5)	1193	12	1.19	1.28	0.39	1.79	0.44-2.61
Lithuania (3)	566	10	1.66	1.65	0.80	2.53	0.54-3.89
Malta (5)	319	8	1.63	1.52	0.00	5.04	0.69-3.15
Netherlands (4)	713	32	4.68	4.26	4.10	6.10	2.86-7.42
Norway (5)	516	42	7.88	7.94	5.00	11.96	5.55-10.66
Poland (8)	885	24	2.32	2.36	0.00	6.67	1.43-3.71
Russian Fed. (3)	1383	13	0.81	0.96	0.00	1.49	0.08-2.41
Slovenia (6)	1419	38	3.43	3.59	1.04	5.56	2.17-5.35
Sweden (7)	352	22	5.57	5.73	1.75	8.82	3.79-7.72
UK England (5)	249	26	10.33	10.00	7.69	13.95	7.77-13.64
UK N-Ireland (30)	984	102	10.24	9.55	2.00	20.00	9.12-11.44
TOTAL (266)	28569	1435	4.95	5.00	0.00	33.33	5.55-6.14

Table A9 Number of residents receiving treatment with more than one molecule per country

Country (*n* NHs)	No. of residents with ABs	Residents with >1 molecule per resident	
		n	%
Belgium (103)	523	12	2.29
Bulgaria (2)	3	0	0.00
Croatia (5)	21	0	0.00
Czech Rep. (6)	54	3	5.56
Denmark (5)	22	0	0.00
Finland (8)	207	14	6.76
France (8)	17	0	0.00
Germany (5)	9	0	0.00
Hungary (4)	7	0	0.00
Ireland (11)	85	5	5.89
Italy (28)	158	3	1.90
Latvia (5)	12	0	0.00
Lithuania (3)	10	0	0.00
Malta (5)	8	0	0.00
Netherlands (4)	32	1	3.13
Norway (5)	42	3	7.14
Poland (8)	24	0	0.00
Russian Fed. (3)	13	0	0.00
Slovenia (6)	38	1	2.63
Sweden (7)	22	1	4.55
UK England (5)	26	3	11.54
UK N-Ireland (30)	102	3	2.94

Table A10 Distribution of route of administration of antimicrobial treatments per country

		Administration route					
	No. of	Oral		Parenteral		Rectal	
Country (*n* NHs)	molecules	*n*	%	*n*	%	*n*	%
Belgium (103)	533/535	518	97.19	15	2.81	0	0.00
Bulgaria (2)	3	2	66.67	1	33.33	0	0.00
Croatia (5)	21	21	100	0	0.00	0	0.00
Czech Rep. (6)	57	48	84.21	9	15.79	0	0.00
Denmark (5)	22	22	100	0	0.00	0	0.00
Finland (8)	221	213	96.38	8	3.62	0	0.00
France (8)	17	16	94.12	1	5.88	0	0.00
Germany (5)	9	8	88.89	1	11.11	0	0.00
Hungary (4)	7	7	100	0	0.00	0	0.00
Ireland (11)	90	81	90.00	7	7.78	2	2.22
Italy (28)	161	86	53.42	75	46.58	0	0.00
Latvia (5)	12	12	100	0	0.00	0	0.00
Lithuania (3)	10	6	60.00	4	40.00	0	0.00
Malta (5)	7/8	7	100	0	0.00	0	0.00
Netherlands (4)	33	32	96.97	1	3.03	0	0.00
Norway (5)	45	45	100	0	0.00	0	0.00
Poland (8)	23/24	12	52.17	11	47.83	0	0.00
Russian Fed. (3)	13	8	61.54	5	38.46	0	0.00
Slovenia (6)	38/39	38	100	0	0.00	0	0.00
Sweden (7)	23	22	95.65	1	4.35	0	0.00
UK England (5)	27/31	26	96.30	1	3.70	0	0.00
UK N-Ireland (30)	105	104	99.05	1	0.95	0	0.00
TOTAL (266)	1477/1486	1334	90.32	141	9.55	2	0.14

Table A11 Distribution of place of prescription of antimicrobial treatments per country

		Place of prescription					
	Total no.	Nursing home		Hospital		Elsewhere	
Country (*n* NHs)	molecules	*n*	%	*n*	%	*n*	%
Belgium (103)	534	503	94.19	29	5.43	2	0.37
Bulgaria (2)	3	3	100	0	0.00	0	0.00
Croatia (5)	19	17	89.47	2	10.53	0	0.00
Czech Rep. (6)	57	49	85.96	7	12.28	1	1.75
Denmark (5)	22	20	90.91	2	9.09	0	0.00
Finland (8)	221	180	81.45	21	9.50	20	9.05
France (8)	17	15	88.24	2	11.76	0	0.00
Germany (5)	9	1	11.11	1	11.11	7	77.78
Hungary (4)	7	7	100	0	0.00	0	0.00
Ireland (11)	89	85	95.51	3	3.37	1	1.12
Italy (28)	160	150	93.75	10	6.25	0	0.00
Latvia (5)	12	9	75.00	3	25.00	0	0.00
Lithuania (3)	10	8	80.00	2	20.00	0	0.00
Malta (5)	8	7	87.50	1	12.50	0	0.00
Netherlands (4)	33	29	87.88	4	12.12	0	0.00
Norway (5)	42	40	95.24	2	4.76	0	0.00
Poland (8)	24	24	100	0	0.00	0	0.00
Russian Fed. (3)	13	13	100	0	0.00	0	0.00
Slovenia (6)	38	33	86.84	5	13.16	0	0.00
Sweden (7)	23	18	78.26	4	17.39	1	4.35
UK England (5)	30	17	56.67	13	43.33	0	0.00
UK N-Ireland (30)	105	89	84.76	7	6.67	9	8.57
TOTAL (266)	1476/1486	1317	89.23	114	7.72	45	3.05

Table A12 Distribution of type of prescriber of antimicrobial treatments per country

Country (*n* NHs)	Total no. molecules	Person who prescribed					
		GP		Specialist		Other	
		n	%	*n*	%	*n*	%
Belgium (103)	533	499	93.62	32	6.00	2	0.38
Bulgaria (2)	3	0	0.00	3	100	0	0.00
Croatia (5)	20	18	90.00	2	10.00	0	0.00
Czech Rep. (6)	57	11	19.30	46	80.70	0	0.00
Denmark (5)	22	18	81.82	2	9.09	2	9.09
Finland (8)	220	93	42.27	126	57.27	1	0.45
France (8)	17	14	82.35	2	11.76	1	5.88
Germany (5)	9	7	77.78	2	22.22	0	0.00
Hungary (4)	7	4	57.14	3	42.86	0	0.00
Ireland (11)	87	74	85.06	1	1.15	12	13.79
Italy (28)	157	68	43.31	88	56.05	1	0.64
Latvia (5)	12	8	66.67	4	33.33	0	0.00
Lithuania (3)	10	8	80.00	2	20.00	0	0.00
Malta (5)	7	7	100	0	0.00	0	0.00
Netherlands (4)	33	29	87.88	4	12.12	0	0.00
Norway (5)	42	0	0.00	2	4.76	40	95.24
Poland (8)	24	17	70.83	7	29.17	0	0.00
Russian Fed. (3)	13	13	100	0	0.00	0	0.00
Slovenia (6)	38	33	86.84	5	13.16	0	0.00
Sweden (7)	23	10	43.48	13	56.62	0	0.00
UK England (5)	30	17	56.67	13	43.33	0	0.00
UK N-Ireland (30)	105	91	86.67	4	3.81	10	9.52
TOTAL (266)	1469	1039	70.73	361	24.57	69	4.70

Table A13 Culture samples and dipsticks performed per country

Country (*n* NHs)	Total no. molecules	Culture sample (%)	Total no. of indications for UTI	Dipstick (% of UTI indication)	No. dipstick for indication other than UTI
Belgium (103)	494	25.10	215/269	30.23	5
Bulgaria (2)	3	0.00	0	n.a.	0
Croatia (5)	19	31.58	10/11	90.00	0
Czech Rep. (6)	57	63.16	0/30	-	-
Denmark (5)	22	63.64	15/16	93.33	1
Finland (8)	215	38.14	156/161	52.56	0
France (8)	15	26.67	2	100	1
Germany (5)	9	0.00	2	100	0
Hungary (4)	7	0.00	1	100	0
Ireland (11)	88	30.68	35/43	80.00	1
Italy (28)	156	35.26	31/32	45.16	34
Latvia (5)	12	25.00	1	0.00	1
Lithuania (3)	10	20.00	1	0.00	0
Malta (5)	8	0.00	2	0.00	0
Netherlands (4)	33	24.24	6/13	66.67	0
Norway (5)	27	55.56	13/29	76.92	1
Poland (8)	24	12.50	2	50.00	0
Russian Fed. (3)	13	7.69	0/1	-	-
Slovenia (6)	35	25.71	18/21	83.33	0
Sweden (7)	23	47.83	0/4	-	-
UK England (5)	25	68.00	5/10	100	0
UK N-Ireland (30)	105	33.33	68	51.47	0
TOTAL (266)	1400	32.29	583/719	49.23	44

n.a.: not applicable
- Data missing for all UTI indications

Table A14 Distribution and type of antibacterials for systemic use (J01) on ATC level 3 per country

	Antibacterials for systemic use																	
Country	All J01	J01A		J01C		J01D		J01E		J01F		J01G		J01M		J01X	
(*n* NHs)	*n*	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
BE (103)	507	14	2.8	140	27.6	13	2.6	9	1.8	26	5.1	1	0.2	106	20.9	198	39.1
BG (2)	3	0	0.0	1	33.3	1	33.3	0	0.0	1	33.3	0	0.0	0	0.0	0	0.0
HR (5)	21	2	9.5	7	33.3	4	19.1	3	14.3	1	4.8	0	0.0	3	14.3	1	4.8
CZ (6)	55	2	3.6	16	29.1	6	10.9	6	10.9	2	3.6	2	3.6	9	16.4	12	21.8
DK(5)	22	0	0.0	9	40.9	0	0.0	3	13.6	0	0.0	0	0.0	0	0.0	10	45.5
FI (8)	214	2	0.9	39	18.2	30	14.0	28	13.1	5	2.3	0	0.0	11	5.1	99	46.3
FR (8)	17	0	0.0	15	88.2	2	11.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
DE (5)	9	1	11.1	2	22.2	4	44.4	1	11.1	0	0.0	0	0.0	1	11.1	0	0.0
HU (4)	7	0	0.0	5	71.4	0	0.0	0	0.0	0	0.0	0	0.0	2	28.6	0	0.0
IE (11)	85	0	0.0	24	28.2	14	16.5	15	17.7	7	8.2	0	0.0	8	9.4	17	20.0
IT (28)	161	0	0.0	38	23.6	47	29.2	3	1.9	4	2.5	8	5.0	55	34.2	6	3.7
LV (5)	12	4	33.3	7	58.3	0	0.0	0	0.0	0	0.0	0	0.0	1	8.33	0	0.0
LT (3)	9	1	11.1	7	77.8	1	11.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
MT (5)	8	0	0.0	3	37.5	0	0.0	0	0.0	2	25.0	0	0.0	3	37.5	0	0.0
NL (4)	32	4	12.5	13	40.6	1	3.1	1	3.1	2	6.3	0	0.0	8	25.0	3	9.4
NO (5)	44	2	4.6	15	34.1	1	2.3	4	9.1	3	6.8	0	0.0	2	4.6	17	38.6
PL (8)	22	2	9.1	5	22.7	6	27.3	0	0.0	4	18.2	0	0.0	5	22.7	0	0.0
RU (3)	13	0	0.0	0	0.0	7	53.9	0	0.0	4	30.8	0	0.0	2	15.4	0	0.0
SI (6)	39	0	0.0	19	48.7	2	5.1	7	18.0	0	0.0	0	0.0	8	20.5	3	7.7
SE (7)	21	1	3.1	10	31.3	2	6.3	2	6.3	1	3.1	0	0.0	2	6.3	3	9.4
UK EN (5)	27	2	7.4	9	33.3	3	11.1	7	25.9	5	18.5	0	0.0	0	0.0	1	3.7
UK N-IE (30)	101	4	4.0	28	27.7	20	19.8	27	26.7	5	5.0	0	0.0	3	3.0	14	13.9
TOTAL (266)	1429	41	2.9	412	28.8	164	11.5	116	8.1	72	5.1	11	0.7	229	16.0	384	26.9

Table A15 Distribution and type of tetracyclines (J01AA) per country

	Tetracyclines (J01A+J01AA)				
	All J01A(A)	J01AA02 doxycycline	J01AA06 oxytetracycline	J01AA07 tetracycline	J01AA08 minocycline
Country (*n* NHs)	*n*	*n*	*n*	*n*	*n*
Belgium (103)	14	8	1	2	3
Croatia (5)	2	2	0	0	0
Czech Rep. (6)	2	2	0	0	0
Finland (8)	2	2	0	0	0
Germany (5)	1	1	0	0	0
Latvia (5)	4	4	0	0	0
Lithuania (3)	1	1	0	0	0
Netherlands (4)	4	4	0	0	0
Norway (5)	2	2	0	0	0
Poland (8)	2	2	0	0	0
Sweden (7)	1	1	0	0	0
UK England (5)	2	2	0	0	0
UK N-Ireland (30)	4	3	1	0	0
TOTAL	41	34	2	2	3
%		82.9%	4.9%	4.9%	7.3%

Table A16 Distribution and type of β-lactam antibacterials (J01C) on ATC level 4 per country

	Beta-lactam antibacterials, penicillins (J01C)								
	All J01C	J01CA		J01CE		J01CF		J01CR	
Country (*n* NHs)	***n***	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Belgium (103)	140	44	31.4	1	0.7	12	8.6	83	59.3
Bulgaria (2)	1	1	100	0	0.0	0	0.0	0	0.0
Croatia (5)	7	2	28.6	0	0.0	0	0.0	5	71.4
Czech Rep. (6)	16	4	25.0	1	6.3	0	0.0	11	68.8
Denmark (5)	9	4	44.4	2	22.2	3	33.3	0	0.0
Finland (8)	39	28	71.8	5	12.8	0	0.0	6	15.4
France (8)	15	9	60.0	0	0.0	0	0.0	6	40.0
Germany (5)	2	0	0.0	0	0.0	0	0.0	2	100
Hungary (4)	5	0	0.0	0	0.0	0	0.0	5	100
Ireland (11)	24	3	12.5	2	8.3	5	20.8	14	58.3
Italy (28)	38	2	5.3	0	0.0	0	0.0	36	94.7
Latvia (5)	7	6	85.7	0	0.0	0	0.0	1	14.3
Lithuania (3)	7	5	71.4	2	28.6	0	0.0	0	0.0
Malta (5)	3	0	0.0	0	0.0	0	0.0	3	100
Netherlands (4)	13	4	30.8	0	0.0	1	7.7	8	61.5
Norway (5)	15	8	53.3	6	40.0	1	6.7	0	0.0
Poland (8)	5	3	60.0	0	0.0	0	0.0	2	40.0
Slovenia (6)	19	2	10.5	1	5.3	0	0.0	16	84.2
Sweden (7)	10	4	40.0	1	10.0	4	40.0	1	10.0
UK England (5)	9	2	22.2	1	11.1	4	44.4	2	22.2
UK N-Ireland (30)	28	13	46.4	1	3.6	7	25.0	7	25.0
TOTAL	412	144	35.0	23	5.6	37	9.0	208	50.5

Table A17 Distribution and type of penicillins with extended spectrum (J01CA) per country

	Beta-lactam antibacterials, penicillins (J01C) / Penicillins with extended spectrum (J01CA)				
	All J01CA	J01CA01 ampicillin	J01CA02 pivampicillin	J01CA04 amoxicillin	J01CA08 pivmecillinam
Country (*n* NHs)	***n***	***n***	***n***	***n***	***n***
Belgium (103)	44	0	0	44	0
Bulgaria (2)	1	0	0	1	0
Croatia (5)	2	0	0	2	0
Czech Rep. (6)	4	0	0	4	0
Denmark (5)	4	0	0	1	3
Finland (8)	28	0	0	1	27
France (8)	9	0	0	9	0
Ireland (11)	3	0	1	2	0
Italy (28)	2	0	0	2	0
Latvia (5)	6	0	0	6	0
Lithuania (3)	5	2	0	3	0
Netherlands (4)	4	0	0	4	0
Norway (5)	8	0	0	1	7
Poland (8)	3	1	0	2	0
Slovenia (6)	2	0	0	2	0
Sweden (7)	4	0	0	1	3
UK England (5)	2	0	0	2	0
UK N-Ireland (30)	13	0	0	12	1
TOTAL	144	3	1	99	41
%		2.1%	0.7%	68.8%	28.5%

Table A18 Distribution and type of β-lactamase sensitive penicillins (J01CE) per country

	Beta-lactam antibacterials, penicillins (J01C) / Beta-lactamase sensitive penicillins (J01CE)				
Country (*n* NHs)	**All J01CE** ***n***	**J01CE01 benzylpenicillin** ***n***	**J01CE02 phenoxy-methylpenicillin** ***n***	**J01CE08 benzathine benzylpenicillin** ***n***	**J01CE09 procaine benzylpenicillin** ***n***
Belgium (103)	1	0	0	1	0
Czech Rep. (6)	1	0	0	0	1
Denmark (5)	2	0	2	0	0
Finland (8)	5	1	3	1	0
Ireland (11)	2	1	1	0	0
Lithuania (3)	2	2	0	0	0
Norway (5)	6	0	6	0	0
Slovenia (6)	1	0	1	0	0
Sweden (7)	1	0	1	0	0
UK England (5)	1	0	1	0	0
UK N-Ireland (30)	1	0	1	0	0
TOTAL	23	4	16	2	1
%		17.4%	69.6%	8.7%	4.4%

Table A19 Distribution and type of β-lactamase resistant penicillins (J01CF) per country

	Beta-lactam antibacterials, penicillins (J01C) / Beta-lactamase resistant penicillins (J01CF)		
Country (*n* NHs)	**All J01CF** ***n***	**J01CF01 dicloxacillin** ***n***	**J01CF05 flucloxacillin** ***n***
Belgium (103)	12	0	12
Denmark (5)	3	3	0
Ireland (11)	5	0	5
Netherlands (4)	1	0	1
Norway (5)	1	1	0
Sweden (7)	4	0	4
UK England (5)	4	0	4
UK N-Ireland (30)	7	0	7
TOTAL	37	4	33
%		10.8%	89.2%

Table A20 Distribution and type of combinations of penicillins, incl. β-lactamase inhibitors (J01CR) per country

	Beta-lactam antibacterials, penicillins (J01C) / Combinations of penicillins, incl. beta-lactamase inhibitors (J01CR)					
Country (*n* NHs)	**All J01CR** ***n***	**J01CR01 ampicillin and enzyme inhibitor** ***n***	**J01CR02 amoxicillin and enzyme inhibitor** ***n***	**J01CR04 sultamicillin** ***n***	**J01CR05 piperacillin and enzyme inhibitor** ***n***	**J01CR50 combinations of penicillins** ***n***
Belgium (103)	83	0	83	0	0	0
Croatia (5)	5	0	5	0	0	0
Czech Rep. (6)	11	0	10	0	1	0
Finland (8)	6	0	6	0	0	0
France (8)	6	0	6	0	0	0
Germany (5)	2	0	2	0	0	0
Hungary (4)	5	0	5	0	0	0
Ireland (11)	14	0	13	1	0	0
Italy (28)	36	0	24	0	7	0
Latvia (5)	1	0	1	0	0	0
Malta (5)	3	0	3	0	0	0
Netherlands (4)	8	0	8	0	0	0
Poland (8)	2	0	2	0	0	0
Slovenia (6)	16	0	16	0	0	0
Sweden (7)	1	0	1	0	0	0
UK England (5)	2	0	2	0	0	0
UK N-Ireland (30)	7	0	6	0	0	1
TOTAL	208	5	193	1	8	1
%		2.4%	92.8%	0.5%	3.9%	0.5%

Table A21 Distribution and type of other β-lactam antibacterials (J01D) on ATC level 4 per country

	Other beta-lactam antibacterials (J01D)										
Country	**All J01D**	**J01DB**		**J01DC**		**J01DD**		**J01DE**		**J01DH**	
(*n* NHs)	***n***	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Belgium (103)	13	3	23.1	10	76.9	0	0.0	0	0.0	0	0.0
Bulgaria (2)	1	0	0.0	0	0.0	1	100	0	0.0	0	0.0
Croatia (5)	4	1	25.0	2	50.0	1	25.0	0	0.0	0	0.0
Czech Rep. (6)	6	0	0.0	4	66.7	2	33.3	0	0.0	0	0.0
Finland (8)	30	25	83.3	3	10.0	2	6.7	0	0.0	0	0.0
France (8)	2	0	0.0	0	0.0	2	100	0	0.0	0	0.0
Germany (5)	4	0	0.0	3	75.0	0	0.0	0	0.0	1	25.0
Ireland (11)	14	3	21.4	6	42.9	5	35.7	0	0.0	0	0.0
Italy (28)	47	0	0.0	0	0.0	42	89.4	1	2.1	4	8.5
Lithuania (3)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0
Netherlands (4)	1	0	0.0	0	0.0	1	100	0	0.0	0	0.0
Norway (5)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0
Poland (8)	6	0	0.0	1	16.7	5	83.3	0	0.0	0	0.0
Russian Fed. (3)	7	4	57.1	0	0.0	3	42.9	0	0.0	0	0.0
Slovenia (6)	2	0	0.0	2	100	0	0.0	0	0.0	0	0.0
Sweden (7)	2	1	50.0	0	0.0	1	50.0	0	0.0	0	0.0
UK England (5)	3	3	100	0	0.0	0	0.0	0	0.0	0	0.0
UK N-Ireland (30)	20	19	95.0	1	5.0	0	0.0	0	0.0	0	0.0
TOTAL	164	60	36.6	33	20.1	65	39.6	1	0.6	5	3.1

Table A22 Distribution and type of 1st generation cephalosporins (J01DB) per country

	Other beta-lactam antibacterials (J01D) / First-generation cephalosporins (J01DB)				
	All J01DB	J01DB01 cefalexin	J01DB04 cefazolin	J01DB05 cefadroxil	J01DB09 cefradine
Country (*n* NHs)	*n*	*n*	*n*	*n*	*n*
Belgium (103)	3	0	1	2	0
Croatia (5)	1	1	0	0	0
Finland (8)	25	25	0	0	0
Ireland (11)	3	2	0	0	1
Norway (5)	1	1	0	0	0
Russian Fed. (3)	4	2	2	0	0
Sweden (7)	1	0	0	1	0
UK England (5)	3	3	0	0	0
UK N-Ireland (30)	19	19	0	0	0
TOTAL	60	53	3	3	1
%		88.3%	5.0%	5.0%	1.7%

Table A23 Distribution and type of 2nd generation cephalosporins (J01DC) per country

	Other beta-lactam antibacterials (J01D) / 2nd-generation cephalosporins (J01DC)		
	All J01DC	J01DC02 cefuroxime	J01DC04 cefaclor
Country (*n* NHs)	*n*	*n*	*n*
Belgium (103)	10	9	1
Croatia (5)	2	2	0
Czech Rep. (6)	4	4	0
Finland (8)	3	3	0
Germany (5)	3	3	0
Ireland (11)	6	5	1
Lithuania (3)	1	1	0
Poland (8)	1	1	0
Slovenia (6)	2	0	2
UK N-Ireland (30)	1	0	1
TOTAL	33	28	5
%		84.9%	15.2%

Table A24 Distribution and type of 3rd generation cephalosporins (J01DD) per country

	Other beta-lactam antibacterials (J01D) / third-generation cephalosporins (J01DD)					
	All J01DD	J01DD01 cefotaxime	J01DD02 ceftazidime	J01DD04 ceftriaxone	J01DD08 cefixime	J01DD13 cefpodoxime
Country (*n* NHs)	*n*	*n*	*n*	*n*	*n*	*n*
Bulgaria (2)	1	1	0	0	0	0
Croatia (5)	1	0	0	0	1	0
Czech Rep. (6)	2	2	0	0	0	0
Finland (8)	2	0	0	2	0	0
France (8)	2	0	0	1	0	1
Ireland (11)	5	0	0	5	0	0
Italy (28)	42	0	4	37	1	0
Netherlands (4)	1	0	0	0	1	0
Poland (8)	5	1	0	4	0	0
Russian Fed. (3)	3	2	0	1	0	0
Sweden (7)	1	0	0	1	0	0
TOTAL	65	6	4	51	3	1
		9.2%	6.2%	78.5%	4.6%	1.5%

A25 Description of the type of J01DE and J01DH molecules on country level

Other beta-lactam antibacterials (J01D) / fourth-generation cephalosporins (J01DE)

The only J01DE molecule was prescribed in Italy and consisted of cefepime (J01DE01).

Other beta-lactam antibacterials (J01D) / carbapenems (J01DH)

Out of five carbapenems, 4 were prescribed in Italy of which 2 were meropenem (J01DH02) and 2 imipenem and enzyme inhibitor (J01DH51). The third J01DH02 molecule was prescribed in Germany.

Table A26 Distribution and type of sulfonamides and trimethoprim (J01E) and J01EA & J01EE molecules per country

	Sulfonamides and trimethoprim (J01E) / Trimethoprim and derivatives (J01EA) & Combinations of sulfonamides and trimethoprim, incl. derivatives (J01EE)				
		J01EA01 trimethoprim		J01EE01 sulfamethoxazole and trimethoprim	
Country (*n* NHs)	All J01E *n*	*n*	%	*n*	%
Belgium (103)	9	0	0.0	9	100
Croatia (5)	3	0	0.0	3	100
Czech Rep. (6)	6	0	0.0	6	100
Denmark (5)	3	3	100	0	0.0
Finland (8)	28	28	100	0	0.0
Germany (5)	1	0	0.0	1	100
Ireland (11)	15	15	100	0	0.0
Italy (28)	3	0	0.0	3	100
Netherlands (4)	1	1	100	0	0.0
Norway (5)	4	4	100	0	0.0
Slovenia (6)	7	0	0.0	7	100
Sweden (7)	2	1	50.0	1	50.0
UK England (5)	7	7	100	0	0.0
UK N-Ireland (30)	27	26	96.3	1	3.7
TOTAL	116	85	73.3	31	26.7

Table A27 Distribution and type of other macrolides, lincosamides and streptogramins (J01F) on ATC level 4 per country

	Macrolides, lincosamides and streptogramins (J01F)				
	All J01F	J01FA		J01FF	
Country (*n* NHs)	*n*	*n*	%	*n*	%
Belgium (103)	26	18	69.2	8	30.8
Bulgaria (2)	1	1	100	0	0.0
Croatia (5)	1	1	100	0	0.0
Czech Rep. (6)	2	1	50.0	1	50.0
Finland (8)	5	0	0.0	5	100
Ireland (11)	7	6	85.7	1	14.3
Italy (28)	4	4	100	0	0.0
Malta (5)	2	1	50.0	1	50.0
Netherlands (4)	2	1	50.0	1	50.0
Norway (5)	3	1	33.3	2	66.7
Poland (8)	4	1	25.0	3	75.0
Russian Fed. (3)	4	4	100	0	0.0
Sweden (7)	1	0	0.0	1	100
UK England (5)	5	5	100	0	0.0
UK N-Ireland (30)	5	5	100	0	0.0
TOTAL	72	49	68.1	23	31.9

Table A28 Distribution and type of macrolides (J01FA) per country

	Macrolides, lincosamides and streptogramins (J01F) / Macrolides (J01FA)					
Country (*n* NHs)	**All J01FA** ***n***	**J01FA01 erythromycin** ***n***	**J01FA03 midecamycin** ***n***	**J01FA09 clarithro-mycin** ***n***	**J01FA10 azithromycin** ***n***	**J01FA15 telithro-mycin** ***n***
Belgium (103)	18	1	0	9	7	1
Bulgaria (2)	1	0	0	0	1	0
Croatia (5)	1	0	0	0	1	0
Czech Rep. (6)	1	0	0	1	0	0
Ireland (11)	6	1	0	5	0	0
Italy (28)	4	0	0	4	0	0
Malta (5)	1	0	0	1	0	0
Netherlands (4)	1	0	0	0	1	0
Norway (5)	1	1	0	0	0	0
Poland (8)	1	0	0	1	0	0
Russian Fed. (3)	4	0	4	0	0	0
UK England (5)	5	1	0	4	0	0
UK N-Ireland (30)	5	3	0	2	0	0
TOTAL	49	7	4	27	10	1
%		9.7%	5.6%	37.5%	13.9%	1.4%

Table A29 Distribution and type of lincosamides (J01FF) per country

	Macrolides, lincosamides and streptogramins (J01F) / Lincosamides (J01FF)		
Country (*n* NHs)	**All J01FF** ***n***	**J01FF01 clindamycin** ***n***	**J01FF02 lincomycin** ***n***
Belgium (103)	8	6	2
Czech Rep. (6)	1	1	0
Finland (8)	5	5	0
Ireland (11)	1	1	0
Malta (5)	1	1	0
Netherlands (4)	1	1	0
Norway (5)	2	2	0
Poland (8)	3	1	2
Sweden (7)	1	1	0
TOTAL	23	19	4
%		82.6%	17.4%

Table A30 Distribution and type of aminoglycoside antibacterials (J01G) and other aminoglycosides (J01GB) per country

	Aminoglycoside antibacterials (J01G) / Other aminoglycosides (J01GB)			
Country (*n* NHs)	**All J01G(B)** ***n***	**J01GB03 gentamicin** ***n***	**J01GB06 amikacin** ***n***	**J01GB07 netilmicin** ***n***
Belgium (103)	1	0	0	1
Czech Rep. (6)	2	2	0	0
Italy (28)	8	1	7	0
TOTAL	11	3	6	1
%		27.3%	63.6%	9.1%

Table A31 Distribution and type of quinolones (J01M) and fluoroquinolones (J01MA) per country

	Quinolone antibacterials (J01M) / Fluoroquinolones (J01MA)					
Country	**All J01MA**	**J01MA01 ofloxacin**	**J01MA02 ciprofloxacin**	**J01MA06 norfloxacin**	**J01MA12 levofloxacin**	**J01MA14 moxifloxacin**
(*n* NHs)	***n***	***n***	***n***	***n***	***n***	***n***
Belgium (103)	106	7	43	10	15	31
Croatia (5)	3	0	1	2	0	0
Czech Rep. (6)	9	3	3	3	0	0
Finland (8)	11	0	7	0	4	0
Germany (5)	1	0	0	0	1	0
Hungary (4)	2	0	2	0	0	0
Ireland (11)	8	5	3	0	0	0
Italy (28)	55	0	25	2	22	6
Latvia (5)	1	0	1	0	0	0
Malta (5)	3	0	3	0	0	0
Netherlands (4)	8	0	3	5	0	0
Norway (5)	2	0	2	0	0	0
Poland (8)	5	0	4	1	0	0
Russian Fed. (3)	2	0	2	0	0	0
Slovenia (6)	8	0	5	3	0	0
Sweden (7)	2	0	2	0	0	0
UK N-Ireland (30)	3	0	3	0	0	0
TOTAL	229	15	109	26	42	37
%		6.6%	47.6%	11.4%	18.3%	16.2%

Table A32 Distribution and type of other antibacterials (J01X) on ATC level 4 per country

	Other antibacterials (J01X)										
Country	**All J01X**	**J01XA**		**J01XC**		**J01XD**		**J01XE**		**J01XX**	
(*n* NHs)	***n***	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Belgium (103)	198	0		0		0		158	79.8	40	20.2
Croatia (5)	1	0		0		0		1	100	0	
Czech Rep. (6)	12	0		0		0		12	100	0	
Denmark (5)	10	0		0		0		10	100	0	
Finland (8)	99	0		1	1.0	0		24	24.2	74	74.8
Ireland (11)	17	0		0		0		17	100	0	
Italy (28)	6	3	50.0	0		0		3	50.0	0	
Netherlands (4)	3	0		0		0		3	100	0	
Norway (5)	17	0		0		0		4	23.5	13	76.5
Slovenia (6)	3	0		0		0		3	100	0	
Sweden (7)	3	0		0		1	33.3	2	66.7	0	
UK England (5)	1	0		0		1	100	0		0	
UK N-Ireland (30)	14	0		0		0		14	100	0	
TOTAL	384	3	0.8	1	0.3	2	0.5	251	65.4	127	33.1

A33 Description of the type of J01XA, J01XC and J01XD molecules on country level

Other antibacterials (J01X) / Glycopeptide antibacterials (J01XA)

The three J01XA molecules consisted of *teicoplanin* (J01XA02) and were prescribed in 3 NHs in Italy.

Other antibacterials (J01X) / Steroid antibacterials (J01XC)

The only J01XA molecule was prescribed in Finland and was *fusidic acid* (J01XC01).

Other antibacterials (J01X) / Imidazole derivatives (J01XD)

The two J01XD molecules were both *metronidazole* (J01XD01) and were prescribed in UK England and Sweden.

Table A34 Distribution and type of nitrofuran derivatives (J01XE) per country

	Other antibacterials (J01X) / Nitrofuran derivatives (J01XE)		
	All J01XE	J01XE01 nitrofurantoin	J01XE02 nifurtoinol
Country (*n* NHs)	***n***	***n***	***n***
Belgium (103)	158	78	80
Croatia (5)	1	1	0
Czech Rep. (6)	12	12	0
Denmark (5)	10	10	0
Finland (8)	24	24	0
Ireland (11)	17	17	0
Italy (28)	3	3	0
Netherlands (4)	3	2	1
Norway (5)	4	4	0
Slovenia (6)	3	3	0
Sweden (7)	2	2	0
UK N-Ireland (30)	14	14	0
TOTAL	251	170	81
%		67.7%	32.3%

Table A35 Distribution and type of other antibacterials (J01XX) per country

	Other antibacterials (J01X) / Other antibacterials (J01XX)			
	All J01XX	J01XX01 fosfomycin	J01XX05 methenamine	J01XX08 linezolid
Country (*n* NHs)	***n***	***n***	***n***	***n***
Belgium (103)	40	39	0	1
Finland (8)	74	1	73	0
Norway (5)	13	0	13	0
TOTAL	127	40	86	1
%		31.5%	67.7%	0.8%

Table A36 Type of antimicrobial treatment (prophylactic, empirical, documented) per country

	No. of	Prophylactic		Empirical		Documented	
Country (*n* NHs)	**molecules**	***n***	**%**	***n***	**%**	***n***	**%**
Belgium (103)	504	148	29.4	264	52.4	92	18.3
Bulgaria (2)	3	0	0.0	3	100	0	0.0
Croatia (5)	21	0	0.0	18	85.7	3	14.3
Czech Rep. (6)	57	12	21.1	23	40.0	22	38.6
Denmark (5)	22	10	45.5	11	50.0	1	4.6
Finland (8)	220	90	40.9	100	45.5	30	13.6
France (8)	16	1	6.3	12	75.0	3	18.8
Germany (5)	9	0	0.0	9	100	0	0.0
Hungary (4)	7	0	0.0	7	100	0	0.0
Ireland (11)	89	31	34.8	50	56.2	8	9.0
Italy (28)	161	8	5.0	130	80.8	23	14.3
Latvia (5)	12	0	0.0	9	75.0	3	25.0
Lithuania (3)	10	1	10.0	7	70.0	2	20.0
Malta (5)	8	1	12.5	7	87.5	0	0.0
Netherlands (4)	33	4	12.1	23	69.7	6	18.2
Norway (5)	45	18	40.0	20	44.4	7	15.6
Poland (8)	23	0	0.0	20	87.0	3	13.0
Russian Fed. (3)	13	0	0.0	13	100	0	0.0
Slovenia (6)	35	6	17.1	24	68.6	5	14.3
Sweden (7)	20	2	10.0	9	45.0	9	45.0
UK England (5)	28	8	28.6	12	42.9	8	28.6
UK N-Ireland (30)	105	54	51.4	40	38.1	11	10.5
TOTAL	1441	394	27.3%	811	56.3%	236	16.4%

Table A37 Prophylactic treatments by type of infection per country

Country (*n* NHs)	All prophylactic treatments	Indications for prophylactic treatment													
		Surgical wound infection		Respiratory tract infection		Urinary tract infection		Gastro-intestinal infection		Bacteremia / septicaemia / sepsis		Unspecified infection		Other infection	
	n	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Belgium (103)	148	0	0.0	5	3.4	131	88.5	0	0.0	0	0.0	7	4.7	5	3.4
Czech Rep. (6)	12	1	8.3	0	0.0	10	83.3	0	0.0	0	0.0	1	8.3	0	0.0
Denmark (5)	10	0	0.0	0	0.0	10	100	0	0.0	0	0.0	0	0.0	0	0.0
Finland (8)	90	0	0.0	1	1.1	81	90.0	0	0.0	0	0.0	0	0.0	8	0.0
France (8)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ireland (11)	31	0	0.0	4	12.9	27	87.1	0	0.0	0	0.0	0	0.0	0	0.0
Italy (28)	8	0	0.0	2	25.0	1	12.5	0	0.0	0	0.0	0	0.0	5	62.5
Lithuania (3)	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	100
Malta (5)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Netherlands (4)	4	0	0.0	0	0.0	2	50.0	0	0.0	2	50.0	0	0.0	0	0.0
Norway (5)	18	0	0.0	0	0.0	18	100	0	0.0	0	0.0	0	0.0	0	0.0
Slovenia (6)	6	0	0.0	0	0.0	6	100	0	0.0	0	0.0	0	0.0	0	0.0
Sweden (7)	2	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
UK England (5)	8	0	0.0	1	12.5	6	75.0	0	0.0	0	0.0	0	0.0	1	12.5
UK N-Ireland (30)	54	0	0.0	0	0.0	50	92.6	0	0.0	0	0.0	3	5.6	1	1.9
TOTAL	394	3	0.8	13	3.3	343	87.1	0	0.0	2	0.5	11	2.8	22	5.6

Table A38 Prophylactic treatments by type of molecule on ATC level 3 per country

Country (*n* NHs)	No. prophylactic molecules	J01A		J01C		J01D		J01E		J01F		J01M		J01X		J02A		J04A	
		Tetracyclines		Beta-lactam antibacterials		Other beta-lactam antibacterials		Sulfonamides & trimethoprim		Macrolides, lincosamides & streptogramins		Quinolone antibacterials		Other antibacterials		Antimycotics for systemic use		Drugs for treatment of tuberculosis	
		n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
BE (103)	148	0	0.0	6	4.1	0	0.0	0	0.0	5	3.4	3	2.0	126	85.1	8	5.4	0	0.0
CZ (6)	12	0	0.0	0	0.0	0	0.0	1	8.3	1	8.3	4	33.3	6	50.0	0	0.0	0	0.0
DK(5)	10	0	0.0	0	0.0	0	0.0	3	30.0	0	0.0	0	0.0	7	70.0	0	0.0	0	0.0
FI (8)	90	0	0.0	12	13.3	2	2.2	24	26.7	0	0.0	1	1.1	50	55.6	1	1.1	0	0.0
FR (8)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
IE (11)	31	0	0.0	1	3.2	0	0.0	10	32.3	3	9.7	1	3.2	16	51.6	0	0.0	0	0.0
IT (28)	8	0	0.0	2	25.0	2	25.0	1	12.5	1	12.5	2	25.0	0	0.0	0	0.0	0	0.0
LT (3)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
MT (5)	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0
NL (4)	4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	25.0	2	50.0	0	0.0	1	25.0
NO (5)	18	0	0.0	1	5.6	0	0.0	3	16.7	0	0.0	0	0.0	14	77.8	0	0.0	0	0.0
SI (6)	6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	50.0	3	50.0	0	0.0	0	0.0
SE (7)	2	0		1	50.0	0	0.0	1	50.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
UK EN (5)	8	1	12.5	1	12.5	0	0.0	6	75.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
UK N-IE (30)	54	1	1.9	2	3.7	16	29.6	22	40.7	0	0.0	1	1.9	11	20.4	1	1.9	0	0.0
TOTAL	394	3	0.8	27	6.9	20	5.1	71	18.0	11	2.8	16	4.1	235	59.6	10	2.5	1	0.3

Table A39 Uroprophylactic treatments by type of molecule on ATC level 4 per country

Country (*n* NHs)	All uroprophylaxis molecules	J01CA Penicillins with extended spectrum	J01CE Beta-lactamase sensitive penicillins	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DB 1st generation cephalosporins	J01EA Trimethoprim and derivatives	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives	J01MA Fluoro-quinolones	J01XE Nitrofuran derivatives	J01XX Other antibacterials	J02AC Triazole derivatives
		n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
BE (103)	131	0	0	0	0	0	0	3	101	25	2
CZ (6)	10	0	0	0	0	0	1	3	6	0	0
DK(5)	10	0	0	0	0	3	0	0	7	0	0
FI (8)	81	7	0	0	0	24	0	0	10	40	0
IE (11)	27	0	0	1	0	10	0	0	16	0	0
IT (28)	1	0	0	0	0	0	1	0	0	0	0
NL (4)	2	0	0	0	0	0	0	0	2	0	0
NO (5)	18	1	0	0	0	3	0	0	1	13	0
SI (6)	6	0	0	0	0	0	0	3	3	0	0
SE (7)	1	0	0	0	0	1	0	0	0	0	0
UK EN (5)	5	0	0	0	0	5	0	0	0	0	0
UK N-IE (30)	50	0	1	0	15	21	0	1	11	0	1
TOTAL	342	8	1	1	15	67	2	10	157	78	3
%		2.3%	0.3%	0.3%	4.4%	19.6%	0.6%	2.9%	45.9%	22.8%	0.9%

Table A40 Specific J01X-molecules for uroprophylaxis per country

Country (*n* NHs)	All uroprophylaxis J01X molecules	J01XE01 Nitrofurantoin		J01XE02 Nifurtoinol		J01XX01 Fosfomycin		J01XX05 Methenamine	
		n	%	*n*	%	*n*	%	*n*	%
BE (103)	126	46	36.5	55	43.7	25	19.8	0	0.0
CZ (6)	6	6	100	0	0.0	0	0.0	0	0.0
DK(5)	7	7	100	0	0.0	0	0.0	0	0.0
FI (8)	50	10	20.0	0	0.0	0	0.0	40	80.0
IE (11)	16	16	100	0	0.0	0	0.0	0	0.0
NL (4)	2	2	100	0	0.0	0	0.0	0	0.0
NO (5)	14	1	7.1	0	0.0	0	0.0	13	92.9
SI (6)	3	3	100	0	0.0	0	0.0	0	0.0
UK N-IE (30)	11	11	100	0	0.0	0	0.0	0	0.0
TOTAL	235	102	43.4	55	16.1	25	7.3	53	15.5

Table A41 Prophylactic treatments of RTI by type of molecule on ATC level 4 per country

Country (*n* NHs)	All RTI prophylaxis molecules	J01CA Penicillins with extended spectrum	J01CE Beta-lactamase sensitive penicillins	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DD 3rd generation cephalo-sporins	J01FA Macrolides	J01MA Fluoro-quinolones
		n	*n*	*n*	*n*	*n*	*n*
BE (103)	5	1	0	0	0	4	0
FI (8)	1	0	1	0	0	0	0
IE (11)	4	0	0	0	0	3	1
IT (28)	2	0	0	1	1	0	0
UK EN (5)	1	0	1	0	0	0	0
TOTAL	13	1	2	1	1	7	1
%		7.7%	15.4%	7.7%	7.7%	53.9%	7.7%

Table A42 Empirical treatments by type of infection per country

Country	All empirical treatments	Indications for empirical treatment																	
		Surgical wound infection		Respiratory tract infection		Urinary tract infection		Gastro-intestinal infection		Bacteremia / septicaemia		Sepsis / septic shock		Unspecified infection		Other infection		Skin or non-surgical wound infection	
	n	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
BE	264	5	1.9	135	51.1	68	25.8	7	2.7	1	0.4	1	0.4	5	1.9	15	5.7	27	10.2
BG	3	0	0.0	3	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
HR	18	0	0.0	8	44.4	8	44.4	0	0.0	0	0.0	0	0.0	0	0.0	1	5.6	1	5.6
CZ	23	1	4.3	13	56.5	6	26.1	0	0.0	0	0.0	0	0.0	3	13.0	0	0.0	0	0.0
DK	11	0	0.0	1	9.1	5	45.5	0	0.0	0	0.0	0	0.0	0	0.0	2	18.2	3	27.3
FI	100	6	6.0	14	14.0	59	59.0	2	2.0	0	0.0	0	0.0	2	2.0	2	2.0	15	15.0
FR	12	0	0.0	10	83.3	0	0.0	0	0.0	0	0.0	0	0.0	1	8.3	1	8.3	0	0.0
DE	9	1	11.1	4	44.4	2	22.2	0	0.0	0	0.0	1	11.1	0	0.0	1	11.1	0	0.0
HU	7	0	0.0	6	85.7	1	14.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
IE	50	1	2.0	29	58.0	14	28.0	1	2.0	0	0.0	0	0.0	0	0.0	1	2.0	4	8.0
IT	130	2	1.5	96	73.8	17	13.1	0	0.0	0	0.0	0	0.0	6	4.6	4	3.1	5	3.8
LV	9	0	0.0	3	33.3	1	11.1	0	0.0	0	0.0	0	0.0	1	11.1	4	44.4	0	0.0
LT	7	1	14.3	4	57.1	1	14.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	14.3
MT	7	0	0.0	3	42.9	2	28.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	28.6
NL	23	0	0.0	10	43.5	9	39.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	17.4
NO	20	1	5.0	4	20.0	5	25.0	2	10.0	0	0.0	0	0.0	2	10.0	2	10.0	4	20.0
PL	20	0	0.0	14	70.0	1	5.0	0	0.0	0	0.0	0	0.0	1	5.0	1	5.0	3	15.0
RU	13	0	0.0	10	76.9	1	7.7	0	0.0	0	0.0	0	0.0	0	0.0	2	15.4	0	0.0
SI	24	0	0.0	8	33.3	11	45.8	0	0.0	0	0.0	0	0.0	1	4.2	0	0.0	4	16.7
SE	9	0	0.0	4	44.4	2	22.2	0	0.0	1	11.1	0	0.0	0	0.0	0	0.0	2	22.2
UK EN	12	0	0.0	6	50.0	3	25.0	0	0.0	0	0.0	0	0.0	1	8.3	0	0.0	2	16.7
UK N-IE	40	2	5.0	14	35.0	13	32.5	0	0.0	0	0.0	0	0.0	1	2.5	3	7.5	7	17.5
TOT.	811	20	2.5	399	49.2	229	28.2	12	1.5	2	0.25	2	0.25	24	3.0	39	4.9	84	10.4

Table A43 Empirical treatments by type of molecule on ATC level 3 per country

Country	No. molecules for empirical treatment	J01A Tetracyclines n %	J01C Beta-lactam antibacterials n %	J01D Other beta-lactam antibacterials n %	J01E Sulfonamides & trimethoprim n %	J01F Macrolides, lincosamides & streptogramins n %	J01G Aminoglycoside antibacterials n %	J01M Quinolone antibacterials n %	J01X Other antibacterials n %	A07A Intestinal antiinfectives n %	D01B Antifungals for systemic use n %	J02A Antimycotics for systemic use n %	P01A Agents against amoebiasis and other protozoal diseases n %
BE	264	7 2.7%	111 42.1%	10 3.8%	4 1.5%	17 6.4%	1 0.4%	60 22.7%	36 13.6%	4 1.5%	1 0.4%	11 4.2%	2 0.8%
BG	3	0	1 33.3%	1 33.3%	0	1 33.3%	0	0	0	0	0	0	0
HR	18	2 11.1%	7 38.9%	3 16.7%	1 5.6%	1 5.6%	0	3 16.7%	1 5.6%	0	0	0	0
CZ	23	2 8.7%	9 39.1%	1 4.4%	5 21.7%	1 4.4%	1 4.4%	4 17.4%	0	0	0	0	0
DK	11	0	9 81.8%	0	0	0	0	0	2 18.2%	0	0	0	0
FI	100	2 2.0%	17 17.0%	24 24.0%	1 1.0%	3 3.0%	0	7 7.0%	43 43.0%	0	1 1.0%	0	2 2.0%
FR	12	0	10 83.3%	2 16.7%	0	0	0	0	0	0	0	0	0
DE	9	1 11.1%	2 22.2%	4 44.4%	1 11.1%	0	0	1 11.1%	0	0	0	0	0
HU	7	0	5 71.4%	0	0	0	0	2 28.6%	0	0	0	0	0
IE	50	0	17 34.0%	14 28.0%	5 10.0%	3 6.0%	7 14.0%	1 2.0%	0	0	0	0	3 6.0%
IT	130	0	35 26.9%	41 31.5%	1 0.8%	2 1.5%	1 0.8%	49 37.7%	1 0.8%	0	0	0	0
LV	9	3 33.3%	6 66.7%	0	0	0	0	0	0	0	0	0	0
LT	7	0	5 71.4%	1 14.3%	0	0	0	0	0	0	0	0	1 14.3%
MT	7	0	3 42.9%	0	0	1 14.3%	0	3 42.9%	0	0	0	0	0
NL	23	4 17.4%	11 47.8%	1 4.4%	0	0	0	6 26.1%	1 4.4%	0	0	0	0
NO	20	2 10.0%	12 60.0%	1 5.0%	0	3 15.0%	0	1 5.0%	0	0	0	0	1 5.0%
PL	20	1 5.0%	4 20.0%	6 30.0%	0	4 20.0%	0	3 15.0%	0	1 5.0%	0	1 5.0%	0
RU	13	0	0	7 53.9%	0	4 30.8%	0	2 15.4%	0	0	0	0	0
SI	24	0	13 54.2%	0	7 29.2%	0	0	4 16.7%	0	0	0	0	0
SE	9	1 11.1%	5 55.6%	1 11.1%	1 11.1%	0	0	0	1 11.1%	0	0	0	0
UK EN	12	0	5 41.7%	3 25.0%	0	4 33.3%	0	0	0	0	0	0	0
UK N-IE	40	1 2.5%	21 52.5%	4 10.0%	4 10.0%	5 12.5%	2 5.0%	0	0	2 5.0%	0	0	1 2.5%
TOT. %	811	26 3.2%	308 38.0%	124 15.3%	30 3.7%	49 6.0%	3 0.4%	154 19.0%	86 10.6%	7 0.9%	2 0.3%	12 1.5%	10 1.2%

Table A44 Empirical treatments of RTI by type of molecule on ATC level 4 per country

Country	No. molecules for empirical treatment of RTI	J01AA Tetracyclines	J01CA Penicillins with extended spectrum	J01CE Beta-lactamase sensitive penicillins	J01CF Beta-lactamase resistant penicillins	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DB 1st generation cephalosporins	J01DC 2nd generation cephalosporins	J01DD 3rd generation cephalosporins	J01DE 4th generation cephalosporins	J01DH Carbapenems	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives	J01FA Macrolides	J01FF Lincosamides	J01GB Other aminoglycosides	J01MA Fluoroquinolones	J01XA Glycopeptide antibacterials	J01XE Nitrofuran derivatives	P01AB Nitroimidazole derivatives
		n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
BE	135	3	31	0	1	45	3	7	0	0	0	1	12	1	1	28	0	2	0
BG	3	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
HR	8	2	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0
CZ	13	1	3	1	0	2	0	0	1	0	0	2	1	0	1	1	0	0	0
DK	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FI	14	2	1	0	0	3	4	1	1	0	0	0	0	0	0	2	0	0	0
FR	10	0	6	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0
DE	4	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	0	0	0
HU	6	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0
IE	29	0	2	0	0	9	0	5	5	0	0	0	3	0	0	3	0	1	1
IT	96	0	2	0	0	27	0	0	27	1	1	0	2	0	0	35	1	0	0
LV	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LT	4	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MT	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0
NL	10	4	2	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0
NO	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PL	14	1	3	0	0	1	0	0	5	0	0	0	1	0	0	3	0	0	0
RU	10	0	0	0	0	0	4	0	2	0	0	0	4	0	0	0	0	0	0
SI	8	0	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	4	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
UK EN	6	0	2	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0
UK N-IE	14	1	7	0	0	1	1	0	0	0	0	0	3	0	0	1	0	0	0
TOT. %	399	15 3.8	69 17.3	7 1.8	1 0.3	110 27.6	13 3.3	16 4.0	46 11.5	1 0.3	1 0.3	3 0.8	32 8.0	1 0.3	2 0.5	77 19.3	1 0.3	3 0.8	1 0.3

Table A45 Empirical treatments of UTI by type of molecule on ATC level 4 per country

Country	No. molecules for empirical treatment of UTI	J01CA Penicillins with extended spectrum	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DB 1st generation cephalosporins	J01DC 2nd generation cephalosporins	J01DD 3rd generation cephalosporins	J01DH Carbapenems	J01EA Trimethoprim and derivatives	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives	J01FA Macrolides	J01MA Fluoroquinolones	J01XE Nitrofuran derivatives	J01XX Other antibacterials
		n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
BE	68	1	5	0	0	0	0	0	2	0	27	27	6
HR	8	0	1	1	1	1	0	0	0	0	3	1	0
CZ	6	0	1	0	0	0	0	0	2	0	3	0	0
DK	5	3	0	0	0	0	0	0	0	0	0	2	0
FI	59	10	0	1	0	0	0	1	0	0	4	9	34
DE	2	0	0	0	1	0	0	0	1	0	0	0	0
HU	1	0	0	0	0	0	0	0	0	0	1	0	0
IE	14	0	1	3	1	0	0	5	0	0	4	0	0
IT	17	0	1	0	0	5	1	0	1	0	9	0	0
LV	1	1	0	0	0	0	0	0	0	0	0	0	0
LT	1	1	0	0	0	0	0	0	0	0	0	0	0
MT	2	0	1	0	0	0	0	0	0	0	1	0	0
NL	9	1	2	0	0	0	0	0	0	0	5	1	0
NO	5	5	0	0	0	0	0	0	0	0	0	0	0
PL	1	0	0	0	1	0	0	0	0	0	0	0	0
RU	1	0	0	0	0	0	0	0	0	0	1	0	0
SI	11	0	0	0	0	0	0	0	7	0	4	0	0
SE	2	1	0	0	0	0	0	0	0	0	0	1	0
UK EN	3	0	1	2	0	0	0	0	0	0	0	0	0
UK N-IE	13	3	1	2	1	0	0	4	0	1	1	0	0
TOT. %	229	26 11.4%	14 6.1%	9 3.9%	5 2.2%	6 2.6%	1 0.4%	10 4.4%	13 5.7%	1 0.4%	63 27.5%	41 17.9%	40 17.5%

Table A46 Documented treatments by type of infection per country

Country	All documented treatments	Indications for documented treatment																	
		Surgical wound infection		Respiratory tract infection		Urinary tract infection		Gastro-intestinal infection		Bacteremia / septicaemia		Sepsis / septic shock		Unspecified infection		Other infection		Skin or non-surgical wound infection	
	n	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
BE	92	2	2.2	8	8.7	65	70.7	1	1.1	1	1.1	0	0.0	1	1.1	5	5.4	9	9.8
HR	3	0	0.0	0	0.0	3	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
CZ	22	2	9.1	3	13.6	14	63.6	1	4.5	0	0.0	1	4.5	1	4.5	0	0.0	0	0.0
DK	1	0	0.0	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FI	30	1	3.3	1	3.3	21	70.0	1	3.3	0	0.0	1	3.3	0	0.0	0	0.0	5	16.7
FR	3	0	0.0	1	33.3	2	66.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
IE	8	0	0.0	1	12.5	2	25.0	1	12.5	0	0.0	2	25.0	0	0.0	0	0.0	2	25.0
IT	23	0	0.0	2	8.7	14	60.9	0	0.0	1	4.3	1	4.3	0	0.0	1	4.3	4	17.4
LV	3	2	66.7	0	0.0	0	0.0	0	0.0	0	0.0	1	33.3	0	0.0	0	0.0	0	0.0
LT	2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	100
NL	6	2	33.3	2	33.3	2	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NO	7	0	0.0	0	0.0	6	85.7	0	0.0	0	0.0	0	0.0	1	14.3	0	0.0	0	0.0
PL	3	0	0.0	1	33.3	1	33.3	0	0.0	0	0.0	0	0.0	0	0.0	1	33.3	0	0.0
SI	5	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	9	0	0.0	0	0.0	1	11.1	3	33.3	0	0.0	0	0.0	0	0.0	2	22.2	3	33.3
UK EN	8	0	0.0	0	0.0	1	12.5	0	0.0	0	0.0	0	0.0	0	0.0	5	62.5	2	25.0
UK N-IE	11	1	9.1	0	0.0	5	45.5	0	0.0	0	0.0	0	0.0	0	0.0	1	9.1	4	36.4
TOT.	236	10	4.2	20	8.5	142	60.2	7	3.0	2	0.8	6	2.5	3	1.3	15	6.4	31	13.1

Table A47 Documented treatments by type of molecule on ATC level 3 per country

Country	No. molecules for documented treatment	J01A Tetracyclines	J01C Beta-lactam antibacterials	J01D Other beta-lactam antibacterials	J01E Sulfonamides & trimethoprim	J01F Macrolides, lincosamides & streptogramins	J01G Aminoglycoside antibacterials	J01M Quinolone antibacterials	J01X Other antibacterials	A01A Stomatological preparations	A07A Intestinal antiinfectives	D01B Antifungals for systemic use	J02A Antimycotics for systemic use	J04A Drugs for treatment of tuberculosis	P01A Agents against amoebiasis and other protozoal diseases
		n %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %	*n* %
BE	92	6 6.5	11 12.0	3 3.3	4 4.4	1 1.1	0	37 40.2	29 31.5	0	0	1 1.1	0	0	0
HR	3	0	0	1 33.3	2 66.7	0	0	0	0	0	0	0	0	0	0
CZ	22	0	7 31.8	5 22.7	0	0	1 4.6	1 4.6	6 27.3	1 4.6	0	0	1 4.6	0	0
DK	1	0	0	0	0	0	0	0	1 100	0	0	0	0	0	0
FI	30	0	10 33.3	3 10.0	3 10.0	2 6.7	0	3 10.0	6 20.0	0	1 3.3	0	0	0	0
FR	3	0	3 100	0	0	0	0	0	0	0	0	0	0	0	0
IE	8	0	5 62.5	0	0	1 12.5	0	0	0	0	0	0	0	0	2 25.0
IT	23	0	1 4.4	4 17.4	1 4.4	1 4.4	7 30.4	4 17.4	5 21.7	0	0	0	0	0	0
LV	3	1 33.3	1 33.3	0	0	0	0	1 33.3	0	0	0	0	0	0	0
LT	2	0	2 100	0	0	0	0	0	0	0	0	0	0	0	0
NL	6	0	2 33.3	0	1 16.7	2 33.3	0	1 16.7	0	0	0	0	0	0	0
NO	7	0	2 28.6	0	1 14.3	0	0	1 14.3	3 42.9	0	0	0	0	0	0
PL	3	1 33.3	1 33.3	0	0	0	0	1 33.3	0	0	0	0	0	0	0
SI	5	0	2 40.0	2 40.0	0	0	0	1 20.0	0	0	0	0	0	0	0
SE	9	0	1 11.1	1 11.1	0	1 11.1	0	2 22.2	2 22.2	0	0	0	0	0	2 22.2
UK EN	8	0	2 25.0	0	1 12.5	0	0	0	1 12.5	0	0	0	0	4 50.0	0
UK N-IE	11	2 18.2	5 45.5	0	1 9.1	0	0	0	3 27.3	0	0	0	0	0	0
TOT. %	236	10 4.2	55 23.3	19 8.1	14 5.9	8 3.4	8 3.4	52 22.0	56 23.7	1 0.4	1 0.4	1 0.4	1 0.4	4 1.7	6 2.5

Table A48 Documented treatments of UTI by type of molecule on ATC level 4 per country

Country (*n* NHs)	No. molecules for documented treatment of UTI	J01CA Penicillins with extended spectrum	J01CE Beta-lactamase sensitive penicillins	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DB 1st generation cephalosporins	J01DC 2nd generation cephalosporins	J01DD 3rd generation cephalosporins	J01EA Trimethoprim and derivatives	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives	J01GB Other aminoglycosides	J01MA Fluoroquinolones	J01XE Nitrofuran derivatives	J01XX Other antibacterials
		n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
BE (103)	65	1	0	4	0	1	0	0	2	0	29	21	7
HR (5)	3	0	0	0	0	1	0	0	2	0	0	0	0
CZ (6)	14	0	0	4	0	3	1	0	0	0	0	6	0
DK(5)	1	0	0	0	0	0	0	0	0	0	0	1	0
FI (8)	21	10	0	0	2	0	0	3	0	0	1	5	0
FR (8)	2	2	0	0	0	0	0	0	0	0	0	0	0
IE (11)	2	1	0	1	0	0	0	0	0	0	0	0	0
IT (28)	14	0	0	0	0	0	2	0	0	5	4	3	0
NL (4)	2	0	0	0	0	0	0	1	0	0	1	0	0
NO (5)	6	1	1	0	0	0	0	1	0	0	0	3	0
PL (8)	1	0	0	1	0	0	0	0	0	0	0	0	0
SI (6)	4	0	1	0	0	2	0	0	0	0	1	0	0
SE (7)	1	0	0	0	0	0	0	0	0	0	0	1	0
UK EN (5)	1	0	0	0	0	0	0	1	0	0	0	0	0
UK N-IE (30)	5	0	0	1	0	0	0	1	0	0	0	3	0
TOTAL	142	15	2	11	2	7	3	7	4	5	36	43	7
%		10.6	1.4	7.8	1.4	4.9	2.1	4.9	2.8	3.5	25.4	30.3	4.9

Table A49 Documented treatments of skin or non-surgical wound infections by type of molecule on ATC level 4 per country

Country	No. molecules for documented treatment of skin or non-surgical wound infections	J01AA Tetracyclines	J01CE Beta-lactamase sensitive penicillins	J01CF Beta-lactamase resistant penicillins	J01CR Combinations of penicillins incl. beta-lactamase inhibitors	J01DH Carbapenems	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives	J01FA Macrolides	J01FF Lincosamides	J01MA Fluoroquinolones	J01XA Glycopeptide antibacterials	J01XD Imidazole derivatives	D01BA Antifungals for systemic use	P01AB Nitroimidazole derivatives
		n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
BE	9	2	0	0	0	0	1	0	0	5	0	0	1	0
FI	5	0	0	0	0	0	0	0	2	1	0	0	0	2
IE	2	0	0	2	0	0	0	0	0	0	0	0	0	0
IT	4	0	0	0	1	1	0	1	0	0	1	0	0	0
LT	2	0	2	0	0	0	0	0	0	0	0	0	0	0
SE	3	0	0	0	0	0	0	0	1	2	0	0	0	0
UK EN	2	0	0	1	0	0	0	0	0	0	0	1	0	0
UK N-IE	4	2	0	1	1	0	0	0	0	0	0	0	0	0
TOT.	31	4	2	4	2	1	1	1	3	8	1	1	1	2
%		12.9	6.5	12.9	6.5	3.2	3.2	3.2	9.7	25.8	3.2	3.2	3.2	6.5

Table A50 Documented treatments of RTI by type of molecule on ATC level 4 per country

Country (*n* NHs)	No. molecules for documented treatment of RTI	J01CA Penicillins with extended spectrum *n*	J01CR Combinations of penicillins incl. beta-lactamase inhibitors *n*	J01DC 2nd generation cephalosporins *n*	J01EE Combinations of sulfonamides & trimethoprim, incl. derivatives *n*	J01FA Macrolides *n*	J01FF Lincosamides *n*	J01GB Other aminoglycosides *n*	J01MA Fluoro-quinolones *n*	J02AB Imidazole derivatives *n*
BE (103)	8	1	3	2	0	0	1	0	1	0
CZ (6)	3	1	0	0	0	0	0	0	1	1
FI (8)	1	0	0	1	0	0	0	0	0	0
FR (8)	1	0	1	0	0	0	0	0	0	0
IE (11)	1	0	0	0	0	0	1	0	0	0
IT (28)	2	0	0	0	1	0	0	1	0	0
NL (4)	2	1	0	0	0	1	0	0	0	0
PL (8)	1	0	0	0	0	0	0	0	1	0
SI (6)	1	0	1	0	0	0	0	0	0	0
TOTAL	20	3	5	3	1	1	2	1	3	1
%		15.0%	25.0%	15.0%	5.0%	5.0%	10.0%	5.0%	15.0%	5.0%

Table A51 Distribution of place of prescription of oral and parenteral antimicrobial treatments per country

Country (*n* NHs)	Administration route: place of prescription — Parenteral: No. molecules	Parenteral: In the NH *n* (%)	Parenteral: In the hospital *n* (%)	Parenteral: Else-where *n* (%)	Oral: No. molecules	Oral: In the NH *n* (%)	Oral: In the hospital *n* (%)	Oral: Else-where *n* (%)
Belgium (103)	15	14 (93.3)	1 (6.7)	0	517	487 (94.2)	28 (5.4)	2 (0.4)
Bulgaria (2)	1	1 (100)	0	0	2	2 (100)	0	0
Croatia (5)	0	-	-	-	19	17 (89.5)	2 (10.5)	0
Czech Rep. (6)	9	8 (88.9)	1 (11.1)	0	48	41 (85.4)	6 (12.5)	1 (2.1)
Denmark (5)	0	-	-	-	22	20 (90.9)	0	2 (9.1)
Finland (8)	8	6 (75.0)	2 (25.0)	0	213	174 (81.7)	19 (8.9)	20 (9.4)
France (8)	1	1 (100)	0	0	16	14 (87.5)	0	2 (12.5)
Germany (5)	1	0	1 (100)	0	8	1 (12.5)	0	7 (87.5)
Hungary (4)	0	-	-	-	7	7 (100)	0	0
Ireland (11)	7	1 (100)	0	0	80	76 (95.0)	3 (3.8)	1 (1.2)
Italy (28)	74	68 (91.9)	6 (8.1)	0	86	82 (95.4)	4 (4.7)	0
Latvia (5)	0	-	-	-	12	9 (75.0)	3 (25.0)	0
Lithuania (3)	4	2 (50.0)	2 (50.0)	0	6	6 (100)	0	0
Malta (5)	0	-	-	-	7	6 (85.7)	1 (14.3)	0
Netherlands (4)	1	1 (100)	0	0	32	28 (87.5)	4 (12.5)	0
Norway (5)	0	-	-	-	42	40 (95.2)	2 (4.8)	0
Poland (8)	11	11 (100)	0	0	12	12 (100)	0	0
Russian Fed. (3)	5	5 (100)	0	0	8	8 (100)	0	0
Slovenia (6)	0	-	-	-	37	32 (86.5)	5 (13.5)	0
Sweden (7)	1	1 (100)	0	0	22	17 (77.3)	4 (18.2)	1 (4.6)
UK England (5)	1	0	1 (100)	0	26	14 (53.9)	12 (46.2)	0
UK N-Ireland (30)	1	1 (100)	0	0	104	88 (84.6)	7 (6.7)	9 (8.7)
TOTAL	140	126 (90.0)	14 (10.0)	0	132	1181 (89.1)	100 (7.5)	45 (3.4)

- not applicable

Table A52 Distribution of type of prescriber of oral and parenteral antimicrobial treatments per country

Country (*n* NHs)	Administration route: type of prescriber							
	Parenteral				Oral			
	No. molecules	GP	Specialist	Other	No. molecules	GP	Specialist	Other
		n (%)	*n* (%)	*n* (%)		*n* (%)	*n* (%)	*n* (%)
Belgium (103)	15	14 (93.3)	1 (6.7)	0	516	483 (93.6)	31 (6.0)	2 (0.4)
Bulgaria (2)	1	0	1 (100)	0	2	0	2 (100)	0
Croatia (5)	0	-	-	-	20	18 (90.0)	2 (10.0)	0
Czech Rep. (6)	9	1 (11.1)	8 (88.9)	0	48	10 (20.8)	38 (79.2)	0
Denmark (5)	0	-	-	-	22	18 (81.8)	2 (9.1)	2 (9.1)
Finland (8)	8	2 (25.0)	6 (75.0)	0	212	91 (42.9)	120 (56.6)	1 (0.5)
France (8)	1	1 (100)	0	0	16	13 (81.3)	2 (12.5)	1 (6.3)
Germany (5)	1	0	1 (100)	0	8	7 (87.5)	1 (12.5)	0
Hungary (4)	0	-	-	-	7	4 (57.1)	3 (42.9)	0
Ireland (11)	7	6 (85.7)	0	1 (14.3)	78	68 (87.2)	1 (1.3)	9 (11.5)
Italy (28)	73	32 (43.8)	41 (56.2)	0	84	36 (42.9)	47 (56.0)	1 (1.2)
Latvia (5)	0	-	-	-	12	8 (66.7)	4 (33.3)	0
Lithuania (3)	4	2 (50.0)	2 (50.0)	0	6	6 (100)	0	0
Malta (5)	0	-	-	-	6	6 (100)	0	0
Netherlands (4)	1	1 (100)	0	0	32	28 (87.5)	4 (12.5)	0
Norway (5)	0	-	-	-	42	0	2 (4.8)	40 (95.2)
Poland (8)	11	11 (100)	0	0	12	5 (41.7)	7 (58.3)	0
Russian Fed. (3)	5	5 (100)	0	0	8	8 (100)	0	0
Slovenia (6)	0	-	-	-	37	32 (86.5)	5 (13.5)	0
Sweden (7)	1	0	1 (100)	0	22	10 (45.5)	12 (54.5)	0
UK England (5)	1	0	1 (100)	0	26	14 (53.9)	12 (46.2)	0
UK N-Ireland (30)	1	1 (100)	0	0	104	90 (86.5)	4 (3.9)	10 (9.6)
TOTAL	139	76 (54.7)	62 (44.6)	1 (0.7)	1320	955 (72.4)	299 (2.7)	66 (5.0)

- not applicable

Table A53 Distribution and type of antibacterials for systemic use (J01) on ATC level 3 for parenteral antimicrobial treatments per country

Country (*n* NHs)	Parenteral treatments	Type of molecules													
		J01C		J01D		J01E		J01F		J01G		J01M		J01X	
	n	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Belgium (103)	15	12	80.0	1	6.7	0	0.0	2	13.3	0	0.0	0	0.0	0	0.0
Bulgaria (2)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Czech Rep. (6)	9	4	44.4	2	22.2	0	0.0	0	0.0	2	22.2	1	11.1	0	0.0
Finland (8)	8	3	37.5	5	62.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
France (8)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Germany (5)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ireland (11)	7	2	28.6	5	71.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Italy (28)	75	12	16.0	46	61.3	1	1.3	0	0.0	8	10.7	5	6.7	3	4.0
Lithuania (3)	4	4	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Netherlands (4)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Poland (8)	11	2	18.2	5	45.5	0	0.0	3	27.3	0	0.0	1	9.1	0	0.0
Russian Fed. (3)	5	0	0.0	5	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Sweden (7)	1	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
UK England (5)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
UK N-Ireland (30)	1	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
TOTAL	141	41	29.1	74	52.5	1	0.7	5	3.6	10	7.1	7	5.0	3	2.1

Table A54 Type of beta-lactam antibacterials (J01C) on ATC level 4 for parenteral antimicrobial treatments per country

Country (*n* NHs)	Parenteral treatments *n*	J01C molecules *n*	Beta-lactam antibacterials J01CA *n*	J01CE *n*	J01CF *n*	J01CR *n*
Belgium (103)	15	12	11	1	0	0
Czech Rep. (6)	9	4	0	1	0	3
Finland (8)	8	3	0	3	0	0
Ireland (11)	7	2	0	1	0	1
Italy (28)	75	12	0	0	0	12
Lithuania (3)	4	4	2	2	0	0
Poland (8)	11	2	1	0	0	1
UK England (5)	1	1	0	0	1	0
UK N-Ireland (30)	1	1	0	0	0	1
TOTAL	141	41	14	8	1	18
% of J01C			34.1	19.5	2.4	43.9
% of parenteral		29.1	9.9	5.7	0.7	12.8

Table A55 Type of other beta-lactam antibacterials (J01D) on ATC level 4 for parenteral antimicrobial treatments per country

Country (*n* NHs)	Parenteral treatments *n*	J01D molecules *n*	Other beta-lactam antibacterials J01DB *n*	J01DC *n*	J01DD *n*	J01DE *n*	J01DH *n*
Belgium (103)	15	1	1	0	0	0	0
Bulgaria (2)	1	1	0	0	1	0	0
Czech Rep. (6)	9	2	0	0	2	0	0
Finland (8)	8	5	0	3	2	0	0
France (8)	1	1	0	0	1	0	0
Germany (5)	1	1	0	0	0	0	1
Ireland (11)	7	5	0	0	5	0	0
Italy (28)	75	46	0	0	41	1	4
Netherlands (4)	1	1	0	0	1	0	0
Poland (8)	11	5	0	1	4	0	0
Russian Fed. (3)	5	5	2	0	3	0	0
Sweden (7)	1	1	0	0	1	0	0
TOTAL	141	74	3	4	61	1	5
% of J01D			4.1	5.4	82.4	1.4	6.8
% of parenteral			2.1	2.8	43.3	0.7	3.6

A56 Description of the type of J01E, J01F, J01G, J01M and J01X molecules for parenteral treatments

Parenteral treatments with sulfonamides and trimethoprim (J01E)

All parenteral J01E molecules consisted of *combinations of sulfonamides and trimethoprim, including derivatives* (J01EE; *n*=1). This was prescribed in Italy.

Parenteral treatments with macrolides, lincosamides and streptogramins (J01F)

All parenteral J01F molecules comprised *lincosamides* (J01FF; *n*=5) of which 3 were prescribed in Poland and 2 in Belgian NHs.

Parenteral treatments with aminoglycoside antibacterials (J01G)

All J01G molecules parenterally administered consisted of *other aminoglycosides* (J01GB; *n*=10). Eight of these were prescribed in Italy and 2 in Czech Republic.

Parenteral treatments with quinolone antibacterials (J01M)

All of the parenteral treatments consisting of J01M molecules were *fluoroquinolones* (J0MA; *n*=7). In Italy 5 of these were prescribed and in Czech Republic and Poland each one.

Parenteral treatments with other antibacterials (J01X)

All J01X molecules administered parenterally consisted of *glycopeptide antibacterials* (J01XA; *n*=3) and were all used in Italy.

Appendix 3 Summary of prescribed antimicrobials at ATC level 2-4

ATC level 2

ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Antibacterials for systemic use	J01	1429	96.2	87.1	100
Antimycotics for systemic use	J02	24	1.6	0	4.2
Antiprotozoals	P01	16	1.1	0	10.0
Antidiarrheals, intestinal antiinflammatory/antiinfective agents	A07	8	0.5	0	4.2
Antimycobacterials	J04	5	0.3	0	12.9
Antifungals for dermatological use	D01	3	0.2	0	0.5
Stomatological preparations	A01	1	0.1	0	1.8

ATC level 3

J01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Beta-lactam antibacterials, penicillins	J01C	412	28.8	0	88.2
Other antibacterials	J01X	384	26.9	0	46.3
Quinolone antibacterials	J01M	229	16.0	0	37.5
Other beta-lactam antibacterials	J01D	164	11.5	0	53.9
Sulfonamides and trimethoprim	J01E	116	8.1	0	26.7
Macrolides, lincosamides and streptogramins	J01F	72	5.1	0	33.3
Tetracyclines	J01A	41	2.9	0	33.3
Aminoglycoside antibacterials	J01G	11	0.7	0	5.0

J02 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Antimycotics for systemic use	J02A	24	100	0	100

J04 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Drugs for treatment of tuberculosis	J04A	5	100	0	100

P01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Agents against amoebiasis and other protozoal diseases	P01A	16	100	0	100

A01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Stomatological preparations	A01A	1	100	0	100

A07 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Intestinal antiinfectives	A07A	8	100	0	100

D01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Antifungals for systemic use	D01B	3	100	0	100

ATC level 4

J01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Beta-lactam antibacterials, penicillins	J01C	412	100		
Penicillins with extended spectrum	J01CA	144	35.0	0	100
Beta-lactamase sensitive penicillins	J01CE	23	5.6	0	40.0
Beta-lactamase resistant penicillins	J01CF	37	9.0	0	44.4
Combinations of penicillins, incl. beta-lactamase inhibitors	J01CR	208	50.5	0	100
Other antibacterials	J01X	384	100		
Glycopeptide antibacterials	J01XA	3	0.8	0	50.0
Steroid antibacterials	J01XC	1	0.3	0	1.0
Imidazole derivatives	J01XD	2	0.5	0	33.3
Nitrofuran derivatives	J01XE	251	65.4	0	100
Other antibacterials	J01XX	127	33.1	0	76.5
Quinolone antibacterials	J01M	229	100		
Fluoroquinolones	J01MA	229	100	100	100
Other beta-lactam antibacterials	J01D	164	100		
1st-generation cephalosporins	J01DB	60	36.6	0	100
2nd-generation cephalosporins	J01DC	33	20.1	0	100
3rd-generation cephalosporins	J01DD	65	39.6	0	100
4th-generation cephalosporins	J01DE	1	0.6	0	2.1
carbapenems	J01DH	5	3.1	0	25.0
Sulfonamides and trimethoprim	J01E	116	100		
Trimethoprim and derivatives	J01EA	85	73.3	0	100
Combinations of sulfonamides and trimethoprim, incl. derivatives	J01EE	31	26.7	0	100
Macrolides, lincosamides and streptogramins	J01F	72	100		
Macrolides	J01FA	49	68.1	0	100
Lincosamides	J01FF	23	31.9	0	100
Tetracyclines	J01A	41	100		
Tetracyclines	J01AA	41	100	100	100
Aminoglycoside antibacterials	J01G	11	100		
Other aminoglycosides	J01GB	11	100	100	100

J02 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Antimycotics for systemic use	J02A	24	100		
Imidazole derivatives	J02AB	1	4.2	0	100
Triazole derivatives	J02AC	23	95.8	0	100

J04 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Drugs for treatment of tuberculosis	J04A	5	100		
Antibiotics	J04AB	2	40.0	25.0	100
Hydrazides	J04AC	1	20.0	25.0	25.0
Thiocarbamide derivatives	J04AD	1	20.0	25.0	25.0
Other drugs for treatment of tuberculosis	J04AK	1	20.0	25.0	25.0

P01 ATC class		Total *n*	Total %	Country level Min. %	Country level Max. %
Agents against amoebiasis and other protozoal diseases	P01A	16	100		
Nitroimidazole derivatives	P01AB	16	100	100	100

A01 ATC class		Total		Country level	
		n	%	Min. %	Max. %
Stomatological preparations	A01A	1	100		
Antiinfectives and antiseptics for local oral treatment	A01AB	1	100	100	100

A07 ATC class		Total		Country level	
		n	%	Min. %	Max. %
Intestinal antiinfectives	A07A	8	100		
Antibiotics	A07AA	8	100	100	100

D01 ATC class		Total		Country level	
		n	%	Min. %	Max. %
Antifungals for systemic use	D01B	3	100		
Antifungals for systemic use	D01BA	3	100	100	100

Appendix 4 Summary of most relevant results for each participating country

BELGIUM

Nursing homes

General data

Participating nursing homes	103
Ownership (% public)	43.1%
Qualified nurse present 24/24h	98.1%
Number of eligible residents	11160

	Mean	Median	Minimum	Maximum
NH size	111.9	103.0	17	274
Bed occupation rate	97.3%	97.8%	87.9%	100%
Proportion of hospitalized residents	1.6%	1.4%	0.0%	6.9%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

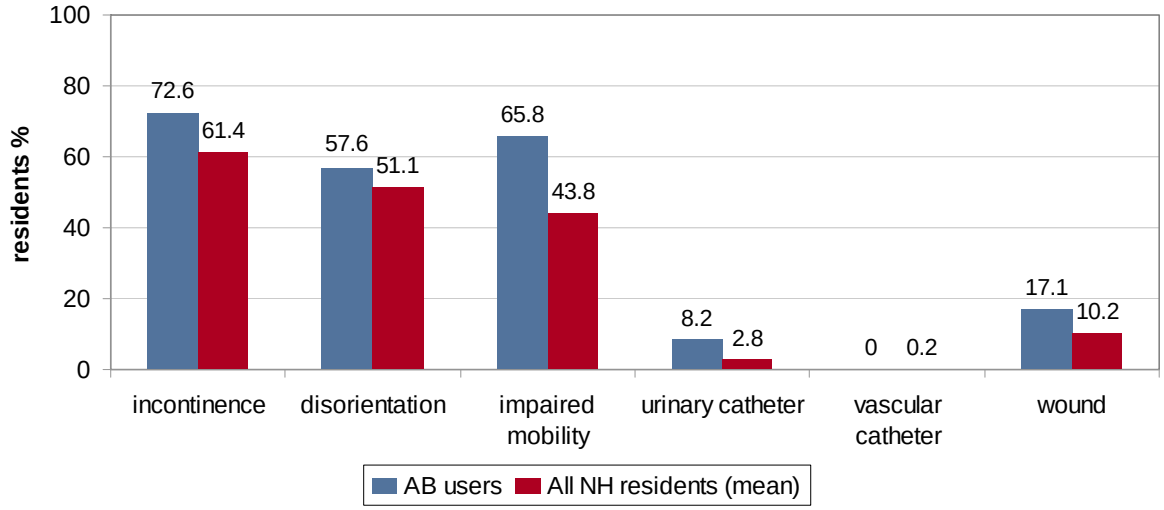
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	61.4%	60.5%	12.8%	100%
Disorientation	51.1%	51.4%	18.2%	100%
Impaired mobility	43.8%	45.9%	7.9%	90.6%
Risk factors				
Urinary catheter	2.8%	2.1%	0.0%	18.8%
Vascular catheter	0.2%	0.0%	0.0%	5.1%
Wounds	10.2%	9.5%	0.0%	23.4%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**523**
Mean age (min-max)	84.0 (47-102)
Gender (%male)	22.2%
Length of NH stay < 1 year	22.6%
Recent hospital admission (past 3 months)	18.8%
Recent surgery (in previous 30 days)	3.2%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	4.7%	4.4%	0.0%	15.4%

Number of prescribed molecules	**535**
Number of residents using 1 molecule	523
Number of residents using >1 molecule	12

Administration route (*n*=533)	
Oral	97.2%
Parenteral	2.8%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=534)	
In the nursing home	94.2%
In the hospital	5.4%
Elsewhere	0.4%

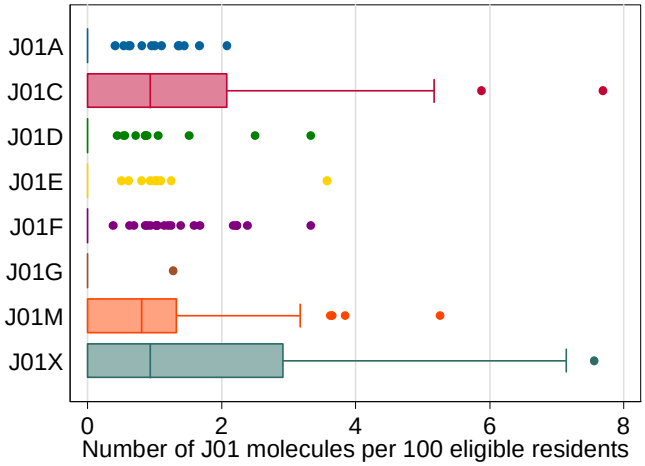
Prescriber (*n*=533)	
General practitioner	93.6%
Specialist	6.0%
Pharmacist	0.0%
Nurse	0.0%
Other	0.4%

Culture sample taken (*n*=494)	25.1%
Dipstick test performed (*n*= 215/269 UTI)	30.2%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.04	0.00	1.92
D01	0.01	0.00	0.88
J01	4.96	0.00	16.67
J02	0.19	0.00	3.45
J04	0.00	0.00	0.00
P01	0.01	0.00	0.56

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=507)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	2.8%	0.14	0.00	2.08
β-lactam antibacterials (J01C)	27.6%	1.33	0.00	7.69
Other β-lactam antibacterials (J01D)	2.6%	0.13	0.00	3.33
Sulfonamides & trimethoprim (J01E)	1.8%	0.10	0.00	3.57
Macrolides, lincosamides & streptogramins (J01F)	5.1%	0.27	0.00	3.33
Aminoglycoside antibacterials (J01G)	0.2%	0.01	0.00	1.28
Quinolone antibacterials (J01M)	20.9%	0.90	0.00	5.26
Other antibacterials (J01X)	39.1%	1.71	0.00	7.56

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01X (n=198)	Nifurtoinol	J01XE02	40.4%
	Nitrofurantoin	J01XE01	39.4%
	Fosfomycin	J01XX01	19.7%
J01C (n=140)	Amoxicillin and enzyme inhibitor	J01CR02	59.3%
	Amoxicillin	J01CA04	31.4%
	Flucloxacillin	J01CF05	8.6%
J01M (n=106)	Ciprofloxacin	J01MA02	40.6%
	Moxifloxacin	J01MA14	29.3%
	Levofloxacin	J01MA12	14.2%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	5	92	**97**	**19.2%**
Respiratory tract	5	135	8	**148**	**29.4%**
Urinary tract	131	68	65	**264**	**52.4%**
Gastro-intestinal	0	7	1	**8**	**1.6%**
Bacteremia/septicaemia	0	1	1	**2**	**0.4%**
Sepsis/septic shock	-	1	0	**1**	**0.2%**
Not specified	7	5	1	**13**	**2.6%**
Other	5	15	5	**25**	**5.0%**
Skin or non-surgical wound	-	27	9	**36**	**7.1%**
Total	**148**	**264**	**92**	**504**	
%	**29.4%**	**52.4%**	**18.3%**		

Most frequently prescribed molecules for urinary tract infections (n=264)

Indication	Molecule	ATC code	%
Prophylactic (n=131)	Nifurtoinol	J01XE02	42.0%
	Nitrofurantoin	J01XE01	35.1%
	Fosfomycin	J01XX01	19.1%
Empirical (n=68)	Ciprofloxacin	J01MA02	23.5%
	Nitrofurantoin	J01XE01	23.5%
	Nifurtoinol	J01XE02	16.2%
Documented (n=65)	Ciprofloxacin	J01MA02	27.7%
	Nitrofurantoin	J01XE01	20.0%
	Nifurtoinol	J01XE02	12.3%

Most frequently prescribed molecules for respiratory tract infections (n=148)

Indication	Molecule	ATC code	%
Prophylactic (n=5)	Azithromycin	J01FA10	60.0%
Empirical (n=135)	Amoxicillin and enzyme inhibitor	J01CR02	33.3%
	Amoxicillin	J01CA04	23.0%
	Moxifloxacin	J01MA14	15.6%
Documented (n=8)	Amoxicillin and enzyme inhibitor	J01CR02	37.5%

BULGARIA

Nursing homes

General data

Participating nursing homes	2
Ownership (% public)	0.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	45

	Mean	Median	Minimum	Maximum
NH size	23.5	23.5	17	30
Bed occupation rate	95.4%	95.4%	94.1%	96.7%
Proportion of hospitalized residents	0.0%	0.0%	0.0%	0.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

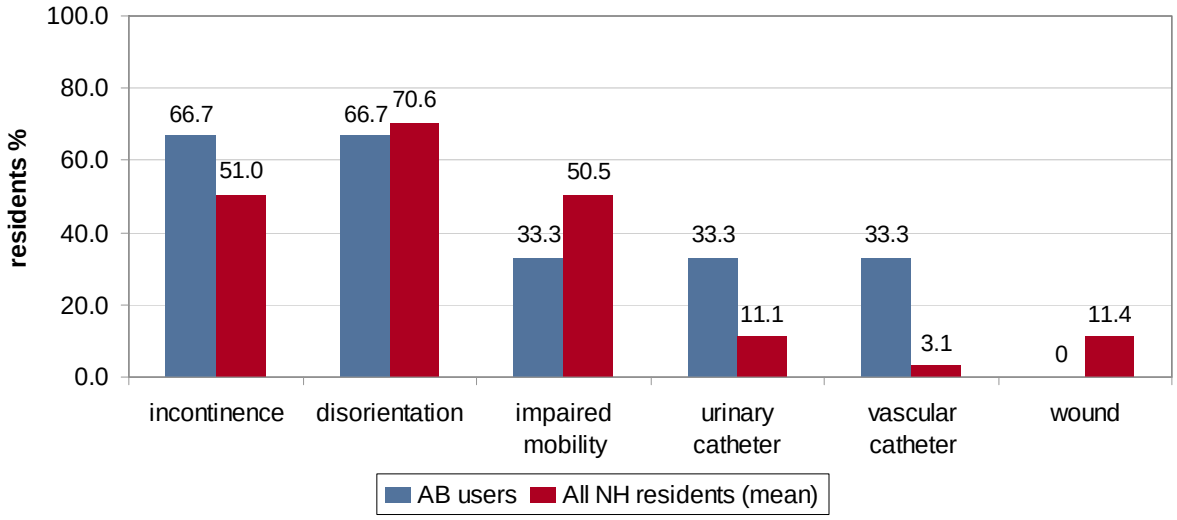
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	51.0%	51.0%	20.7%	81.3%
Disorientation	70.6%	70.6%	68.8%	72.4%
Impaired mobility	50.5%	50.5%	44.8%	56.3%
Risk factors				
Urinary catheter	11.1%	11.1%	3.5%	18.8%
Vascular catheter	3.1%	3.1%	0.0%	6.3%
Wounds	11.4%	11.4%	10.3%	12.5%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**3**
Mean age (min-max)	83.0 (81-85)
Gender (% male)	0.0%
Length of NH stay < 1 year	33.3%
Recent hospital admission (past 3 months)	33.3%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	9.4%	9.4%	0.0%	18.8%

Number of prescribed molecules	**3**
Number of residents using 1 molecule	3
Number of residents using >1 molecule	0

Administration route (*n*=3)	
Oral	66.7%
Parenteral	33.3%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=3)	
In the nursing home	100%
In the hospital	0.0%
Elsewhere	0.0%

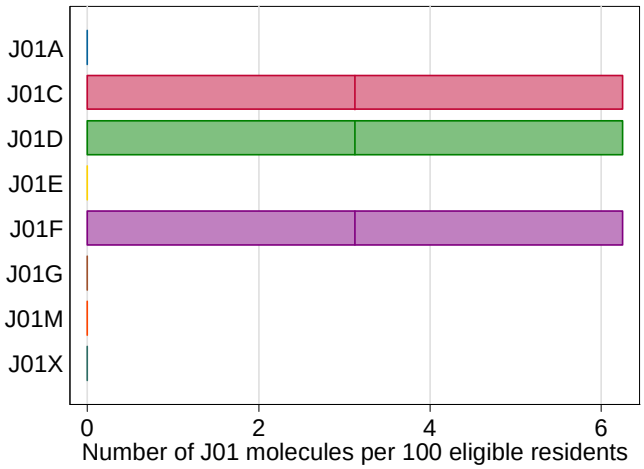
Prescriber (*n*=3)	
General practitioner	0.0%
Specialist	100%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=3)	0.0%
Dipstick test performed (*n*=0 UTI)	-

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	9.38	0.00	18.75
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=3)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.0	0.0	0.0
β-lactam antibacterials (J01C)	33.3%	3.13	0	6.25
Other β-lactam antibacterials (J01D)	33.3%	3.13	0	6.25
Sulfonamides & trimethoprim (J01E)	0.0%	0.0	0.0	0.0
Macrolides, lincosamides & streptogramins (J01F)	33.3%	3.13	0	6.25
Aminoglycoside antibacterials (J01G)	0.0%	0.0	0.0	0.0
Quinolone antibacterials (J01M)	0.0%	0.0	0.0	0.0
Other antibacterials (J01X)	0.0%	0.0	0.0	0.0

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=1)	Amoxicillin	J01CA04	100%
J01D (n=1)	Cefotaxime	J01DD01	100%
J01F (n=1)	Azithromycin	J01FA10	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0%**
Respiratory tract	0	3	0	**3**	**100%**
Urinary tract	0	0	0	**0**	**0.0%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	0	0	**0**	**0.0%**
Skin or non-surgical wound	-	0	0	**0**	**0.0%**
Total	**0**	**3**	**0**	**3**	
%	**0.0%**	**100%**	**0.0%**		

Most frequently prescribed molecules for urinary tract infections (n=0)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=0)	-	-	-
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=3)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=3)	Amoxicillin	J01CA04	33.3%
	Cefotaxime	J01DD01	33.3%
	Azithromycin	J01FA10	33.3%
Documented (n=0)	-	-	-

CROATIA

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	1281

	Mean	Median	Minimum	Maximum
NH size	261.8	293.0	107	380
Bed occupation rate	98.3%	99.2%	94.2%	100%
Proportion of hospitalized residents	1.3%	0.8%	0.0%	3.7%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

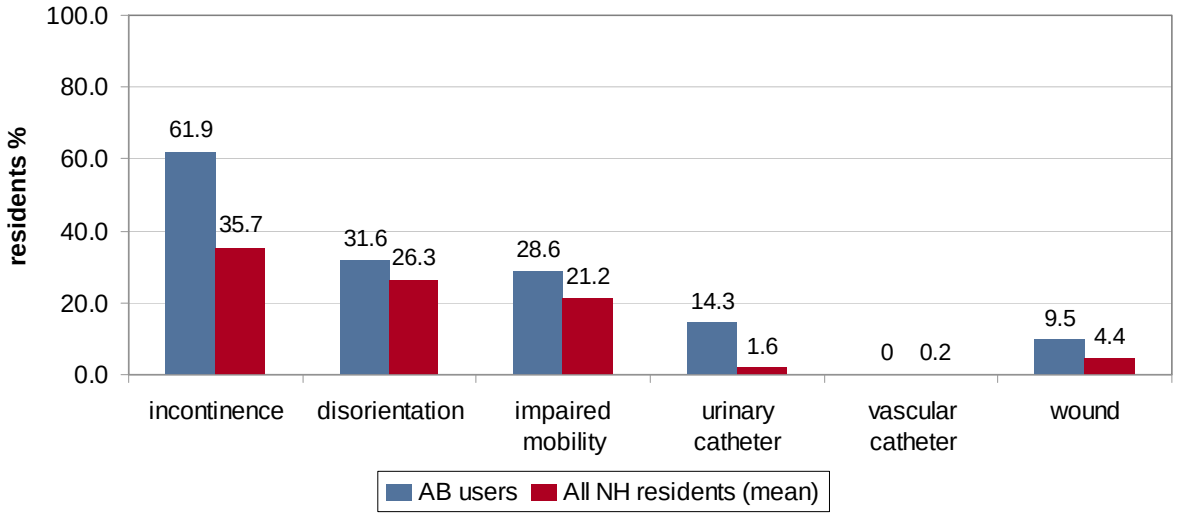
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	35.7%	36.9%	10.5%	58.9%
Disorientation	26.3%	26.8%	11.5%	46.7%
Impaired mobility	21.2%	17.2%	14.2%	34.6%
Risk factors				
Urinary catheter	1.6%	2.0%	0.3%	2.6%
Vascular catheter	0.2%	0.0%	0.0%	0.9%
Wounds	4.4%	4.5%	1.9%	8.3%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**21**
Mean age (min-max)	82.7 (71-101)
Gender (% male)	38.1%
Length of NH stay < 1 year	14.3%
Recent hospital admission (past 3 months)	9.5%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	1.8%	1.9%	0.6%	3.7%

Number of prescribed molecules	**21**
Number of residents using 1 molecule	21
Number of residents using >1 molecule	0

Administration route (*n*=21)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=19)	
In the nursing home	89.5%
In the hospital	10.5%
Elsewhere	0.0%

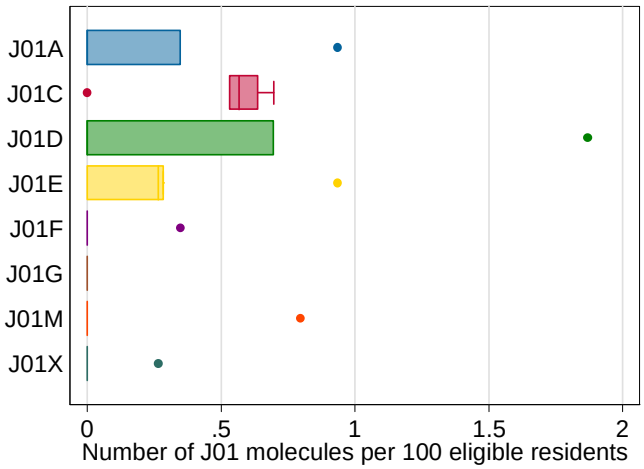
Prescriber (*n*=20)	
General practitioner	90.0%
Specialist	10.0%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=19)	31.6%
Dipstick test performed (*n*=10/11 UTI)	90.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	1.83	0.64	3.74
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=21)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	9.5%	0.26	0.00	0.93
β-lactam antibacterials (J01C)	33.3%	0.49	0.00	0.70
Other β-lactam antibacterials (J01D)	19.1%	0.51	0.00	1.87
Sulfonamides & trimethoprim (J01E)	14.3%	0.30	0.00	0.93
Macrolides, lincosamides & streptogramins (J01F)	4.8%	0.07	0.00	0.35
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	14.3%	0.16	0.00	0.80
Other antibacterials (J01X)	4.8%	0.05	0.00	0.27

Most frequently administered antibacterials within the 2 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=7)	Amoxicillin and enzyme inhibitor	J01CR02	71.4%
J01D (n=4)	Cefuroxime	J01DC02	50.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0%**
Respiratory tract	0	8	0	**8**	**38.1%**
Urinary tract	0	8	3	**11**	**52.4%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	1	0	**1**	**4.8%**
Skin or non-surgical wound	-	1	0	**1**	**4.8%**
Total	**0**	**18**	**3**	**21**	
%	**0.0%**	**85.7%**	**14.3%**		

Most frequently prescribed molecules for urinary tract infections (n=11)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=8)	Amoxicillin and enzyme inhibitor	J01CR02	50.0%
Documented (n=3)	Sulfamethoxazole and trimethoprim	J01EE01	66.7%

Most frequently prescribed molecules for respiratory tract infections (n=8)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=8)	Norfloxacin	J01MA06	25.0%
Documented (n=0)	-	-	-

CZECH REPUBLIC

Nursing homes

General data

Participating nursing homes	6
Ownership (% public)	66.7%
Qualified nurse present 24/24h	100%
Number of eligible residents	607

	Mean	Median	Minimum	Maximum
NH size	119.2	109.0	40	208
Bed occupation rate	81.6%	80.6%	70.6%	95.7%
Proportion of hospitalized residents	0.0%	0.0%	0.0%	0.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

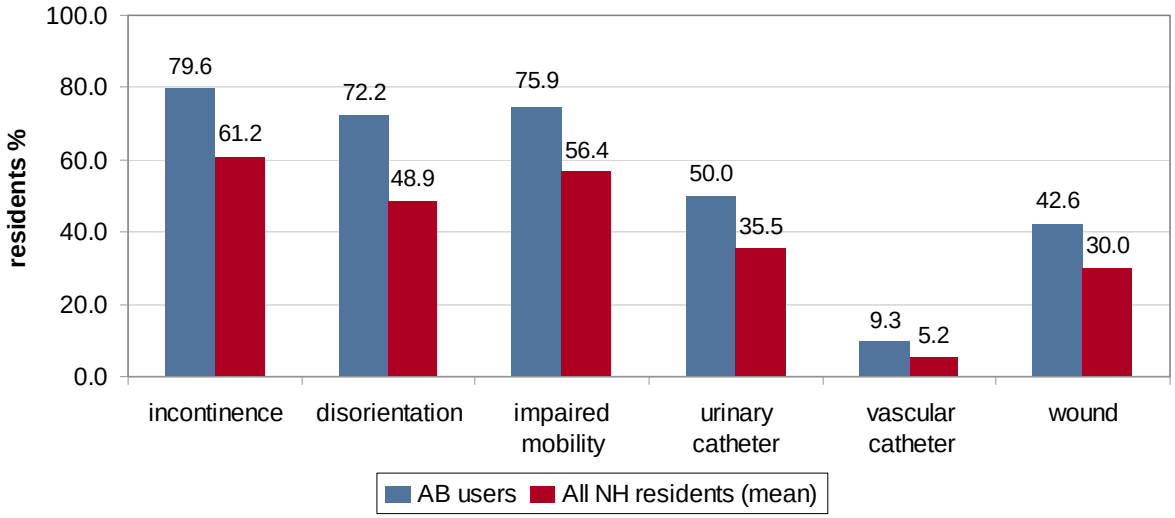
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	61.2%	62.5%	30.9%	86.5%
Disorientation	48.9%	43.9%	14.7%	89.1%
Impaired mobility	56.4%	57.1%	22.1%	76.3%
Risk factors				
Urinary catheter	35.5%	30.7%	16.7%	61.7%
Vascular catheter	5.2%	3.4%	0.0%	16.1%
Wounds	30.0%	28.0%	16.0%	46.1%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**54**
Mean age (min-max)	78.8 (40-97)
Gender (% male)	48.1%
Length of NH stay < 1 year	100%
Recent hospital admission (past 3 months)	85.2%
Recent surgery (in previous 30 days)	*missing*

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	9.6%	9.0%	2.9%	19.4%

Number of prescribed molecules	**57**
Number of residents using 1 molecule	54
Number of residents using >1 molecule	3

Administration route (*n*=57)	
Oral	84.2%
Parenteral	15.8%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=57)	
In the nursing home	86.0%
In the hospital	12.3%
Elsewhere	1.8%

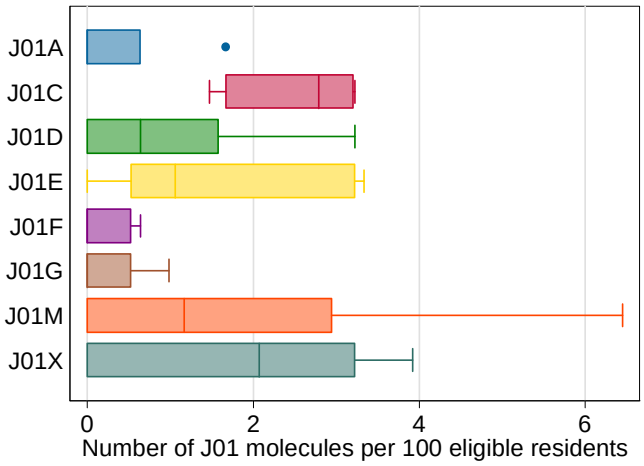
Prescriber (*n*=57)	
General practitioner	19.3%
Specialist	80.7%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=57)	63.2%
Dipstick test performed (*n*=0/30 UTI)	-

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.09	0.00	0.53
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	9.74	2.94	19.35
J02	0.11	0.00	0.64
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=55)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	3.6%	0.38	0.00	1.67
β-lactam antibacterials (J01C)	29.1%	2.52	1.47	3.23
Other β-lactam antibacterials (J01D)	10.9%	1.01	0.00	3.23
Sulfonamides & trimethoprim (J01E)	10.9%	1.53	0.00	3.33
Macrolides, lincosamides & streptogramins (J01F)	3.6%	0.19	0.00	0.64
Aminoglycoside antibacterials (J01G)	3.6%	0.25	0.00	0.98
Quinolone antibacterials (J01M)	16.4%	1.95	0.00	6.45
Other antibacterials (J01X)	21.8%	1.88	0.00	3.92

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=16)	Amoxicillin and enzyme inhibitor	J01CR02	62.5%
	Amoxicillin	J01CA04	25.0%
J01X (n=12)	Nitrofurantoin	J01XE01	100%
J01M (n=9)	Ofloxacin	J01MA01	33.3%
	Ciprofloxacin	J01MA02	33.3%
	Norfloxacin	J01MA06	33.3%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	1	1	2	**4**	**7.0%**
Respiratory tract	0	13	3	**16**	**28.1%**
Urinary tract	10	6	14	**30**	**52.6%**
Gastro-intestinal	0	0	1	**1**	**1.8%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	1	**1**	**1.8%**
Not specified	1	3	1	**5**	**8.8%**
Other	0	0	0	**0**	**0.0%**
Skin or non-surgical wound	-	0	0	**0**	**0.0%**
Total	**12**	**23**	**22**	**57**	
%	**21.1%**	**40.0%**	**38.6%**		

Most frequently prescribed molecules for urinary tract infections (n=30)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=10)	Nitrofurantoin	J01XE01	60.0%
	Norfloxacin	J01MA06	30.0%
Empirical (n=6)	Ofloxacin	J01MA01	50.0%
Documented (n=14)	Nitrofurantoin	J01XE01	42.9%
	Amoxicillin and enzyme inhibitor	J01CR02	28.6%
	Cefuroxime	J01DC02	21.4%

Most frequently prescribed molecules for respiratory tract infections (n=16)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=13)	Amoxicillin	J01CA04	23.1%
	Amoxicillin and enzyme inhibitor	J01CR02	15.4%
	Sulfamethoxazole and trimethoprim	J01EE01	15.4%
Documented (n=3)	Amoxicillin	J01CA04	33.3%
	Ciprofloxacin	J01MA02	33.3%
	Ketoconazole	J02AB02	33.3%

DENMARK

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	100%
Qualified nurse present 24/24h	20.0%
Number of eligible residents	325

	Mean	Median	Minimum	Maximum
NH size	69.8	61.0	54	103
Bed occupation rate	94.8%	96.7%	90.3%	98.2%
Proportion of hospitalized residents	1.1%	1.5%	0.0%	2.2%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

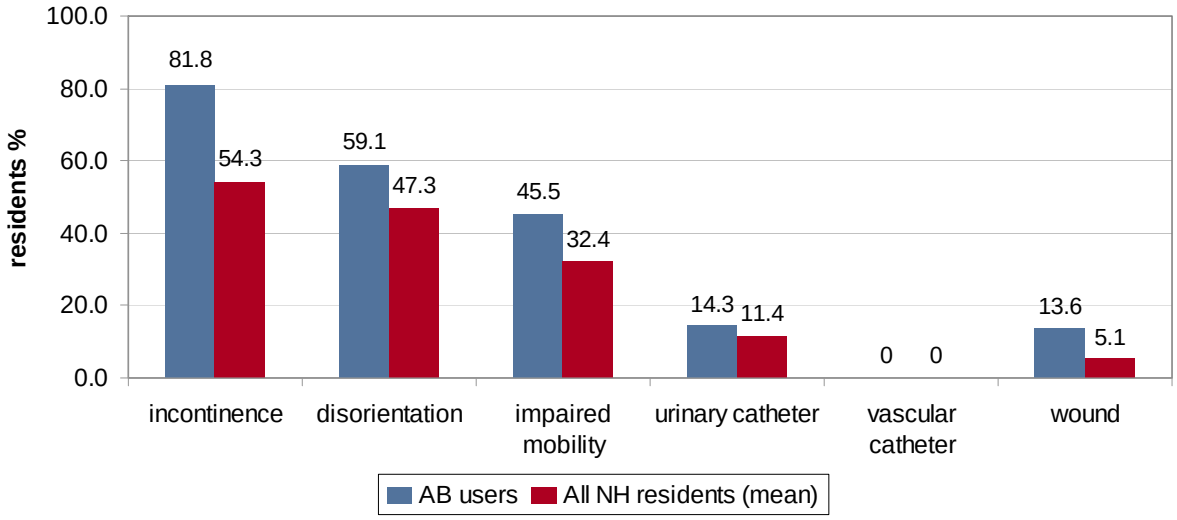
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	54.3%	55.4%	47.3%	58.5%
Disorientation	47.3%	57.1%	6.6%	68.2%
Impaired mobility	32.4%	32.1%	27.1%	37.4%
Risk factors				
Urinary catheter	11.4%	10.7%	6.1%	20.8%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	5.1%	3.6%	0.0%	11.0%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**22**
Mean age (min-max)	84.5 (64-97)
Gender (% male)	30.0%
Length of NH stay < 1 year	28.6%
Recent hospital admission (past 3 months)	4.6%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	6.4%	7.6%	1.9%	8.8%

Number of prescribed molecules	**22**
Number of residents using 1 molecule	22
Number of residents using >1 molecule	0

Administration route (*n*=22)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=22)	
In the nursing home	90.9%
In the hospital	9.1%
Elsewhere	0.0%

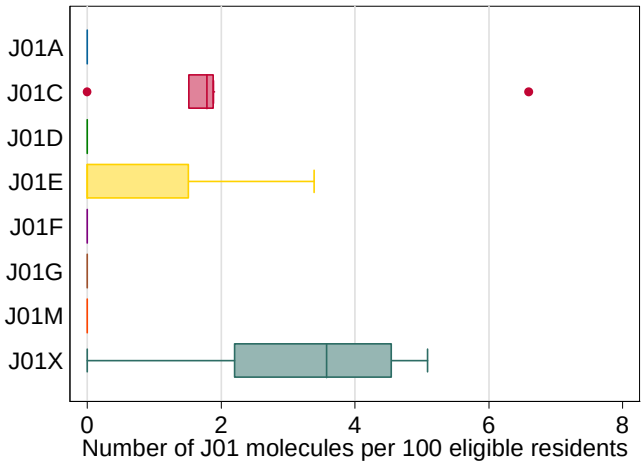
Prescriber (*n*=22)	
General practitioner	81.8%
Specialist	9.1%
Pharmacist	0.0%
Nurse	0.0%
Other	9.1%

Culture sample taken (*n*=22)	63.6%
Dipstick test performed (*n*=15/16 UTI)	93.3%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	6.42	1.89	8.79
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=22)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	40.9%	2.36	0.00	6.59
Other β-lactam antibacterials (J01D)	0.0%	0.00	0.00	0.00
Sulfonamides & trimethoprim (J01E)	13.6%	0.98	0.00	3.39
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	0.0%	0.00	0.00	0.00
Other antibacterials (J01X)	45.5%	3.08	0.00	5.08

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01X (n=10)	Nitrofurantoin	J01XE01	100%
J01C (n=9)	Pivmecillinam	J01CA08	33.3%
	Dicloxacillin	J01CF01	33.3%
J01E (n=3)	Trimethoprim	J01EA01	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0%**
Respiratory tract	0	1	0	**1**	**4.5%**
Urinary tract	10	5	1	**16**	**72.7%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	2	0	**2**	**9.1%**
Skin or non-surgical wound	-	3	0	**3**	**13.6%**
Total	**10**	**11**	**1**	**22**	
%	**45.5%**	**50.0%**	**4.6%**		

Most frequently prescribed molecules for urinary tract infections (n=16)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=10)	Nitrofurantoin	J01XE01	70.0%
	Trimethoprim	J01EA01	30.0%
Empirical (n=5)	Pivmecillinam	J01CA08	60.0%
Documented (n=1)	Nitrofurantoin	J01XE01	100%

Most frequently prescribed molecules for respiratory tract infections (n=1)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Phenoxymethylpenicillin	J01CE02	100%
Documented (n=0)	-	-	-

FINLAND

Nursing homes

General data

Participating nursing homes	8
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	1765

	Mean	Median	Minimum	Maximum
NH size	228.4	192.5	60	587
Bed occupation rate	98.5%	98.6%	95.9%	100%
Proportion of hospitalized residents	0.4%	0.2%	0.0%	1.5%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

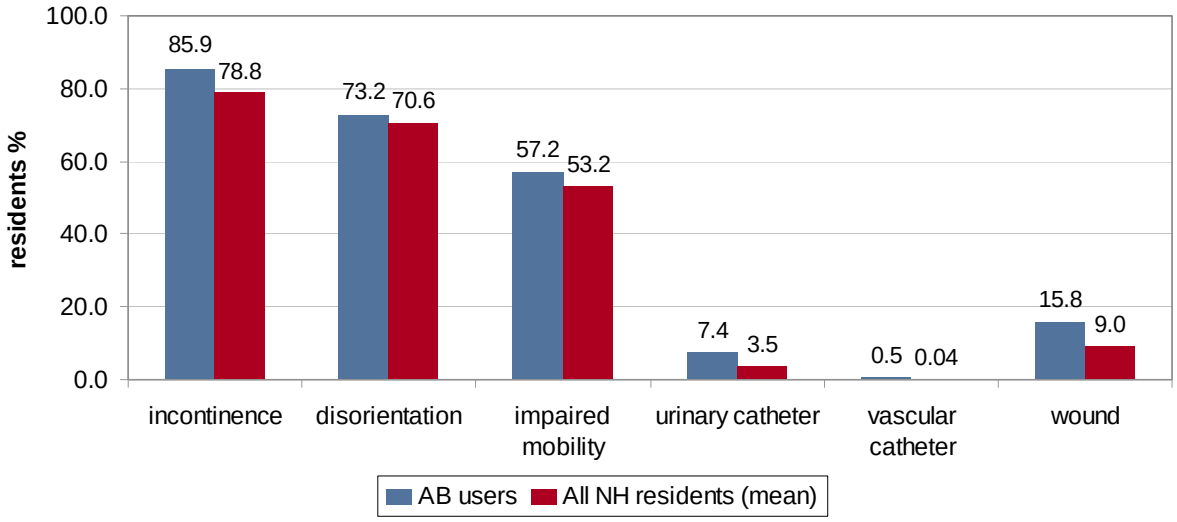
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	78.8%	80.1%	58.3%	96.7%
Disorientation	70.6%	69.1%	48.3%	95.0%
Impaired mobility	53.2%	42.8%	33.3%	100%
Risk factors				
Urinary catheter	3.5%	3.2%	1.4%	6.7%
Vascular catheter	0.04%	0.0%	0.0%	0.4%
Wounds	9.0%	10.1%	0.7%	14.6%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**207**
Mean age (min-max)	84.5 (47-102)
Gender (% male)	18.0%
Length of NH stay < 1 year	32.5%
Recent hospital admission (past 3 months)	14.4%
Recent surgery (in previous 30 days)	2.5%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	13.1%	12.2%	3.2%	33.3%

Number of prescribed molecules	**221**
Number of residents using 1 molecule	207
Number of residents using >1 molecule	14

Administration route (*n*=221)	
Oral	96.4%
Parenteral	3.6%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=221)	
In the nursing home	81.5%
In the hospital	9.5%
Elsewhere	9.5%

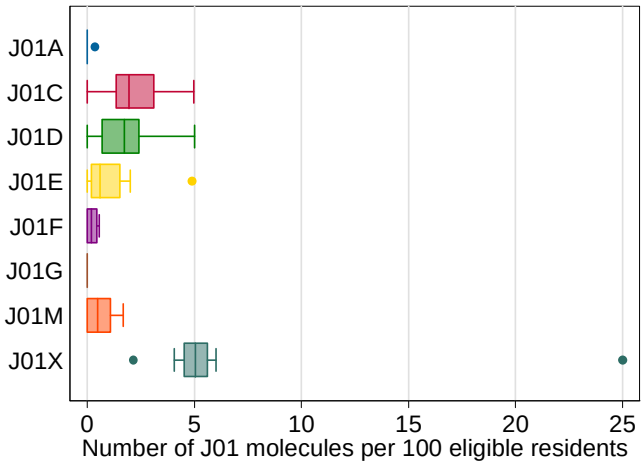
Prescriber (*n*=220)	
General practitioner	42.3%
Specialist	57.3%
Pharmacist	0.0%
Nurse	0.0%
Other	0.5%

Culture sample taken (*n*=215)	38.1%
Dipstick test performed (*n*=156/161 UTI)	52.6%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.05	0.00	0.41
D01	0.06	0.00	0.52
J01	13.29	3.23	33.33
J02	0.06	0.00	0.52
J04	0.00	0.00	0.00
P01	0.17	0.00	0.56

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=214)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.9%	0.05	0.00	0.36
β-lactam antibacterials (J01C)	18.2%	2.22	0.00	4.97
Other β-lactam antibacterials (J01D)	14.0%	1.84	0.00	5.00
Sulfonamides & trimethoprim (J01E)	13.1%	1.18	0.00	4.88
Macrolides, lincosamides & streptogramins (J01F)	2.3%	0.23	0.00	0.56
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	5.1%	0.59	0.00	1.67
Other antibacterials (J01X)	46.3%	7.18	2.15	25.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01X (n=99)	Methenamine	J01XX05	73.7%
	Nitrofurantoin	J01XE01	24.2%
J01C (n=39)	Pivmecillinam	J01CA08	69.2%
	Amoxicillin and enzyme inhibitor	J01CR02	15.4%
	Phenoxymethylpenicillin	J01CE02	7.7%
J01D (n=30)	Cefalexin	J01DB01	83.3%
	Cefuroxime	J01DC02	10.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	6	1	**7**	**3.2%**
Respiratory tract	1	14	1	**16**	**7.3%**
Urinary tract	81	59	21	**161**	**73.2%**
Gastro-intestinal	0	2	1	**3**	**1.4%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	1	**1**	**0.5%**
Not specified	0	2	0	**2**	**0.9%**
Other	8	2	0	**10**	**4.5%**
Skin or non-surgical wound	-	15	5	**20**	**9.1%**
Total	**90**	**100**	**30**	**220**	
%	**40.9%**	**45.5%**	**13.6%**		

Most frequently prescribed molecules for urinary tract infections (n=161)

Indication	Molecule	ATC code	%
Prophylactic (n=81)	Methenamine	J01XX05	49.4%
	Trimethoprim	J01EA01	29.6%
	Nitrofurantoin	J01XE01	12.4%
Empirical (n=59)	Methenamine	J01XX05	55.9%
	Pivmecillinam	J01CA08	17.0%
	Nitrofurantoin	J01XE01	15.3%
Documented (n=21)	Pivmecillinam	J01CA08	47.6%
	Nitrofurantoin	J01XE01	23.8%

Most frequently prescribed molecules for respiratory tract infections (n=16)

Indication	Molecule	ATC code	%
Prophylactic (n=1)	Phenoxymethylpenicillin	J01CE02	100%
Empirical (n=14)	Cefalexin	J01DB01	28.6%
	Amoxicillin and enzyme inhibitor	J01CR02	21.4%
Documented (n=1)	Cefuroxime	J01DC02	100%

FRANCE

Nursing homes

General data

Participating nursing homes	8
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	599

	Mean	Median	Minimum	Maximum
NH size	80.4	79.5	43	119
Bed occupation rate	93.7%	98.6%	78.8%	100%
Proportion of hospitalized residents	0.94%	0.2%	0.0%	2.7%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

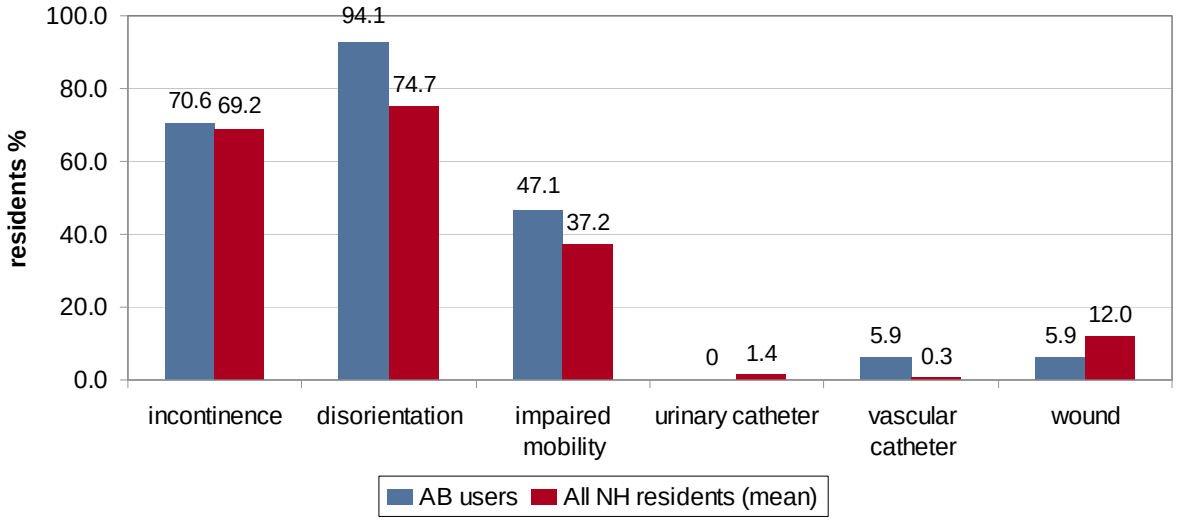
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	69.2%	71.2%	43.6%	94.6%
Disorientation	74.7%	70.7%	57.3%	98.2%
Impaired mobility	37.2%	33.9%	20.9%	74.6%
Risk factors				
Urinary catheter	1.4%	0.7%	0.0%	4.6%
Vascular catheter	0.3%	0.0%	0.0%	2.7%
Wounds	12.0%	11.1%	2.3%	23.3%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**17**
Mean age (min-max)	85.0 (68-78)
Gender (% male)	35.3%
Length of NH stay < 1 year	29.4%
Recent hospital admission (past 3 months)	11.8%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	3.3%	2.5%	0.0%	11.6%

Number of prescribed molecules	**17**
Number of residents using 1 molecule	17
Number of residents using >1 molecule	0

Administration route (*n*=17)	
Oral	94.1%
Parenteral	5.9%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=17)	
In the nursing home	88.2%
In the hospital	11.8%
Elsewhere	0.0%

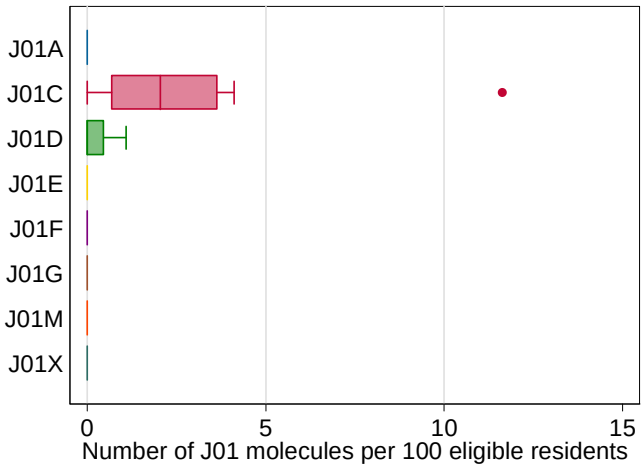
Prescriber (*n*=17)	
General practitioner	82.4%
Specialist	11.8%
Pharmacist	0.0%
Nurse	0.0%
Other	5.9%

Culture sample taken (*n*=15)	26.7%
Dipstick test performed (*n*=2/2 UTI)	100%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	3.29	0.00	11.63
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=17)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	88.2%	3.04	0.00	11.63
Other β-lactam antibacterials (J01D)	11.8%	0.25	0.00	1.09
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	0.0%	0.00	0.00	0.00
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 2 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=15)	Amoxicillin	J01CA04	60.0%
	Amoxicillin and enzyme inhibitor	J01CR02	40.0%
J01D (n=2)	Ceftriaxone	J01DD04	50.0%
	Cefpodoxime	J01DD13	50.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	1	0	0	**1**	**6.3%**
Respiratory tract	0	10	1	**11**	**68.8%**
Urinary tract	0	0	2	**2**	**12.5%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	1	0	**1**	**6.3%**
Other	0	1	0	**1**	**6.3%**
Skin or non-surgical wound	-	0	0	**0**	**0.0%**
Total	**1**	**12**	**3**	**16**	
%	**6.3%**	**75.0%**	**18.8%**		

Most frequently prescribed molecules for urinary tract infections (n=2)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=0)	-	-	-
Documented (n=2)	Amoxicillin	J01CA04	100%

Most frequently prescribed molecules for respiratory tract infections (n=11)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=10)	Amoxicillin	J01CA04	60.0%
Documented (n=1)	Amoxicillin and enzyme inhibitor	J01CR02	100%

GERMANY

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	60.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	474

	Mean	Median	Minimum	Maximum
NH size	80.4	79.5	43	119
Bed occupation rate	95.1%	94.6%	91.3%	99.1%
Proportion of hospitalized residents	1.3%	0.9%	0.0%	3.4%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

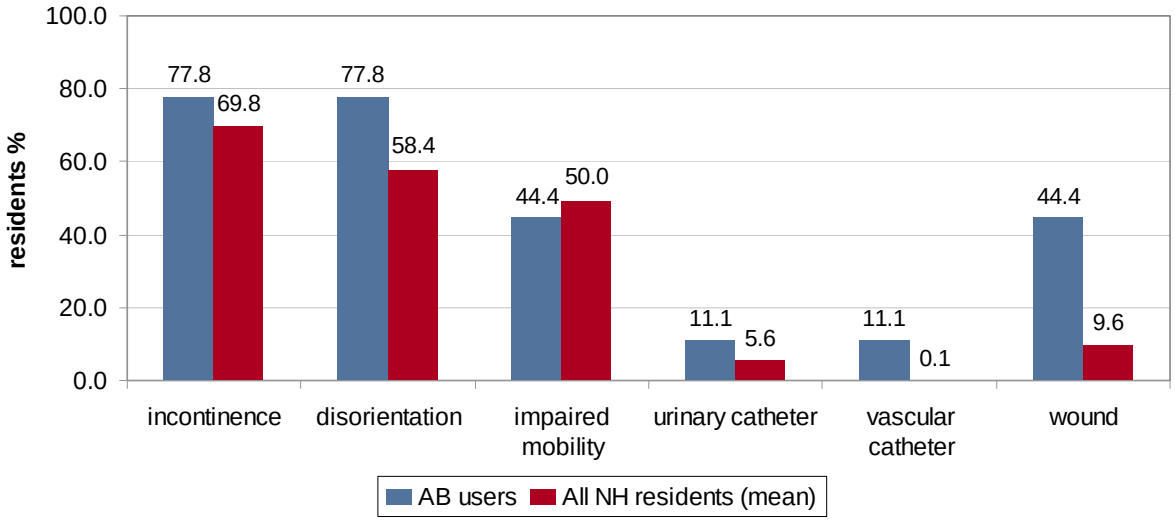
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	69.8%	69.8%	50.0%	83.0%
Disorientation	58.4%	61.3%	39.3%	66.0%
Impaired mobility	50.0%	51.4%	32.1%	58.8%
Risk factors				
Urinary catheter	5.6%	6.6%	3.6%	7.6%
Vascular catheter	0.1%	0.0%	0.0%	0.6%
Wounds	9.6%	9.4%	6.0%	14.3%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**9**
Mean age (min-max)	74.1 (31-89)
Gender (% male)	44.4%
Length of NH stay < 1 year	44.4%
Recent hospital admission (past 3 months)	25.0%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	3.3%	2.5%	0.0%	11.6%

Number of prescribed molecules	**9**
Number of residents using 1 molecule	9
Number of residents using >1 molecule	0

Administration route (*n*=9)	
Oral	88.9%
Parenteral	11.1%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=9)	
In the nursing home	11.1%
In the hospital	11.1%
Elsewhere	77.8%

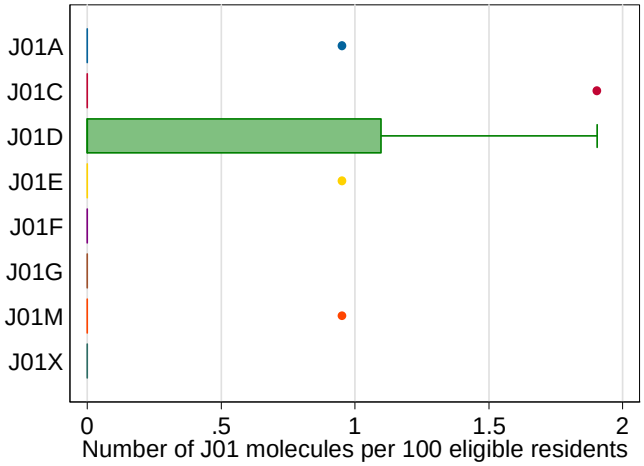
Prescriber (*n*=9)	
General practitioner	77.8%
Specialist	22.2%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=9)	0.0%
Dipstick test performed (*n*=2/2 UTI)	100%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	1.55	0.00	6.67
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=9)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	11.1%	0.19	0.00	0.95
β-lactam antibacterials (J01C)	22.2%	0.38	0.00	1.90
Other β-lactam antibacterials (J01D)	44.4%	0.60	0.00	1.90
Sulfonamides & trimethoprim (J01E)	11.1%	0.19	0.00	0.95
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	11.1%	0.19	0.00	0.95
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 2 largest J01 classes

J01 class	Molecule	ATC code	%
J01D (n=4)	Cefuroxime	J01DC02	75.0%
J01C (n=2)	Amoxicillin and enzyme inhibitor	J01CR02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	1	0	**1**	**11.1%**
Respiratory tract	0	4	0	**4**	**44.4%**
Urinary tract	0	2	0	**2**	**22.2%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	1	0	**1**	**11.1%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	1	0	**1**	**11.1%**
Skin or non-surgical wound	-	0	0	**0**	**0.0%**
Total	**0**	**9**	**0**	**9**	
%	**0.0%**	**100%**	**0.0%**		

Most frequently prescribed molecules for urinary tract infections (n=2)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=2)	Cefuroxime	J01DC02	50.0%
	Sulfamethoxazole and trimethoprim	J01EE01	50.0%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=4)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=4)	Cefuroxime	J01DC02	50.0%
Documented (n=0)	-	-	-

HUNGARY

Nursing homes

General data

Participating nursing homes	4
Ownership (% public)	0.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	281

	Mean	Median	Minimum	Maximum
NH size	72.5	70.0	40	110
Bed occupation rate	97.6%	97.9%	94.5%	100%
Proportion of hospitalized residents	1.7%	0.8%	0.0%	5.5%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

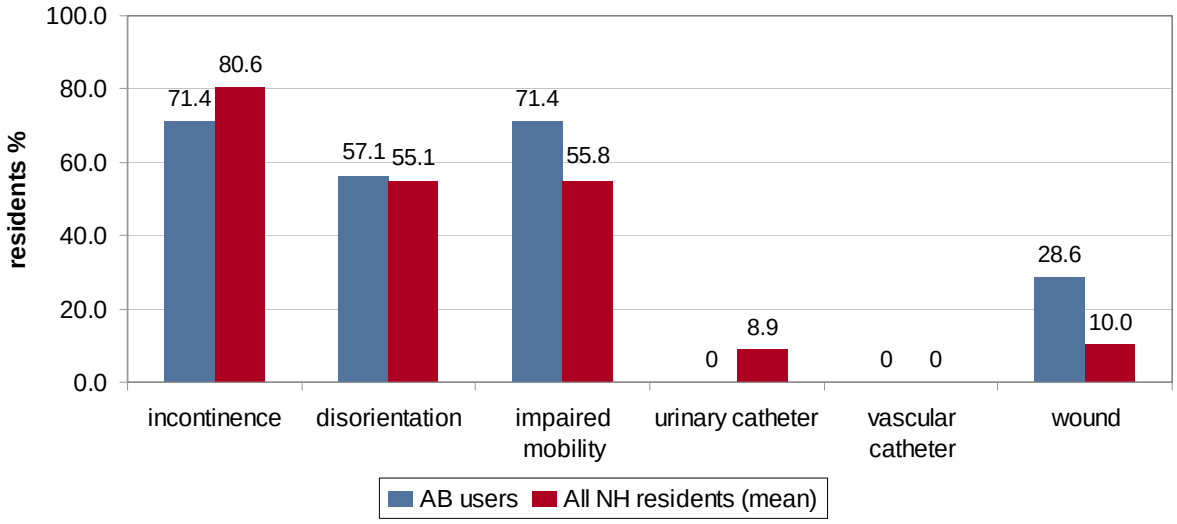
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	80.6%	81.8%	73.1%	85.9%
Disorientation	55.1%	56.4%	43.8%	64.1%
Impaired mobility	55.8%	55.9%	42.5%	68.8%
Risk factors				
Urinary catheter	8.9%	4.8%	0.0%	26.0%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	10.0%	10.9%	5.8%	12.5%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**7**
Mean age (min-max)	82.7 (74-97)
Gender (% male)	28.6%
Length of NH stay < 1 year	42.9%
Recent hospital admission (past 3 months)	14.3%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	2.1%	2.3%	0.0%	3.9%

Number of prescribed molecules	**7**
Number of residents using 1 molecule	7
Number of residents using >1 molecule	0

Administration route (*n*=7)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=7)	
In the nursing home	100%
In the hospital	0.0%
Elsewhere	0.0%

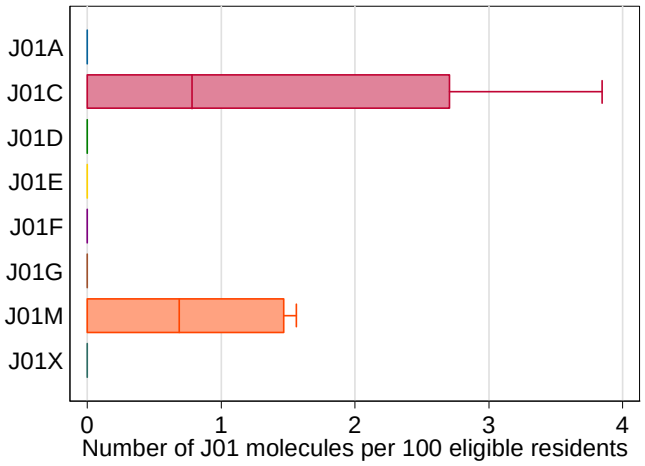
Prescriber (*n*=7)	
General practitioner	57.1%
Specialist	42.9%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=7)	0%
Dipstick test performed (*n*=1/1 UTI)	100%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	2.09	0.00	3.85
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=7)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	71.4%	1.35	0.00	3.85
Other β-lactam antibacterials (J01D)	0.0%	0.00	0.00	0.00
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	28.6%	0.73	0.00	1.56
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 2 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=5)	Amoxicillin and enzyme inhibitor	J01CR02	100%
J01M (n=2)	Ciprofloxacin	J01MA02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0 %**
Respiratory tract	0	6	0	**6**	**85.7 %**
Urinary tract	0	1	0	**1**	**14.3 %**
Gastro-intestinal	0	0	0	**0**	**0.0 %**
Bacteremia/septicaemia	0	0	0	**0**	**0.0 %**
Sepsis/septic shock	-	0	0	**0**	**0.0 %**
Not specified	0	0	0	**0**	**0.0 %**
Other	0	0	0	**0**	**0.0 %**
Skin or non-surgical wound	-	0	0	**0**	**0.0 %**
Total	**0**	**7**	**0.0**	**7**	
%	**0.0 %**	**100 %**	**0.0 %**		

Most frequently prescribed molecules for urinary tract infections (n=1)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Ciprofloxacin	J01MA02	100%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=6)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=6)	Amoxicillin and enzyme inhibitor	J01CR02	83.3%
Documented (n=0)	-	-	-

IRELAND

Nursing homes

General data

Participating nursing homes	11
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	843

	Mean	Median	Minimum	Maximum
NH size	86.2	58.0	21	195
Bed occupation rate	91.2%	93.2%	75.0%	100%
Proportion of hospitalized residents	0.6%	0.0%	0.0%	2.2%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

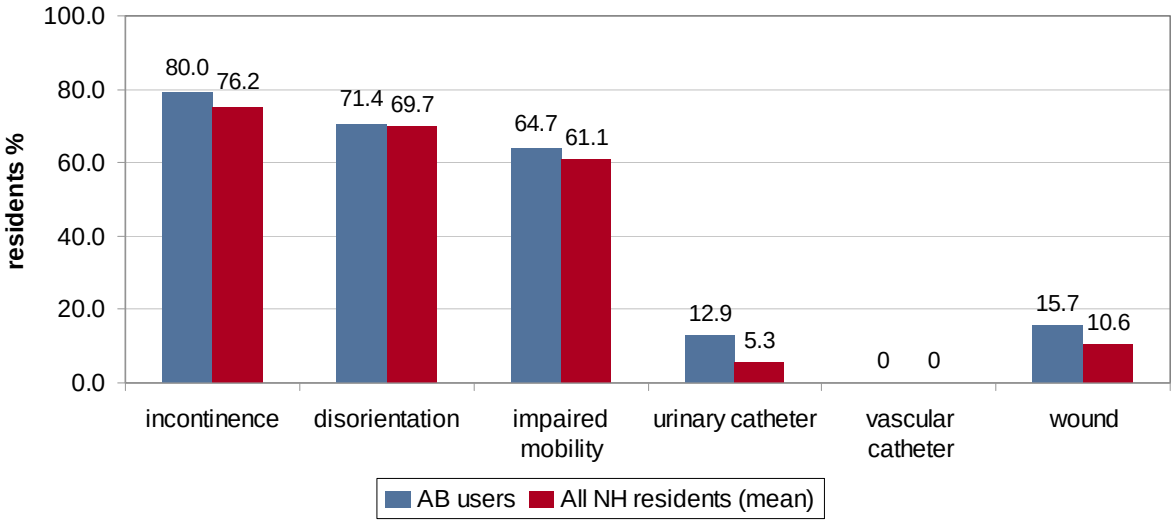
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	76.2%	75.6%	58.1%	94.7%
Disorientation	69.7%	68.9%	55.0%	98.2%
Impaired mobility	61.1%	60.0%	47.2%	71.1%
Risk factors				
Urinary catheter	5.3%	5.8%	0.9%	9.8%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	10.6%	9.3%	2.6%	26.8%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	85
Mean age (min-max)	81.7 (60-96)
Gender (% male)	36.1%
Length of NH stay < 1 year	34.5%
Recent hospital admission (past 3 months)	17.7%
Recent surgery (in previous 30 days)	4.8%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	10.1%	10.0%	2.3%	22.0%

Number of prescribed molecules	**90**
Number of residents using 1 molecule	85
Number of residents using >1 molecule	5

Administration route (*n*=90)	
Oral	90.0%
Parenteral	7.8%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	2.2%

Place of prescription (*n*=89)	
In the nursing home	95.5%
In the hospital	3.4%
Elsewhere	1.1%

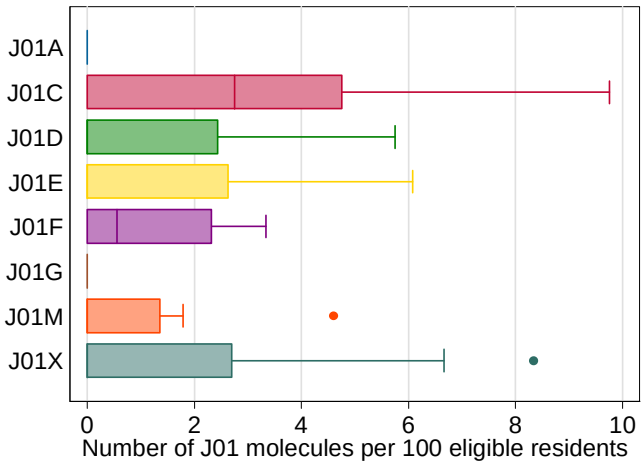
Prescriber (*n*=87)	
General practitioner	85.1%
Specialist	1.2%
Pharmacist	0.0%
Nurse	0.0%
Other	13.8%

Culture sample taken (*n*=88)	30.7%
Dipstick test performed (*n*=35/43 UTI)	80.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	9.90	2.33	19.51
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.65	0.00	4.88

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=85)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	28.2%	3.13	0.00	9.76
Other β-lactam antibacterials (J01D)	16.5%	1.31	0.00	5.75
Sulfonamides & trimethoprim (J01E)	17.7%	1.50	0.00	6.08
Macrolides, lincosamides & streptogramins (J01F)	8.2%	1.09	0.00	3.33
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	9.4%	0.81	0.00	4.60
Other antibacterials (J01X)	20.0%	2.07	0.00	8.33

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=24)	Amoxicillin and enzyme inhibitor	J01CR02	54.2%
	Flucloxacillin	J01CF05	20.8%
J01X (n=17)	Nitrofurantoin	J01XE01	100%
J01E (n=15)	Trimethoprim	J01EA01	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	1	0	**1**	**1.1%**
Respiratory tract	4	29	1	**34**	**38.2%**
Urinary tract	27	14	2	**43**	**48.3%**
Gastro-intestinal	0	1	1	**2**	**2.2%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	2	**2**	**2.2%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	1	0	**1**	**1.1%**
Skin or non-surgical wound	-	4	2	**6**	**6.7%**
Total	**31**	**50**	**8**	**89**	
%	**34.8%**	**56.2%**	**9.0%**		

Most frequently prescribed molecules for urinary tract infections (n=43)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=27)	Nitrofurantoin	J01XE01	59.3%
	Trimethoprim	J01EA01	37.0%
Empirical (n=14)	Trimethoprim	J01EA01	35.7%
	Ofloxacin	J01MA01	21.4%
Documented (n=2)	Amoxicillin	J01CA04	50.0%
	Amoxicillin and enzyme inhibitor	J01CR02	50.0%

Most frequently prescribed molecules for respiratory tract infections (n=34)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=4)	Clarithromycin	J01FA09	50.0%
Empirical (n=29)	Amoxicillin and enzyme inhibitor	J01CR02	27.6%
	Ceftriaxone	J01DD04	17.2%
	Cefuroxime	J01DC02	13.8%
Documented (n=1)	Clindamycin	J01FF01	100%

ITALY

Nursing homes

General data

Participating nursing homes	28
Ownership (% public)	85.7%
Qualified nurse present 24/24h	82.9%
Number of eligible residents	2610

	Mean	Median	Minimum	Maximum
NH size	96.3	60.0	20	470
Bed occupation rate	95.3%	98.1%	70.4%	100%
Proportion of hospitalized residents	0.7%	0.0%	0.0%	2.8%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

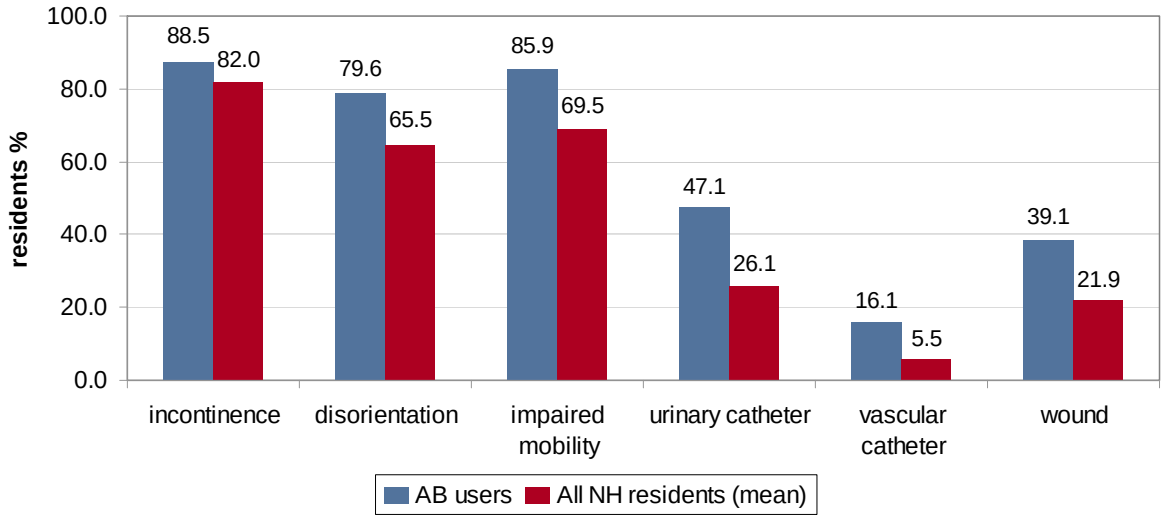
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	82.0%	86.3%	41.2%	99.5%
Disorientation	65.5%	65.0%	27.5%	98.3%
Impaired mobility	69.5%	75.0%	11.3%	92.5%
Risk factors				
Urinary catheter	26.1%	18.5%	0.0%	73.3%
Vascular catheter	5.5%	2.4%	0.0%	45.2%
Wounds	21.9%	18.7%	5.5%	64.7%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**158**
Mean age (min-max)	84.4 (48-103)
Gender (% male)	33.8%
Length of NH stay < 1 year	36.3%
Recent hospital admission (past 3 months)	22.9%
Recent surgery (in previous 30 days)	2.6%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	6.2%	5.7%	0.0%	26.7%

Number of prescribed molecules	**161**
Number of residents using 1 molecule	158
Number of residents using >1 molecule	3

Administration route (*n*=161)	
Oral	53.4%
Parenteral	46.6%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=160)	
In the nursing home	93.8%
In the hospital	6.3%
Elsewhere	0.0%

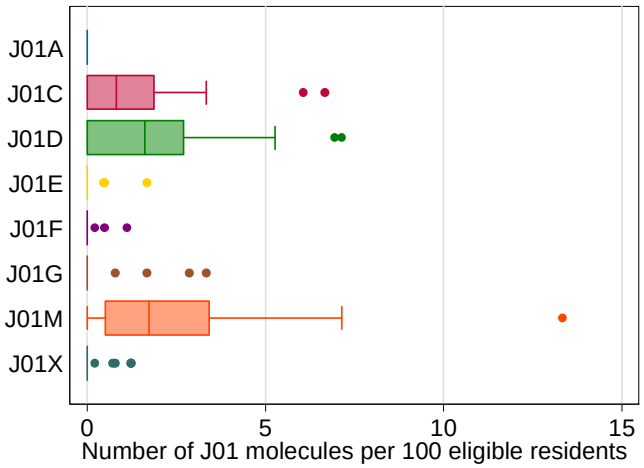
Prescriber (*n*=157)	
General practitioner	43.3%
Specialist	56.1%
Pharmacist	0.0%
Nurse	0.0%
Other	0.6%

Culture sample taken (*n*=156)	35.3%
Dipstick test performed (*n*=31/32 UTI)	45.2%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	6.35	0.00	26.67
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=161)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	23.6%	1.27	0.00	6.67
Other β-lactam antibacterials (J01D)	29.2%	1.91	0.00	7.14
Sulfonamides & trimethoprim (J01E)	1.9%	0.09	0.00	1.67
Macrolides, lincosamides & streptogramins (J01F)	2.5%	0.06	0.00	1.11
Aminoglycoside antibacterials (J01G)	5.0%	0.31	0.00	3.33
Quinolone antibacterials (J01M)	34.2%	2.51	0.00	13.33
Other antibacterials (J01X)	3.7%	0.19	0.00	1.25

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01M (n=55)	Ciprofloxacin	J01MA02	45.5%
	Levofloxacin	J01MA12	40.0%
	Moxifloxacin	J01MA14	10.9%
J01D (n=47)	Ceftriaxone	J01DD04	78.7%
	Ceftazidime	J01DD02	8.5%
J01C (n=38)	Amoxicillin and enzyme inhibitor	J01CR02	63.2%
	Piperacillin and enzyme inhibitor	J01CR05	18.4%
	Ampicillin and enzyme inhibitor	J01CR01	13.2%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	2	0	**2**	**1.2%**
Respiratory tract	2	96	2	**100**	**62.1%**
Urinary tract	1	17	14	**32**	**19.9%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	1	**1**	**0.6%**
Sepsis/septic shock	-	0	1	**1**	**0.6%**
Not specified	0	6	0	**6**	**3.7%**
Other	5	4	1	**10**	**6.2%**
Skin or non-surgical wound	-	5	4	**9**	**5.6%**
Total	**8**	**130**	**23**	**161**	
%	**5.0%**	**80.8%**	**14.3%**		

Most frequently prescribed molecules for urinary tract infections (n=32)

Indication	Molecule	ATC code	%
Prophylactic (n=1)	Sulfamethoxazole and trimethoprim	J01EE01	100%
Empirical (n=17)	Ciprofloxacin	J01MA02	29.4%
	Ceftriaxone	J01DD04	23.5%
	Levofloxacin	J01MA12	17.7%
Documented (n=14)	Amikacin	J01GB06	35.7%
	Ciprofloxacin	J01MA02	21.4%
	Nitrofurantoin	J01XE01	21.4%

Most frequently prescribed molecules for respiratory tract infections (n=100)

Indication	Molecule	ATC code	%
Prophylactic (n=2)	Ampicillin and enzyme inhibitor	J01CR01	50.0%
	Ceftriaxone	J01DD04	50.0%
Empirical (n=96)	Ceftriaxone	J01DD04	26.0%
	Amoxicillin and enzyme inhibitor	J01CR02	16.7%
	Ciprofloxacin	J01MA02	15.6%
	Levofloxacin	J01MA12	15.6%
Documented (n=2)	Sulfamethoxazole and trimethoprim	J01EE01	50.0%
	Amikacin	J01GB06	50.0%

LATVIA

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	1193

	Mean	Median	Minimum	Maximum
NH size	243.2	240.0	65	519
Bed occupation rate	98.8%	98.6%	97.7%	100%
Proportion of hospitalized residents	0.5%	0.7%	0.0%	1.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

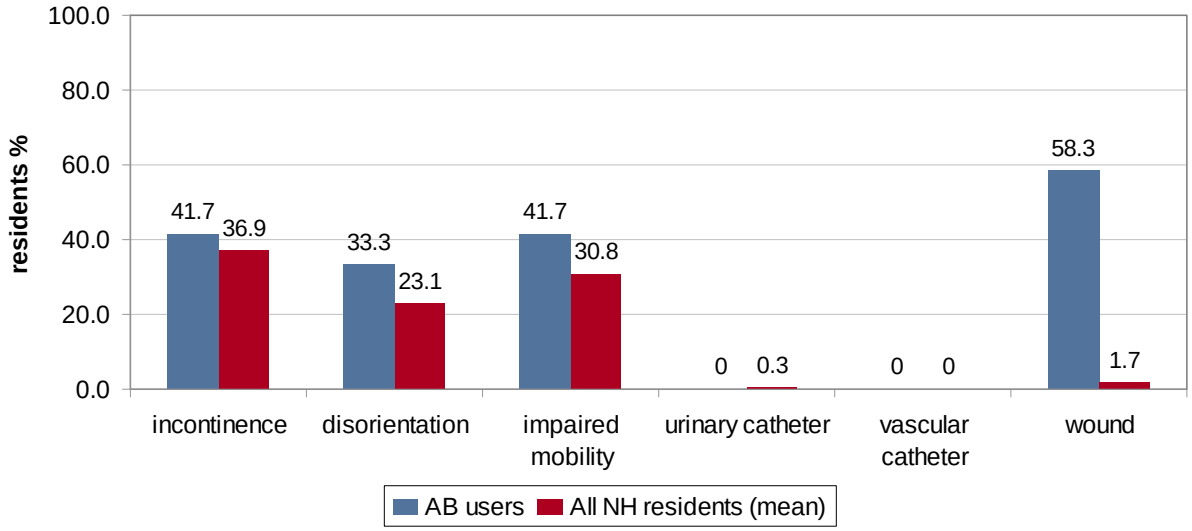
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	36.9%	27.2%	15.4%	75.7%
Disorientation	23.1%	15.4%	13.4%	37.4%
Impaired mobility	30.8%	26.8%	14.4%	50.5%
Risk factors				
Urinary catheter	0.3%	0.4%	0.0%	0.9%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	1.7%	2.5%	0.0%	3.2%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	12
Mean age (min-max)	71.6 (49-89)
Gender (% male)	50.0%
Length of NH stay < 1 year	25.0%
Recent hospital admission (past 3 months)	33.3%
Recent surgery (in previous 30 days)	16.7%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	1.2%	1.3%	0.4%	1.8%

Number of prescribed molecules	**12**
Number of residents using 1 molecule	12
Number of residents using >1 molecule	0

Administration route (*n*=12)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=12)	
In the nursing home	75.0%
In the hospital	25.0%
Elsewhere	0.0%

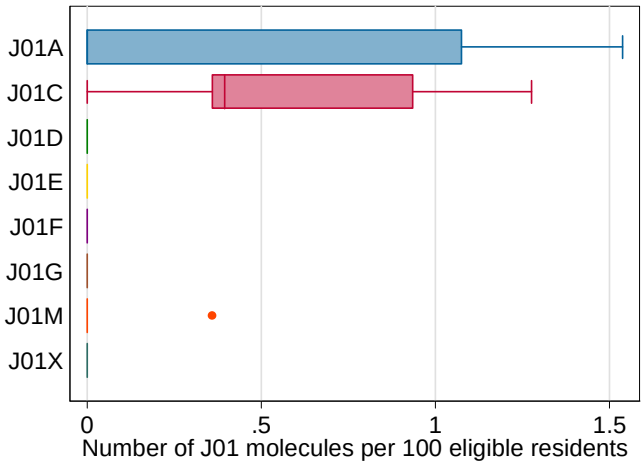
Prescriber (*n*=12)	
General practitioner	66.7%
Specialist	33.3%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=12)	25.0%
Dipstick test performed (*n*=1/1 UTI)	0.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	1.19	0.39	1.79
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=12)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	33.3%	0.52	0.00	1.54
β-lactam antibacterials (J01C)	58.3%	0.59	0.00	1.28
Other β-lactam antibacterials (J01D)	0.0%	0.00	0.00	0.00
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	8.3%	0.07	0.00	0.36
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=7)	Amoxicillin	J01CA04	85.7%
J01A (n=4)	Doxycycline	J01AA02	100%
J01M (n=1)	Ciprofloxacin	J01MA02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	2	**2**	**16.7%**
Respiratory tract	0	3	0	**3**	**25.0%**
Urinary tract	0	1	0	**1**	**8.3%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	1	**1**	**8.3%**
Not specified	0	1	0	**1**	**8.3%**
Other	0	4	0	**4**	**33.3%**
Skin or non-surgical wound	-	0	0	**0**	**0.0%**
Total	**0**	**9**	**3**	**12**	
%	**0.0%**	**75.0%**	**25.0%**		

Most frequently prescribed molecules for urinary tract infections (n=1)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Amoxicillin	J01CA04	100%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=3)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=3)	Amoxicillin	J01CA04	100%
Documented (n=0)	-	-	-

LITHUANIA

Nursing homes

General data

Participating nursing homes	3
Ownership (% public)	100% (*n*=2)
Qualified nurse present 24/24h	100%
Number of eligible residents	566

	Mean	Median	Minimum	Maximum
NH size	195.7	203.0	128	256
Bed occupation rate	97.1%	97.7%	95.7%	98.0%
Proportion of hospitalized residents	0.4%	0.5%	0.0%	0.8%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

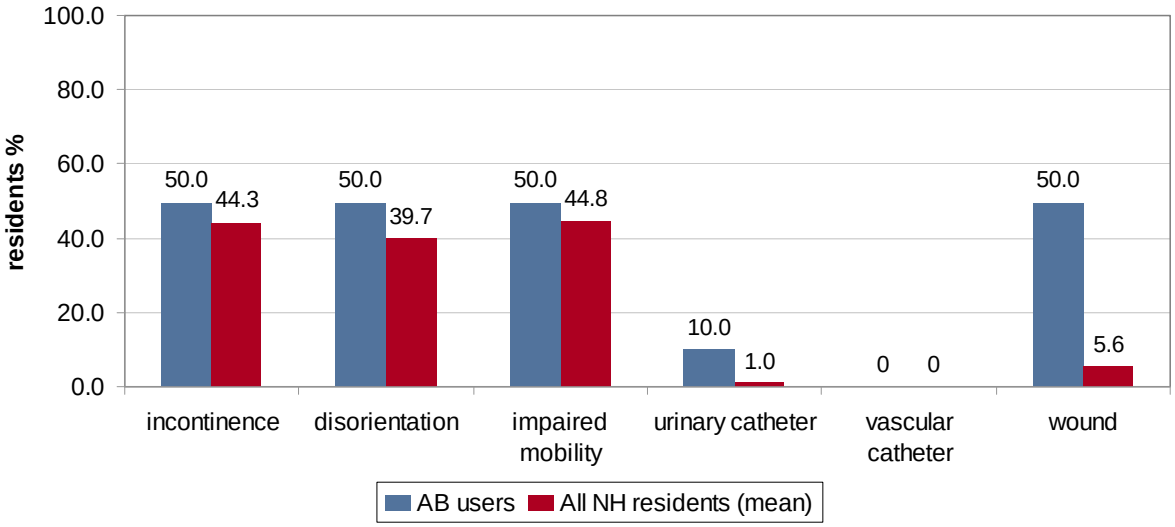
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	44.3%	44.0%	15.2%	73.6%
Disorientation	39.7%	33.3%	16.2%	69.6%
Impaired mobility	44.8%	44.4%	41.9%	48.0%
Risk factors				
Urinary catheter	1.0%	1.0%	0.0%	2.1%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	5.6%	4.0%	3.7%	9.1%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	10
Mean age (min-max)	69.6 (40-92)
Gender (% male)	30.0%
Length of NH stay < 1 year	20.0%
Recent hospital admission (past 3 months)	20.0%
Recent surgery (in previous 30 days)	20.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	1.7%	1.7%	0.8%	2.5%

Number of prescribed molecules	**10**
Number of residents using 1 molecule	10
Number of residents using >1 molecule	0

Administration route (*n*=10)	
Oral	60.0%
Parenteral	40.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=10)	
In the nursing home	80.0%
In the hospital	20.0%
Elsewhere	0.0%

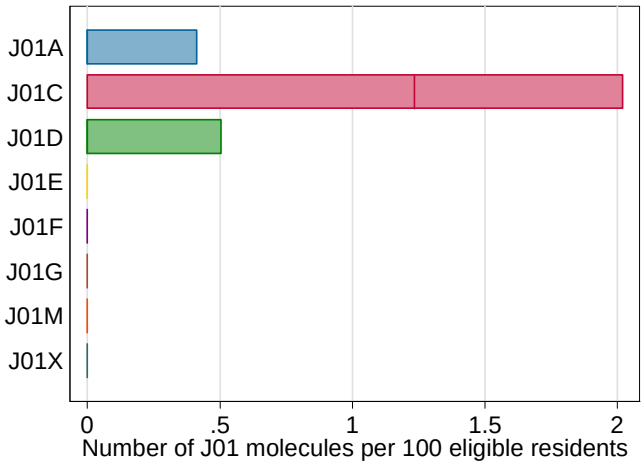
Prescriber (*n*=10)	
General practitioner	80.0%
Specialist	20.0%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=10)	20.0%
Dipstick test performed (*n*=1/1 UTI)	0.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	1.39	0.00	2.53
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.27	0.00	0.80

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=9)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	11.1%	0.14	0.00	0.41
β-lactam antibacterials (J01C)	77.8%	1.08	0.00	2.02
Other β-lactam antibacterials (J01D)	11.1%	0.17	0.00	0.51
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	0.0%	0.00	0.00	0.00
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=7)	Amoxicillin	J01CA04	42.9%
J01A (n=1)	Doxycycline	J01AA02	100%
J01D (n=1)	Cefuroxime	J01DC02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	1	0	**1**	**10.0%**
Respiratory tract	0	4	0	**4**	**40.0%**
Urinary tract	0	1	0	**1**	**10.0%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	1	0	0	**1**	**10.0%**
Skin or non-surgical wound	-	1	2	**3**	**30.0%**
Total	**1**	**7**	**2**	**10**	
%	**10.0%**	**70.0%**	**20.0%**		

Most frequently prescribed molecules for urinary tract infections (n=1)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Ampicillin	J01CA01	100%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=4)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=4)	Amoxicillin	J01CA04	50.0%
Documented (n=0)	-	-	-

MALTA

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	100%
Qualified nurse present 24/24h	100%
Number of eligible residents	319

	Mean	Median	Minimum	Maximum
NH size	66.2	64.0	31	123
Bed occupation rate	95.6%	96.8%	90.3%	98.4%
Proportion of hospitalized residents	1.4%	0.0%	0.0%	4.4%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

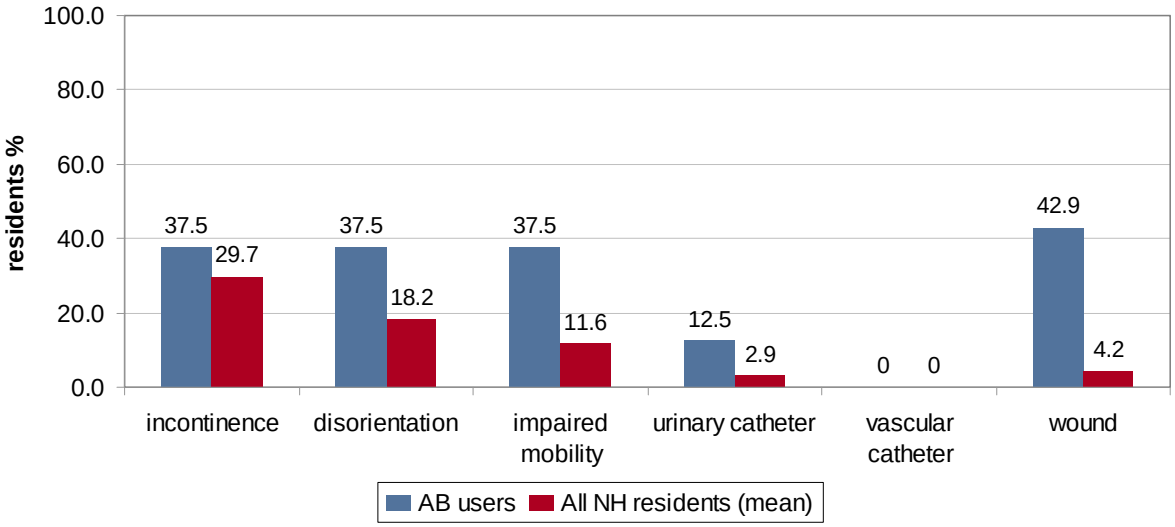
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	29.7%	30.6%	14.0%	43.7%
Disorientation	18.2%	19.2%	9.5%	25.0%
Impaired mobility	11.6%	8.1%	2.3%	27.7%
Risk factors				
Urinary catheter	2.9%	3.6%	0.0%	5.0%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	4.2%	5.0%	0.0%	6.7%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**8**
Mean age (min-max)	83.8 (65-92)
Gender (% male)	37.5%
Length of NH stay < 1 year	12.5%
Recent hospital admission (past 3 months)	0.0%
Recent surgery (in previous 30 days)	12.5%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	1.6%	1.5%	0.0%	5.0%

Number of prescribed molecules	**8**
Number of residents using 1 molecule	8
Number of residents using >1 molecule	0

Administration route (*n*=7)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=8)	
In the nursing home	87.5%
In the hospital	12.5%
Elsewhere	0.0%

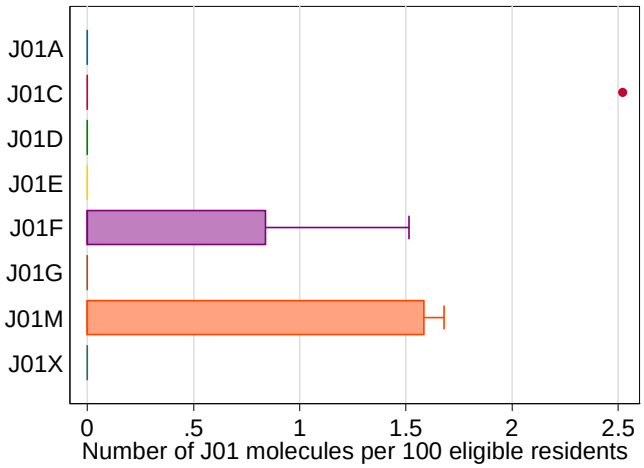
Prescriber (*n*=7)	
General practitioner	100%
Specialist	0.0%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=8)	0.0%
Dipstick test performed (*n*=2/2 UTI)	0.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	1.63	0.00	5.04
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=8)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	37.5%	0.50	0.00	2.52
Other β-lactam antibacterials (J01D)	0.0%	0.00	0.00	0.00
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	25.0%	0.47	0.00	1.52
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	37.5%	0.65	0.00	1.68
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=3)	Amoxicillin and enzyme inhibitor	J01CR02	100%
J01M (n=3)	Ciprofloxacin	J01MA02	100%
J01F (n=2)	Clarithromycin	J01FA09	50.0%
	Clindamycin	J01FF01	50.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	1	0	0	**1**	**12.5%**
Respiratory tract	0	3	0	**3**	**37.5%**
Urinary tract	0	2	0	**2**	**25.0%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	0	0	**0**	**0.0%**
Skin or non-surgical wound	-	2	0	**2**	**25.0%**
Total	**1**	**7**	**0**	**8**	
%	**12.5%**	**87.5%**	**0.0%**		

Most frequently prescribed molecules for urinary tract infections (n=2)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=2)	Amoxicillin and enzyme inhibitor	J01CR02	50.0%
	Ciprofloxacin	J01MA02	50.0%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=3)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=3)	Ciprofloxacin	J01MA02	66.7%
Documented (n=0)	-	-	-

NETHERLANDS

Nursing homes

General data

Participating nursing homes	4
Ownership (% public)	100%
Qualified nurse present 24/24h	75.0%
Number of eligible residents	713

	Mean	Median	Minimum	Maximum
NH size	185.8	141.5	82	378
Bed occupation rate	97.4%	98.3%	93.0%	100%
Proportion of hospitalized residents	1.8%	0.1%	0.0%	7.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

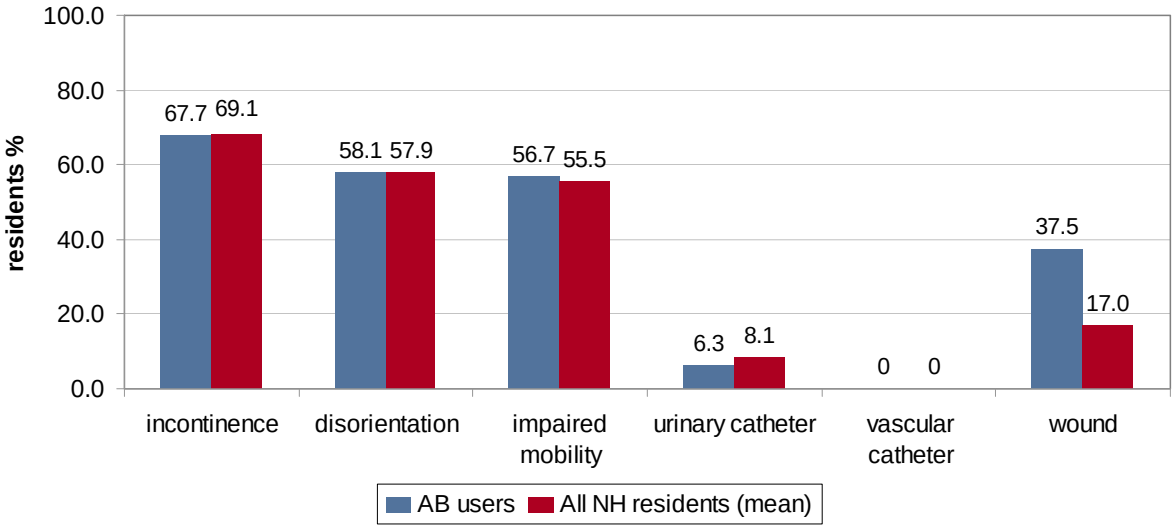
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	69.1%	67.5%	65.8%	75.4%
Disorientation	57.9%	56.6%	41.5%	77.1%
Impaired mobility	55.5%	54.6%	50.7%	62.3%
Risk factors				
Urinary catheter	8.1%	7.4%	4.1%	13.4%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	17.0%	17.0%	13.5%	20.5%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**32**
Mean age (min-max)	79.8 (48-93)
Gender (% male)	34.4%
Length of NH stay < 1 year	30.0%
Recent hospital admission (past 3 months)	3.6%
Recent surgery (in previous 30 days)	3.5%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	4.7%	4.3%	4.1%	6.1%

Number of prescribed molecules	**33**
Number of residents using 1 molecule	32
Number of residents using >1 molecule	1

Administration route (*n*=33)	
Oral	97.0%
Parenteral	3.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=33)	
In the nursing home	87.9%
In the hospital	12.1%
Elsewhere	0.0%

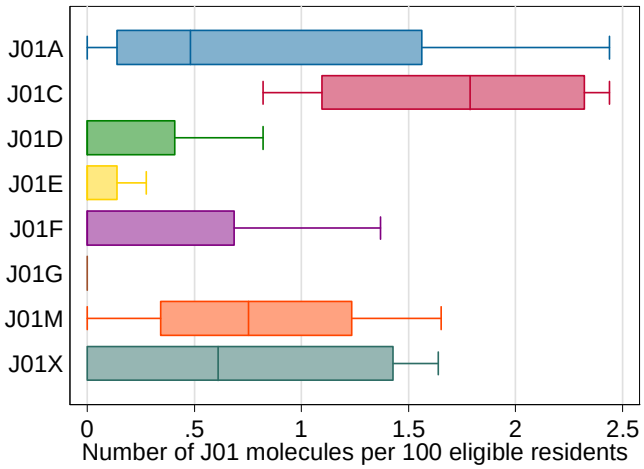
Prescriber (*n*=33)	
General practitioner	87.9%
Specialist	12.1%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=33)	24.2%
Dipstick test performed (*n*=6/13 UTI)	66.7%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	4.67	4.10	6.10
J02	0.00	0.00	0.00
J04	0.20	0.00	0.82
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=32)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	12.5%	0.85	0.00	2.44
β-lactam antibacterials (J01C)	40.6%	1.71	0.82	2.44
Other β-lactam antibacterials (J01D)	3.1%	0.20	0.00	0.82
Sulfonamides & trimethoprim (J01E)	3.1%	0.07	0.00	0.28
Macrolides, lincosamides & streptogramins (J01F)	6.3%	0.34	0.00	1.37
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	25.0%	0.79	0.00	1.65
Other antibacterials (J01X)	9.4%	0.71	0.00	1.64

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=13)	Amoxicillin and enzyme inhibitor	J01CR02	61.5%
	Amoxicillin	J01CA04	30.8%
J01M (n=8)	Norfloxacin	J01MA06	62.5%
	Ciprofloxacin	J01MA02	37.5%
J01A (n=4)	Doxycycline	J01AA02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	2	**2**	**6.1%**
Respiratory tract	0	10	2	**12**	**36.4%**
Urinary tract	2	9	2	**13**	**39.4%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	2	0	0	**2**	**6.1%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	0	0	**0**	**0.0%**
Other	0	0	0	**0**	**0.0%**
Skin or non-surgical wound	-	4	0	**4**	**12.1%**
Total	**4**	**23**	**6**	**33**	
%	**12.1%**	**69.7%**	**18.2%**		

Most frequently prescribed molecules for urinary tract infections (n=13)

Indication	Molecule	ATC code	%
Prophylactic (n=2)	Nitrofurantoin	J01XE01	100%
Empirical (n=9)	Norfloxacin	J01MA06	55.6%
Documented (n=2)	Trimethoprim	J01EA01	50.0%
	Ciprofloxacin	J01MA02	50.0%

Most frequently prescribed molecules for respiratory tract infections (n=12)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=10)	Doxycycline	J01AA02	40.0%
	Amoxicillin and enzyme inhibitor	J01CR02	30.0%
Documented (n=2)	Amoxicillin	J01CA04	50.0%
	Azithromycin	J01FA10	50.0%

NORWAY

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	60.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	516

	Mean	Median	Minimum	Maximum
NH size	105.4	108.0	40	160
Bed occupation rate	98.5%	99.2%	94.4%	100%
Proportion of hospitalized residents	0.4%	0.0%	0.0%	1.3%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

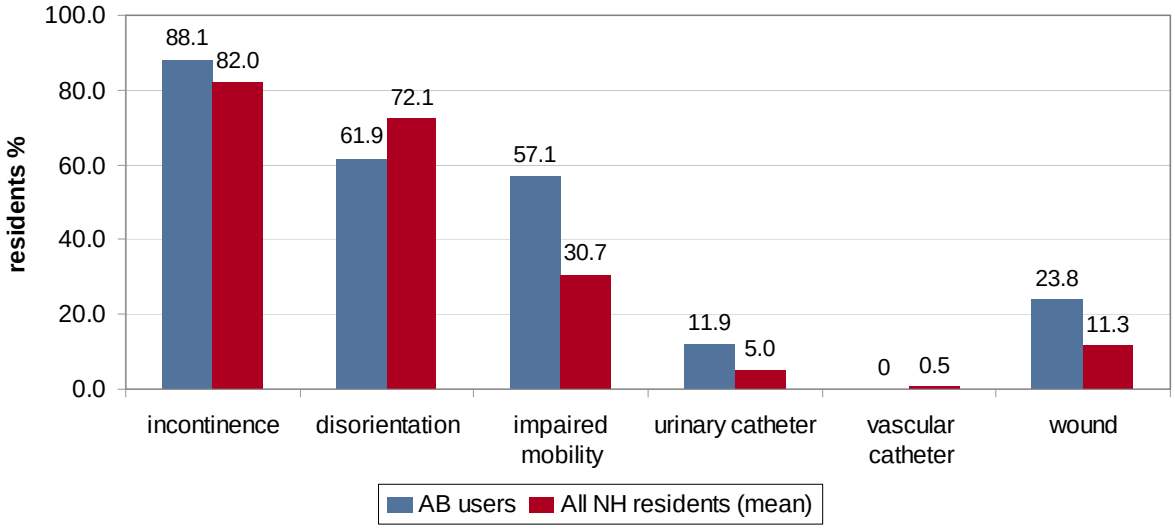
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	82.0%	75.4%	71.7%	95.0%
Disorientation	72.1%	70.7%	53.2%	85.0%
Impaired mobility	30.7%	32.5%	22.5%	34.8%
Risk factors				
Urinary catheter	5.0%	6.4%	0.0%	7.3%
Vascular catheter	0.5%	0.0%	0.0%	1.6%
Wounds	11.3%	13.3%	5.0%	16.8%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**42**
Mean age (min-max)	86.5 (69-106)
Gender (% male)	16.7%
Length of NH stay < 1 year	28.6%
Recent hospital admission (past 3 months)	16.7%
Recent surgery (in previous 30 days)	2.4%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	7.9%	7.9%	5.0%	12.0%

Number of prescribed molecules	**45**
Number of residents using 1 molecule	42
Number of residents using >1 molecule	3

Administration route (*n*=45)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=42)	
In the nursing home	95.2%
In the hospital	4.8%
Elsewhere	0.0%

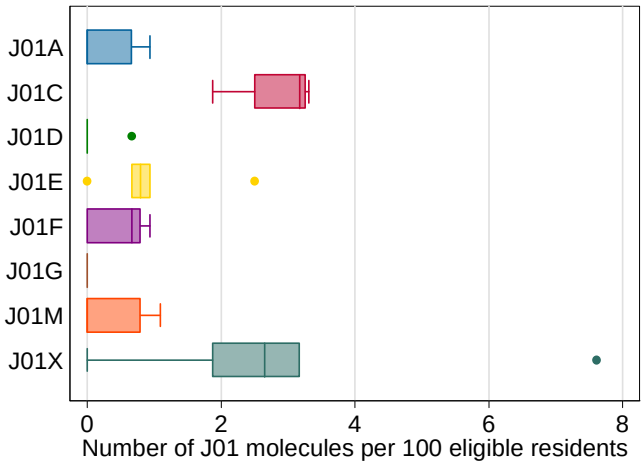
Prescriber (*n*=42)	
General practitioner	0.0%
Specialist	4.8%
Pharmacist	0.0%
Nurse	0.0%
Other	95.2%

Culture sample taken (*n*=27)	55.6%
Dipstick test performed (*n*=13/29 UTI)	76.9%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	8.17	5.00	11.96
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.22	0.00	1.09

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=44)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	4.6%	0.32	0.00	0.93
β-lactam antibacterials (J01C)	34.1%	2.82	1.87	3.31
Other β-lactam antibacterials (J01D)	2.3%	0.13	0.00	0.66
Sulfonamides & trimethoprim (J01E)	9.1%	0.98	0.00	2.50
Macrolides, lincosamides & streptogramins (J01F)	6.8%	0.48	0.00	0.93
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	4.6%	0.38	0.00	1.09
Other antibacterials (J01X)	38.6%	3.06	0.00	7.61

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01X (n=17)	Methenamine	J01XX05	76.5%
	Nitrofurantoin	J01XE01	23.5%
J01C (n=15)	Pivmecillinam	J01CA08	46.7%
	Phenoxymethylpenicillin	J01CE02	40.0%
J01E (n=4)	Trimethoprim	J01EA01	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	1	0	**1**	**2.2%**
Respiratory tract	0	4	0	**4**	**8.9%**
Urinary tract	18	5	6	**29**	**64.4%**
Gastro-intestinal	0	2	0	**2**	**4.4%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	2	1	**3**	**6.7%**
Other	0	2	0	**2**	**4.4%**
Skin or non-surgical wound	-	4	0	**4**	**8.9%**
Total	**18**	**20**	**7**	**45**	
%	**40.0%**	**44.4%**	**15.6%**		

Most frequently prescribed molecules for urinary tract infections (n=29)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=18)	Methenamine	J01XX05	72.2%
	Trimethoprim	J01EA01	16.7%
Empirical (n=5)	Pivmecillinam	J01CA08	100%
Documented (n=6)	Nitrofurantoin	J01XE01	50.0%

Most frequently prescribed molecules for respiratory tract infections (n=4)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=4)	Phenoxymethylpenicillin	J01CE02	100%
Documented (n=0)	-	-	-

POLAND

Nursing homes

General data

Participating nursing homes	8
Ownership (% public)	100%
Qualified nurse present 24/24h	75.0%
Number of eligible residents	885

	Mean	Median	Minimum	Maximum
NH size	161.5	95.0	55	415
Bed occupation rate	95.4%	95.7%	89.7%	100%
Proportion of hospitalized residents	0.1%	0.0%	0.0%	0.6%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

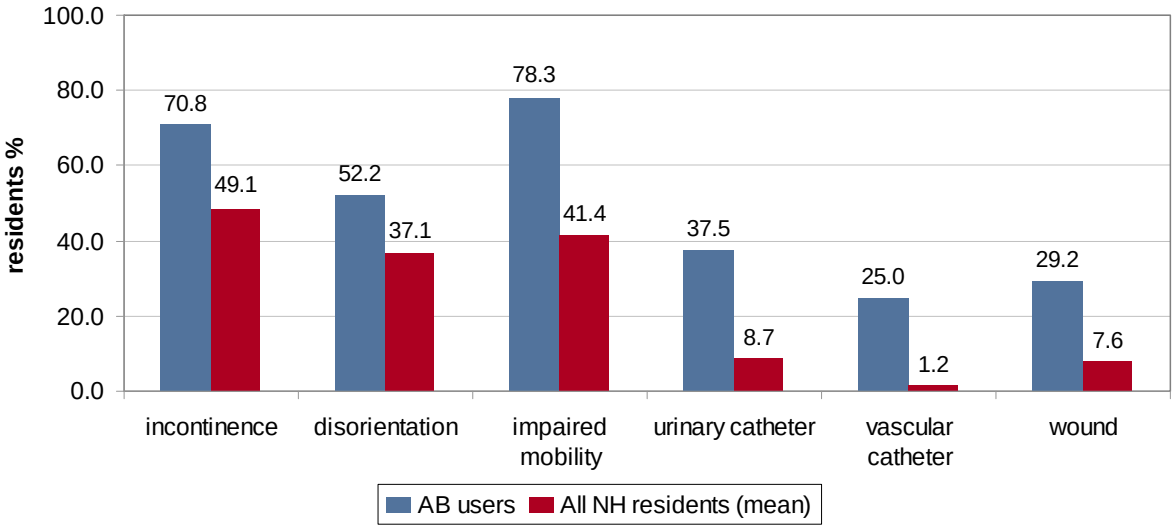
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	49.1%	42.9%	11.4%	84.8%
Disorientation	37.1%	40.6%	10.5%	55.1%
Impaired mobility	41.4%	46.2%	21.1%	60.0%
Risk factors				
Urinary catheter	8.7%	0.0%	0.0%	35.2%
Vascular catheter	1.2%	0.0%	0.0%	6.2%
Wounds	7.6%	5.2%	0.0%	16.7%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	24
Mean age (min-max)	77.8 (37-104)
Gender (% male)	30.4%
Length of NH stay < 1 year	20.8%
Recent hospital admission (past 3 months)	20.8%
Recent surgery (in previous 30 days)	0.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	2.3%	2.4%	0.0%	6.7%

Number of prescribed molecules	**24**
Number of residents using 1 molecule	24
Number of residents using >1 molecule	0

Administration route (*n*=23)	
Oral	52.2%
Parenteral	47.8%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=24)	
In the nursing home	100%
In the hospital	0.0%
Elsewhere	0.0%

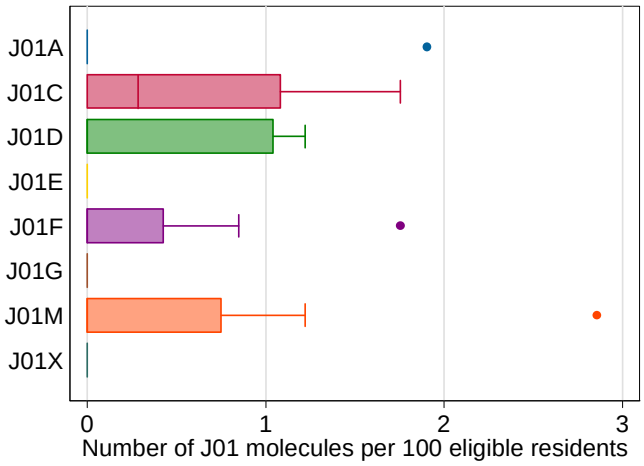
Prescriber (*n*=24)	
General practitioner	70.8%
Specialist	29.2%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=24)	12.5%
Dipstick test performed (*n*=2/2 UTI)	50.0%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.12	0.00	0.94
D01	0.00	0.00	0.00
J01	2.08	0.00	5.71
J02	0.12	0.00	0.95
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=22)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	9.1%	0.24	0.00	1.90
β-lactam antibacterials (J01C)	22.7%	0.56	0.00	1.75
Other β-lactam antibacterials (J01D)	27.3%	0.41	0.00	1.22
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	18.2%	0.33	0.00	1.75
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	22.7%	0.54	0.00	2.86
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01D (n=6)	Ceftriaxone	J01DD04	66.7%
J01C (n=5)	Amoxicillin	J01CA04	40.0%
	Amoxicillin and enzyme inhibitor	J01CR02	40.0%
J01M (n=5)	Ciprofloxacin	J01MA02	80.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0 %**
Respiratory tract	0	14	1	**15**	**65.2 %**
Urinary tract	0	1	1	**2**	**8.7 %**
Gastro-intestinal	0	0	0	**0**	**0.0 %**
Bacteremia/septicaemia	0	0	0	**0**	**0.0 %**
Sepsis/septic shock	-	0	0	**0**	**0.0 %**
Not specified	0	1	0	**1**	**4.3 %**
Other	0	1	1	**2**	**8.7 %**
Skin or non-surgical wound	-	3	0	**3**	**13.0 %**
Total	**0**	**20**	**3**	**23**	
%	**0.0 %**	**87.0 %**	**13.0 %**		

Most frequently prescribed molecules for urinary tract infections (n=2)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Cefuroxime	J01DC02	100%
Documented (n=1)	Amoxicillin and enzyme inhibitor	J01CR02	100%

Most frequently prescribed molecules for respiratory tract infections (n=15)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=14)	Ceftriaxone	J01DD04	28.6%
	Ciprofloxacin	J01MA02	21.4%
Documented (n=1)	Ciprofloxacin	J01MA02	100%

RUSSIAN FEDERATION

Nursing homes

General data

Participating nursing homes	3
Ownership (% public)	66.7%
Qualified nurse present 24/24h	100%
Number of eligible residents	1383

	Mean	Median	Minimum	Maximum
NH size	491.3	514.0	310	650
Bed occupation rate	95.4%	96.9%	91.9%	97.5%
Proportion of hospitalized residents	0.9%	0.9%	0.8%	1.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

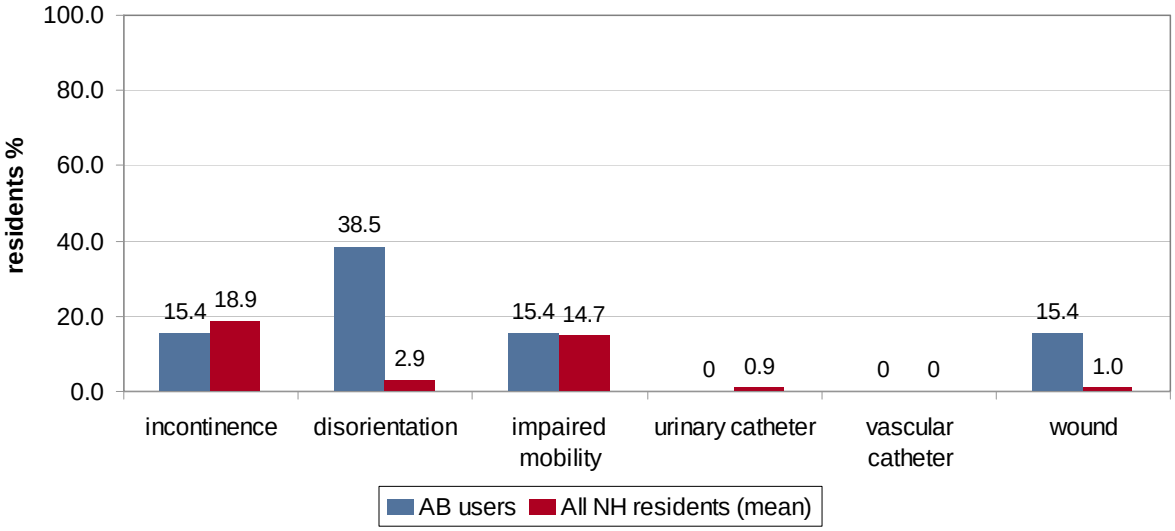
	Mean	Median	Minimum	Maximum
Care load indicators (*n*=2)				
Urinary/faecal incontinence	18.9%	18.9%	11.8%	26.0%
Disorientation	2.9%	2.9%	2.7%	3.2%
Impaired mobility	14.7%	14.7%	9.8%	19.6%
Risk factors (*n*=2)				
Urinary catheter	0.9%	0.9%	0.8%	1.1%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	1.0%	1.0%	0.7%	1.9%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**13**
Mean age (min-max)	78.2 (56-93)
Gender (% male)	23.1%
Length of NH stay < 1 year	7.7%
Recent hospital admission (past 3 months)	7.7%
Recent surgery (in previous 30 days)	*missing*

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	0.8%	1.0%	0.0%	1.5%

Number of prescribed molecules	**13**
Number of residents using 1 molecule	13
Number of residents using >1 molecule	0

Administration route (*n*=13)	
Oral	61.5%
Parenteral	38.5%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=13)	
In the nursing home	100%
In the hospital	0.0%
Elsewhere	0.0%

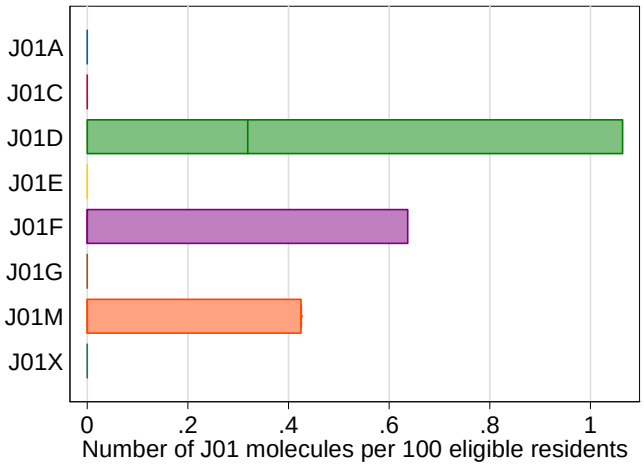
Prescriber (*n*=13)	
General practitioner	100%
Specialist	0.0%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=13)	7.7%
Dipstick test performed (*n*=0/1 UTI)	-

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	0.81	0.00	5.71
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=13)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	0.0%	0.00	0.00	0.00
Other β-lactam antibacterials (J01D)	53.9%	0.46	0.00	1.06
Sulfonamides & trimethoprim (J01E)	0.0%	0.00	0.00	0.00
Macrolides, lincosamides & streptogramins (J01F)	30.8%	0.21	0.00	0.64
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	15.4%	0.14	0.00	0.43
Other antibacterials (J01X)	0.0%	0.00	0.00	0.00

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01D (n=7)	Cefalexin	J01DB01	28.6%
	Cefazolin	J01DB04	28.6%
	Cefotaxime	J01DD01	28.6%
J01F (n=4)	Midecamycin	J01FA03	100%
J01M (n=2)	Ciprofloxacin	J01MA02	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0 %**
Respiratory tract	0	10	0	**10**	**76.9 %**
Urinary tract	0	1	0	**1**	**7.7 %**
Gastro-intestinal	0	0	0	**0**	**0.0 %**
Bacteremia/septicaemia	0	0	0	**0**	**0.0 %**
Sepsis/septic shock	-	0	0	**0**	**0.0 %**
Not specified	0	0	0	**0**	**0.0 %**
Other	0	2	0	**2**	**15.4 %**
Skin or non-surgical wound	-	0	0	**0**	**0.0 %**
Total	**0**	**13**	**0**	**13**	
%	**0.0 %**	**100 %**	**0.0 %**		

Most frequently prescribed molecules for urinary tract infections (n=1)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=1)	Ciprofloxacin	J01MA02	100%
Documented (n=0)	-	-	-

Most frequently prescribed molecules for respiratory tract infections (n=10)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=0)	-	-	-
Empirical (n=10)	Spiramycin	J01FA02	40.0%
Documented (n=0)	-	-	-

SLOVENIA

Nursing homes

General data

Participating nursing homes	6
Ownership (% public)	66.7%
Qualified nurse present 24/24h	100%
Number of eligible residents	1419

	Mean	Median	Minimum	Maximum
NH size	240.3	193.5	73	606
Bed occupation rate	98.5%	98.6%	96.5%	100%
Proportion of hospitalized residents	1.7%	1.5%	1.0%	3.5%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

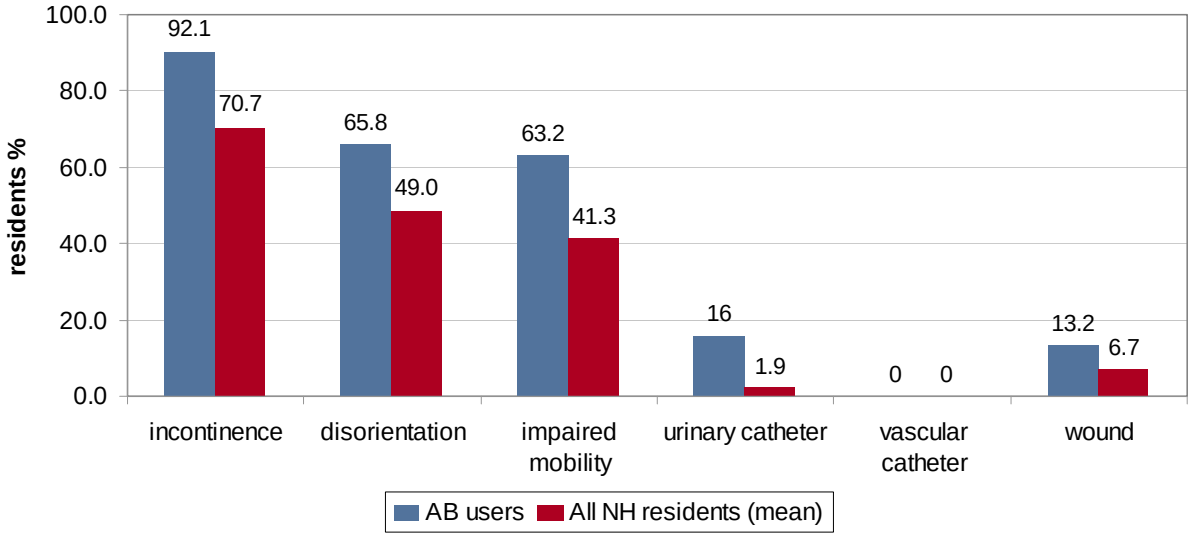
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	70.7%	81.7%	21.7%	87.5%
Disorientation	49.0%	44.0%	20.1%	87.5%
Impaired mobility	41.3%	40.9%	32.1%	52.8%
Risk factors				
Urinary catheter	1.9%	1.9%	0.0%	3.7%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	6.7%	5.2%	2.6%	16.7%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**38**
Mean age (min-max)	82.1 (63-96)
Gender (% male)	21.0%
Length of NH stay < 1 year	27.0%
Recent hospital admission (past 3 months)	18.4%
Recent surgery (in previous 30 days)	7.9%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	3.4%	3.6%	1.0%	5.6%

Number of prescribed molecules	**39**
Number of residents using 1 molecule	38
Number of residents using >1 molecule	1

Administration route (*n*=38)	
Oral	100%
Parenteral	0.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=38)	
In the nursing home	86.8%
In the hospital	13.2%
Elsewhere	0.0%

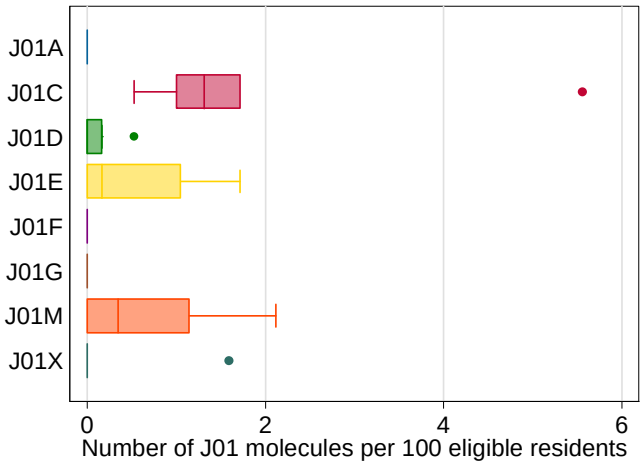
Prescriber (*n*=38)	
General practitioner	86.8%
Specialist	13.2%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=35)	25.7%
Dipstick test performed (*n*=18/21 UTI)	83.3%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	3.46	1.04	5.56
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=39)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	0.0%	0.00	0.00	0.00
β-lactam antibacterials (J01C)	48.7%	1.90	0.52	5.56
Other β-lactam antibacterials (J01D)	5.1%	0.12	0.00	0.52
Sulfonamides & trimethoprim (J01E)	18.0%	0.52	0.00	1.71
Macrolides, lincosamides & streptogramins (J01F)	0.0%	0.00	0.00	0.00
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	20.5%	0.66	0.00	2.12
Other antibacterials (J01X)	7.7%	0.26	0.00	1.59

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=19)	Amoxicillin and enzyme inhibitor	J01CR02	84.2%
J01M (n=8)	Ciprofloxacin	J01MA02	62.5%
	Norfloxacin	J01MA06	37.5%
J01E (n=7)	Sulfamethoxazole and trimethoprim	J01EE01	100%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0%**
Respiratory tract	0	8	1	**9**	**25.7%**
Urinary tract	6	11	4	**21**	**60.0%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	1	0	**1**	**2.9%**
Other	0	0	0	**0**	**0.0%**
Skin or non-surgical wound	-	4	0	**4**	**11.4%**
Total	**6**	**24**	**5**	**35**	
%	**17.1%**	**68.6%**	**14.3%**		

Most frequently prescribed molecules for urinary tract infections (n=21)

Indication	Molecule	ATC code	%
Prophylactic (n=6)	Nitrofurantoin	J01XE01	50.0%
Empirical (n=11)	Sulfamethoxazole and trimethoprim	J01EE01	63.6%
Documented (n=4)	Cefaclor	J01DC04	50.0%

Most frequently prescribed molecules for respiratory tract infections (n=9)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=8)	Amoxicillin and enzyme inhibitor	J01CR02	87.5%
Documented (n=1)	Amoxicillin and enzyme inhibitor	J01CR02	100%

SWEDEN

Nursing homes

General data

Participating nursing homes	7
Ownership (% public)	66.7%
Qualified nurse present 24/24h	42.9%
Number of eligible residents	352

	Mean	Median	Minimum	Maximum
NH size	65.3	63.0	48	87
Bed occupation rate	95.7%	99.0%	79.2%	100%
Proportion of hospitalized residents	0.0%	0.0%	0.0%	0.0%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

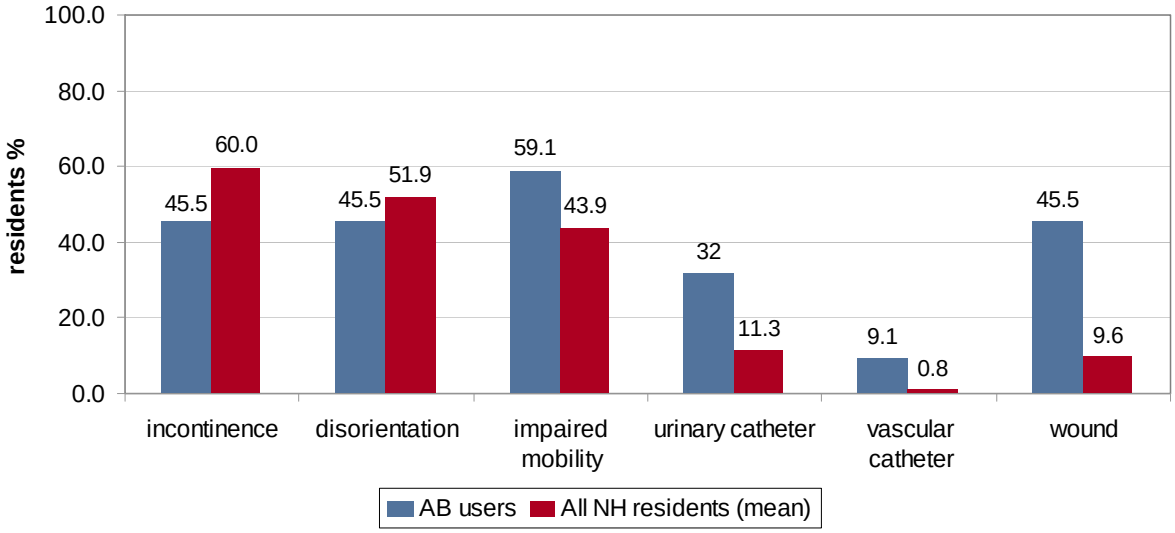
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	60.0%	62.4%	14.7%	82.5%
Disorientation	51.9%	59.0%	25.0%	75.4%
Impaired mobility	43.9%	44.5%	15.5%	68.4%
Risk factors				
Urinary catheter	11.3%	10.8%	1.7%	20.6%
Vascular catheter	0.8%	0.0%	0.0%	2.9%
Wounds	9.6%	10.0%	1.7%	16.2%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**22**
Mean age (min-max)	83.7 (59-99)
Gender (% male)	36.4%
Length of NH stay < 1 year	68.2%
Recent hospital admission (past 3 months)	40.9%
Recent surgery (in previous 30 days)	*missing*

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	5.6%	5.7%	1.8%	8.8%

Number of prescribed molecules	**23**
Number of residents using 1 molecule	22
Number of residents using >1 molecule	1

Administration route (*n*=23)	
Oral	95.7%
Parenteral	4.4%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=23)	
In the nursing home	78.3%
In the hospital	17.4%
Elsewhere	4.4%

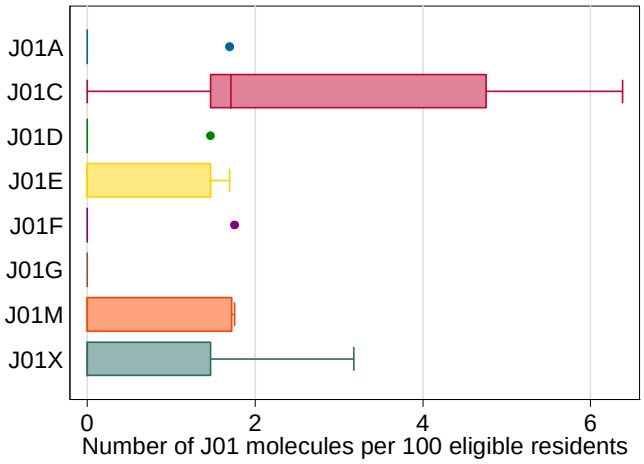
Prescriber (*n*=23)	
General practitioner	43.5%
Specialist	56.6%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=23)	47.8%
Dipstick test performed (*n*=0 / 4 UTI)	-

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	5.37	1.04	5.56
J02	0.00	0.00	0.00
J04	0.00	0.00	0.00
P01	0.49	0.00	2.94

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=21)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	3.1%	0.28	0.00	1.69
β-lactam antibacterials (J01C)	31.3%	2.67	0.00	6.38
Other β-lactam antibacterials (J01D)	6.3%	0.25	0.00	1.47
Sulfonamides & trimethoprim (J01E)	6.3%	0.53	0.00	1.69
Macrolides, lincosamides & streptogramins (J01F)	3.1%	0.29	0.00	1.75
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	6.3%	0.58	0.00	1.75
Other antibacterials (J01X)	9.4%	0.77	0.00	3.17

Most frequently administered antibacterials within the 2 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=10)	Flucloxacillin	J01CF05	40.0%
	Pivmecillinam	J01CA08	30.0%
J01X (n=3)	Nitrofurantoin	J01XE01	66.7%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0 %**
Respiratory tract	0	4	0	**4**	**20.0 %**
Urinary tract	1	2	1	**4**	**20.0 %**
Gastro-intestinal	0	0	3	**3**	**15.0 %**
Bacteremia/septicaemia	0	1	0	**1**	**5.0 %**
Sepsis/septic shock	-	0	0	**0**	**%**
Not specified	0	0	0	**0**	**%**
Other	1	0	2	**3**	**15.0 %**
Skin or non-surgical wound	-	2	3	**5**	**25.0 %**
Total	**2**	**9**	**9**	**20**	
%	**10.0 %**	**45.0 %**	**45.0 %**		

Most frequently prescribed molecules for urinary tract infections (n=4)

Indication	Molecule	ATC code	%
Prophylactic (n=1)	Trimethoprim	J01EA01	100%
Empirical (n=2)	Pivmecillinam	J01CA08	50.0%
	Nitrofurantoin	J01XE01	50.0%
Documented (n=1)	Nitrofurantoin	J01XE01	100%

Most frequently prescribed molecules for respiratory tract infections (n=4)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=4)	Doxycycline	J01AA02	25.0%
	Amoxicillin	J01CA04	25.0%
	Phenoxymethylpenicillin	J01CE02	25.0%
	Ceftriaxone	J01DD04	25.0%
Documented (n=0)	-	-	-

UNITED KINGDOM - ENGLAND

Nursing homes

General data

Participating nursing homes	5
Ownership (% public)	0.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	249

	Mean	Median	Minimum	Maximum
NH size	51.8	46.0	40	85
Bed occupation rate	96.7%	97.5%	93.5%	100%
Proportion of hospitalized residents	1.6%	1.2%	0.0%	4.4%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

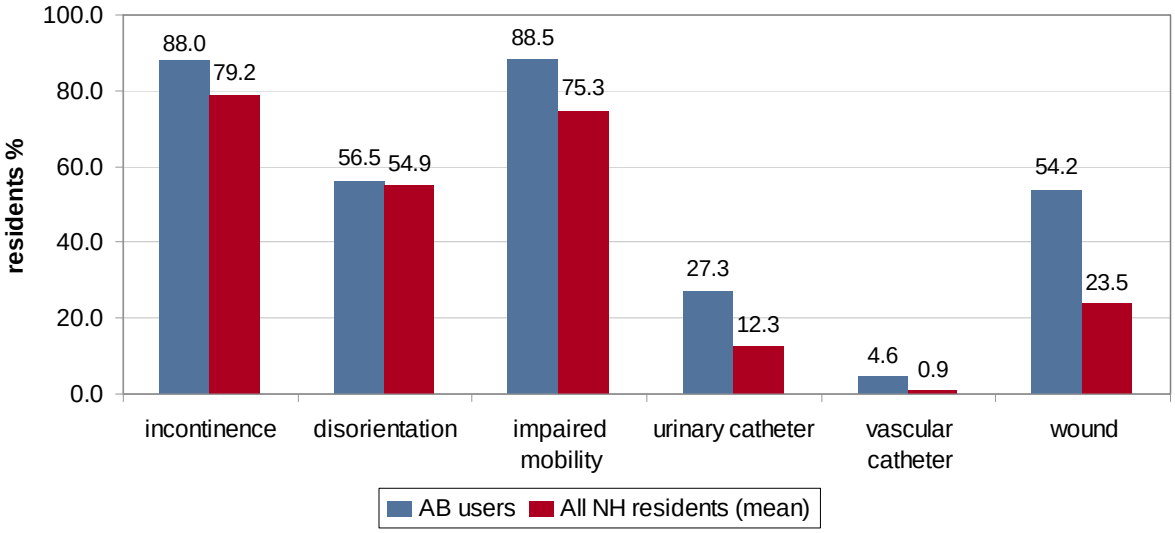
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	79.2%	79.5%	67.4%	90.7%
Disorientation	54.9%	59.5%	20.9%	79.5%
Impaired mobility	75.3%	72.1%	64.1%	86.1%
Risk factors				
Urinary catheter	12.3%	10.7%	7.5%	20.9%
Vascular catheter	0.9%	0.0%	0.0%	4.7%
Wounds	23.5%	16.7%	14.0%	48.8%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	**26**
Mean age (min-max)	73.2 (32-96)
Gender (% male)	46.1%
Length of NH stay < 1 year	60.0%
Recent hospital admission (past 3 months)	53.9%
Recent surgery (in previous 30 days)	4.2%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	10.3%	10.0%	7.7%	14.0%

Number of prescribed molecules	**31**
Number of residents using 1 molecule	26
Number of residents using >1 molecule	3

Administration route (*n*=27)	
Oral	96.3%
Parenteral	3.7%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=30)	
In the nursing home	56.7%
In the hospital	43.3%
Elsewhere	0.0%

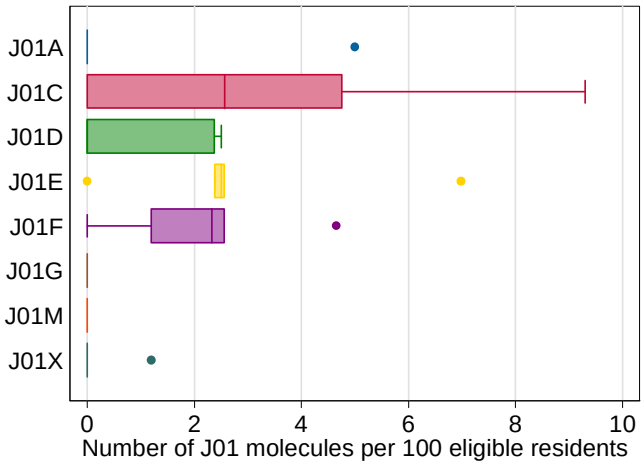
Prescriber (*n*=30)	
General practitioner	56.7%
Specialist	43.3%
Pharmacist	0.0%
Nurse	0.0%
Other	0.0%

Culture sample taken (*n*=25)	68.0%
Dipstick test performed (*n*=5/10 UTI)	100%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.00	0.00	0.00
D01	0.00	0.00	0.00
J01	10.57	7.69	11.90
J02	0.00	0.00	0.00
J04	1.86	0.00	9.30
P01	0.00	0.00	0.00

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=27)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	7.4%	1.00	0.00	5.00
β-lactam antibacterials (J01C)	33.3%	3.33	0.00	9.30
Other β-lactam antibacterials (J01D)	11.1%	0.98	0.00	2.50
Sulfonamides & trimethoprim (J01E)	25.9%	2.88	0.00	6.98
Macrolides, lincosamides & streptogramins (J01F)	18.5%	2.15	0.00	4.65
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	0.0%	0.00	0.00	0.00
Other antibacterials (J01X)	3.7%	0.24	0.00	1.19

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=9)	Flucloxacillin	J01CF05	44.4%
J01E (n=7)	Trimethoprim	J01EA01	100%
J01F (n=5)	Clarithromycin	J01FA09	80.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	0	0	**0**	**0.0%**
Respiratory tract	1	6	0	**7**	**25.0%**
Urinary tract	6	3	1	**10**	**35.7%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	0	1	0	**1**	**3.6%**
Other	1	0	5	**6**	**21.4%**
Skin or non-surgical wound	-	2	2	**4**	**14.3%**
Total	**8**	**12**	**8**	**28**	
%	**28.6%**	**42.9%**	**28.6%**		

Most frequently prescribed molecules for urinary tract infections (n=10)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=6)	Trimethoprim	J01EA01	100%
Empirical (n=3)	Cefalexin	J01DB01	66.7%
Documented (n=1)	Trimethoprim	J01EA01	100%

Most frequently prescribed molecules for respiratory tract infections (n=7)			
Indication	**Molecule**	**ATC code**	**%**
Prophylactic (n=1)	Phenoxymethylpenicillin	J01CE02	100%
Empirical (n=6)	Clarithromycin	J01FA09	50.0%
Documented (n=0)	-	-	-

UNITED KINGDOM - NORTHERN IRELAND

Nursing homes

General data

Participating nursing homes	30
Ownership (% public)	0.0%
Qualified nurse present 24/24h	100%
Number of eligible residents	984

	Mean	Median	Minimum	Maximum
NH size	48.6	50.0	25	86
Bed occupation rate	92.2%	94.2%	68.0%	100%
Proportion of hospitalized residents	2.1%	2.0%	0.0%	8.7%

Eligible nursing home population

Care load indicators and risk factors in the eligible nursing home population

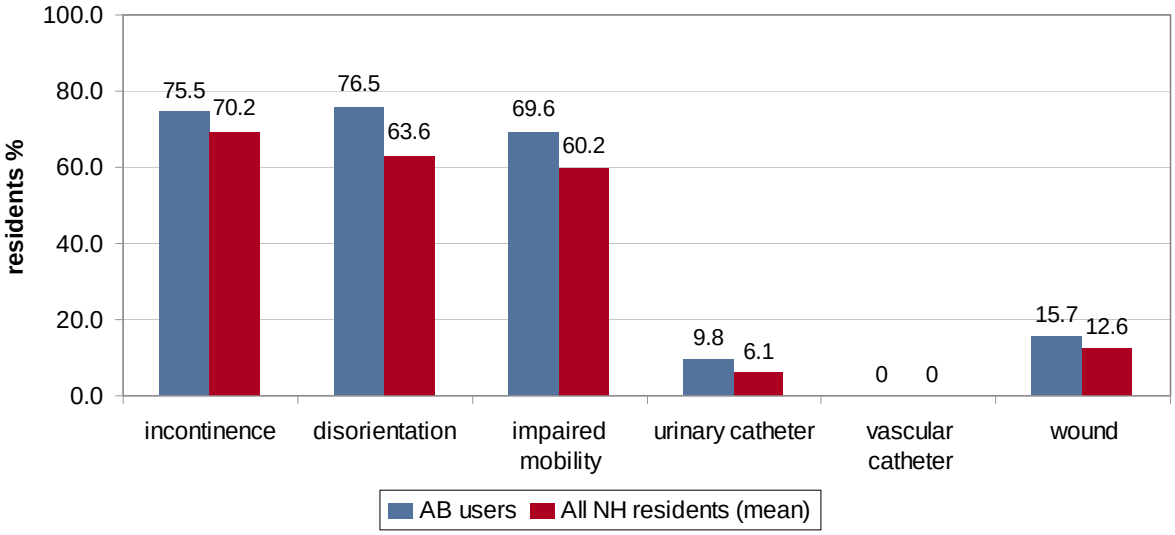
	Mean	Median	Minimum	Maximum
Care load indicators				
Urinary/faecal incontinence	70.2%	71.2%	45.5%	91.4%
Disorientation	63.6%	63.3%	28.0%	100%
Impaired mobility	60.2%	58.1%	26.3%	95.2%
Risk factors				
Urinary catheter	6.1%	5.6%	0.0%	24.0%
Vascular catheter	0.0%	0.0%	0.0%	0.0%
Wounds	12.6%	12.1%	3.3%	42.9%

Residents with antimicrobial treatment

Characteristics

Number of AB using residents	102
Mean age (min-max)	82.9 (44-101)
Gender (% male)	25.5%
Length of NH stay < 1 year	20.6%
Recent hospital admission (past 3 months)	14.7%
Recent surgery (in previous 30 days)	2.0%

Care load indicators & risk factors



Antimicrobial consumption

	Mean	Median	Minimum	Maximum
AB prevalence	10.2%	9.6%	2.0%	20.0%

Number of prescribed molecules	**105**
Number of residents using 1 molecule	102
Number of residents using >1 molecule	3

Administration route (*n*=105)	
Oral	99.1%
Parenteral	1.0%
Nasal (mupirocin)	0.0%
Inhalation	0.0%
Rectal	0.0%

Place of prescription (*n*=105)	
In the nursing home	84.8%
In the hospital	6.7%
Elsewhere	8.6%

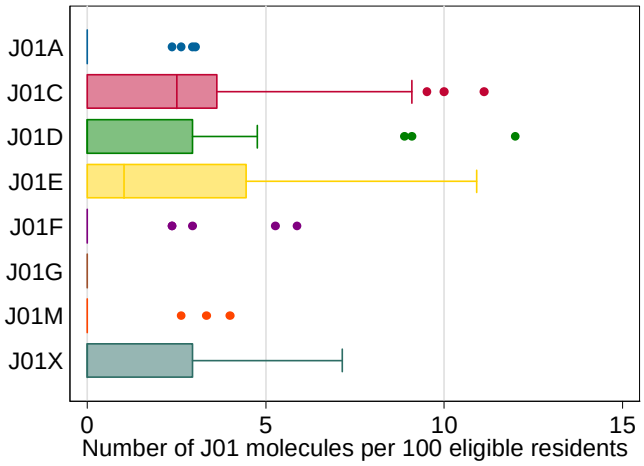
Prescriber (*n*=105)	
General practitioner	86.7%
Specialist	3.8%
Pharmacist	0.0%
Nurse	0.0%
Other	9.5%

Culture sample taken (*n*=105)	33.3%
Dipstick test performed (*n*=68/68 UTI)	51.5%

Distribution of antimicrobial treatments ATC level 2 per 100 eligible residents

Class	Mean	Min.	Max.
A01	0.00	0.00	0.00
A07	0.18	0.00	3.70
D01	0.00	0.00	0.00
J01	10.25	2.00	22.22
J02	0.06	0.00	1.82
J04	0.00	0.00	0.00
P01	0.07	0.00	2.22

Distribution of J01 treatments ATC level 3 per 100 eligible residents



Distribution of J01 classes

J01 class	% of J01 class (*n*=101)	Mean no. per 100 eligible residents	Min. (per 100)	Max. (per 100)
Tetracyclines (J01A)	4.0%	0.37	0.00	3.03
β-lactam antibacterials (J01C)	27.7%	2.87	0.00	11.11
Other β-lactam antibacterials (J01D)	19.8%	2.02	0.00	12.00
Sulfonamides & trimethoprim (J01E)	26.7%	2.41	0.00	10.91
Macrolides, lincosamides & streptogramins (J01F)	5.0%	0.63	0.00	5.88
Aminoglycoside antibacterials (J01G)	0.0%	0.00	0.00	0.00
Quinolone antibacterials (J01M)	3.0%	0.33	0.00	4.00
Other antibacterials (J01X)	13.9%	1.61	0.00	7.14

Most frequently administered antibacterials within the 3 largest J01 classes

J01 class	Molecule	ATC code	%
J01C (n=28)	Amoxicillin	J01CA04	42.9%
	Flucloxacillin	J01CF05	25.0%
	Amoxicillin and enzyme inhibitor	J01CR02	21.4%
J01E (n=27)	Trimethoprim	J01EA01	96.3%
J01D (n=20)	Cefalexin	J01DB01	95.0%

Indications for antimicrobial treatments

Type of infection	Type of treatment			Total	%
	Prophylactic	Empirical	Documented		
Surgical wound	0	2	1	**3**	**2.9%**
Respiratory tract	0	14	0	**14**	**13.3%**
Urinary tract	50	13	5	**68**	**64.8%**
Gastro-intestinal	0	0	0	**0**	**0.0%**
Bacteremia/septicaemia	0	0	0	**0**	**0.0%**
Sepsis/septic shock	-	0	0	**0**	**0.0%**
Not specified	3	1	0	**4**	**3.8%**
Other	1	3	1	**5**	**4.8%**
Skin or non-surgical wound	-	7	4	**11**	**10.5%**
Total	**54**	**40**	**11**	**105**	
%	**51.4%**	**38.1%**	**10.5%**		

Most frequently prescribed molecules for urinary tract infections (n=68)

Indication	Molecule	ATC code	%
Prophylactic (n=50)	Trimethoprim	J01EA01	42.0%
	Cefalexin	J01DB01	30.0%
	Nitrofurantoin	J01XE01	22.0%
Empirical (n=13)	Trimethoprim	J01EA01	30.8%
	Amoxicillin	J01CA04	23.1%
Documented (n=5)	Nitrofurantoin	J01XE01	60.0%

Most frequently prescribed molecules for respiratory tract infections (n=14)

Indication	Molecule	ATC code	%
Prophylactic (n=0)	-	-	-
Empirical (n=14)	Amoxicillin	J01CA04	50.0%
Documented (n=0)	-	-	-