

The Antibiotic Resistance and Prescribing in European Children (ARPEC): The European paediatric and neonatal antimicrobial web-based point prevalence survey in 73 hospitals within Europe and globally in 2011.



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Background

The ARPEC project aims to improve the quality of antibiotic prescribing for children in order to reduce prevalence rates of antimicrobial resistance in children (<http://www.arpecproject.eu/>). The European paediatric and neonatal antimicrobial hospital web-based Point Prevalence Survey (PPS) is part of the ARPEC project (work package 5).

The aims of the survey were:

- To develop a standardized method for surveillance of antimicrobial use in hospitals within Europe and globally.
- To determine the quality and quantity of antibiotic drug use by indication.
- To identify targets for quality improvement.

Method: the execution of a one day "PPS"

Data was collected during 2 weeks between September 19th and 30th 2011, several hospitals also provided data collected during November 2011. The PPS included all children admitted on a paediatric and a neonatal ward at 8:00 am on the day of survey, and receiving an antimicrobial treatment. Mandatory data were age, gender, current weight, birth weight and gestational age (neonates only), underlying diagnosis, antimicrobial agent, dose and indication for treatment. Data collection was performed using paper forms: a department, a paediatric and NICU form. Afterwards, data was entered onto a central database using the ARPEC-webPPS program, a web-based application for data-entry and reporting designed by the University of Antwerp, Belgium. http://app.esac.ua.ac.be/arpec_webpps/

Results (updated data as compared to abstract)

73 hospitals from 23 countries entered data, Slovenia only entered data during the feasibility PPS. Highest antimicrobial prevalence rates (N patients treated with at least one antimicrobial/100 patients) were observed among hospitals outside Europe (Table 1). Overall, 39% patients admitted to a paediatric ward (N=1625) and 28% patients admitted to a neonatal ward (N=478) were receiving at least one antibiotic.

Mainly cephalosporins (30% and 35%) followed by penicillins (22% and 18%) were prescribed for patients admitted to European and non European paediatric wards.

Among the cephalosporin subgroup, 70% and 72% were 3rd generation cephalosporins respectively.

For patients admitted to neonatal wards, mainly aminoglycosides were prescribed (32% and 30%), followed by penicillins (28% and 29%) and cephalosporins (17% and 24%) for European and non European neonatal wards respectively.

Overall, the most common sites of infection for which antibiotics were prescribed were bacterial lower respiratory tract infection (LRTI) (15.3%), prophylaxis for medical problems (11.0%), sepsis (10.3%) and prophylaxis for surgical disease (10.2%) for paediatric patients; and sepsis (35.8%) and prophylaxis for newborn risk factors (12.6%) for neonates.

Quality indicator 1 - The duration of antibiotic surgical prophylaxis was more than one day in 80% and 75% of the children admitted on a European and a non-European paediatric ward, respectively (Figure 1).

Quality indicator 2 - Overall, most frequently prescribed drugs for bacterial LRTI were broad spectrum 3rd generation cephalosporins. In European paediatric wards, 3rd generation cephalosporins were prescribed equally for hospital acquired and community acquired (CA) bacterial LRTI, whereas they were only prescribed for CA bacterial LRTI in non European paediatric wards (Figure 2).

Table 1: Overall degree of participation, bed utilization and country specific antimicrobial prevalence rates.

N countries	N hospitals	N beds	N patients	N treated patients	Bed utilization (%)	Treated patients (%)
Europe						
BELGIUM	4	455	309	98	67,9	31,7
ESTONIA	1	111	67	17	60,4	25,4
FRANCE	4	701	548	175	78,2	31,9
GERMANY	1	119	97	36	81,5	37,1
GREECE	2	525	332	102	63,2	30,7
ITALY	4	419	306	116	73,0	37,9
LATVIA	2	562	410	123	73,0	30,0
LITHUANIA	1	450	319	84	70,9	26,3
LUXEMBOURG	1	55	45	16	81,8	35,6
PORTUGAL	2	213	144	41	67,6	28,5
ROMANIA	2	92	81	58	88,0	71,6
SLOVENIA*	(1)	271	146	38	53,9	26,0
SPAIN	5	368	289	109	78,5	37,7
SWITZERLAND	2	208	129	34	62,0	26,4
UNITED KINGDOM	19	1060	691	211	65,2	30,5
14 Subtotal	50	5609	3913	1258	69,8	32,1
Non Europe						
AUSTRALIA	2	436	416	170	95,4	40,9
GAMBIA	2	146	102	37	69,9	36,3
GEORGIA	11	454	186	113	41,0	60,8
GHANA	1	247	240	82	97,2	34,2
ISLAMIC REPUBLIC OF IRAN	3	445	364	222	81,8	61,0
KINGDOM OF SAUDI ARABIA	1	210	137	61	65,2	44,5
MALAWI	1	339	339	136	100,0	40,1
SOUTH AFRICA	1	112	78	33	69,6	42,3
UNITED STATES	1	303	240	100	79,2	41,7
9 Subtotal	23	2692	2102	954	78,1	45,4
23 Grand Total	73	8301	6015	2212	72,5	36,8

*SLOVENIA: data collected during feasibility PPS (March-April 2011).

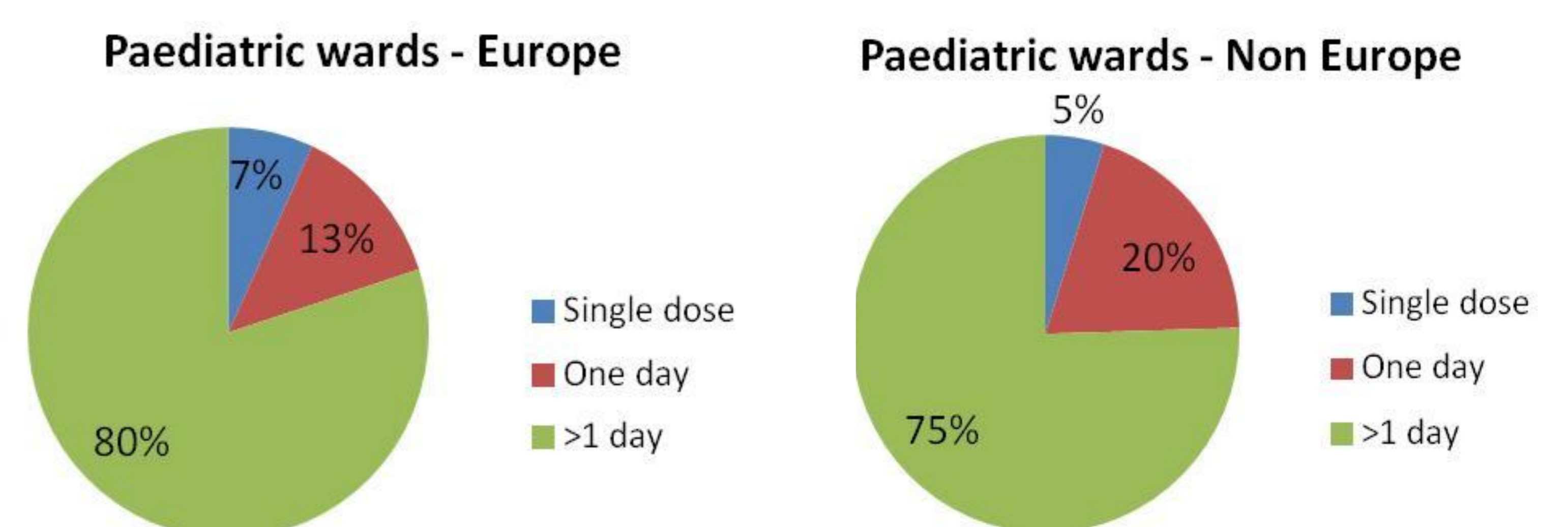


Figure 1: Proportion of duration of surgical prophylactic antibiotic use for children admitted on a paediatric ward in European (n=130 patients) versus non-European (n=83 patients) hospitals.

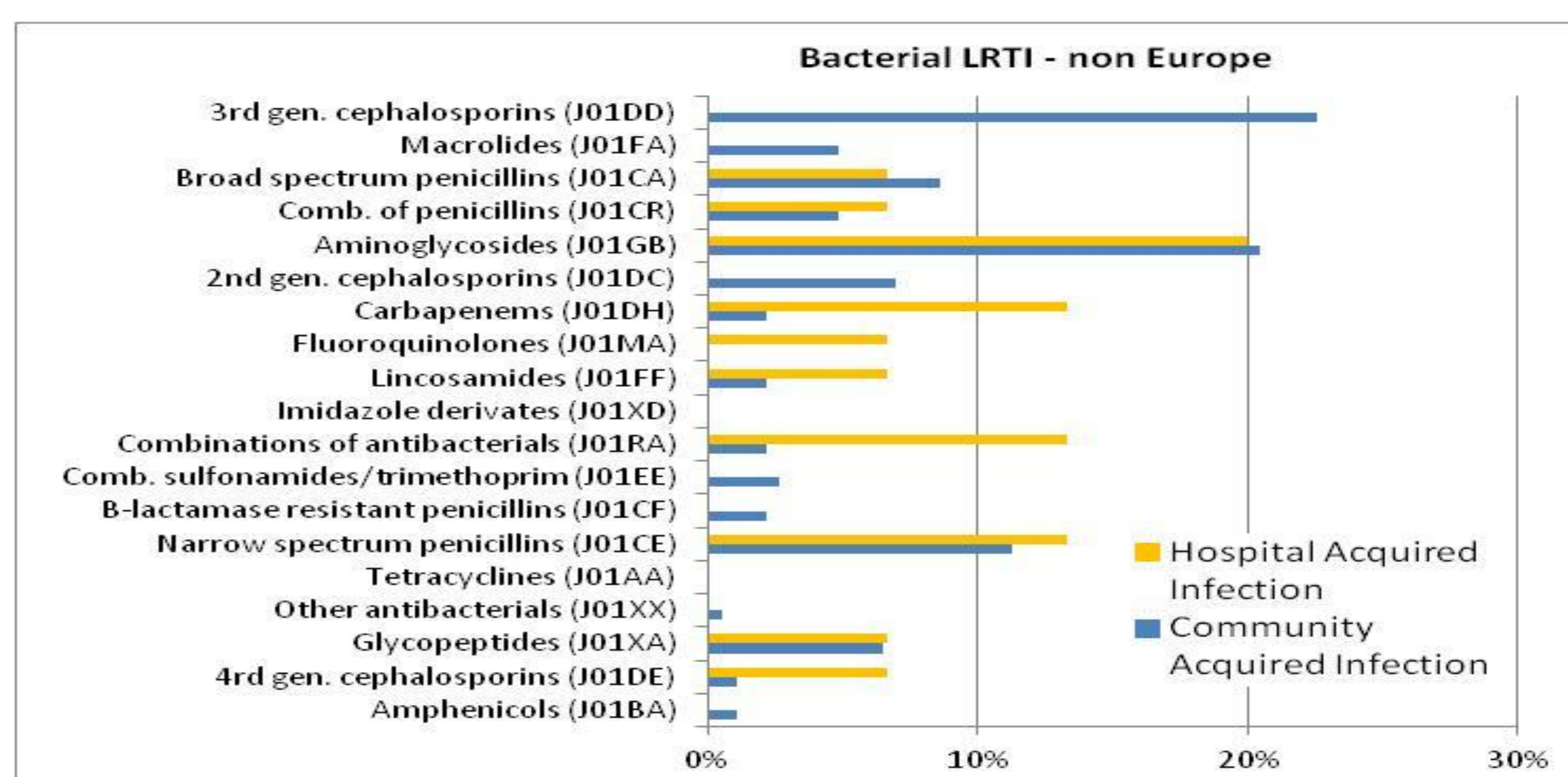
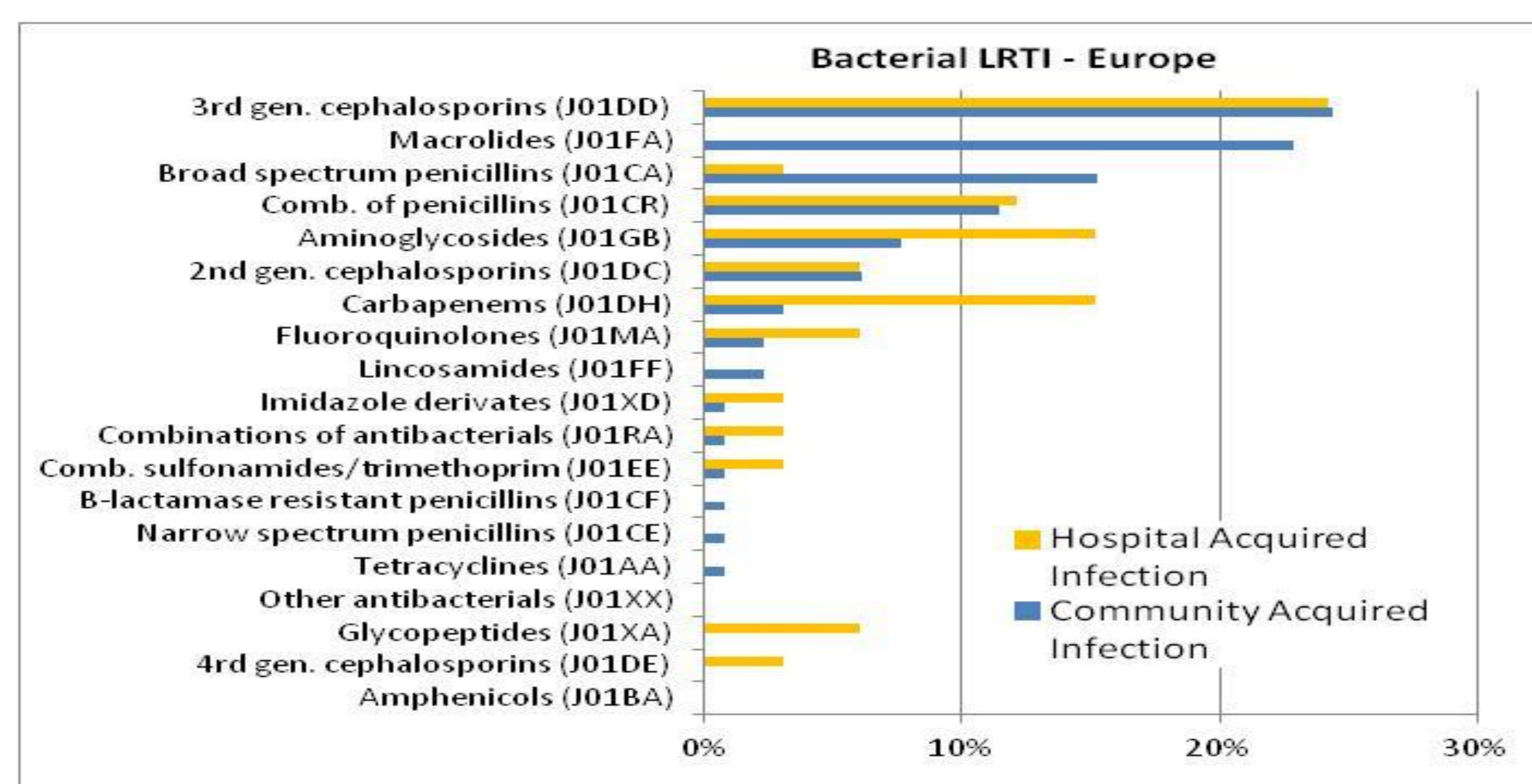


Figure 2: Proportional use of antibiotics (ATC4 level) prescribed for a bacterial LRTI for a hospital versus community acquired infection for patients admitted to a paediatric ward in European and non European hospitals.

Conclusion

The paediatric and neonatal web-based PPS was successfully conducted in 50 European and 23 non European hospitals. It offered a feasible and standardized tool to survey hospital antibiotic prescribing practices. It further enabled us to identify targets for quality improvement.