

HPSC SURVEILLANCE REPORT: MAY 2017

SURVEILLANCE OF KEY PATHOGENS CAUSING BLOODSTREAM INFECTIONS & CDI (TO END Q4 2016)

- ***Escherichia coli***: The proportion of patients with BSI caused by *E. coli* producing extended-spectrum β -lactamases (ESBLs) **increased from 10.5% (2015) to 11.1%**, with a slight decrease in the proportion of BSI caused by multi-drug resistant (MDR) *E. coli* (displaying resistance to three or more antimicrobial classes) **from 14.6% (2015) to 14.3%** [Figures 1 & 2]. One carbapenem resistant *E. coli* BSI (CRE NDM-type) was reported in 2016 versus two in 2015
- ***Klebsiella pneumoniae***: The proportion of patients with BSI caused by MDR-*K. pneumoniae* (MDRKP) **decreased to 7.1%** in 2016 from 9.8% in 2015 [Figure 3]. Four carbapenem resistant *K. pneumoniae* BSI (CRE KPC type = 3; CRE OXA-48 type = 1) were reported in 2016 versus seven in 2015
- ***Staphylococcus aureus***: The proportion of *S. aureus* BSI that were methicillin resistant (i.e., MRSA) **decreased from 18.4% (2015) to 14.7%**, while the rate **decreased from 0.050 (2015) to 0.043 cases per 1,000 bed days used (BDU)**. The rate of MSSA BSI **increased from 0.223 (2015) to 0.245 cases per 1,000 BDU** [Figures 4 & 5]
- ***Enterococcus faecium***: The proportion of *E. faecium* BSI that were vancomycin resistant (i.e., VRE) **decreased from 45.6% (2015) to 44.4%**. **Ireland has by far the highest proportion in Europe of VRE causing BSI** [Figures 6 & 7]
- ***Pseudomonas aeruginosa***: The proportion of patients with BSI caused by MDR-*P. aeruginosa* **increased from 7.5% (2015) to 13.2%, the highest annual proportion to date**
- ***C. difficile* infection (CDI)**: The national rate of new hospital-acquired CDI decreased **to 2.0 cases per 10,000 BDU from 2.2 (2015)** [Figure 8]

SURVEILLANCE OF MULTI-DRUG RESISTANT ENTEROBACTERIACEAE

- **MDR-*K. pneumoniae* (MDRKP)**: A national MDRKP surveillance programme collected data from January 2014 to December 2016, with 1,449 MDRKP cases were reported by 53 (88%) acute hospitals in Ireland to end 2016. Of those, 234 (16%) were also carbapenem resistant (CRE). **Compared with 2015, there was a 19% increase in all MDRKP reported and an almost two-fold (195%) increase in MDRKP that were also carbapenem resistant (CRE) in 2016**. Two thirds of MDRKP cases were reported in patients attending acute hospitals, with one third reported from patients attending GPs or residents of long-term care facilities. Of hospitalised patients for whom treatment information was provided – 58% had required antimicrobial treatment for MDRKP infection prior to case notification. Further information on MDRKP in Ireland is available at the weblink below: <http://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/EuropeanAntimicrobialResistanceSurveillanceSystemEARSS/ReferenceandEducationalResourceMaterial/Klebsiellapneumoniae/DataonmultidrugresistantKpneumoniae/>
- **Carbapenem resistant *Enterobacteriaceae* (CRE)**: **2016 saw 327 cases of CRE confirmed** by the reference laboratory service (CPEaRLS) [2013; 48, 2014; 81, 2015; 140]. In 2016, OXA-48 type predominated, followed by KPC and NDM-1. **From January to April 2017, 146 patient isolates were confirmed CRE** by the reference laboratory [Figure 16]

SURVEILLANCE OF ANTIMICROBIAL CONSUMPTION

- **Hospitals**: To the end of 2016, the rate of **antimicrobial consumption in acute hospitals increased to 84.8 defined daily doses (DDD) per 100 bed days used (BDU), versus 81.8 in 2015** [Figure 9 & 10]
- **Community**: To the end of 2016, the rate of **community antimicrobial consumption decreased to 23.0 DDD per 1,000 inhabitants per day (DID), versus the revised*rate for 2015 of 25.0** [Figure 11]







*Rates have been revised after publication of the final population census and the inter-census population estimates were recalculated
<http://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/EuropeanSurveillanceofAntimicrobialConsumptionESAC/PublicMicroBReports/>



HAND HYGIENE COMPLIANCE AUDIT & ALCOHOL-BASED HAND RUB USE IN ACUTE HOSPITALS

- **Hand hygiene compliance audit**: **At 90.8%, the overall compliance score for acute hospitals was statistically higher in Oct/Nov 2016 (Period 12) than Oct/Nov 2014 (Period 10) 89.2%** [Figures 12 to 14].
- **Alcohol-based hand rub (ABHR) use**: This is an indirect measure of hand hygiene. To the end of Q4 2016, **a reduction in ABHR use to 29.7 litres per 1,000 BDU** was observed versus 32.5 for 2015 [Figure 15]

OTHER ACTIVITIES

- **CRE surveillance in Ireland:** In response to the increasing incidence of CRE in Ireland, all microbiology laboratories will be required to submit data on all confirmed carbapenemase-producing CRE to HPSC on a quarterly basis from 1st January 2017. This surveillance scheme will replace the voluntary enhanced surveillance of CRE, which was established in 2011. Invasive CRE infections (e.g., BSI) and CRE outbreaks remain notifiable to Departments of Public Health
- **Point prevalence survey (PPS) of hospital acquired infections & antimicrobial use in acute hospitals:** Sixty acute hospitals in Ireland are participating in this European PPS during May 2017. The PPS was last undertaken in May 2012. Further information at:
<http://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/HospitalPointPrevalenceSurveys/>
- **PPS of HCAI & antimicrobial use in Irish long term care facilities (HALT):** In May 2016, 223 Irish LTCF participated in the HALT PPS. Local reports have been issued to participating LTCF and the national HALT report was published in March 2017. Further information at:
<http://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/HCAIinlongtermcarefacilities/>
- **Worldwide shortage of piperacillin-tazobactam:** The impact of the worldwide shortage of piperacillin-tazobactam is affecting supply to Irish hospitals and the OPAT programme. Hospital antimicrobial stewardship teams are asked to consider the impact of the shortage on local empiric prescribing guidance and to restrict piperacillin-tazobactam use pending restoration of supply
- **The RCSI/HPSC Annual Safe Patient Care 'Infection Control – A Foundation Course for Residential Care Settings':** This course is planned to take place over four days in September 2017. Following a very successful course in September 2016, the focus of this year's course will again be on healthcare workers in residential care/nursing home settings. Further information including registration and programme will be posted on the HPSC website www.hpsc.ie during June 2017

	2011	2012	2013	2014	2015	2016 [†]	2016 v 2015
Patients with Bloodstream Infections (BSI)							
Total BSI due to key EARS-Net pathogens*	4757	5085	5304	5572	5486	4565	
<i>E. coli</i> (Figs 1 & 2)							
- Patients with <i>E. coli</i> BSI	2210**	2450**	2530**	2771**	2696**	3057**	
- Patients with ESBL- <i>E. coli</i> BSI (%)	164 (7.5%)	215 (8.8%)	264 (10.5%)	280 (10.2%)	283 (10.5%)	337 (11.1%)	% 
- Patients with MDR [†] - <i>E. coli</i> BSI (%)	286 (13.0%)	326 (13.4%)	373 (14.8%)	416 (15.0%)	389 (14.6%)	436 (14.3%)	% 
[†] MDR = resistant to ≥3 antimicrobial classes							
<i>K. pneumoniae</i> (Fig 3)							
- Patients with <i>K. pneumoniae</i> BSI	312**	345**	326**	358**	401**	467**	
- Patients with MDR- <i>K. pneumoniae</i> BSI (%) ^{††}	14 (4.6%)	18 (5.3%)	40 (12.3%)	29 (8.2%)	39 (9.8%)	33 (7.1%)	% 
^{††} MDRKP = resistant to gentamicin, ciprofloxacin plus ESBL OR carbapenemase-producer							
<i>S. aureus</i> (Figs 4 & 5)							
- Patients with <i>S. aureus</i> BSI	1095	1060	1094	1117	1082	1168	
- Patients with MRSA BSI (%)	263 (24.0%)	242 (22.8%)	222 (20.3%)	217 (19.4%)	199 (18.4%)	172 (14.7%)	% 
- MRSA rate (cases/1,000 BDU)	0.066	0.060	0.056	0.055	0.050	0.043	Rate 
<i>Enterococcus faecium</i> (Fig 6)							
- Patients with <i>E. faecium</i> BSI	364	392	409**	405	421**	431**	
- Patients with VRE BSI (%)	136 (37.4%)	178 (45.4%)	176 (43.1%)	186 (45.9%)	191 (45.6%)	191 (44.4%)	% 





	2011	2012	2013	2014	2015	2016†	2016 v2015
Patients with Bloodstream Infections (BSI)							
<i>Pseudomonas aeruginosa</i>							
- Patients with <i>P. aeruginosa</i> BSI	184**	219**	207**	182**	201**	250	
- Patients with MDR [†] - <i>P. aeruginosa</i> BSI (%)	7 (4.0%)	28 (13.0%)	19 (9.4%)	12 (6.7%)	15 (7.5%)	33 (13.2%)	% 
[†] MDR = resistant to ≥3 antimicrobial classes							
Patients with <i>C. difficile</i> Infection (CDI)							
New cases of CDI	1396	1499	1523	1523	1666	1565	
CDI rate (new HCAI cases/ 10,000 BDU)*** (Fig 8)	2.8	2.4	2.2	2.1	2.3	2.0	Rate 
Participating hospitals	40	44	47	53	52	53	

† Data provisional to end Q4 2016 (Note: includes data from private hospitals and other non-acute facilities); Note: 2015 and 2016 BSI data incomplete from 3 and 2 laboratories representing 97% and 99% coverage, respectively

* The eight EARS-Net pathogens are *S. aureus*, *S. pneumoniae*, *E. coli*, *E. faecium*, *E. faecalis*, *K. pneumoniae*, *P. aeruginosa*, *Acinetobacter* spp (2012 onwards);

** Note: not all isolates tested for ESBL, multi-drug resistance (MDR) or vancomycin resistance;

*** CDI rate based on number of new CDI originating within the participating HCF, where enhanced surveillance specifies the origin as 'healthcare-associated' and the location as 'this hospital'

	2011	2012	2013	2014	2015	2016†	2016 v 2015
Hospital antimicrobial consumption (DDD/100 BDU), median	82.3	85.5	84.0	82.0	81.8	84.8	Rate 
Community antimicrobial consumption (DDD/1,000 inhabitants/day - DID), overall	22.7	22.9	24.9	23.9	25.0	23.0	Rate 
Biannual audit of hand hygiene compliance % in acute public hospitals (Figs 9-11)	79.6 (Period 2- Oct/Nov)	84.3 (Period 4- Oct/Nov)	86.2 (Period 6- Oct/Nov)	87.2 (Period 8- Oct/Nov)	89.2 (Period 10- Oct/Nov)	90.8 (Period 12- Oct/Nov)	% 
Alcohol-based hand rub use (L/1,000BDU), median (Fig 12)	21.3	23.8	26.3	27.7	32.5	29.7	Rate 

† Data to end Q4 2016 only unless otherwise stated

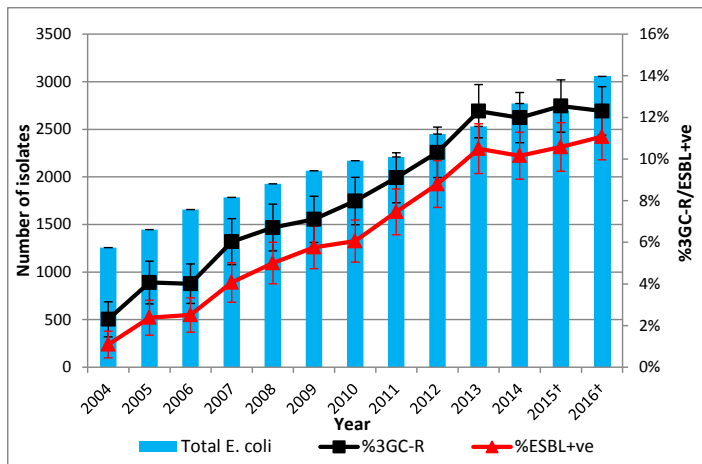


Figure 1: Total number of *E. coli* bloodstream isolates and proportions of 3GC-resistant and ESBL-producing isolates from acute hospitals (public & private) by year, 2004 to 2016

3GC, 3rd-Generation Cephalosporin; **ESBL**, Extended-Spectrum Beta-Lactamase

† 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

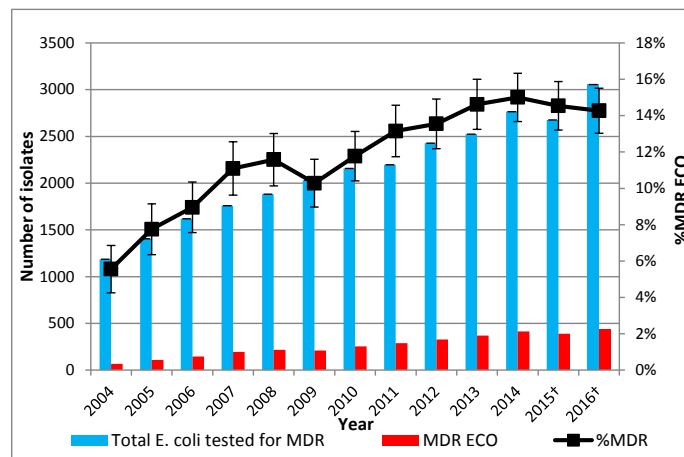


Figure 2: Total number of *E. coli* bloodstream isolates and proportions of MDR isolates from acute hospitals (public & private) by year, 2004 to 2016*

MDR, Multi-drug resistant *E. coli*

† 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

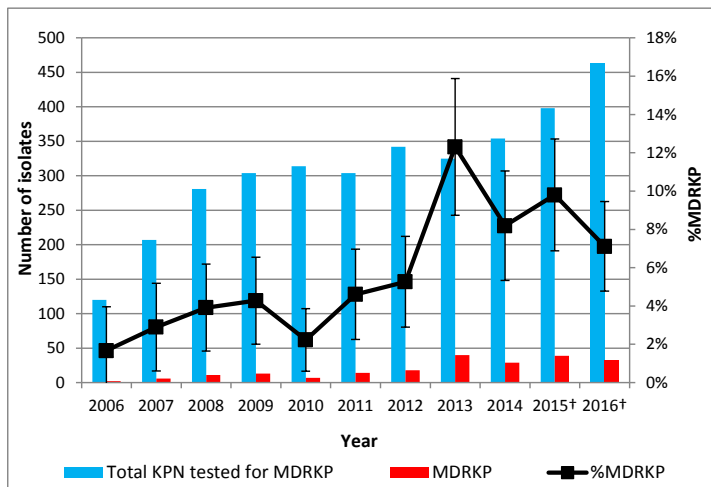


Figure 3: Number of *MDRKP* bloodstream isolates and MDRKP proportions from acute hospitals (public & private) by year, 2006 to 2016

MDRKP - Multi-drug resistant *K. pneumoniae*; † 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

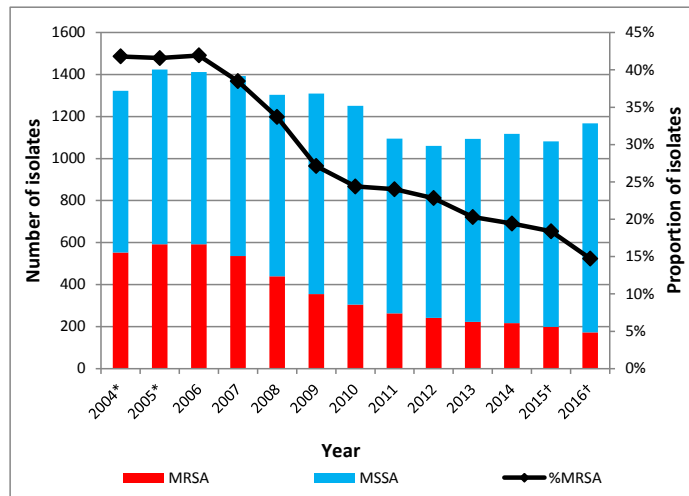


Figure 4: Total number of *S. aureus* (MRSA and MSSA) bloodstream isolates and proportion (%) MRSA from acute hospitals (public & private) by year, 2004 to 2016

† 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

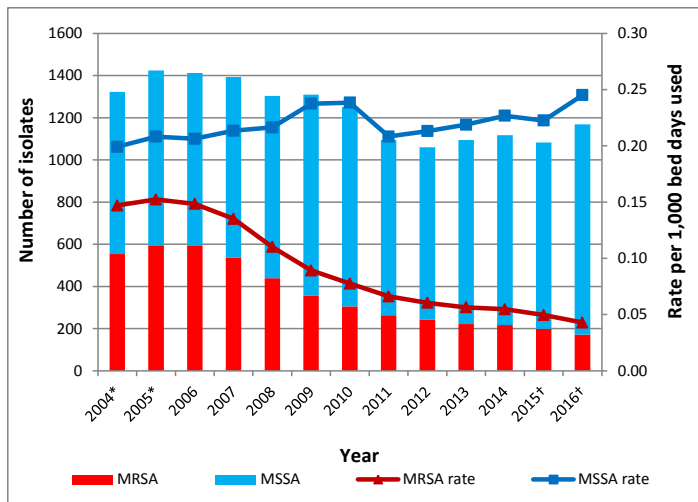


Figure 5: Total number of *S. aureus* (MRSA and MSSA) bloodstream isolates, and MRSA and MSSA rates (per 1,000 bed days used) from acute hospitals (public & private) by year, 2004 to 2016

† 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

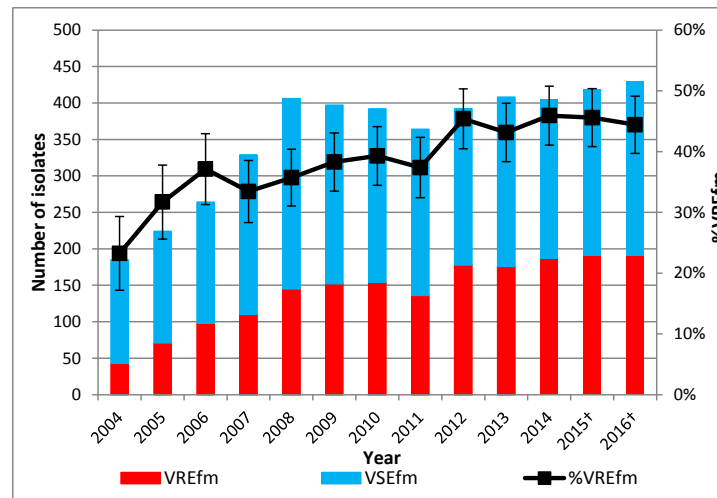


Figure 6: Total number of *E. faecium* (VREfm and VSEfm) bloodstream isolates, and VREfm proportions from acute hospitals (public & private) by year, 2004 to 2016

VREfm, Vancomycin resistant *E. faecium*; VSEfm, Vancomycin susceptible *E. faecium*; † 2015 and 2016 incomplete data from 3 and 2 laboratories representing 97% and 99% coverage, respectively

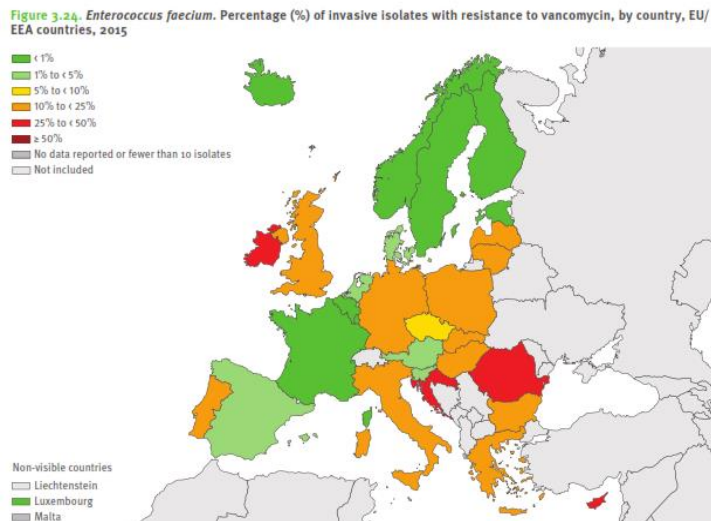


Figure 7: VREfm isolates Europe 2015 (Source: EARS-Net at ECDC; map accessed via www.ecdc.europa.eu 06/02/17)

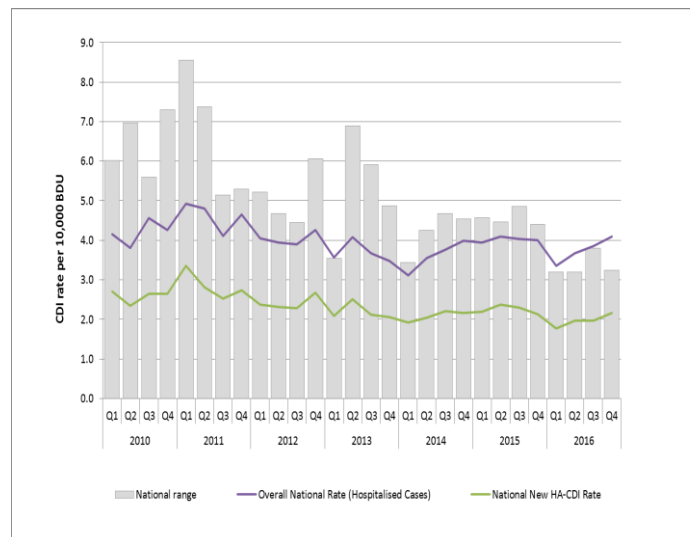


Figure 8: Quarterly national CDI rates per 10,000 BDU. Overall (purple) and new hospital acquired CDI (green)

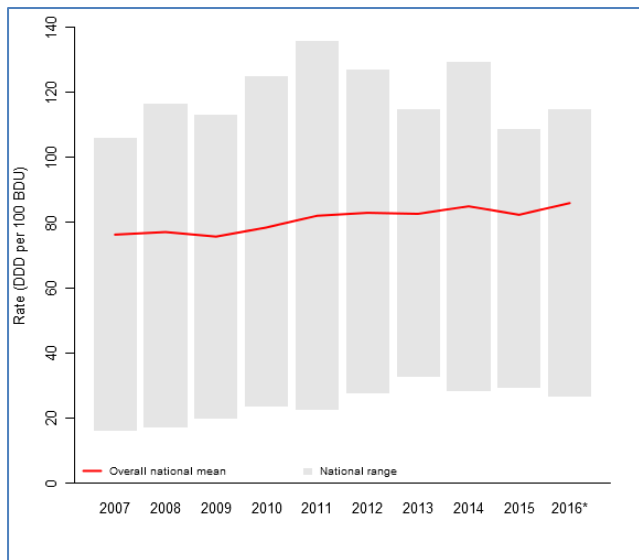


Figure 9: Hospital antimicrobial consumption (DDD per 100 BDU)
*Data to end of Q4 2016

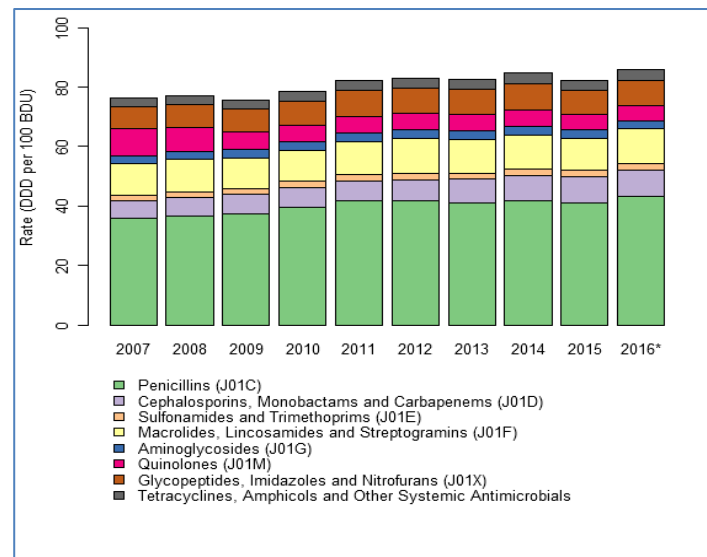


Figure 10: Hospital antimicrobial consumption by class (DDD per 100 BDU)
*Data to end of Q4 2016

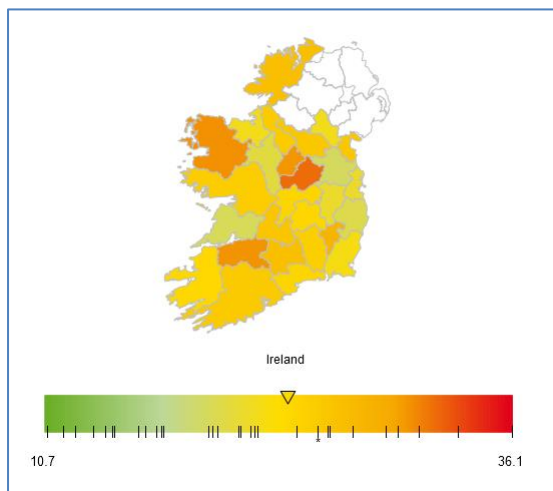


Figure 11: Community antimicrobial consumption in DDD per 1000 inhabitants per day (DID) *Data to end of Q4 2016

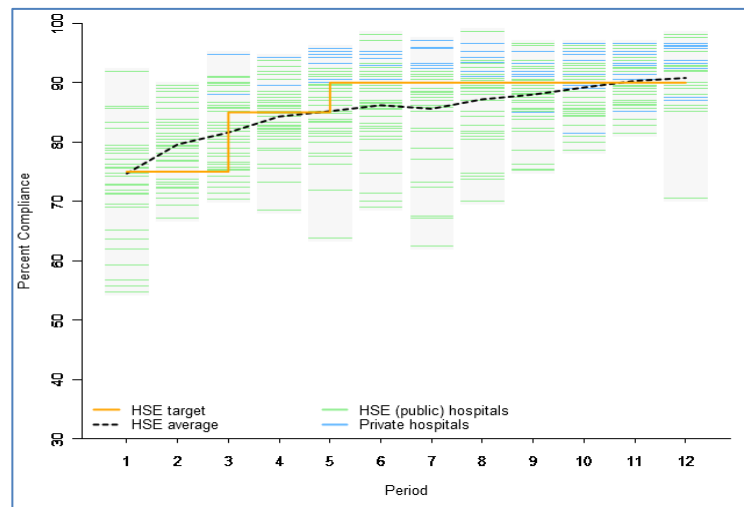


Figure 12: Hand hygiene compliance audit up to Period 12 (Oct/Nov 2016)

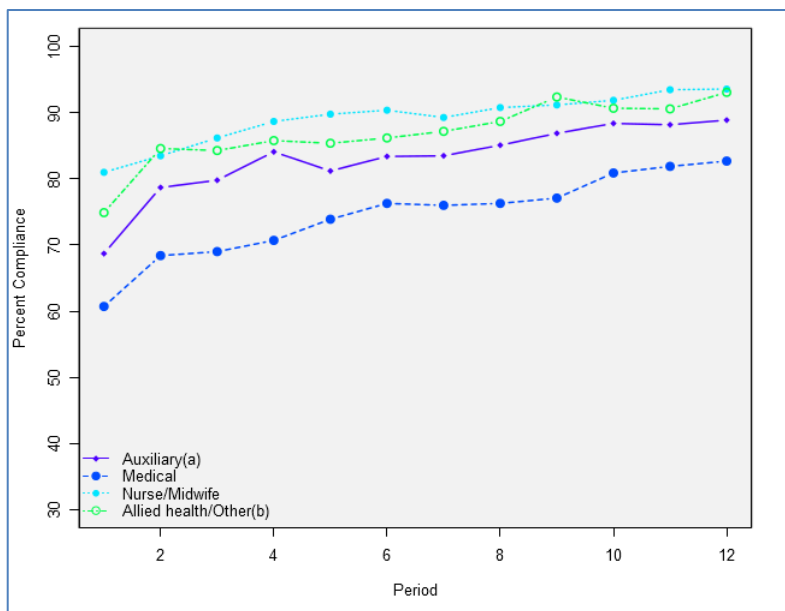


Figure 13: Hand hygiene compliance by healthcare worker category up to Period 12 (Oct/Nov 2016)

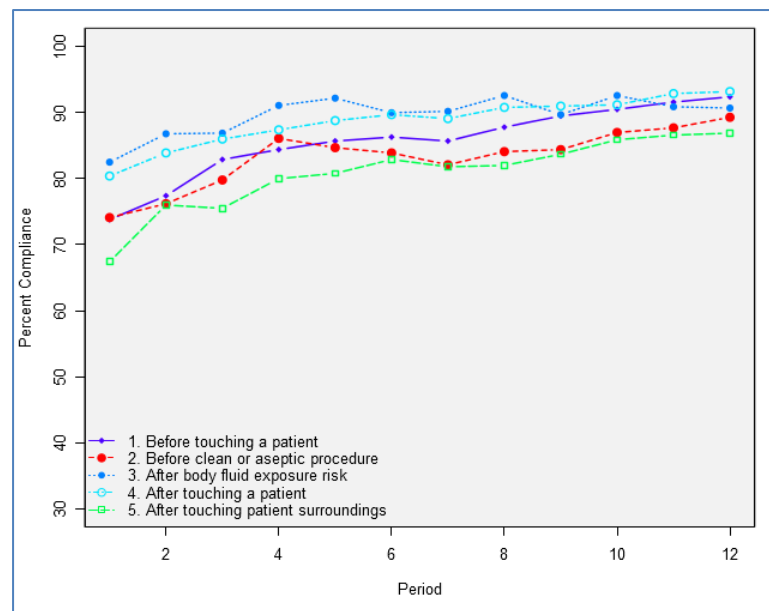


Figure 14: Hand hygiene compliance by the WHO '5 moments' up to Period 12 (Oct/Nov 2016)

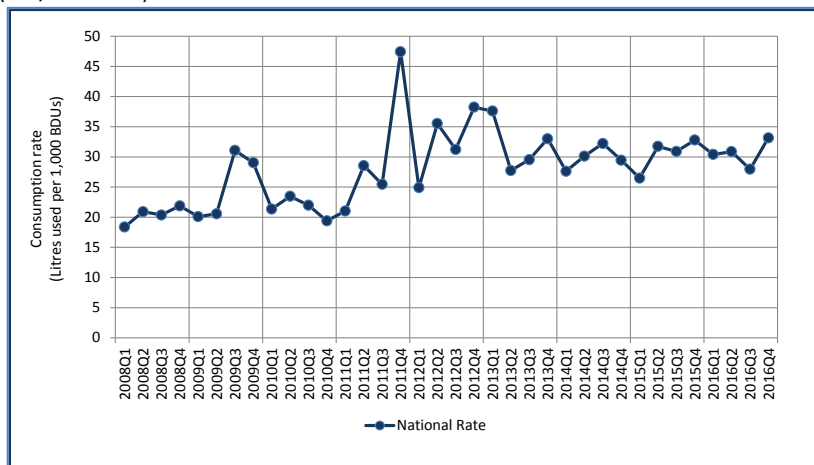


Figure 15: Quarterly alcohol-based hand-rub (ABHR) use in acute hospitals: 2008 to Q4 2016

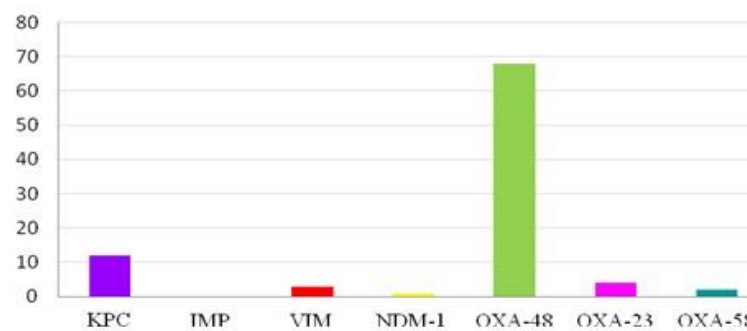


Figure 16: Carbapenemase type CRE Ireland: Jan to April 2017 (Data courtesy CPEARLS)

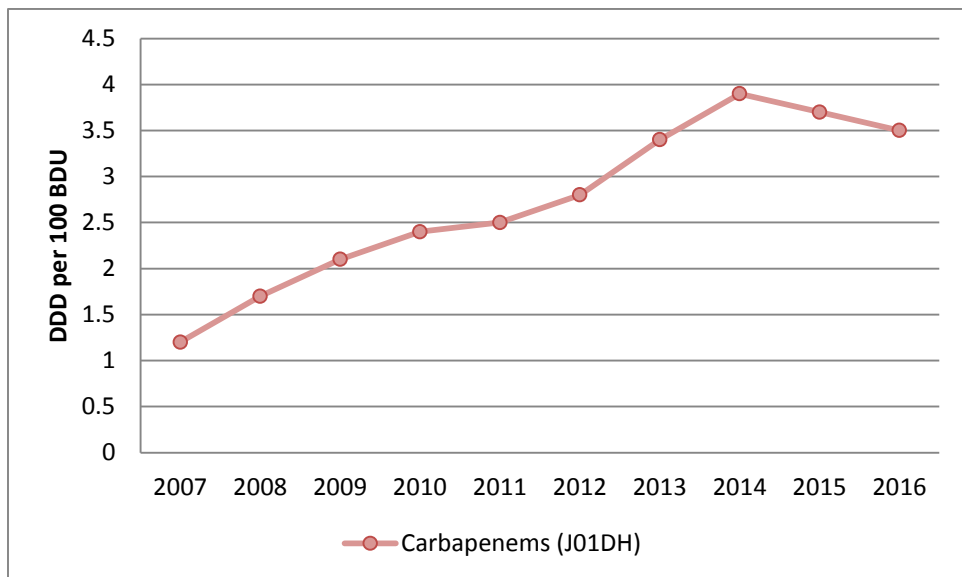


Figure 17: National annual carbapenem consumption: 2007 to 2016