HCAI / AMR Newsletter – March 2016

Multi-drug resistant organisms (MDRO) - What the GP needs to know

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Antimicrobial Resistance

Antimicrobial resistance is now recognised as a major public health threat.
Although the problem of antimicrobial resistance has primarily been associated with patients that develop health care associated infection, antibiotic resistant organisms can also cause community acquired infections and can be found as part of the flora of healthy individuals, animals (including pets) and the environment. Resistant organisms have a higher associated morbidity and mortality. Antimicrobial therapy required to treat these infections are often less effective, more toxic, and more expensive. The number of new antibiotic agents being developed has declined significantly in the last decades leading to an increasingly limited number of agents that may be of use to treat these difficult infections. Our ability to control infection has been critical in the facilitation of other areas of medicine including critical care, neonatology, transplantation, and high risk surgery. Therefore, in addition to the effect on the individual patient, antimicrobial resistance now threatens to undermine the effectiveness of health delivery more broadly. Antimicrobial use is a key driver of resistance whether that use is appropriate or inappropriate.

In a keynote address at the conference on Combating Antimicrobial Resistance: Time for Action held in Copenhagen, Denmark on 14 March 2012, Dr Margaret Chan, Director-General of the World Health Organization, stated “If current trends continue unabated, the future is easy to predict. Some experts say we are moving back to the pre-antibiotic era. No. This will be a post-antibiotic era. In terms of new replacement antibiotics, the pipeline is virtually dry, especially for Gram-negative bacteria. The cupboard is nearly bare.” “A post-antibiotic era means, in effect, an end to modern medicine as we know it. Things as common as strep throat or a child’s scratched knee could once again kill.” http://www.who.int/dg/speeches/2012/amr_20120314/en/

In Europe, the ECDC/EMEA Joint Technical Report estimated that infections due to MDROs in the EU resulted in extra healthcare costs and productivity losses of at least €1.5 billion each year; based on the number of extra hospital days, extra in-hospital costs were estimated at more than €900 million in the EU, Iceland and Norway, with outpatient care costs estimated at about €10 million.

Click here for further information on known resistant rates in Ireland and Europe.

European Centre for Disease prevention and Control/European Medicines Agencies (ECDPC/EMA) ECDC/EMEA Joint Technical report. Stockholm: ECDPC/EMA; 2009.

http://www.who.int/gpsc/country_work/burden_hcai/en/

What are the multidrug resistant organisms that may affect my patient?

The number of multidrug resistant organisms isolated and identified in the Irish healthcare setting continues to increase. It is therefore possible that patients may be identified as being colonised/infected with an MDRO while they are in hospital or when samples are sent by general practitioners to their local laboratories. The most problematic MDROs are Methicillin-resistant Staphylococcus aureus (MRSA), multidrug resistant gram negative rods (e.g. extended spectrum beta-lactamase producing enterobacteriaceae, e.g. ESBL *E. col. K.pneumonia*), organisms resistant to flouroquinolones (e.g. *P. aeruginosa*, *E. coli*, *Enterobacter* spp.) and Vancomycin resistant enterococci (VRE). A major concern both nationally and internationally is the development of carbapenem-resistant *Enterobacteriaceae* (CRE).

Not all resistance is the same:
The degree of resistance can also vary and this may impact on the advice given in relation to treatment and control strategies. An organism can be (1) multi drug resistant, where the isolate is resistant to greater than 3 or more antimicrobial categories or classes, (2) extensively drug resistant (XDR), where susceptibility is only detected to two or fewer antimicrobial classes and (3) pan drug resistant, when the organism is resistant to all agents in all antimicrobial categories.

What does it mean for my patient?
The significance of a multi drug resistant organism being identified varies for each individual patient depending on the clinical context.

A number of questions should be asked:

1. If my patient has clinical signs of infection: What is the likely organism?
When assessing a patient, the first question that needs to be addressed is whether the patient has clinical evidence of an infection? If yes, then knowledge of the most likely pathogens will aid antimicrobial choices. If it is a skin/soft tissue infection, then most likely pathogens are Staphylococcus aureus and haemolytic streptococci; if a UTI then E. Coli, K. pneumonia, etc.

2. Is my patient at risk of multi drug resistant organism colonisation?
Risk factors for MDRO colonisation are well recognised. These include:

i. Previous colonisation with an MDRO.
ii. Previous exposure to antimicrobial agents.
iii. Recurrent admissions to hospital or an ICU stay.
iv. The presence of invasive devices such as urinary catheters or the presence of broken skin or also as required with regular dressings.
v. Being in a nursing home or long stay care resident.
vii. Recent international travel or hospitalisation abroad.
vii. Being a healthcare worker.

3. Patient assessment:

If the patient has known colonisation with, or risk factors for, a multi drug resistant organism likely to cause such an infection, this should be factored into the therapeutic decision making. The follow actions should be undertaken.

i. MDRO colonised patients should be reassured that knowledge of their colonisation status facilitates appropriate care if infection should develop at some later stage.

ii. In terms of dealing with a patient with MDRO colonisation in your surgery standard precautions should be implemented and hand hygiene remains a critical component in the prevention of spread.

iii. Patients should be informed that the risk to healthy family members is extremely low. Standard precautions, hand hygiene and normal cleaning are sufficient as infection control measures in the home.

iv. Consider the need to take a culture, for example, mid stream urine patient with a urinary tract infection.

v. Consider the choice of agent, e.g. if the patient has a previous history of an MDRO then previous susceptibility data should be used to guide the choice of agent. If in doubt, talk to the local microbiologist. In some cases, the history of a known MDRO may influence a decision as to whether a patient needs to be referred for inpatient care with intravenous antibiotic therapy as no acceptable oral options may be available.

4. Prevention is better than cure:

As with all infections, prevention is better than cure and some basic advice includes

i. Prevent infection:
   - Maintain homeostasis – mobility, nutrition, skin integrity
   - Vaccinate when indicated
   - Remove devices, e.g. catheters if not essential
   - Screen for an MDRO if clinically indicated, e.g. MRSA if high risk surgery planned

ii. Diagnose and treat infection effectively
   - Consider early culture if risk factors for MDRO exist
   - If known MDRO carrier consider a potential pathogen when appropriate
   - Get expert advice if in doubt

iii. Prescribe antimicrobials appropriately

iv. Prevention of transmission

5. The most commonly encountered MDROs include:

MRSA colonisation/infection:

It is well known that Methicillin-resistant Staphylococcus aureus (MRSA) is as pathogenic as Methicillin susceptible Staphylococcus aureus (MSSA) and that colonisation with either organism increases the risk of infection in individual patients.

i. When a patient develops a staphylococcal type infection, e.g. skin and soft tissue, and they are known to be colonised with MRSA, it is likely that the infection is due to MRSA. In such cases, where isolates have previously been identified, susceptibility data will usually be available from your local laboratory and if not present on your patient file discussion with your local microbiologist may be helpful.

ii. Decolonisation protocols are available and may be indicated, e.g. prior to surgery.

Click here for more information

Extended spectrum beta-lactamase enterobacteriaceae (ESBL E. coli):

Enterobacteriaceae e.g E. coli are normal commensal bacteria in the gut, however, they are a common cause of infections, e.g. urinary tract and intra abdominal infections. Risk factors for multi drug resistant enterobacteriaceae for example ESBLs have already been defined. If you are told that your patient has been identified as being an ESBL producing enterobacteriaceae carrier, this may have implications for the future management and care of that patient. Many of these enterobacteriaceae are MDR and some are XDR and a minority have pan resistance. The resistance pattern may limit significantly the therapeutic choices, especially oral options, available for treatment.

If your patient develops an infection that is possibly due to an enterobacteriaceae, e.g. UTI and they are known ESBL carriers or have risk factors then you should:

i. consider the possibility may be caused by a multi drug resistant and culture the patient, e.g. send an MSU.

ii. Previous susceptibility data may be used to guide therapy and if you do not have this to hand, it maybe available from your local microbiology department.

iii. The decision to refer to an acute setting for additional care should be guided by the clinical picture and by the agents available based on previous susceptibility data.

iv. Decolonisation protocols for ESBL carriers do not exist.

Click here for more information

Vancomycin Resistant Enterococci (VRE):

The risk of infection with this organism in the community is small. However, this risk is higher in vulnerable groups, e.g. patients with long term catheters / immunosuppressed patients.

If your patient is a known VRE carrier and develops an infection where enterococci are potential pathogens, e.g. UTI, then:

i. consider the possibility may be caused by a multi drug resistant and culture the patient, e.g. send an MSU.

ii. Previous susceptibility data may be used to guide therapy and if you do not have this to hand, it may be available from your local microbiology department.

iii. The decision to refer to an acute setting for additional care should be guided by the clinical picture and by the agents available based on previous susceptibility data.

iv. Decolonisation protocols for VRE carriers do not exist.

Other resources:

https://www.hpsc.ie/Publications/InformationforGPsandPrimaryCare/

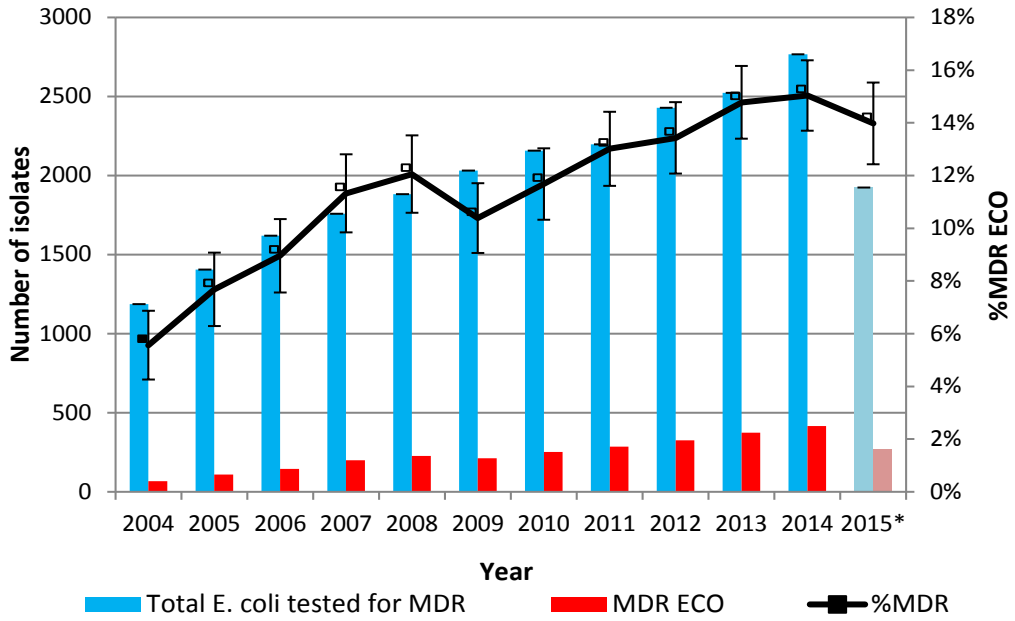
http://www.hpsc.ie/Publications/InformationforGPsandPrimaryCare/GuidanceforGPsandPrimaryCare/

http://www.antibioticprescribing.ie/

http://www.hse.ie/eng/about/Who/clinical/natclinprog/medicinemanagementprogramme/yourmedicines/prescribingtips/antibioticsprimary%20care.pdf

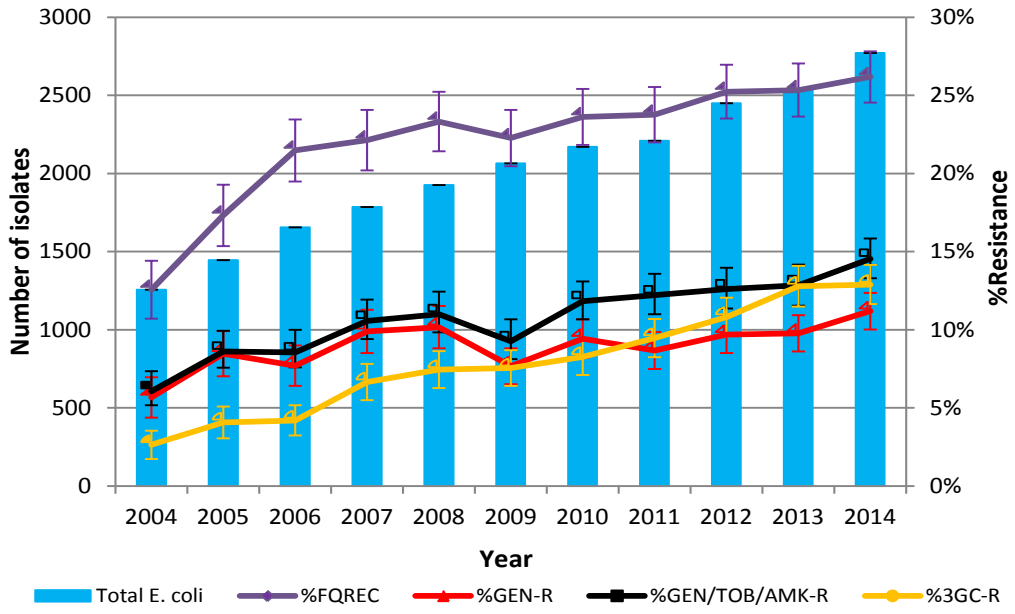
Following graphs downloaded from: https://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/EuropeanAntimicrobialResistanceSurveillanceSystemEARSS/EARSSSurveillanceReports/2015Reports/

Trends in *E. coli* invasive infections (bacteraemia) with percentage multi-drug resistance in Ireland 2004-2015



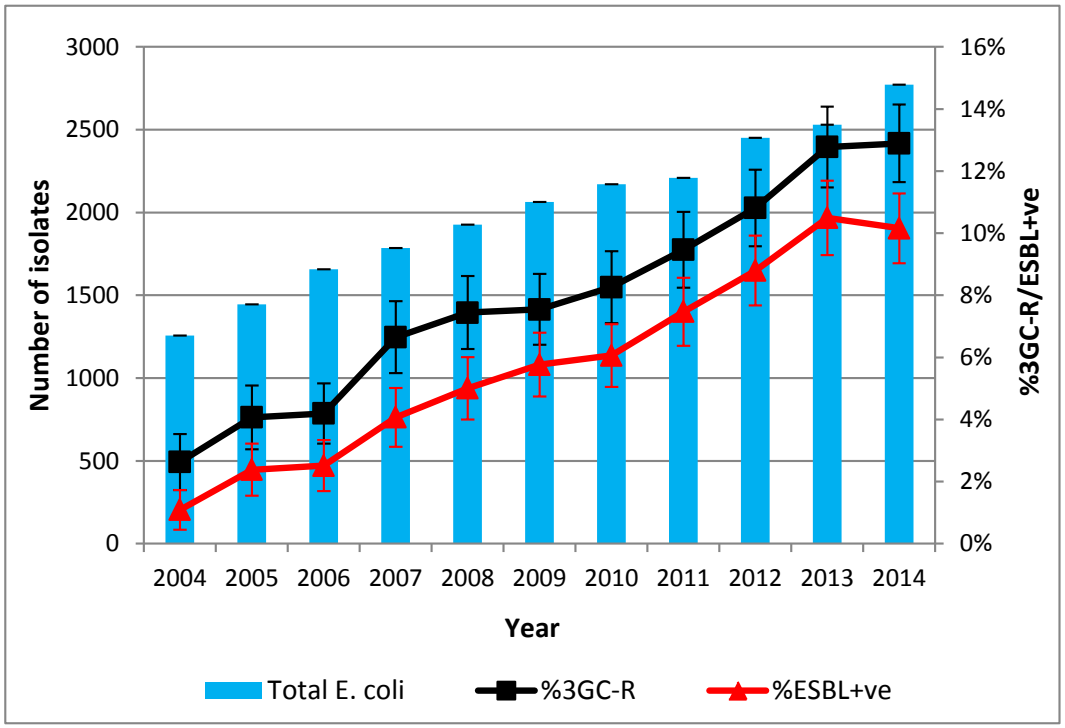
*2015 data to the end of Q3 only
MDR, multidrug resistance (defined as resistance to 3 or more classes of antibiotics OR a confirmed carbapenemase producer)

Trends in *E. coli* invasive infections (bacteraemia) showing percentage resistance to fluoroquinolones, aminoglycosides and 3rd-generation cephalosporins in Ireland 2004-2015



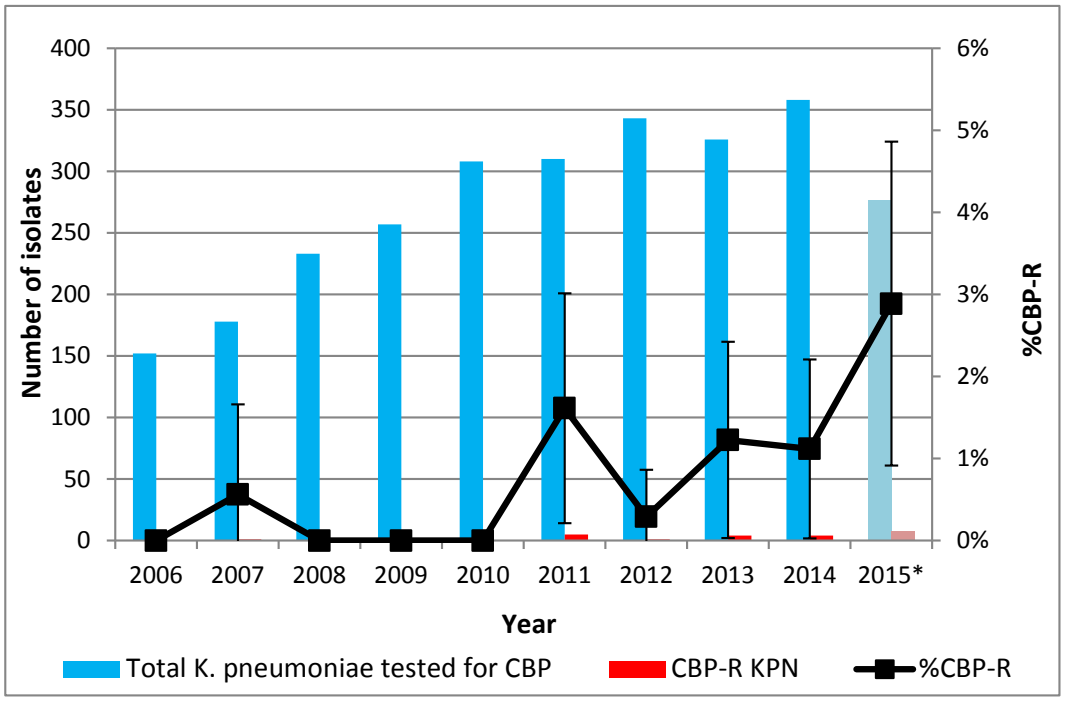
FQREC, fluoroquinolone (e.g. ciprofloxacin)-resistant *E. coli*; GEN, gentamicin, TOB, tobramycin; AMK, amikacin (GEN, TOB and AMK are aminoglycosides); 3GC, 3rd-generation cephalosporins (e.g. cefotaxime, ceftazidime)

Trends in *E. coli* invasive infections (bacteraemia) showing percentage 3GC-resistance and ESBL-positivity in Ireland 2004-2015

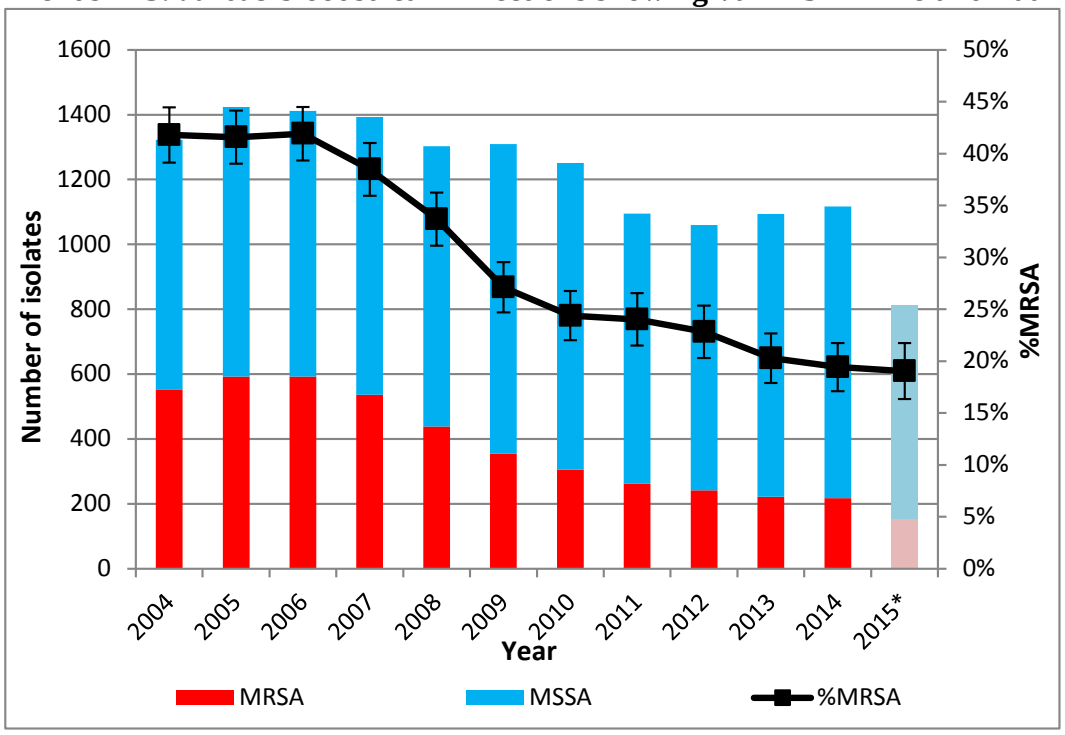


3GC, 3rd-generation cephalosporins (e.g. cefotaxime, ceftazidime); ESBL, extended-spectrum beta-lactamase

Trends in carbapenemase-producing *K. pneumoniae* (bacteraemia) in Ireland 2006-2015

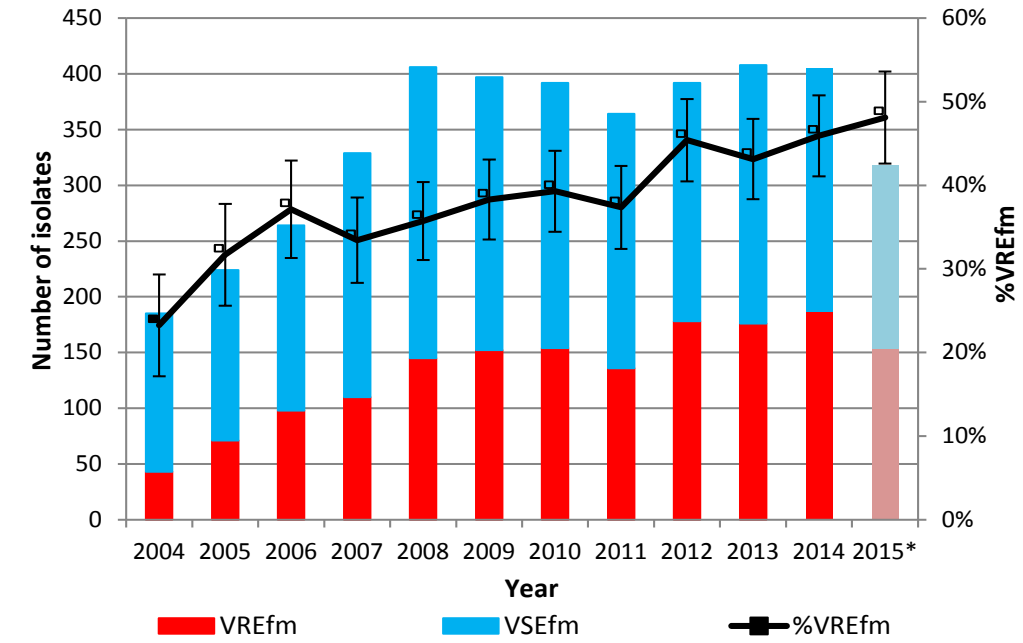


Trends in *S. aureus* bloodstream infections showing %MRSA in Ireland 2004-2015



*2015 data to the end of Q3 only

Trends in *E. faecium* bloodstream infections showing %VRE in Ireland 2004-2015



*2015 data to the end of Q3 only