Evaluating the effectiveness of Carbapenem and Piperacillin/Tazobactam prescribing guidelines within NHS Scotland June 2015: Survey Results focussing on the potential role of the laboratory to assist in antimicrobial stewardship

SAPG Carbapenems Project
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Where this work fits in with the SAPG carbapenems project....

- A piece of work responding to the increase in broad spectrum antimicrobial use (3 stages)
  - A survey of Antimicrobial Management Teams (AMTs) to define current prescribing and laboratory practice (completed June 2015)
  - A bespoke point prevalence survey of carbapenem and piperacillin/tazobactam use (completed November 2015)
  - Qualitative evaluation of clinicians' views and experience of using carbapenems and piperacillin/tazobactam (planned for 2016-17)

SAPG Aim:

- To provide intelligence around the use of pip/taz and carbapenems together with carbapenem sparing agents → to inform QI work around reducing unnecessary prescibing

Methods

- Monkey survey
- Board level overview of pip/taz, carbapenems, alternative Gram negative agents
- Antibiotic policies including any restrictions of the use of these
- Reporting of these agents by the lab including suppression and mechanisms of suppression

Results summary

- Carbapenem susceptibility testing and reporting
- Piperacillin/Tazobactam susceptibility testing and reporting
- Carbapenem sparing agents' susceptibility testing and reporting
- A couple of examples of MDR/ESBL reporting

Q17 Is Meropenem sensitivity routinely tested in your laboratory?

Yes – routinely tested in all 15 health boards

Q18 Is Meropenem routinely suppressed in your laboratory?

Meropenem routinely suppressed	**Number**	**Percent**
Yes, by automatic rules on all samples	9	67%
Yes, by automatic rules on some samples	3	40%
Yes, at authorisation by microbiologist/BMS	1	60%
Available on request	3	13%
No	2	27%

Q21 Is Imipenem sensitivity routinely tested in your laboratory?

Imipenem is used in 3 out of 15 Health Boards (20%), NHS Grampian, NHS Lanarkshire and NHS Lothian. Imipenem sensitivity is routinely tested in 2 out of 3 labs (67%), and is tested on request in 1 out of 3 labs (33%)

Q23 Is Imipenem routinely suppressed in your laboratory?

Imipenem routinely suppressed	**Number**	**Percent**
Yes, by automatic rules on all samples	1	33%
Yes, by automatic rules on some samples	0	0%
Yes, at authorisation by microbiologist/BMS	1	33%
Available on request	1	33%
No	0	0%

Q26 Is Ertapenem sensitivity routinely tested in your laboratory?

12 Health Boards use Ertapenem. Ertapenem sensitivity is routinely tested in 8 out of 12 labs (67%), and on request in a further 2 of 12 labs (17%)

Q28 Is Ertapenem routinely suppressed in your laboratory?

Ertapenem routinely suppressed	Number	Percent
Yes, by automatic rules on all samples	6	50%
Yes, by automatic rules on some samples	2	17%
Yes, at authorisation by microbiologist/BMS	2	17%
Available on request	3	25%
No	1	8%

Q34 Is Piperacillin/Tazobactam sensitivity routinely tested in your laboratory?

Piperacillin/Tazobactam sensitivity is routinely tested in the labs of all 15 Health Boards (100%)

Q35 Is Piperacillin/Tazobactam routinely suppressed in your laboratory?

Piperacillin/Tazobactam routinely suppressed	Number	Percent
Yes, by automatic rules on all samples	5	33%
Yes, by automatic rules on some samples	6	40%
Yes, at authorisation by microbiologist/BMS	1	7%
Available on request	2	13%
No	3	20%

Q44 What laboratory testing and reporting is available for the Carbapenem sparing antibiotics used in your Health Board?

Testing and reporting for Carbapenem sparing antibiotics	Aztreonam	Temocillin	Pivecillinam	Fosfomycin
Routinely reported	1	1	0	1
Reported only if resistant organism - rule based on all samples	2	2	2	4
Reported only if resistant organism - rule based on some samples	1	3	3	3
Reported only if resistant organism - at authorisation by microbiologist	9	7	7	6
Reported in preference to meropenem	2	1	2	2
Not reported because not tested	0	1	3	0

Q45 In your laboratory, which of the following would be reported on an MDR or ESBL *E. coli* GP urine sample, if found to be susceptible on sensitivity testing?

Antibiotics reported on an MDR or ESBL *E. coli* GP urine sample if found to be susceptible on sensitivity testing	**Number**	**Percent**
Aztreonam	1	7%
Co-amoxiclav	9	60%
Co-trimoxazole	7	47%
Ertapenem	2	13%
Fosfomycin	11	73%
Imipenem	0	0%
Meropenem	4	27%
Piperacillin/Tazobactam	5	33%
Pivmecillinam	10	67%
Temocillin	3	20%
Tetracycline	6	40%

Q46 In your laboratory, which of the following would be reported on an MDR or ESBL *E. coli* hopsital urine sample, if found to be susceptible on sensitivity testing?

Antibiotics reported on an MDR or ESBL *E. coli* hospital urine sample if found to be susceptible on sensitivity testing	**Number**	**Percent**
Aztreonam	4	27%
Co-amoxiclav	9	60%
Co-trimoxazole	7	47%
Ertapenem	2	13%
Fosfomycin	9	60%
Imipenem	0	0%
Meropenem	12	80%
Piperacillin/Tazobactam	13	87%
Pivmecillinam	9	60%
Temocillin	8	53%
Tetracycline	6	40%

Q47 In your laboratory, which of the following would be reported on an MDR or ESBL *E. coli* blood culture sample, if found to be susceptible on sensitivity testing?

Antibiotics reported on an MDR or ESBL *E. coli* blood culture isolate if found to be susceptible on sensitivity testing	**Number**	**Percent**
Aztreonam	4	27%
Co-amoxiclav	9	60%
Co-trimoxazole	5	33%
Ertapenem	3	20%
Fosfomycin	1	7%
Imipenem	2	13%
Meropenem	13	87%
Piperacillin/Tazobactam	13	87%
Pivmecillinam	1	7%
Temocillin	8	53%
Tetracycline	3	20%

Additional comments

- Concerns over pricing of/resistance developing to carbapenem sparing agents
- Local treatment failures with beta-lactam inhibitor combinations driving suppression of these agents
- Automatic rules in VITEK to restrict use of agents

- Recent change to urine testing protocol (CSU specimens without clinical details not tested, MSU specimens with only dipstick results not tested) yet to realise an impact on resistance patterns but anticipated benefit in reducing prescribing
- Guidance surrounding testing and workflow for pivmecillinam would be useful

Conclusions

- Inconsistency in approach of the lab towards antimicrobial stewardship nationally
- A minority of boards do not suppress piperacillin/tazobactam or meropenem routinely
- Suppression and release of antimicrobials occurs via a variety of mechanisms, most commonly by automatic rules on all samples (less commonly by automatic rules on some samples, or at authorisation of lab reports by the microbiologist or BMS staff)
- Generally differences between reporting of antimicrobials depending on origin of sample (community vs. acute), though not consistent across boards
- Although tested in the laboratory, a number of carbapenem sparing agents are not routinely reported, and few are reported in preference to meropenem

Recommendations

- Scotland is in a unique position to provide a standardised approach to antimicrobial stewardship from a laboratory perspective, as the bulk of antimicrobial susceptibility testing is standardised across all health boards
- Reporting of antimicrobials, the consumption of antimicrobials, the classes of antimicrobials promoted and any restrictions on usage are all interlinked, and ideally should be viewed together with resistance data to inform local and national prescribing and policy

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