Trends in Gram-negative bloodstream infection, antimicrobial use and antimicrobial resistance in Northern Ireland


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**Introduction:**

Antimicrobial resistance (AMR) is a present and growing threat to global human health. Gram-negative organisms present a particular challenge due to their ability to develop resistance, while the inappropriate and overuse of antibiotics further accelerates the AMR process. The Northern Ireland (NI) Department of Health, Social Services and Public Safety aimed to ‘establish and maintain systems to monitor antimicrobial usage and surveillance of resistance’ (DHSSPSNI, 2012). The selected results outlined in this poster are the product of that system. Full results are available at: [http://pha.site/AMR2017](http://pha.site/AMR2017)

**Methods:**

2009-2016 period

Trust microbiology labs (x 5) test for GNBs

Public Health Agency HCAI team +VEs voluntarily reported to CoSurv

Antibiotic susceptibility testing. Reported to PHA as:

- **Susceptible (S):** growth inhibited in vitro by a concentration of the drug associated with a high likelihood of therapeutic success.
- **Indeterminate (I):** concentration required to inhibit growth in vitro associated with uncertain therapeutic outcome at standard doses.
- **Resistant (R):** concentration required to inhibit growth in vitro associated with a high likelihood of therapeutic failure.

*I and R grouped together as ‘Non-Susceptible’ for reporting purposes.

**Results:**

**E. coli**

Bloodstream Infection

980 in 2009

1487 in 2016

**K. pneumoniae**

Bloodstream Infection

143 in 2009

208 in 2016

No change in total antibiotic use from 2014 to 2016 @ 32 DDD / 1000 inhabitants / day

**Resistance:**

- **E. coli**
  - Proportion resistant to 3rd Generation Cephalosporins: 2016
  - Proportion resistant to Carapenem: 2016
  - Proportion resistant to Gentamicin: 2016
  - Proportion resistant to Ciprofloxacin: 2016
  - Proportion resistant to Piperacillin/Tazobactam: 2016

- **K. pneumoniae**
  - Proportion resistant to 3rd Generation Cephalosporins: 2016
  - Proportion resistant to Carapenem: 2016
  - Proportion resistant to Gentamicin: 2016
  - Proportion resistant to Ciprofloxacin: 2016
  - Proportion resistant to Piperacillin/Tazobactam: 2016

- **Pseudomonas Spp.**
  - Proportion resistant to 3rd Generation Cephalosporins: 2016
  - Proportion resistant to Carapenem: 2016
  - Proportion resistant to Gentamicin: 2016
  - Proportion resistant to Ciprofloxacin: 2016
  - Proportion resistant to Piperacillin/Tazobactam: 2016

**Consumption:**

- **Carbapenems**
  - meropenem
  - imipenem with cilastatin

- **Piperacillin/tazobactum**
  - co-amoxiclav
  - amoxicillin with clavulanic acid
  - piperacillin/tazobactam

- **Penicillins**
  - amoxicillin
  - benzylpenicillin
  - phenoxymethylpenicillin

- **Trimethoprim**
  - ampicillin
  - flucloxacillin
  - piperacillin

- **Nitrofurantoin**

**Conclusions:**

- There has been an increasing incidence of gram-negative bloodstream infections and a small rise in the proportion resistant to selected antibiotics.
- Rates of antibiotic consumption are stable but substantially higher than other parts of the UK.
- We have limited information about who is receiving antibiotics and who is prescribing them.

**Recommendations:**

- Further investigation is needed to identify who is receiving and prescribing antibiotics in Northern Ireland.
- Availability of timely, detailed intelligence for practitioners/managers should help target efforts to reduce consumption and inappropriate antibiotic use.