

Surveillance of Antimicrobial Consumption in Ireland

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A Strategy for the Control of
Antimicrobial Resistance in Ireland

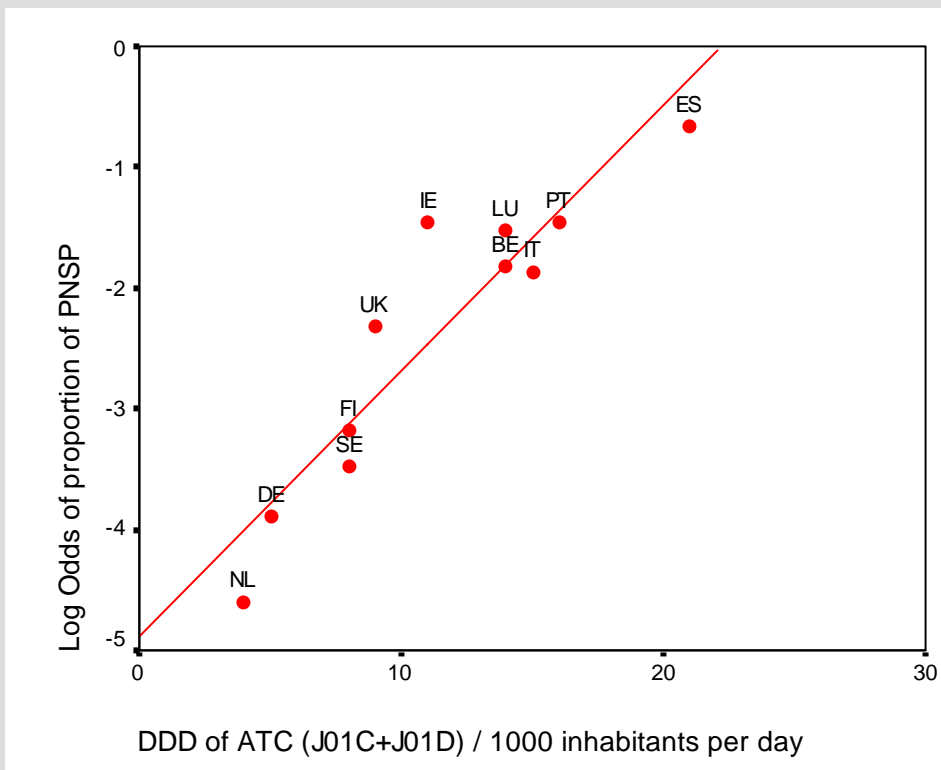
S A R I

ESAC
European Surveillance of
Antimicrobial Consumption



A European Study on the Relationship between Antimicrobial Use and Antimicrobial Resistance (1998-1999)

Bronzwaer *et al* 2002 Emerging Infectious Diseases **8**:278-282



$r^2 = 0.8$
 $P < 0.001$

PNSP = Penicillin nonsusceptible *Streptococcus pneumoniae*

Anatomical Therapeutic Chemical (ATC) classification

<http://www.whooc.no/atcddd/>

J ANTIINFECTIVES FOR SYSTEMIC USE

- J01 ANTIBACTERIALS FOR SYSTEMIC USE
 - J01A TETRACYCLINES
 - J01B AMPHENICOLS
 - J01C BETA-LACTAM ANTIBACTERIALS, PENICILLINS
 - J01D OTHER BETA-LACTAM ANTIBACTERIALS
 - J01E SULFONAMIDES AND TRIMETHOPRIM
 - J01F MACROLIDES, LINCOSAMIDES AND STREPTOGRAMINS
 - J01FA Macrolides
 - J01FF Lincosamides

*The **Defined Daily Dose (DDD)** is the assumed average maintenance dose per day for a drug used for its main indication in adults.*

	DDD	Unit	Adm.route
J01FF01 Clindamycin	1.2	g	O
J01FF01 Clindamycin	1.8	g	P
J01FF02 Lincomycin	1.8	g	O,P

ATC 2004 version used

ESAC European Surveillance of Antimicrobial Consumption



- Granted by DG SANCO project number 2110/SID/136
- Construct an inventory of antibiotic usage in EU
- Link with resistance data
- Census of determinants on usage of major classes
- Towards intervention

Antibiotic Consumption in the Community in Ireland 1993 – 2003 Retrospective Data

- Irish pharmaceutical sales data purchased from IMS Health
 - Wholesaler to retail pharmacy sales data
- Automated data extraction protocol developed at HPSC
 - Convert IMS data to ATC/DDD outputs
 - Multiply the DDD per pack (DPP) by quantity sold
 - Output summed and expressed as a rate
 - Number of days, population of region

FILE EXTRACT

PRODUCT PACK LABEL	ITEMS PER PACK	QUANTITY
Ambisome Inj 50mg	10	10
Ceporex Syrup 125mg/5ml 100ml	1	2
Diflucan Caps 50mg	7	55
Klacid Paed Susp 125mg/5ml 70ml	1	8

$$3.5 * 8 = 28$$



$$(70 * (125/5) * 1) / 500 = 3.5$$

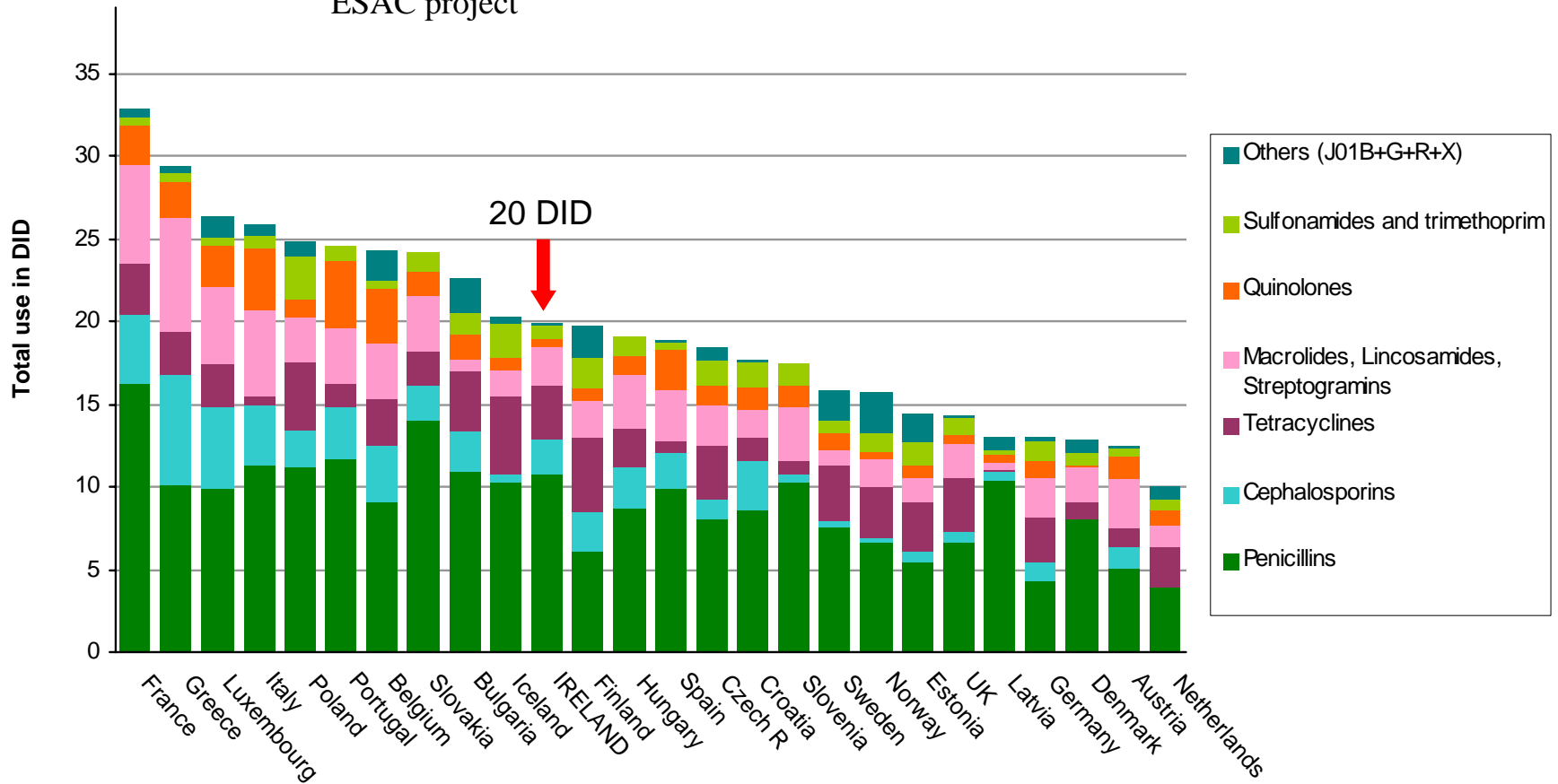
ATC	ROUTE ADMIN	TOTAL DDD
J01FA09	0	28

PRODUCT REGISTER

ProductName	Klacid
PackName	PAED SUSP 125MG 70ML
Ingredient	Clarithromycin
Form	LIQUIDS
PackSize	70
PackSizeUnit	ml
Strength	125
StrengthUnit	mg
InBasQ	5
PackMultiple	1
RouteAdmin	0
DDD	500
DDU	mg
ATC	J01FA09
DPP	3.5

Antibiotic Consumption in the Ambulatory Care in Europe

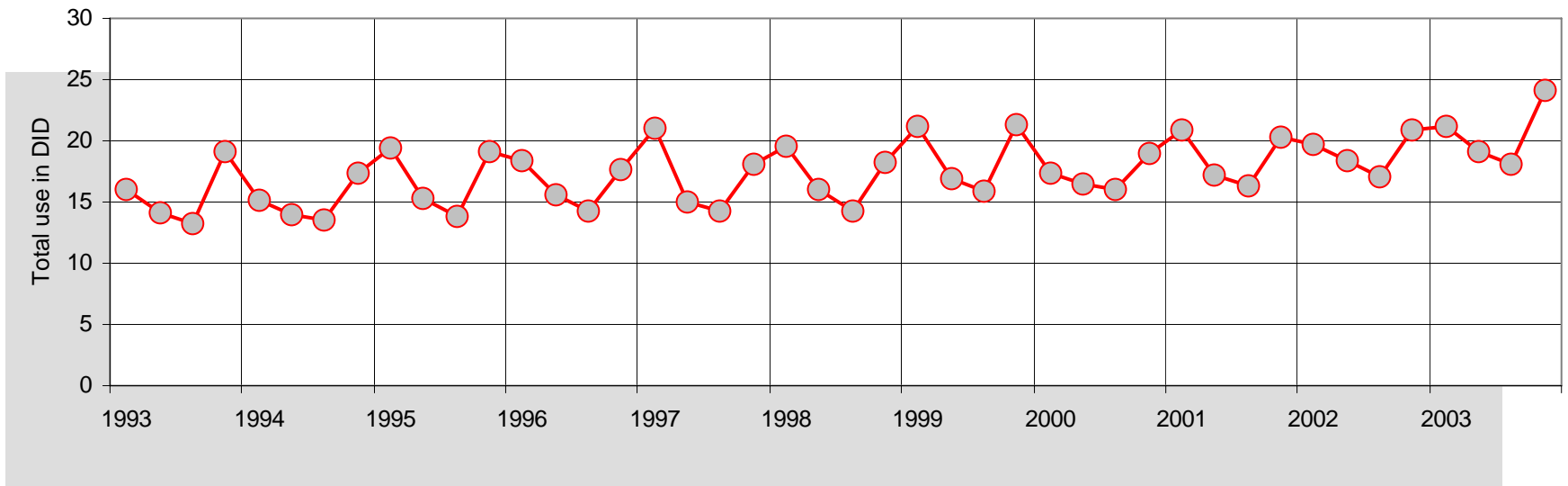
DDD per 1000 inhabitants per day (DID), 2003 data
ESAC project



Preliminary results – ATC 2004 version used

HPAI Conf., Dublin, April 2005

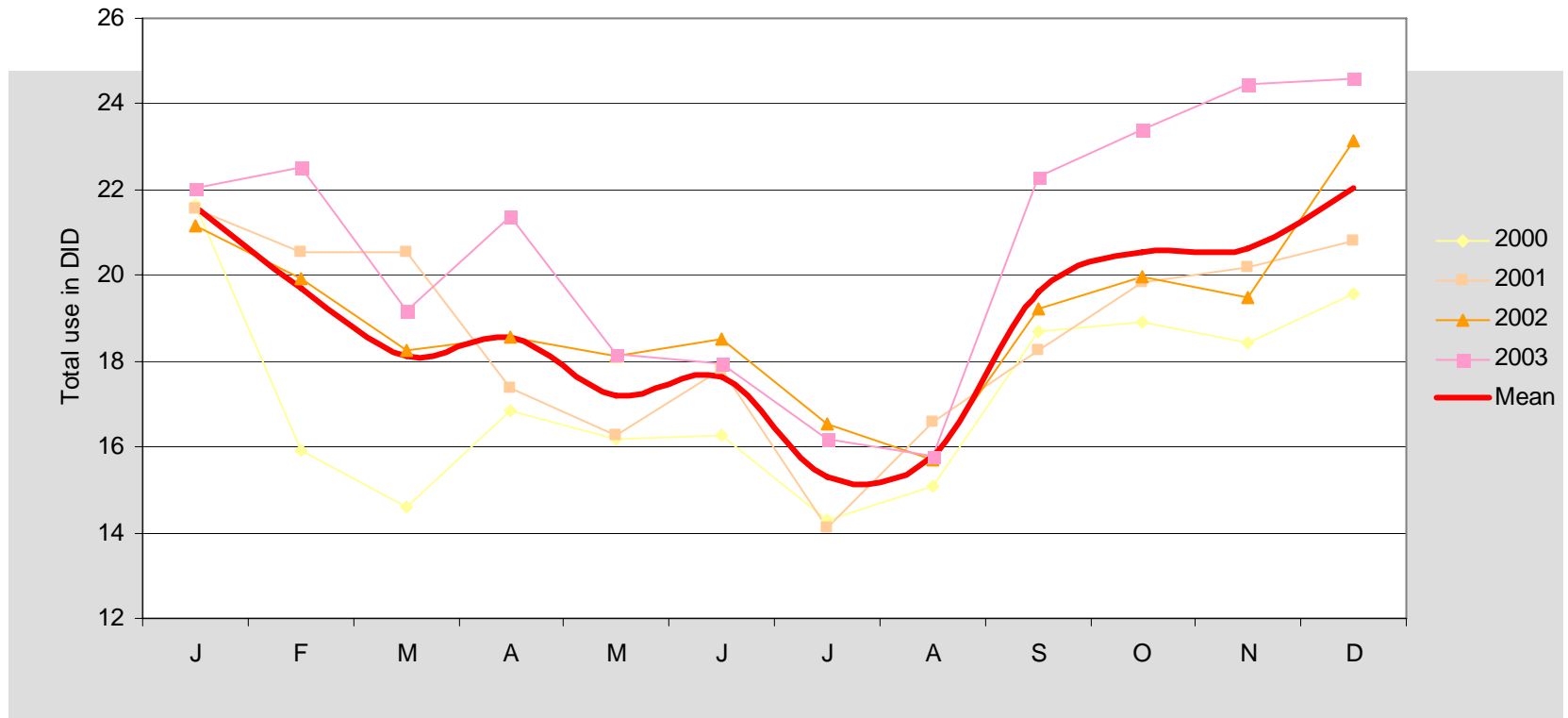
Antibiotic Consumption in the Community in Ireland 1993 – 2003 Quarterly Data, J01



Sharp winter peaks reflect high usage among ESAC participants

Preliminary results – ATC 2004 version used

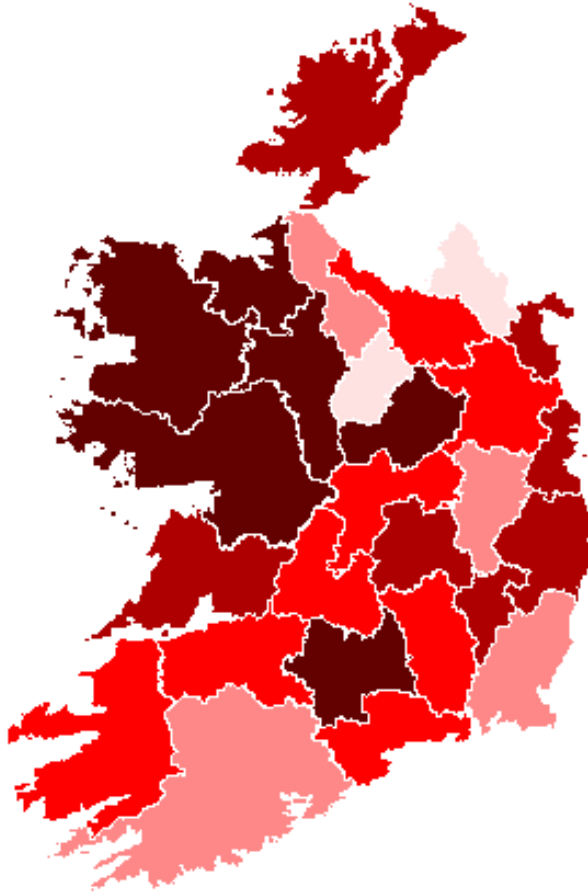
Antibiotic Consumption in the Community in Ireland 2000 – 2003 Monthly Data, J01



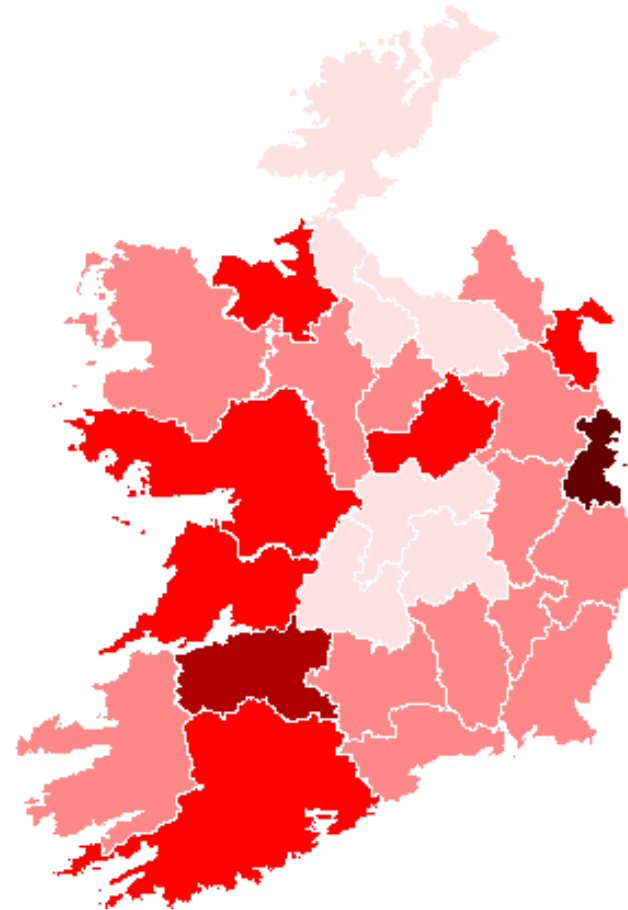
Preliminary results – ATC 2004 version used

Proportions of specific antibiotic groups by county, 2003

Narrow Spec Penicillins (J01CE / J01C)



Tetracyclines (J01A / J01)



Preliminary results – ATC 2004 version used

Hospital Antibiotic Survey - Ireland 2004

METHOD

- Hospital pharmacists in Ireland were asked to provide antibiotic usage data for their hosp – by quarter
- A pilot of data collection was tried out in 2004
- A general request was sent out in Feb 2005 by HPAI
- The protocol (devised by Michael Fitzpatrick) was used to extract usage data from CLINIScript® computer system
- At HPSC data were converted into ATC/DDD outputs as per community data extraction
- A short questionnaire was also completed by data providers

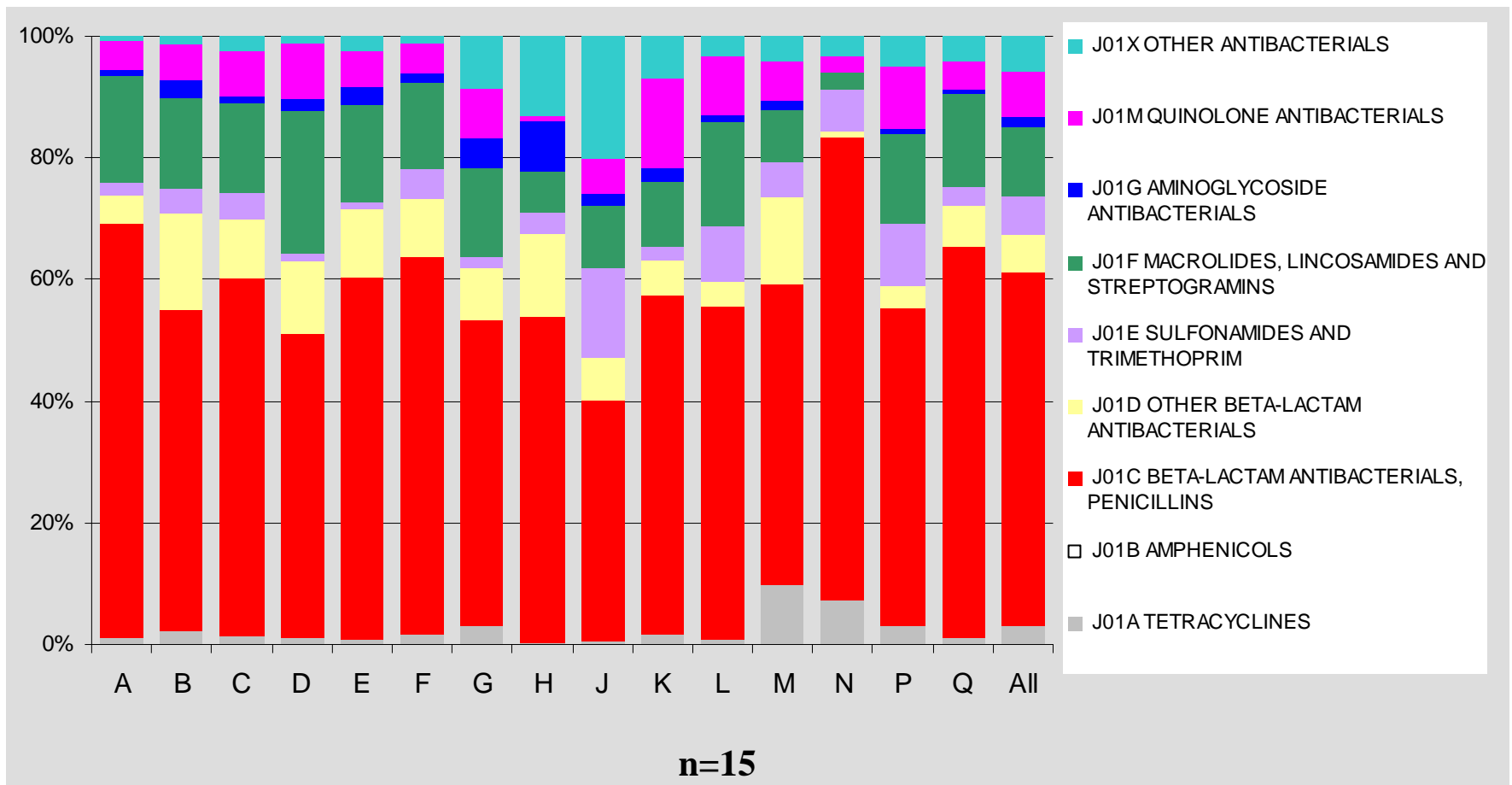
Hospital Antibiotic Survey - Ireland 2004

RESULTS

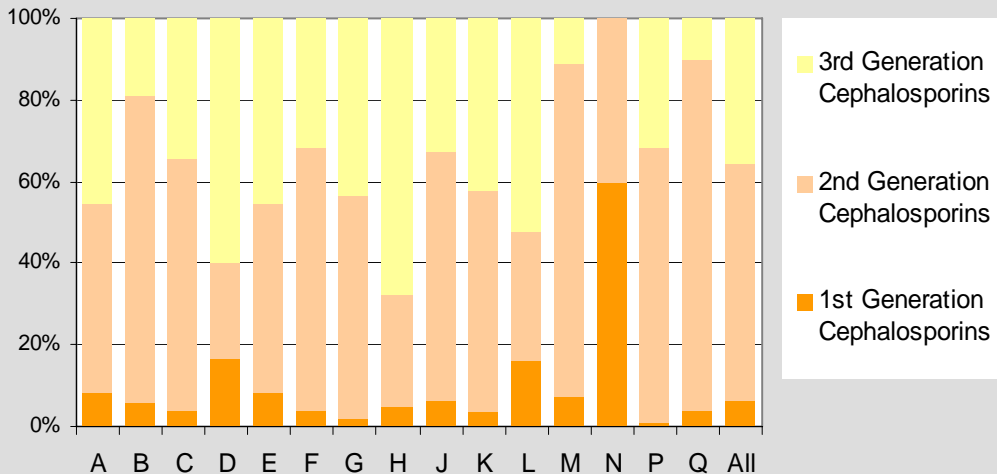
- Fifteen hospitals provided data, of which
 - 1 was by paper
 - 14 were by email (“.CSV”)
- Respondents were supplied with breakdown of their own data
- Hospital activity data (bed-days used) present for 14 of the 15 hosps
- Antimicrobial resistance (e.g. MRSA rate) data available for 13 of the 15 hosps

Hospital Antibiotic Survey - Ireland 2004

ATC level 3

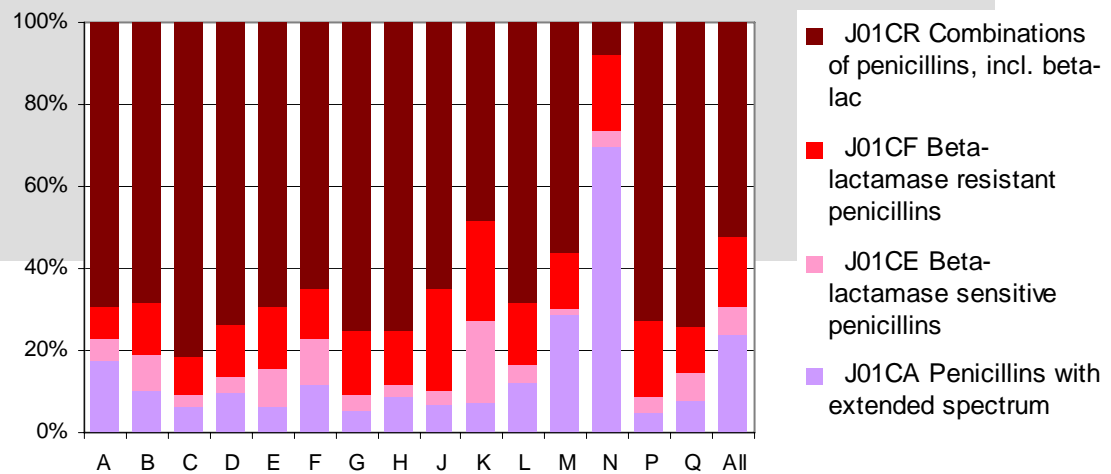


Hospital Antibiotic Survey - Ireland 2004



Proportional Cephalosporin and Pencillin Usage

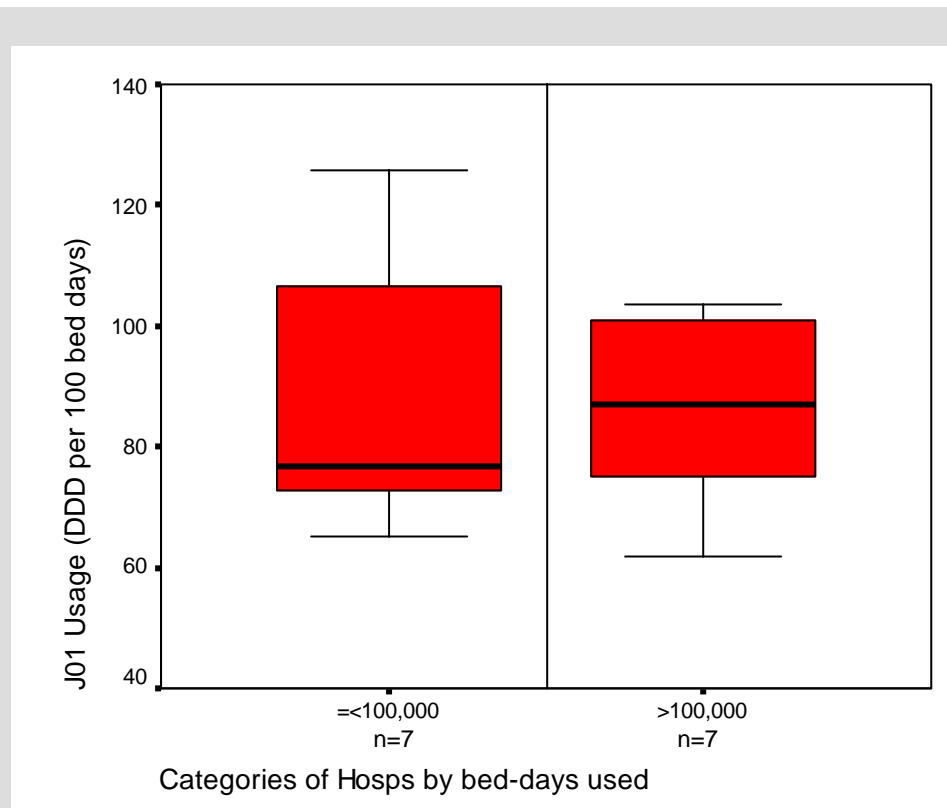
n=15



Preliminary results – ATC 2004 version used

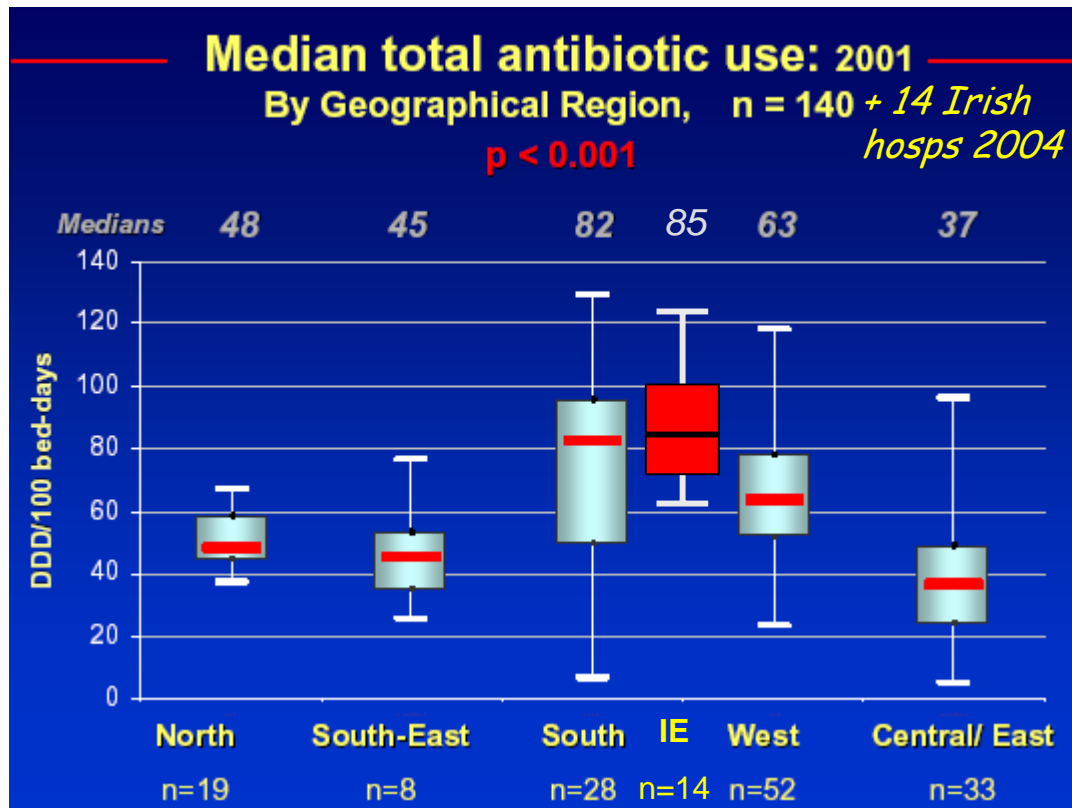
Hospital Antibiotic Survey - Ireland 2004

Rates of total antibiotics used



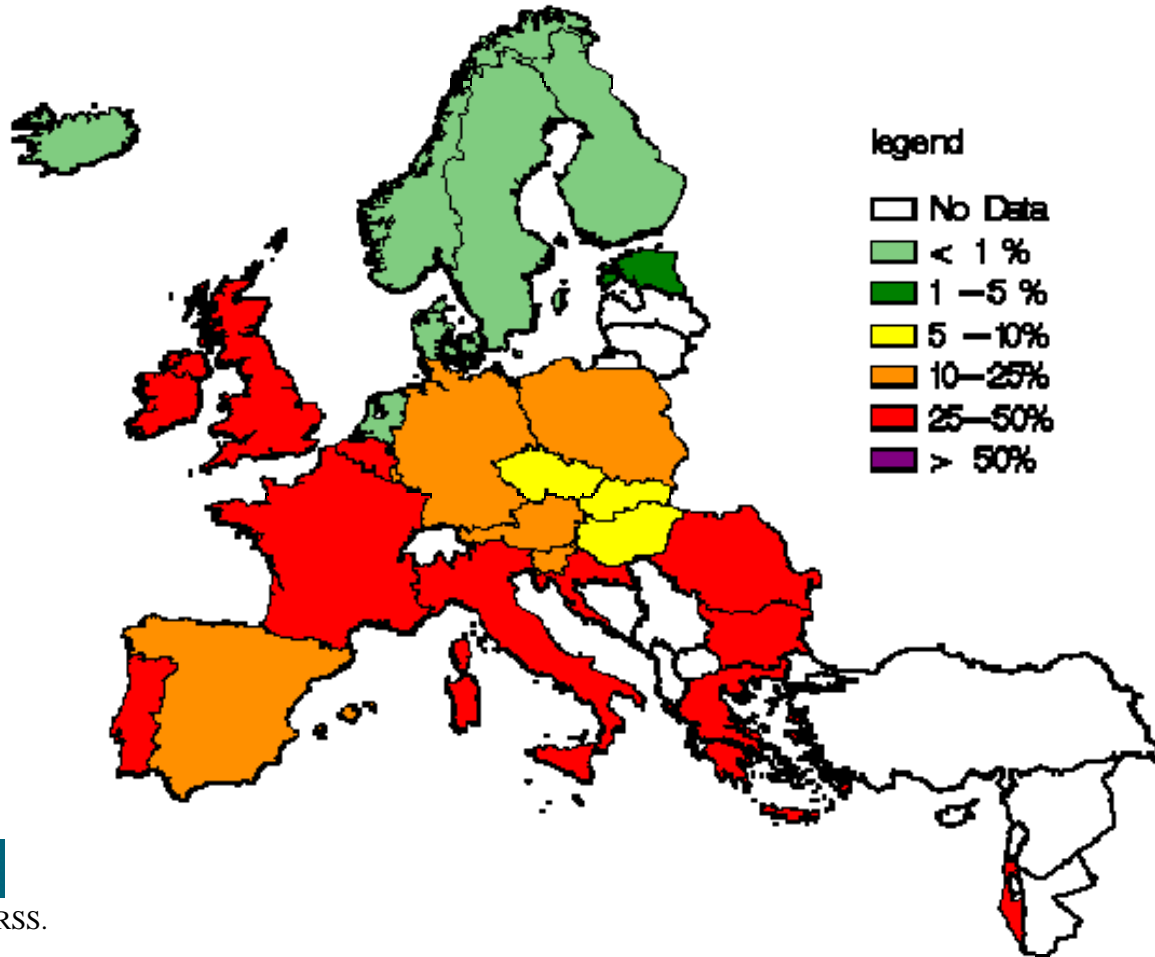
Preliminary results – ATC 2004 version used

Antibiotic Usage in European Hospitals



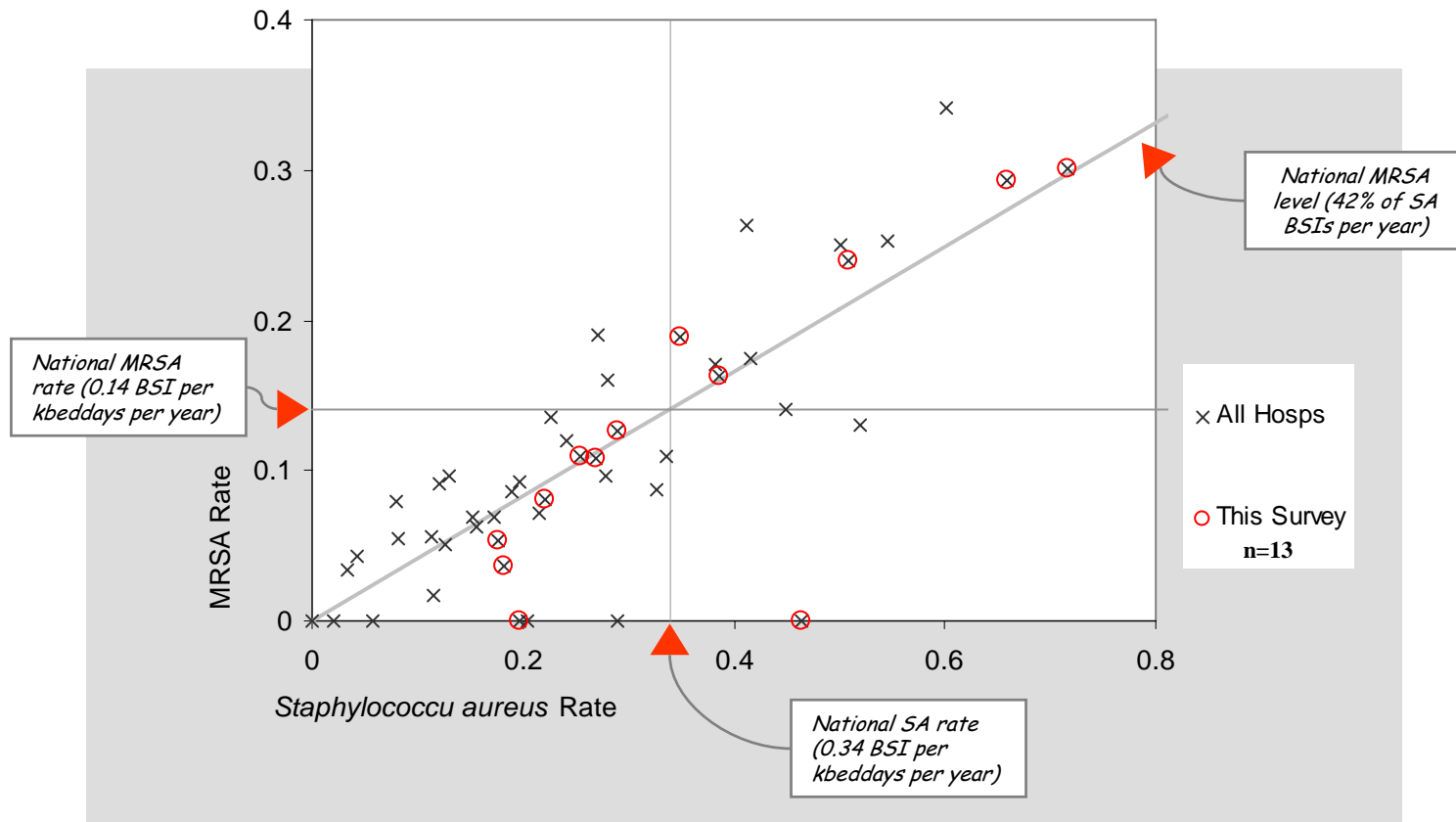
Preliminary results – ATC 2004 version used

MRSA Levels 2002 – Data from European Antimicrobial Resistance Surveillance System (EARSS)



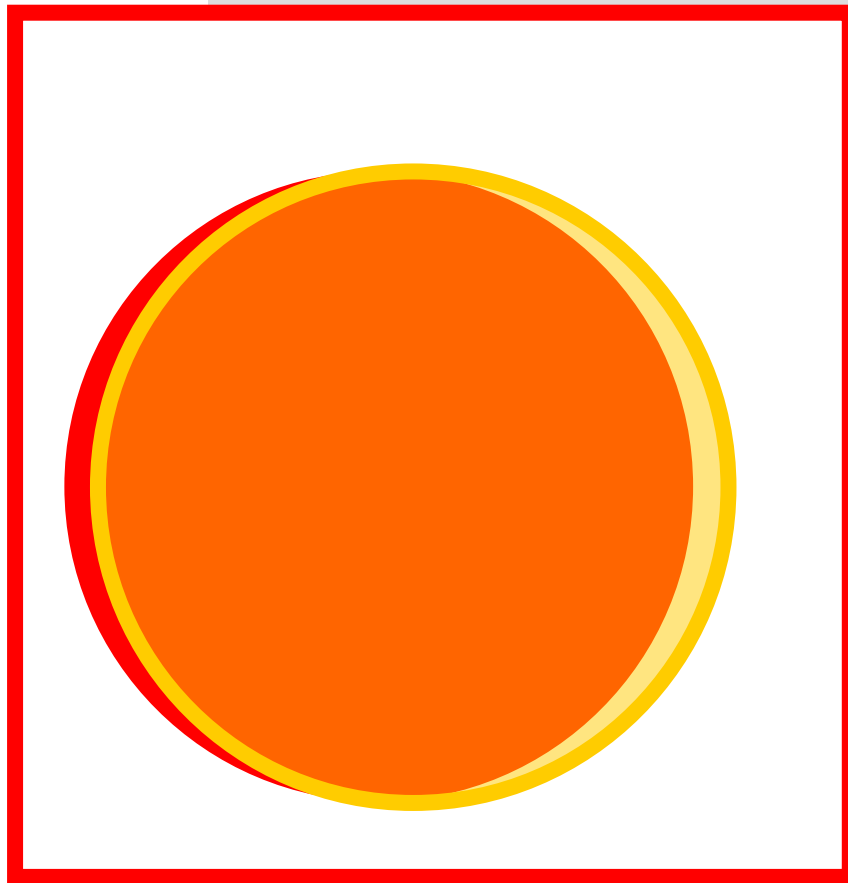
©2004 RIVM/EARSS.

MRSA in Ireland 2004 – EARSS data



CAUTION: Representation of hosps in this survey not complete and rates are influenced by patient case-mix and other factors

Antibiotic usage and resistance in hospitals Ireland 2004



Pearson Correlation n = 13	Total antibiotic usage J01 (DDD / 100 bed days)	Quinolone usage J01M / J01 (DDD proportion)
Methicillin resistance in <i>S. aureus</i>	r = -0.12 P = 0.35	r = 0.52 P = 0.03
Ciprofloxacin resistance in <i>E. coli</i>	r = 0.44 P = 0.07	r = 0.65 P = 0.008

-  All SA BSI
-  MRSA
-  Ciprofloxacin r

Preliminary results – ATC 2004 version used

Hospital Antibiotic Survey - Ireland 2004

LIMITATIONS

- ATC/DDD classification system does not apply to paediatric care
- What proportion of outpatient usage reflected in survey?
 - Up to 15% in questionnaires
- International methods of denominator calculations vary
- Currently other J class antiinfectives (e.g. anti-fungals, anti-virals) not included in the analyses
- Not all hospitals use the same computer system

HOWEVER

- These problems can be addressed!

Hospital Antibiotic Survey - Ireland 2004

ADVANTAGES

- Standardised method
- Automation in data analysis is possible
- Allows benchmarking
- Facilitate auditing
- Facilitate studies on efficacy & interventions
- To improve quality
 - Cost effectiveness
 - Resistance in pathogens
 - Outcome

Surveillance of Antimicrobial Consumption in Ireland

Future Aims

- Data from remaining hospitals
- Prospective data collection for 2005 – community & hosp
- Develop database for remote access by hospital pharmacy
 - Ward or patient level analysis
 - Longitudinal studies with smaller time segments
- Provide feedback to hospitals & regional SARI groups
- Promote prudent antibiotic usage & infection control
 - Need for educational encouragement
 - Need for more (ID) pharmacists

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Antimicrobial Resistance in Ireland

S A R I

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ACKNOWLEDGMENTS

- Dr Robert Cunney
- Michael Fitzpatrick
- Marie Philbin
- Elaine Conyard & HPAI
- EARSS Ireland & RIVM
- Hospital Pharmacies for providing the data

THANK YOU!