Global-PPS and antimicrobial quality indicators: Towards effective hospital antimicrobial stewardship

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Supporting healthcare professionals in the fight against resistance

BIOMÉRIEUX

What are quality indicators for appropriate antibiotic/antimicrobial use

- Antimicrobial **control measures** which lead to an **improvement in quality of prescribing**, **cost-effectiveness** and **reduction in resistance**. (Nathwani D. et al, J Hosp Infect. 2002)
- Allows to **measure appropriateness of antibiotic use** in the treatment of bacterial infections in hospitalized patients and …
- Are a **requirement for an effective antibiotic stewardship program** (Van den Bosch et al, CID, 2015)
- Allows to **monitor** the appropriateness of hospital antibiotic use (Van den Bosch et al, CMI, 2016)

Types of indicators

- **Structure**
  - Attributes of care settings
    - Material resources
    - Human resources
    - Organisational structure

  e.g. presence of an antimicrobial stewardship team
- **Process**
  - describe the important processes that contribute to the achievement of outcomes e.g. quality of training
- **Outcome**
  - Accomplishment of desired outcomes e.g. Number of antibiotic prescriptions

The ideal indicator should be

- Clearly defined (which, target, timing, …)
- Evidence-based
- Specific and sensitive
- Accurate and reproducible
- Valid
- Feasible
- Allow discrimination and comparision
- Action-focused

ref: https://www.slideshare.net/balbiger/ntiobiotc-stewardship-indicators

Which quality indiators does the Global-PPS offer to measure appropriate antimicrobial use in the hospital ?

1. Overall prevalence (%) of antimicrobial (AM) use
2. Prevalence of antimicrobial use by ward type
3. Prevalence broad-spectrum antibiotic prescribing
4. Hospital-acquired infection rate (patient level)
5. Antibiotic prevalence for hospital-acquired infections (HAI) (at antibiotic level)
6. Overall targeted therapeutic antibiotic prescribing
7. Targeted broad-spectrum antibiotic prescribing for HAI
8. Prevalence of patients treated with antibiotics targeting resistant organisms

Which quality indiators does the Global-PPS offer to measure appropriate antimicrobial use in the hospital ?

9. Antibiotic prevalence for community acquired infections (CAI)
10. Empirical broad-spectrum antibiotic prescribing for CAI
11. Parenteral administration of antibiotics
12. Number of antibiotic combination therapies
13. Documentation of reason for AM prescribing in notes
14. Prevalence of stop/review date documented
15. Antibiotic prescriptions for which guidelines were available
16. Antibiotic prescriptions prescribed according to local guidelines

Ref: Versporten et al, JAC, 2016; Versporten et al, LGH, 2018

Which quality indiators does the Global-PPS offer to measure appropriate antimicrobial use in the hospital ?

17. Broad-spectrum antibiotic prescribing for surgical prophylaxis
18. Prolonged antibiotic prescribing for surgical prophylaxis
19. Prevalence of antibiotic use following the WHO Essential Medicines List (EML) Access/Watch/Reserve (AWaRe) classification*

Ref: Sharland M, Pulcini C, Harbarth S, et al. Classifying antibiotics in the WHO Essential Medicines List for optimal use-be AWaRe. *Lancet Infect Dis* 2018; **18**(1): 18-20.

A long list …

Which quality indicator to choose in your hospital ?

- Feedback report
- Own analyses using the excel file with your own raw hospital data

Quality indicators for antibiotic use

	Africa		Latin AM		North AM		East-South Asia	
	N	%	N	%	N	%	N	%
Medical								
Reason in notes	1289	68.1	2119	89.1	1030	90.4	4853	66.3
Guidelines missing	794	42.0	448	18.8	177	15.5	1751	23.9
Guideline compliant	390	67.7	1062	78.2	608	83.7	2818	71.4
Stop/review date documented	437	23.1	1088	45.8	728	63.9	1771	24.2
Surgical								
Reason in notes	1298	66.4	1262	72.5	442	79.8	2592	51.5
Guidelines missing	1050	53.7	346	19.9	101	18.2	1389	27.6
Guideline compliant	272	54.3	638	67.0	237	69.1	1536	58.9
Stop/review date documented	550	28.1	679	39.0	357	64.4	1540	30.6
ICU								
Reason in notes	414	57.7	1377	88.4	390	90.1	1103	58.8
Guidelines missing	232	32.3	224	14.4	87	20.1	337	18.0
Guideline compliant	175	68.1	636	76.3	176	77.9	701	74.7
Stop/review date	120	16.7	726	46.6	284	65.6	534	28.4

Example of Feedback

Antibiotic quality indicators – adult wards (2017)

	Hospital		Country		Continent		Hospital type		Europe	
	N	%	N	%	N	%	N	%	N	%
Medical										
Reason in notes	74	96.1	281	66.3	649	61.6	401	66.8	3834	80.6
Guidelines missing	66	85.7	271	63.9	429	40.7	167	27.8	832	17.5
Guideline compliant	3	37.5	17	48.6	221	65.0	151	68.9	2232	74.2
Stop/review date documented	75	97.4	129	30.4	238	22.6	126	21.0	1650	34.7
Surgical										
Reason in notes	173	100.0	658	80.3	1015	65.7	744	66.3	2767	72.8
Guidelines missing	169	97.7	553	67.5	739	47.8	485	43.2	735	19.3
Guideline compliant	0	0.0	29	45.3	242	54.3	180	56.6	1619	67.8
Stop/review date documented	173	100.0	357	43.6	505	32.7	380	33.9	1552	40.9
ICU										
Reason in notes	4	100.0	20	76.9	139	42.2	61	33.2	878	69.0
Guidelines missing	4	100.0	6	23.1	71	21.6	40	21.7	361	28.4
Guideline compliant	0	0.0	2	66.7	100	69.9	60	75.9	459	77.5
Stop/review date documented	4	100.0	6	23.1	48	14.6	8	4.3	340	26.7

Need to develop antibiotic guidelines !

Antibiotic quality indicators by activity (medical, surgical, ICU) for patients admitted on adult wards receiving antibacterials for systemic use (ATC J01).
- For reason in notes and stop/review date documented: Count at antibacterial level.
- For guidelines missing: Count on NA (= no local guidelines for the specific indication) at patient level and diagnosis over total scores for this indicator.
- For guideline compliance: Count at patient level and diagnosis for compliance = yes or no only. For combination therapy with >1 antibiotic: if 1 antibiotic by diagnosis is not compliant, this combination therapy as a whole for this diagnosis will be counted as non-compliant.

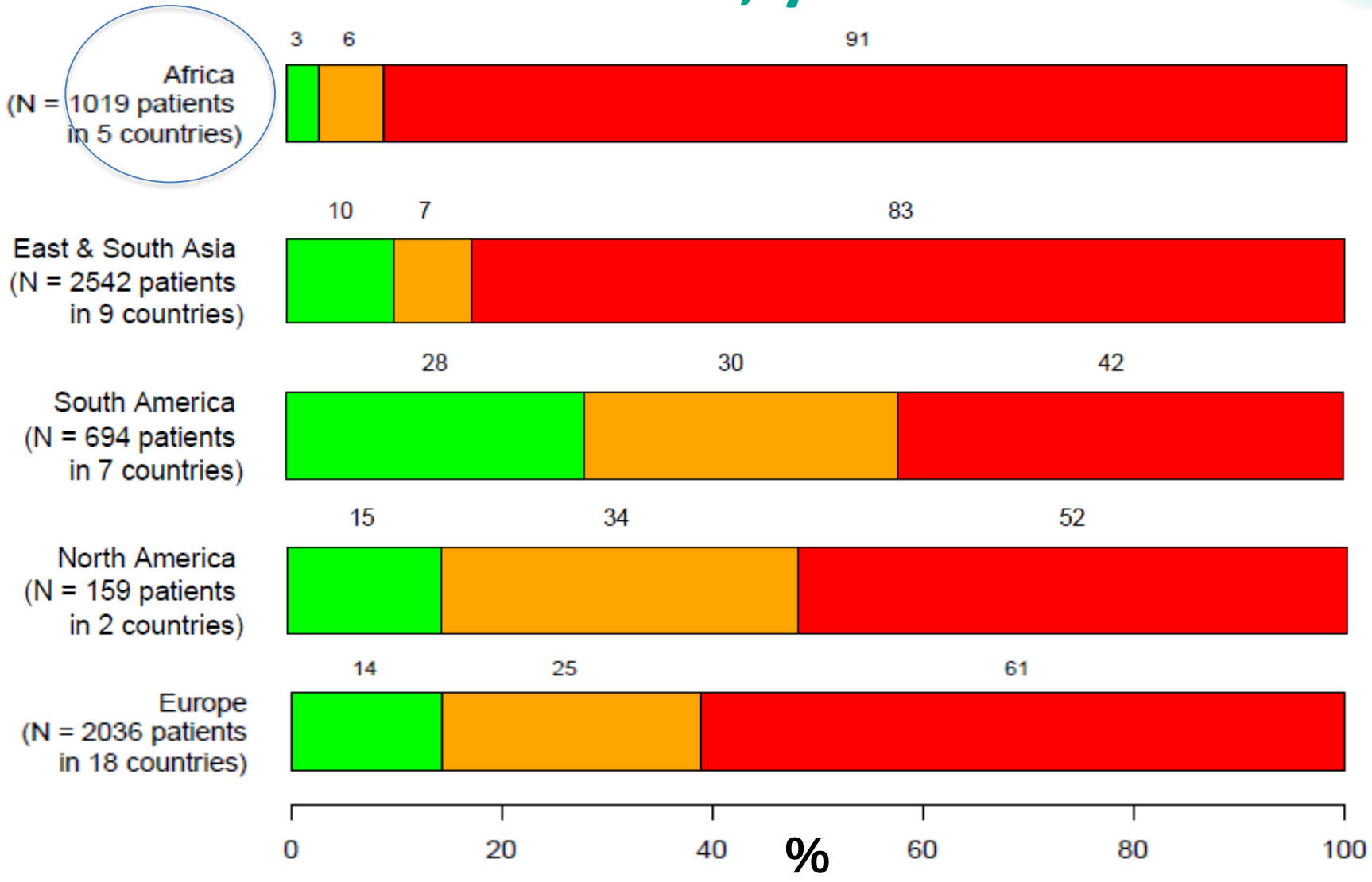
If there are less than three participating hospitals, results are not reported.

Targeted therapeutic antibiotic prescribing

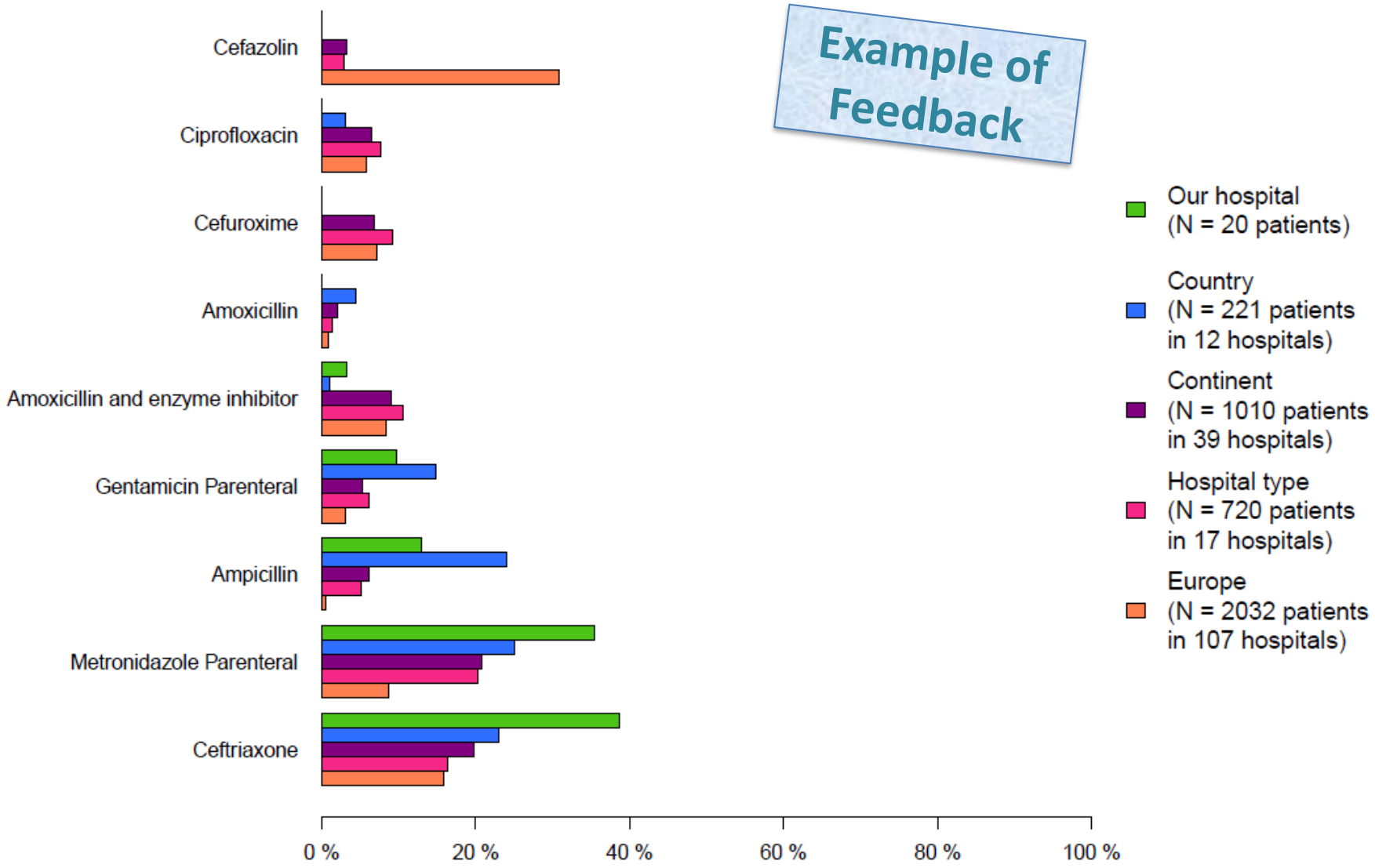
Example of Feedback

	Africa		Latin AM		North AM		East-South Asia	
	N	%	N	%	N	%	N	%
All patients								
Empiric	4325	94.7	4526	79.8	1526	72.6	12226	86.4
Targetted	240	5.3	1148	20.2	575	27.4	1927	13.6
Adults (>= 18 years)								
Empiric	2846	95.2	3854	78.7	1222	70.8	9858	85.5
Targetted	143	4.8	1040	21.3	505	29.2	1670	14.5
Children (< 18 years)								
Empiric	1198	94.3	558	85.8	251	81.8	2011	90.1
Targetted	72	5.7	92	14.2	56	18.2	222	9.9
Neonates (NICU)								
Empiric	281	91.8	114	87.7	53	79.1	357	91.1
Targetted	25	8.2	16	12.3	14	20.9	35	8.9

Prolonged surgical prophylaxis is very common in Africa, year 2017



Top 5 most frequently used antibiotics for surgical prophylaxis in adults and children (2017)



Top 5 most prescribed antibacterials for systemic use (ATC code J01) for surgical prophylaxis use at hospital level, supplemented with the most prescribed antibiotics at country, continent and hospital type level if they do not fall within the top 5 of the hospital. Selection on indication = SP; All patients are included with exception of patients admitted on NMW and NICU.

National initiatives derived from ESAC-PPS Northern Ireland

BJCP British Journal of Clinical Pharmacology

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A point prevalence survey of antibiotic prescriptions: benchmarking and patterns of use

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SHORT REPORT

A point prevalence survey of antibiotic use in four acute-care teaching hospitals utilizing the European Surveillance of Antimicrobial Consumption (ESAC) audit tool

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- Comparison:
  - between hospitals
  - 2008-2009 PPS

Public Health Agency strategic action plan (2012) recommended repeat PPS

- Track progress in achieving the objectives of ensuring better patient outcomes

National initiatives derived from ESAC-PPS Scotland – set targets

Malcolm *et al. Antimicrobial Resistance and Infection Control* 2013, **2**:3
http://www.aricjournal.com/content/2/1/3

ANTIMICROBIAL RESISTANCE & INFECTION CONTROL

RESEARCH Open Access

From intermittent antibiotic point prevalence surveys to quality improvement: experience in Scottish hospitals

William Malcolm[1*], Dilip Nathwani[2], Peter Davey[3], Tracey Cromwell[4], Andrea Patton[5], Jacqueline Reilly[1], Shona Cairns[1] and Marion Bennie[4,6]

	TARGETS
POLICY COMPLIANCE (2009 baseline-PPS) **Antibiotic choice compliant with local policy measured in acute admissions wards** **(Mean result 76% compliance)**	**≥95% National compliance**
SURGICAL PROPHYLAXIS (2009 baseline-PPS) **Duration <24 hours in several surgical specialties** **(Mean result 69% <24h while 48% in EU)**	**≥95% National compliance with single dose**

National initiatives derived from ESAC-PPS Scotland, timeline

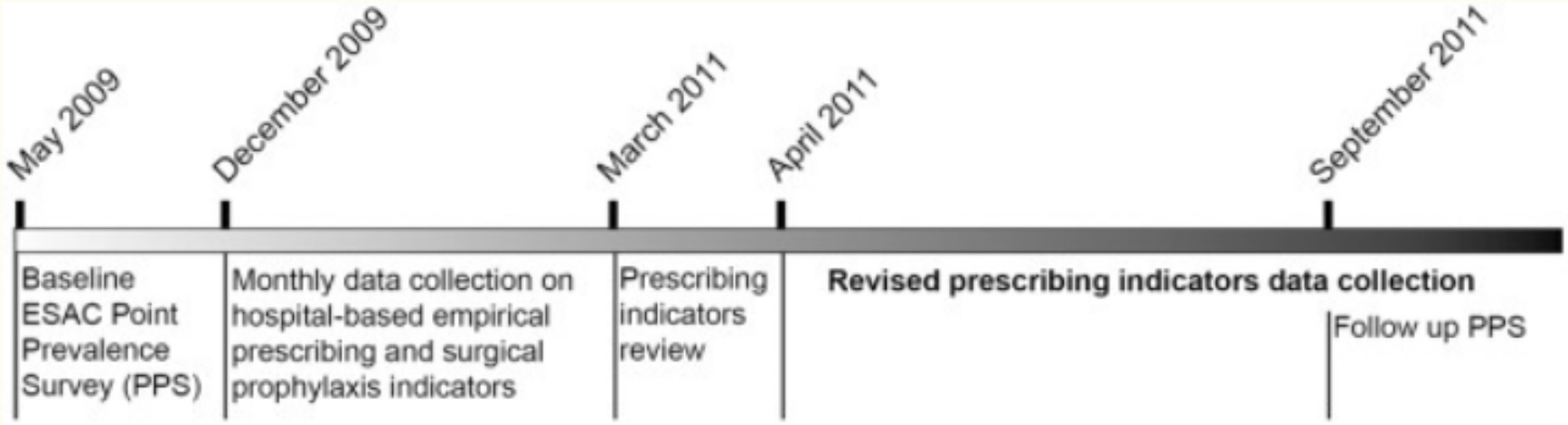


Figure 1

Time line showing progress from Point Prevalence Survey to Continuous Quality improvement.

National initiatives derived from ESAC-PPS
Scotland, policy compliant, indication documented

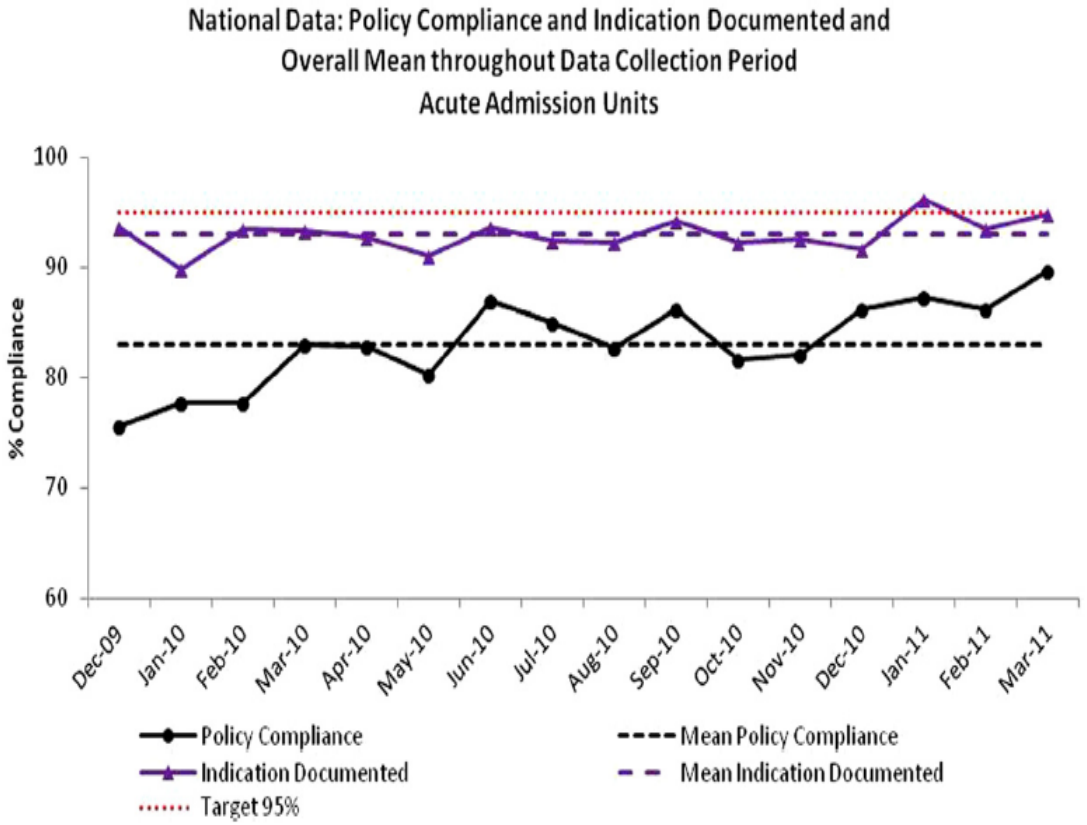


Figure 2 Hospital empiric prescribing: National compliance with Indication Documented and Policy Compliant (antibiotic choice) and overall mean, December 2009-March 2011.

Malcolm *et al. Antimicrobial Resistance and Infection Control* 2013, **2**:3

National initiatives derived from ESAC-PPS Scotland, surgical prophylaxis

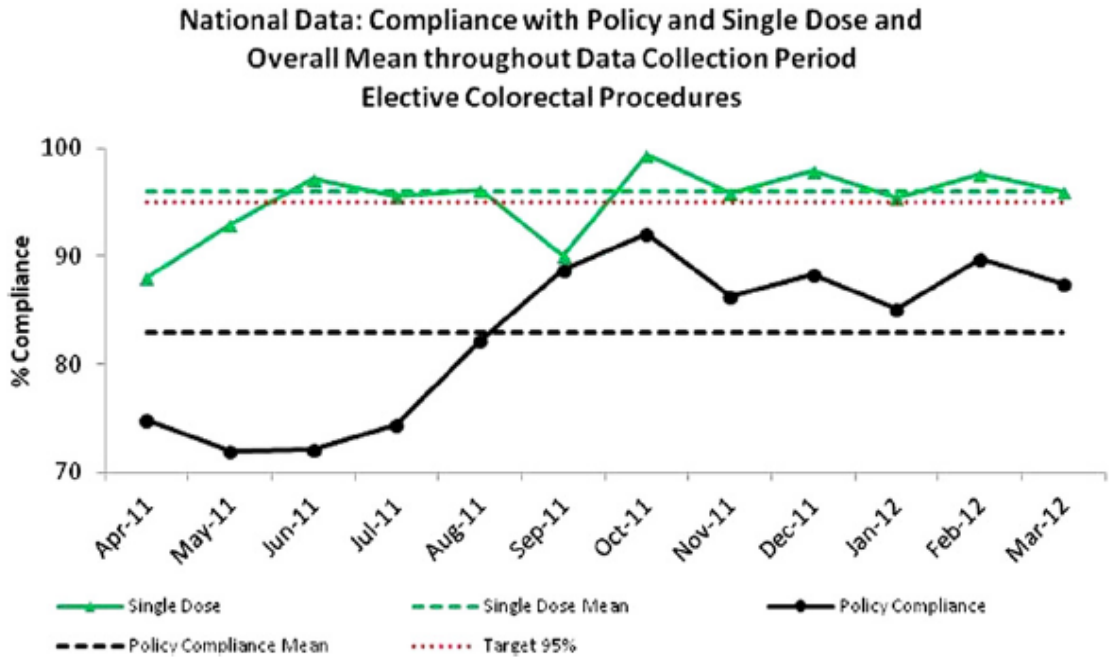


Figure 5 Surgical prophylaxis: National compliance with Single dose and Policy Compliance in elective colorectal procedures and overall mean, April 2011-March 2012.

Implementation of quality indicators of antibiotic use:

- Promotion of local policies through clinical engagement and staff education
- Local feedback of results monthly and national reporting every 3 months

Malcolm *et al. Antimicrobial Resistance and Infection Control* 2013, **2**:3

Lessons learned from the past ?

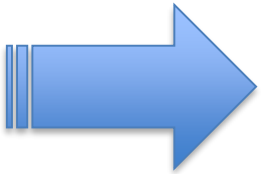
- Setting measurable and achievable targets for reducing antibiotic consumption is essential for securing commitment and for raising awareness
- These targets can be very misleading due to the complexity of the measurement units:
  - DDDs unreliable in countries where the number of units per package and the amount of active substance per unit increased over time for antibiotics that are proportionally frequently prescribed
  - Standard units suffer similar problems as DDD
- Coordinated and harmonized approach is needed, locally, nationally and globally
- Exchange of experiences between countries is essential

PPS methodology is easy and practical

- Stimulates local networking
- Allows identification of quantifiable outcome measures and high-impact targets for quality improvement (Antimicrobial Stewardship Programs)
- Tool for assessing interventions to improve antibiotic prescribing in hospitals – repeated PPS

What makes the network work?

- Shared goal
- Bottom up network with highly engaged members
- Relevant for local, national and regional public health policies
- Ownership
- Trust
- Transparency
- Flexibility and solidarity
- Accountability
- Rigorous & scientific
- Personal relationships



sustained awareness


If you want to go Fast, go alone.
If you want to go Far, go together.