

An aerial photograph of a city, likely Breda, showing a dense urban landscape with numerous buildings and a large hospital complex in the foreground. The hospital complex features several large, modern buildings with flat roofs and a parking lot filled with cars. The surrounding city has a mix of older and newer buildings, with a prominent church spire visible in the background.

Early switch to oral therapy and dynamics of
resistance in hospitalised patients

Ina Willemsen
Amphia hospital BREDA

How to use antibiotics “better”:

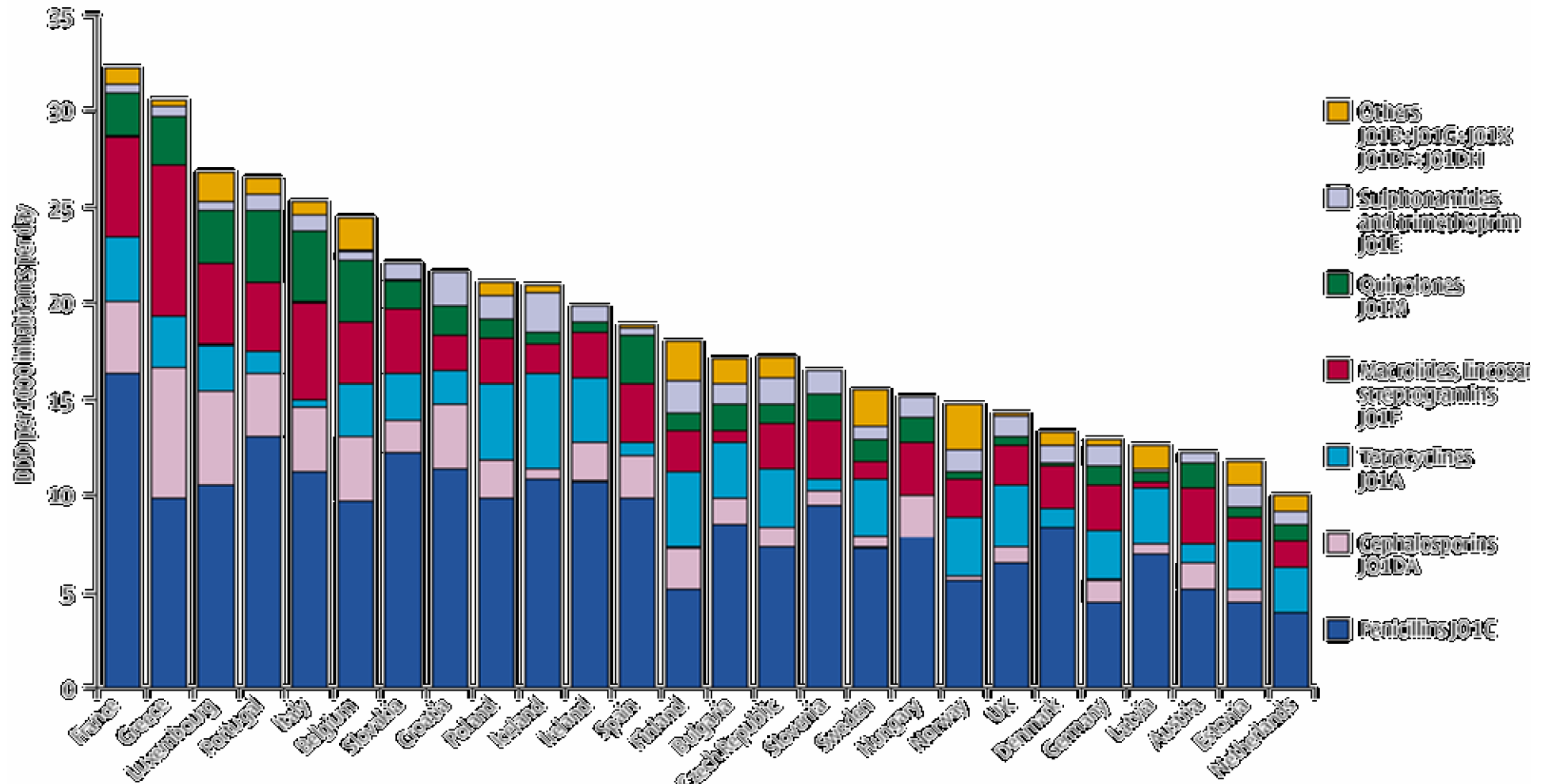
1. How do we use antibiotics

- to determine the appropriateness of antimicrobial therapy
- to identify determinants for inappropriate use

2. Interventions to use antibiotics “better”

3. How to measure the effects of the interventions

How to use antibiotics “better”:



ESAC Project Group. Lancet 2005;365:579-587

Appropriateness of Antimicrobial Therapy Measured by Repeated Prevalence Surveys[∇]

Ina Willemsen,¹ Anneke Groenhuijzen,² Diana Bogaers,¹ Arie Stuurman,³
Peter van Keulen,¹ and Jan Kluytmans^{1*}

6 surveys (2001 – 2004)

- total 4105 patients**
- average of 684 patients per survey**
- 46% male**
- infection on admission: 16,7%**
- at least 1 nosocomial infection: 8,7%**

Use of antimicrobial therapy (AMT):

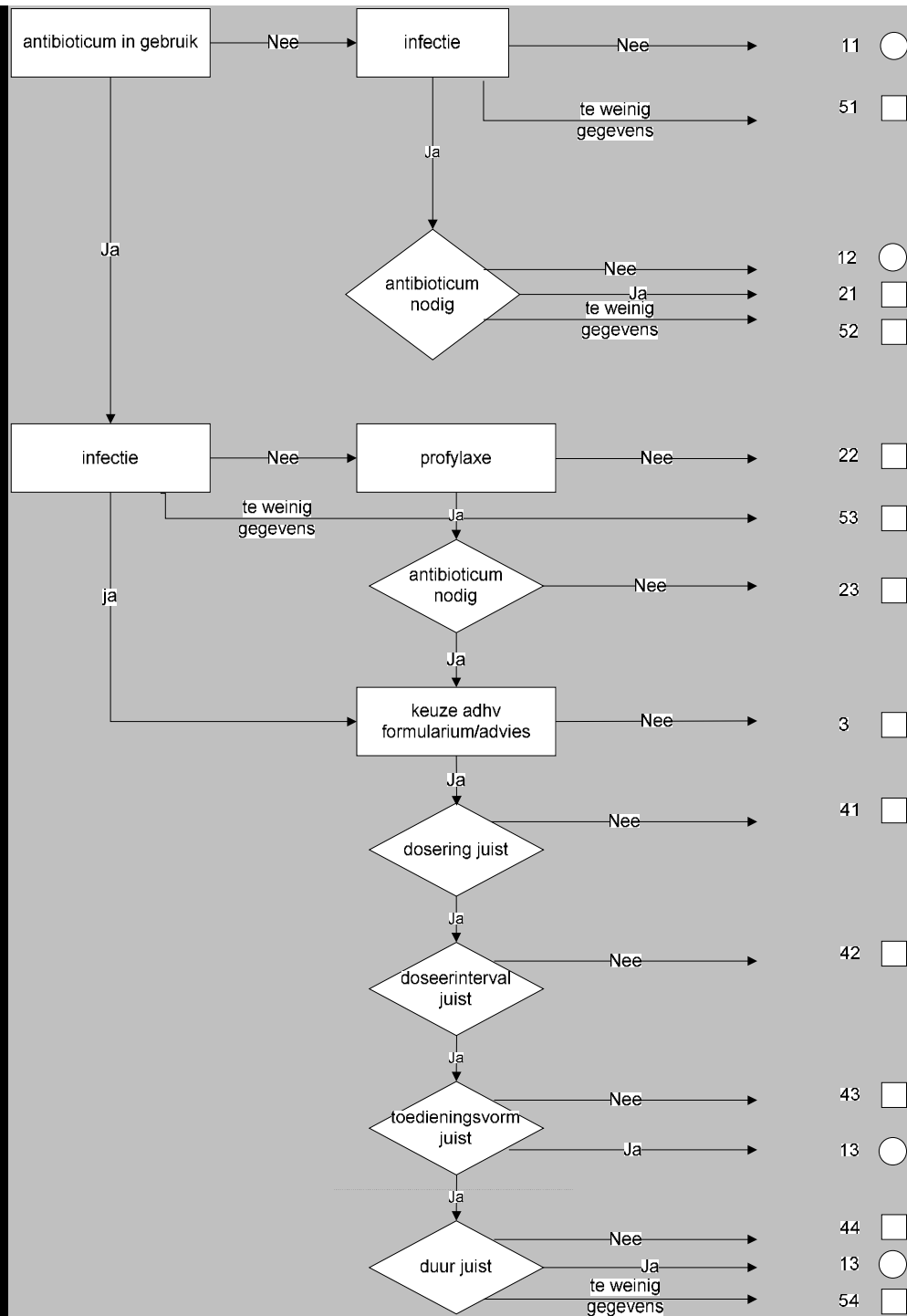
Total 4105 patients:

- 938 (22,9%) patients using AMT

of those 938 patients:

- 48 (5,1%) were treated with 2 antibiotics

**- 10 (1,1%) were treated with 3 or more
antibiotics**



-Correct decision:
for treating and for not treating

-Incorrect decision:
for treating and for not treating antibiotics

-Incorrect choice

-Incorrect use

-Insufficient information

Appropriateness (AP) of use:

938 patients on antimicrobial therapy:

- 351 (37,2%) were treated inappropriate

of those 351 patients:

**- 123 unjustified antimicrobial therapy
(3% of total group)**

- 140 incorrect choice of antibiotics

- 88 correct choice but used incorrectly

- 71 (1,7%) insufficient information

Inappropriately (IA) not treated:

25 patients (0,6%) did not receive antimicrobial therapy although this was indicated.

6 patients started therapy within one week

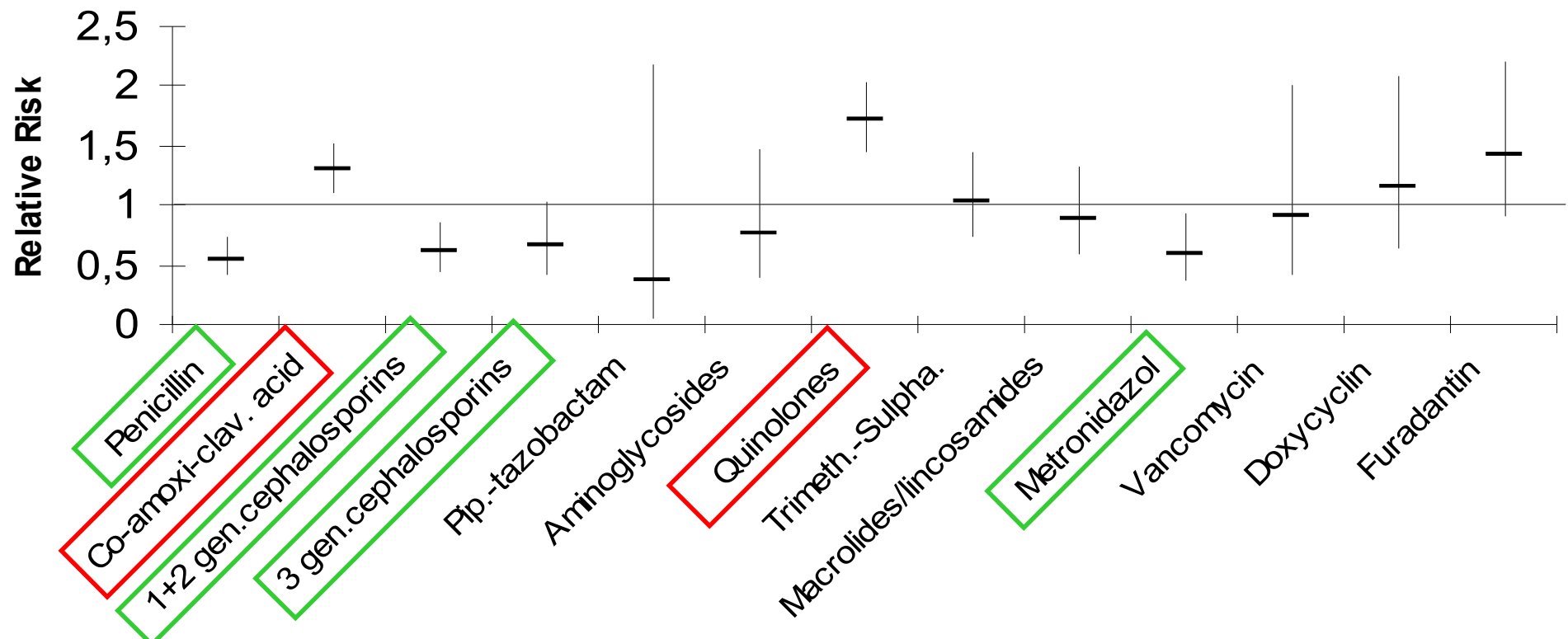
7 patients were discharged from the hospital within one week

4 patients were deliberately not treated

8 patients, not clear if therapy was started

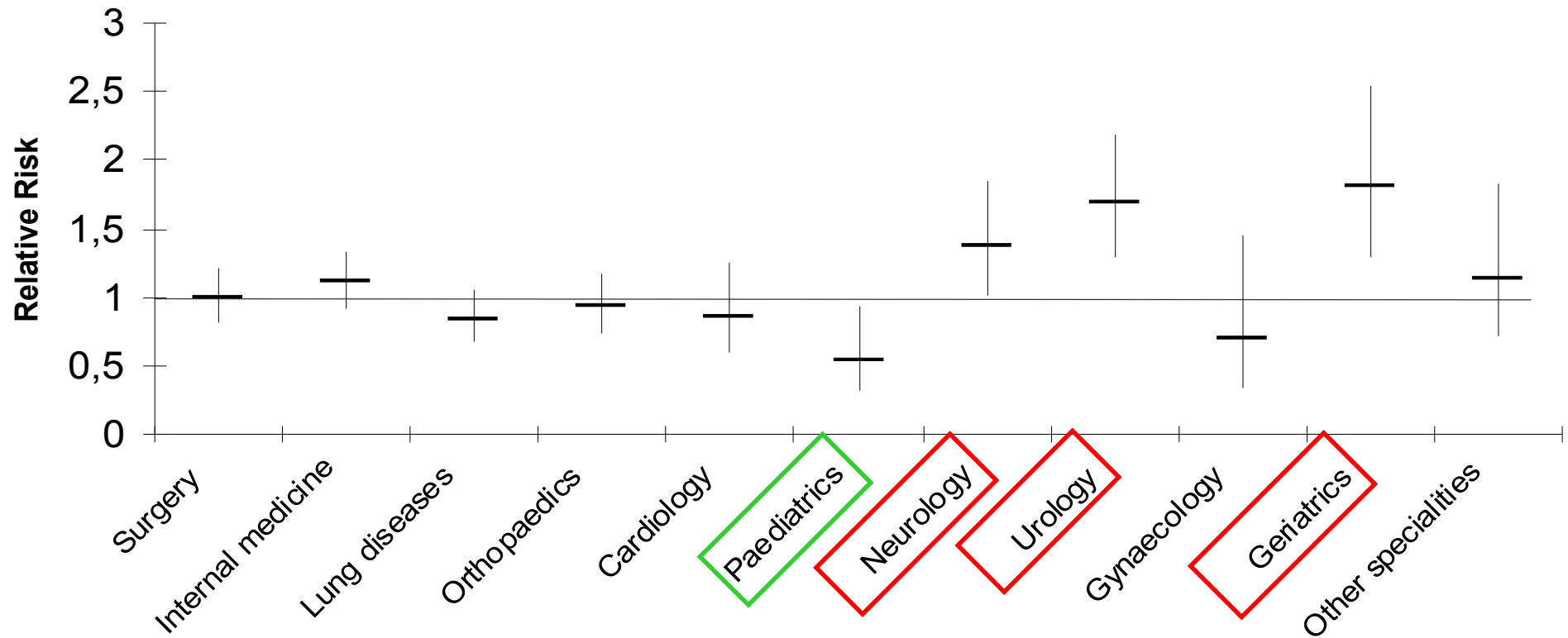
Determinants for IA use: antibiotic groups

Relative risk for inappropriate use of antimicrobial therapy by antibiotic group



Determinants for IA: by medical speciality

Relative risk for inappropriate use by medical speciality



univariate analyses:

Quinolones
Co-amoxicillin-clav. acid
Urology
Neurology
Geriatrics
Older age
Nosocomial infection

multivariate analyses:

Quinolones

When patients on orthopaedic-surgery, urology or neurology were treated with Quinolones more than 75% was considered inappropriate !

Conclusions:

- **The appropriateness of AMT can be determined in prevalence surveys**
- **It provides an estimate of the proportion of patients that did not receive AMT although this was indicated**

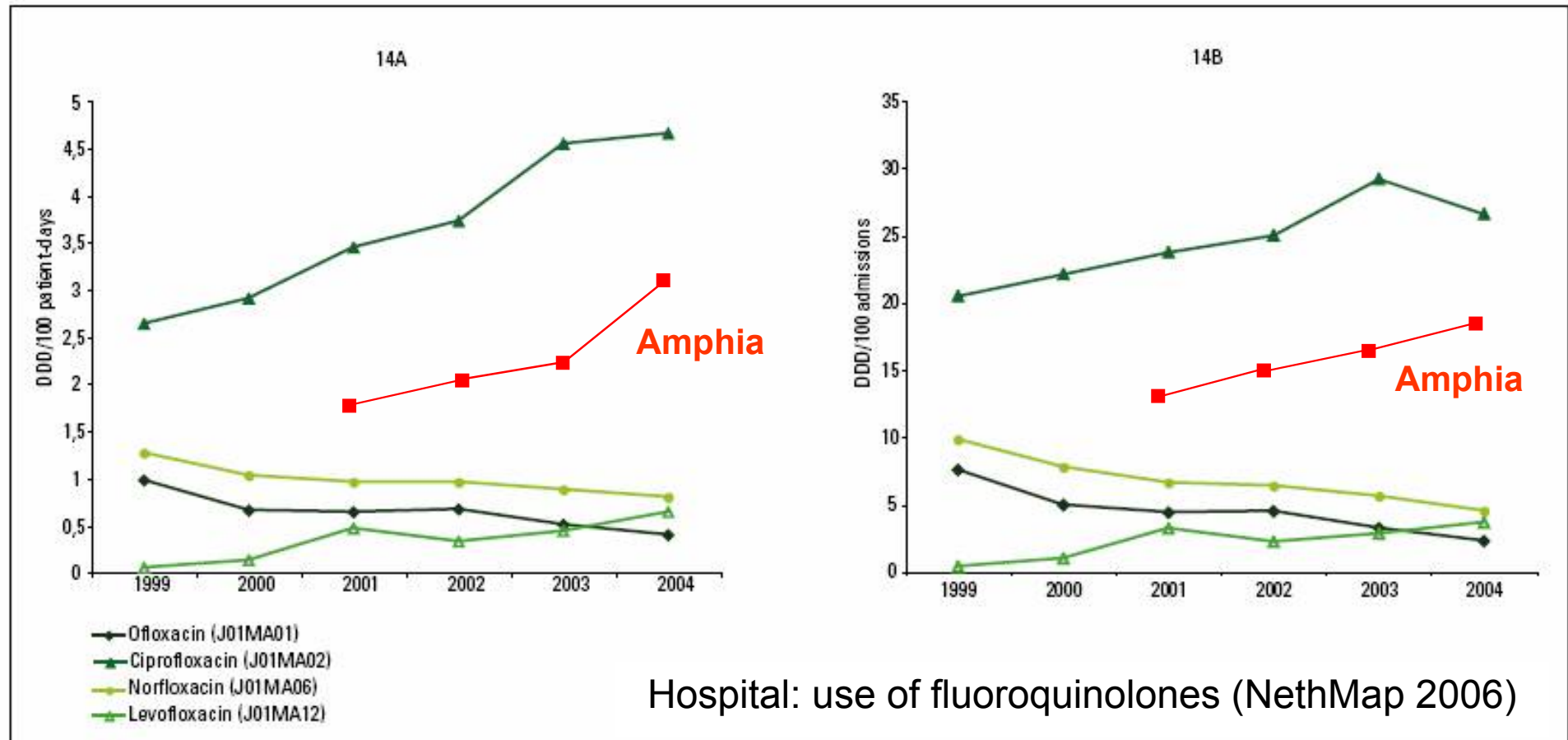
Conclusions:

- **Determinants for inappropriate use can be identified, which offers opportunities for targeted interventions**
- **Repeated prevalence surveys can be used to measure the effect of the interventions**

Interventions:

- **Ciprofloxacin is the only independent determinant for inappropriate use**

Figure 14A/B. Use of fluoroquinolones in hospitals, 1999-2004 (Source: SWAB).



Resistance in E.coli from clinical patients over time:

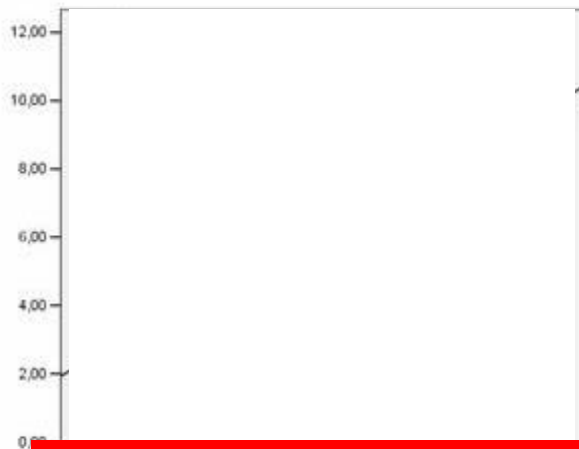
Period: 2003-2006

Ciprofloxacin

Amoxicillin-clavulanic acid

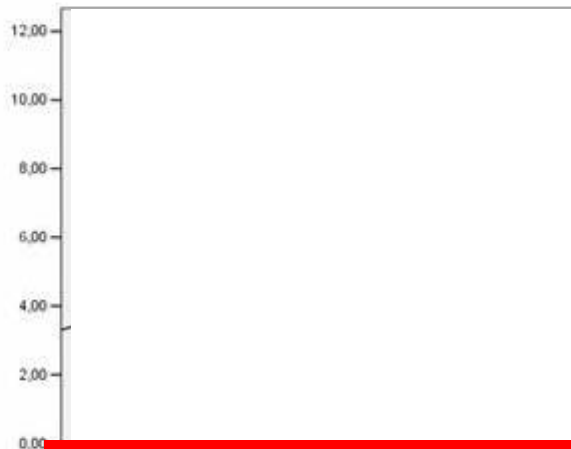
1st&2th gen. cephalosporines

% resistance



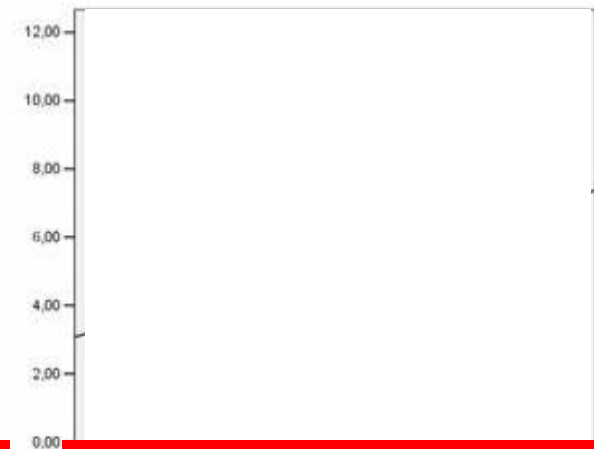
2.6% ↑ per year

% resistance



1.5% ↑ per year

% resistance



1.9% ↑ per year

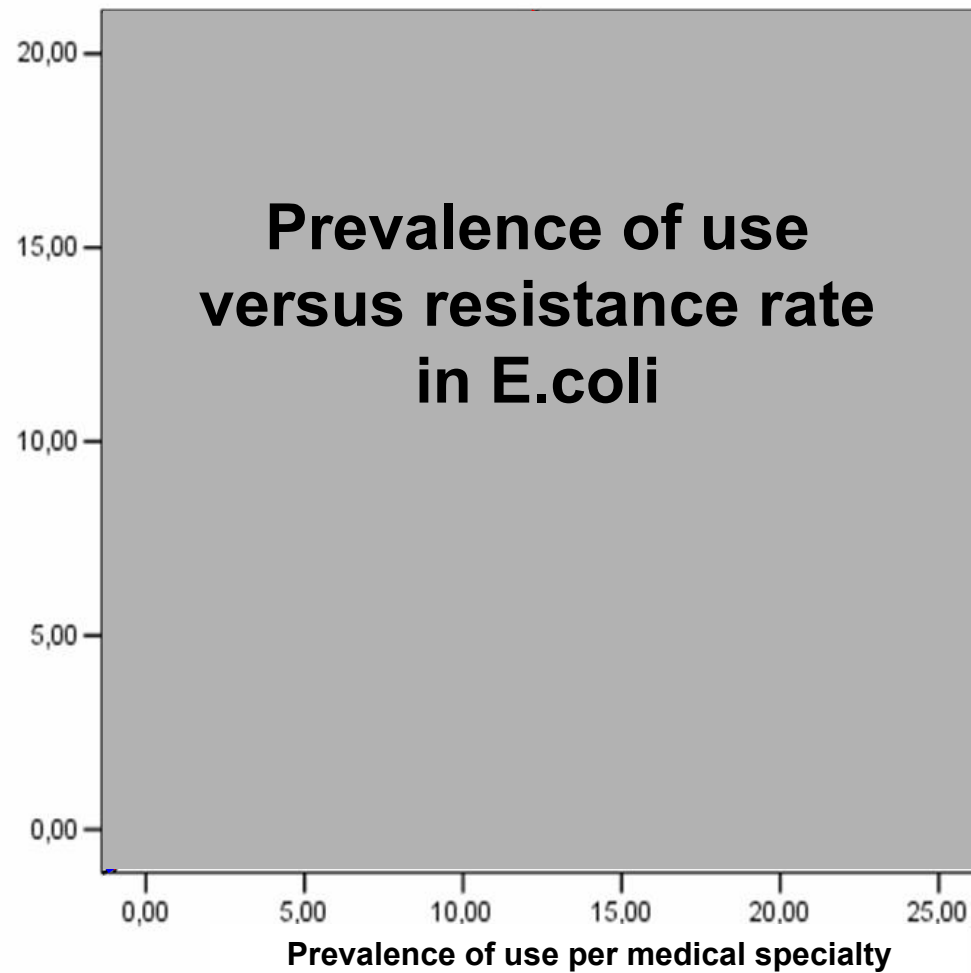
± 3%

± 10%

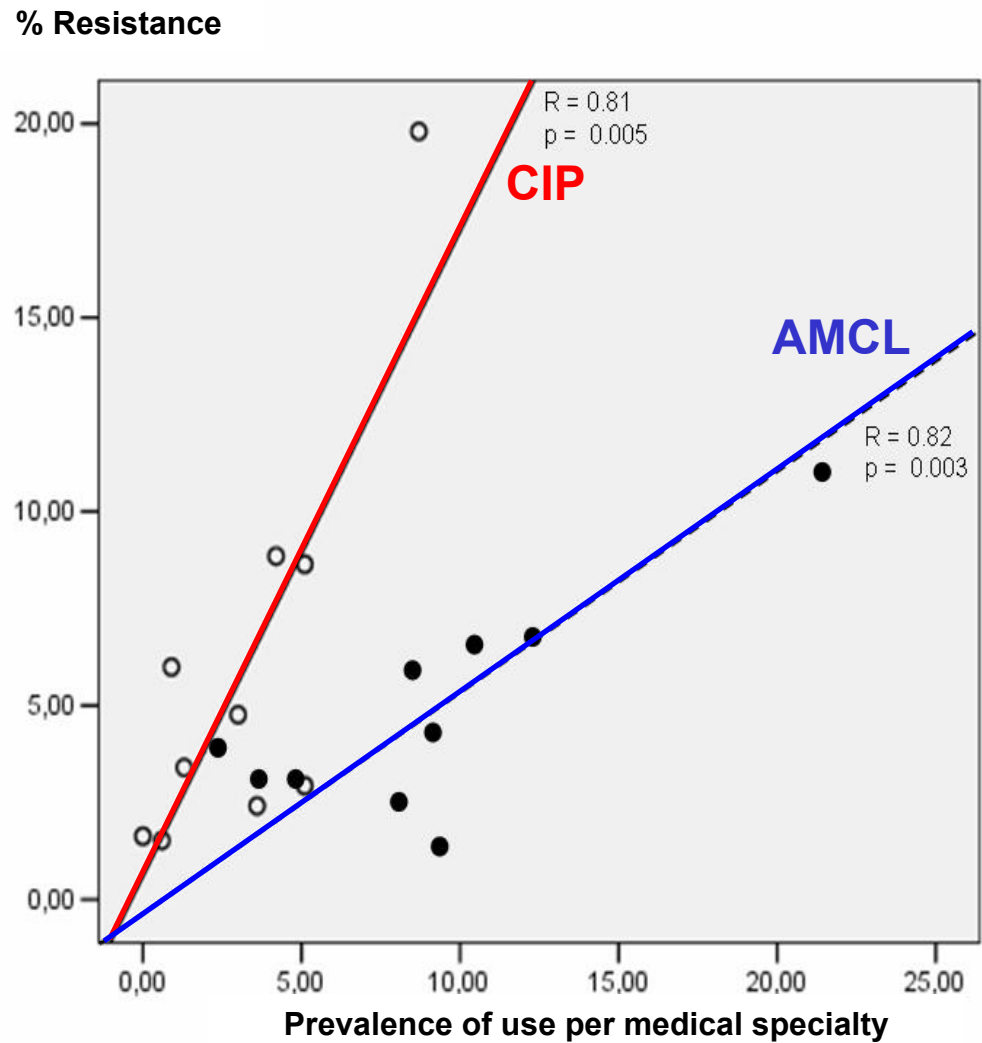
± 4%

Relation between use and resistance in different medical specialties:

% Resistance



Relation between use and resistance in different medical specialties:



Intervention 1:

Ciprofloxacin switch project

Target:

- 50% reduction of ciprofloxacin i.v. use
- reduction in costs

Method *Cipro Switch*:

Start intervention:

- Januari 2006

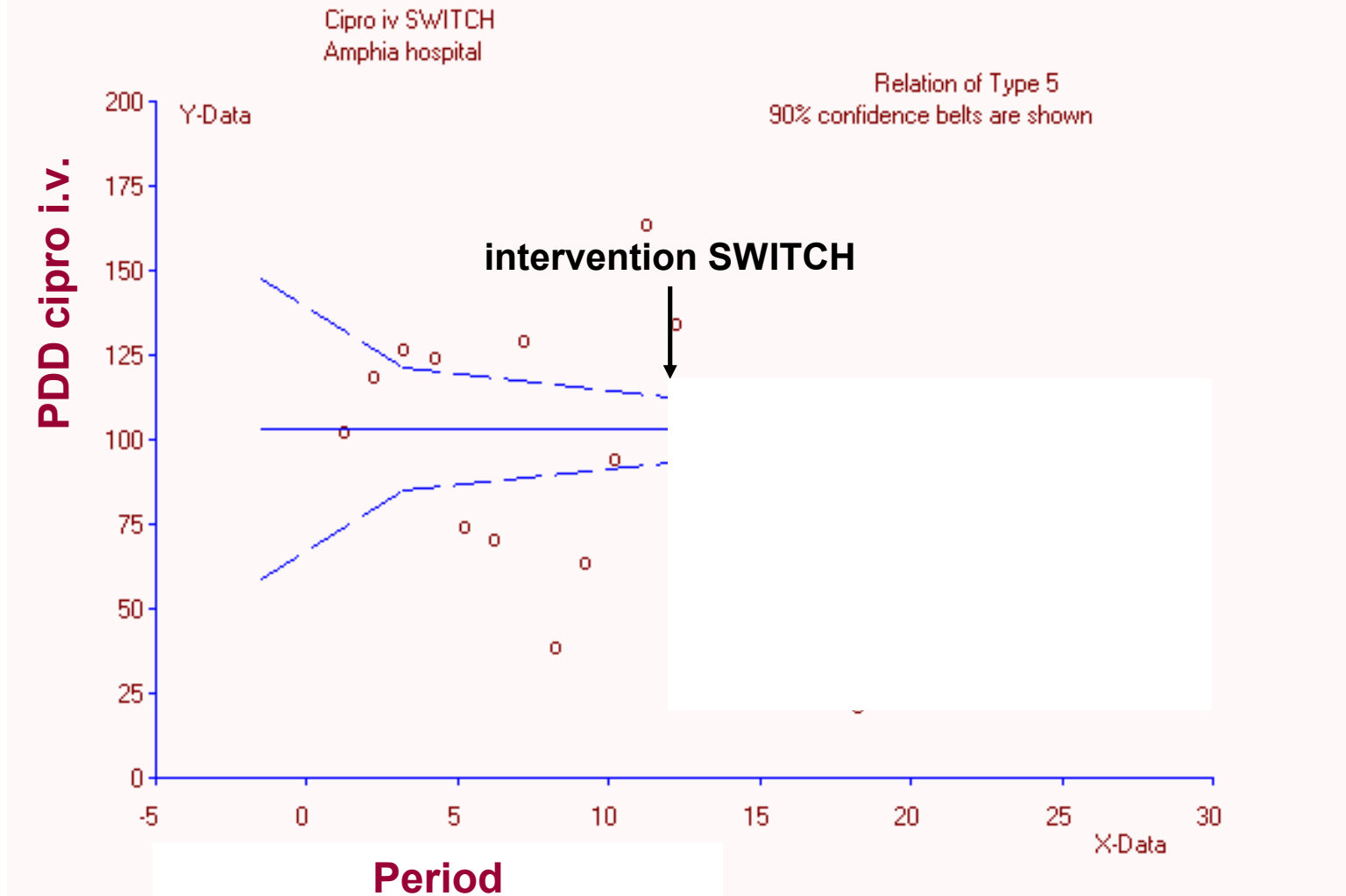
Three criteria:

1. patient should be able to take oral medication
2. No switch when patients were hemodynamically unstable
 - systolic bloodpressure <100 mmHg
 - pulse >100 beats/min
3. No switch when patients were given parenteral nutrition

Method *Cipro Switch*:

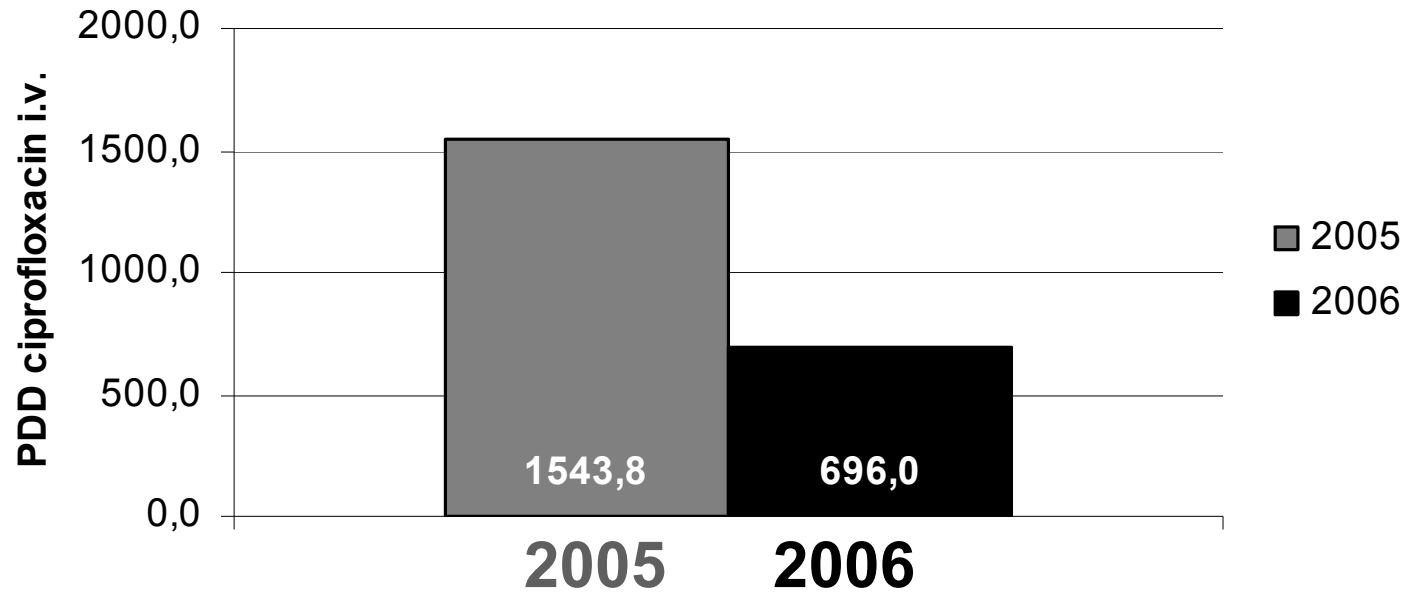
- Check cipro i.v. prescriptions by *pharmacy assistant*
- Contact with *attending physician*
- Complicated cases are discussed with *consultant microbiologist*

How to measure?



Cost saving?

use of ciprofloxacin i.v. in 2005 and 2006



Costs: € 106.290 € 63.644

Costsaving: € 42.646

Intervention 2:

**Optimalisation of total use of ciprofloxacin
(i.v. and oral)**

Target:

- 33% reduction from 3 to 2 PDD/100 patientdays

Method *Cipro* reduction:

Start intervention:

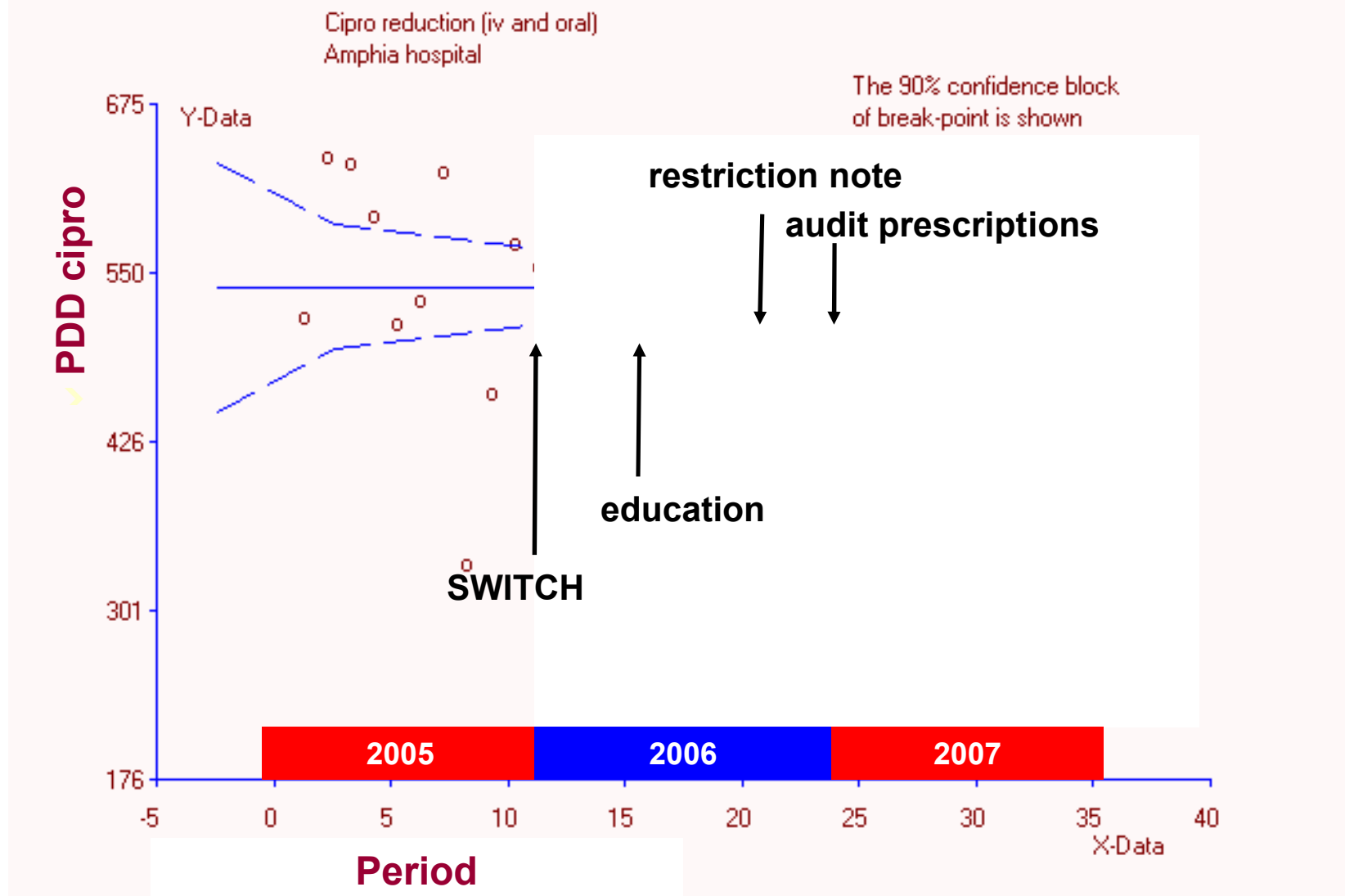
- Januari 2007

1. Education per specialism
2. Ciprofloxacin is noted as a restricted antibiotic

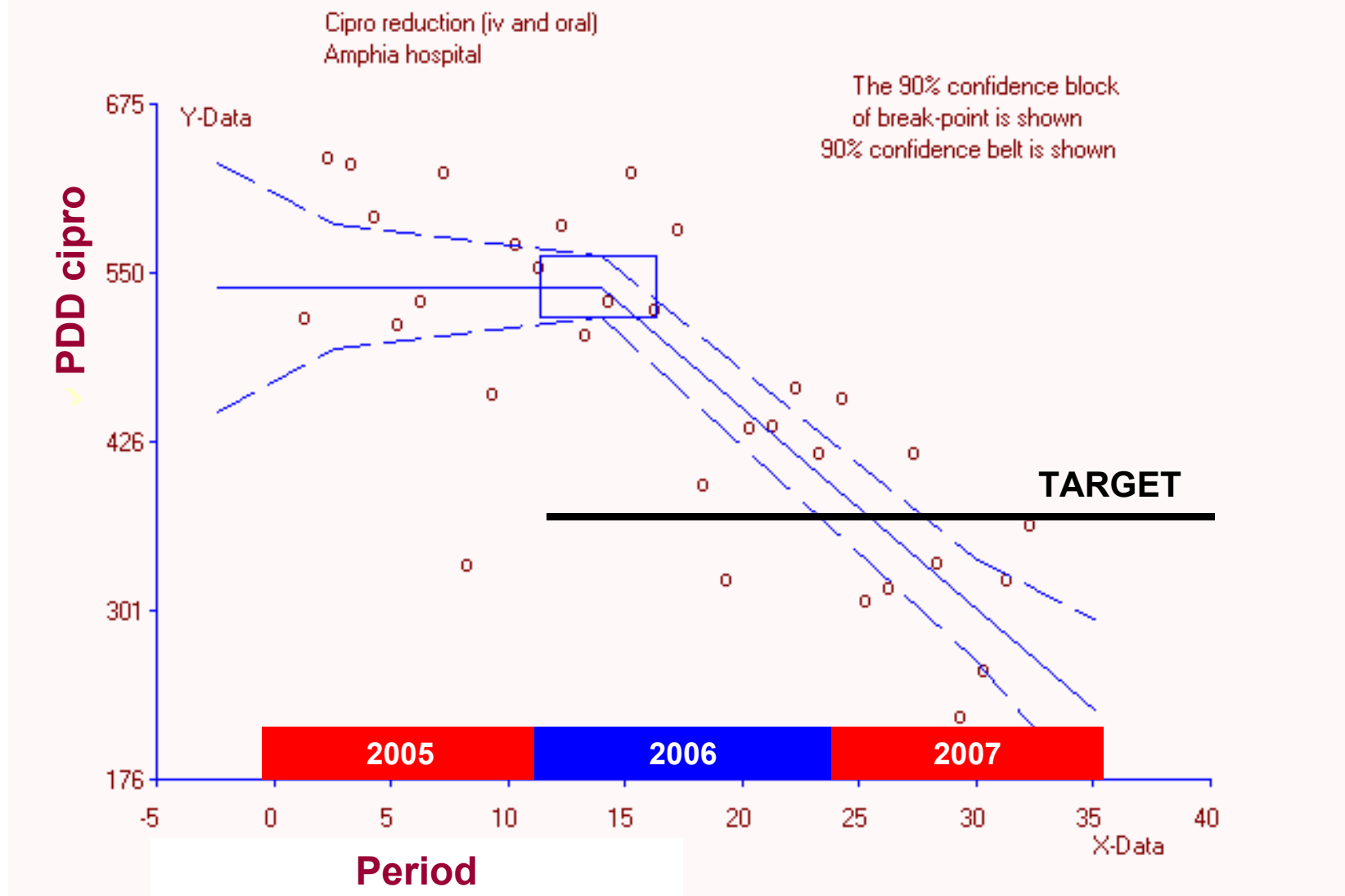
Ciprofloxacin is in het antibiotica beleid van het Amphia ziekenhuis een reserve antibioticum waarmee terughoudend dient te worden omgegaan.

3. Audit of all ciprofloxacin prescriptions by consultant microbiologist

How to measure?



How to measure?



Conclusies (1):

- **There are large unexplained variations in the use of antibiotics between hospitals in the Netherlands**
- **In a hospital with a relative low use of antibiotics, 37% of the use was considered incorrect**
- **The use of ciprofloxacin was a independent and significant determinant for incorrect use**

Conclusies (2):

- **A significant more rapid development of resistance to ciprofloxacin than to the beta-lactams**
- **Interventions to improve the use of ciprofloxacin were succesfull and are associated with considereble costsavings**

If you want to do better

Just Do It...

