

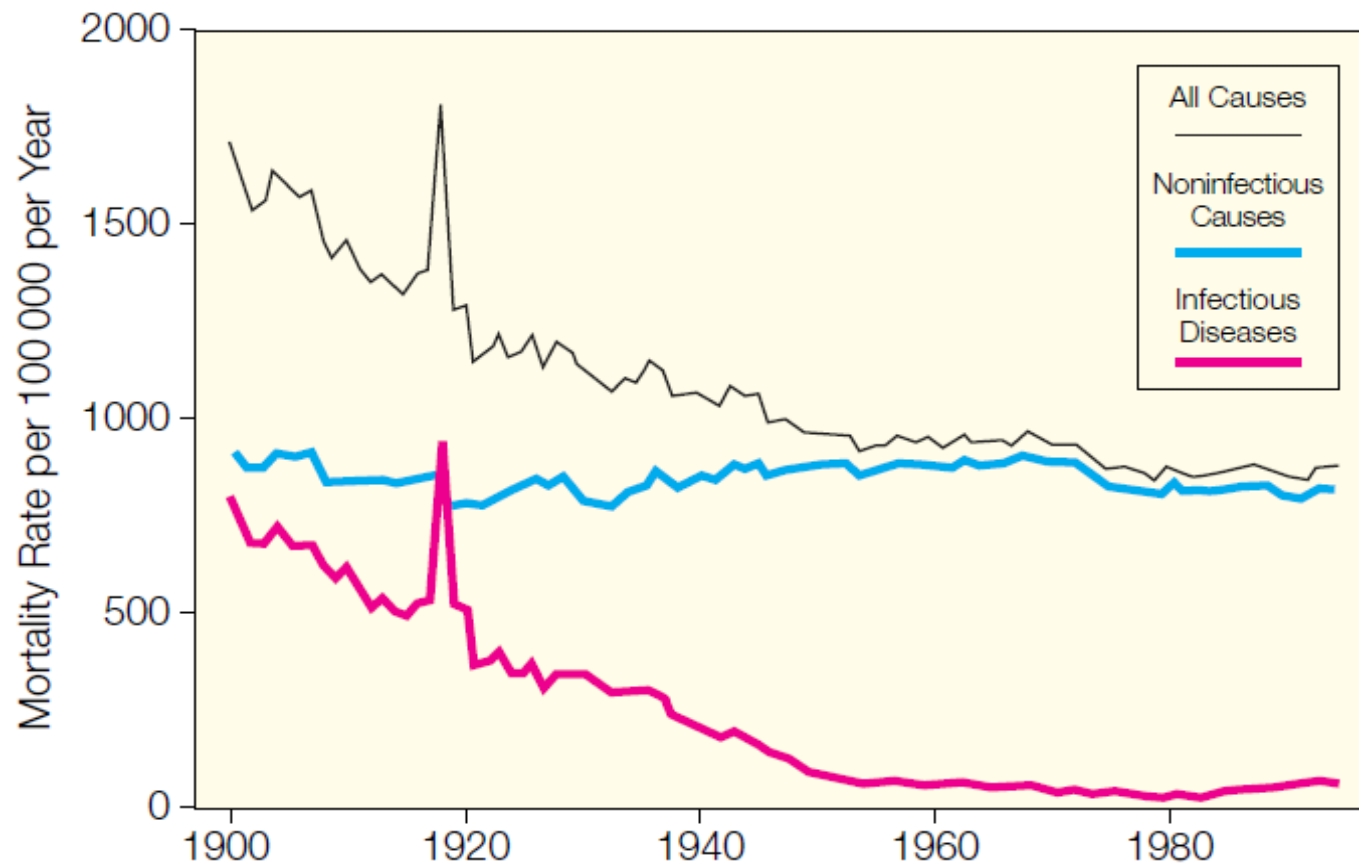
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# What can human medicine do to control antibiotic resistance?

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# Mortality rate USA 1900-2000. Armstrong, JAMA 1999;281:61-6

**Figure 2.** Crude Mortality Rates for All Causes, Noninfectious Causes, and Infectious Diseases



# 1586 tilfeller av pneumokokk-pneumoni 1929-35 i Boston (Tilghman RC, Finland M. Arch Intern Med, 1937)

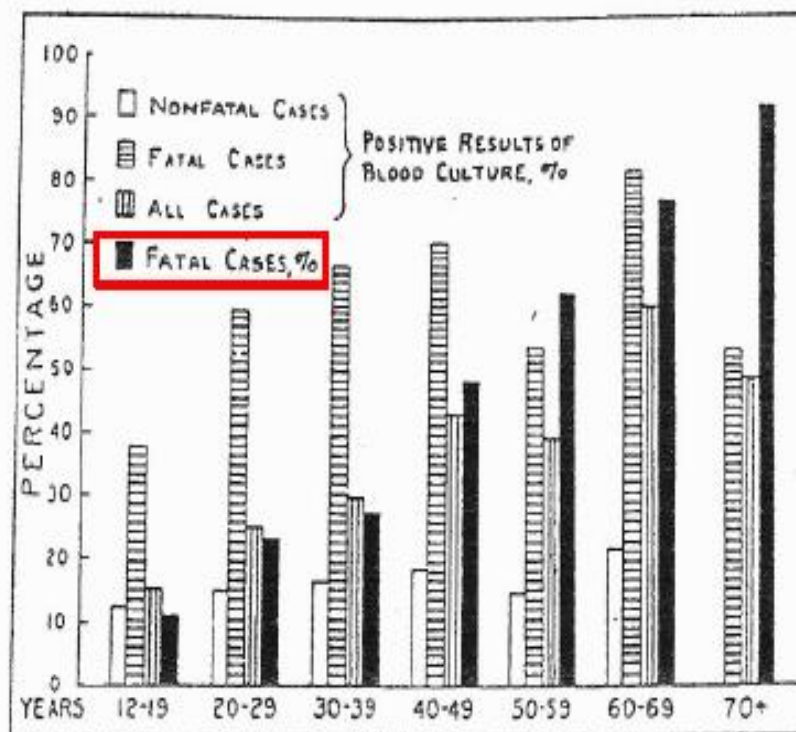
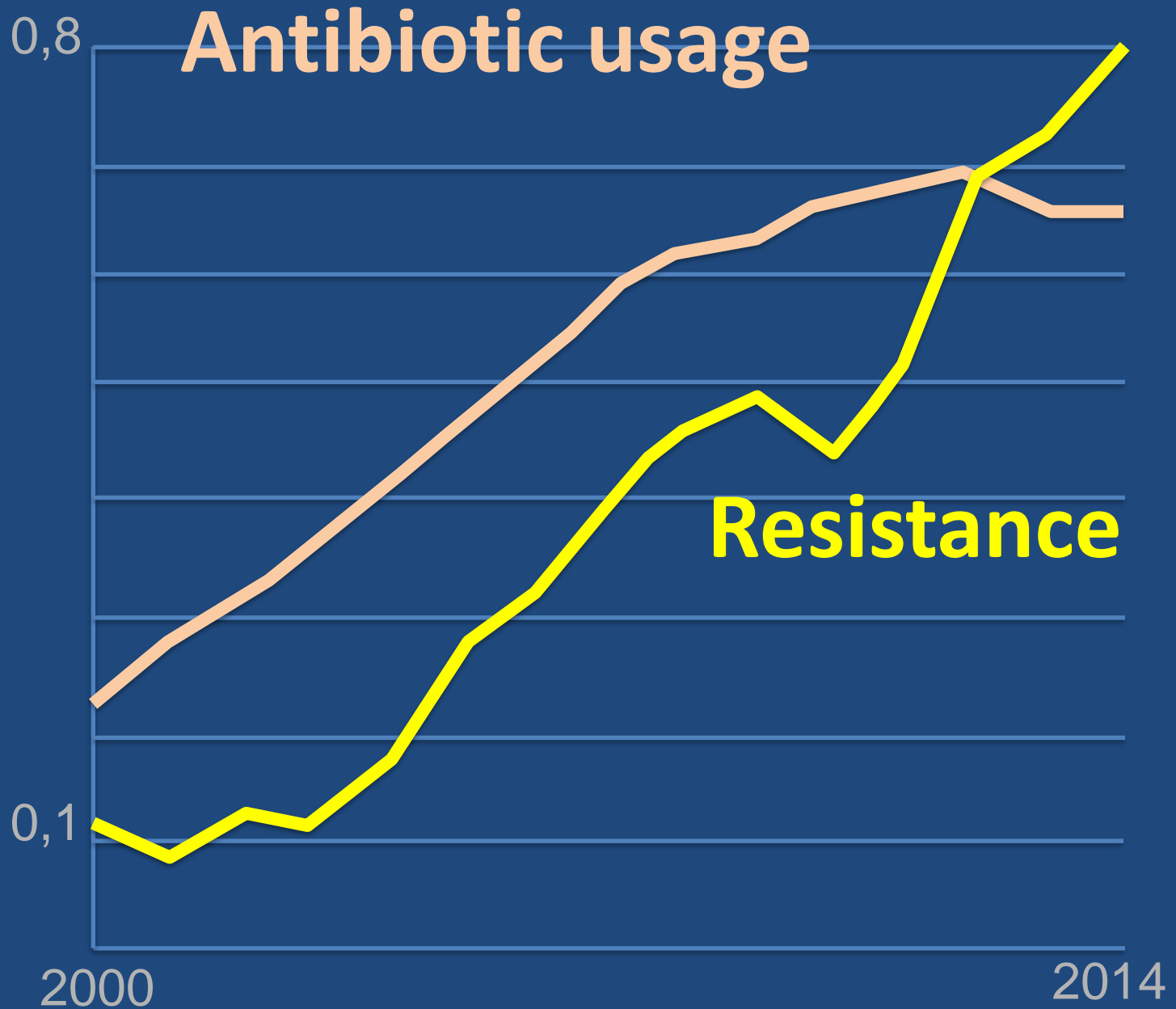


Chart 1.—Comparison of the incidence of bacteremia and the mortality for various age groups.

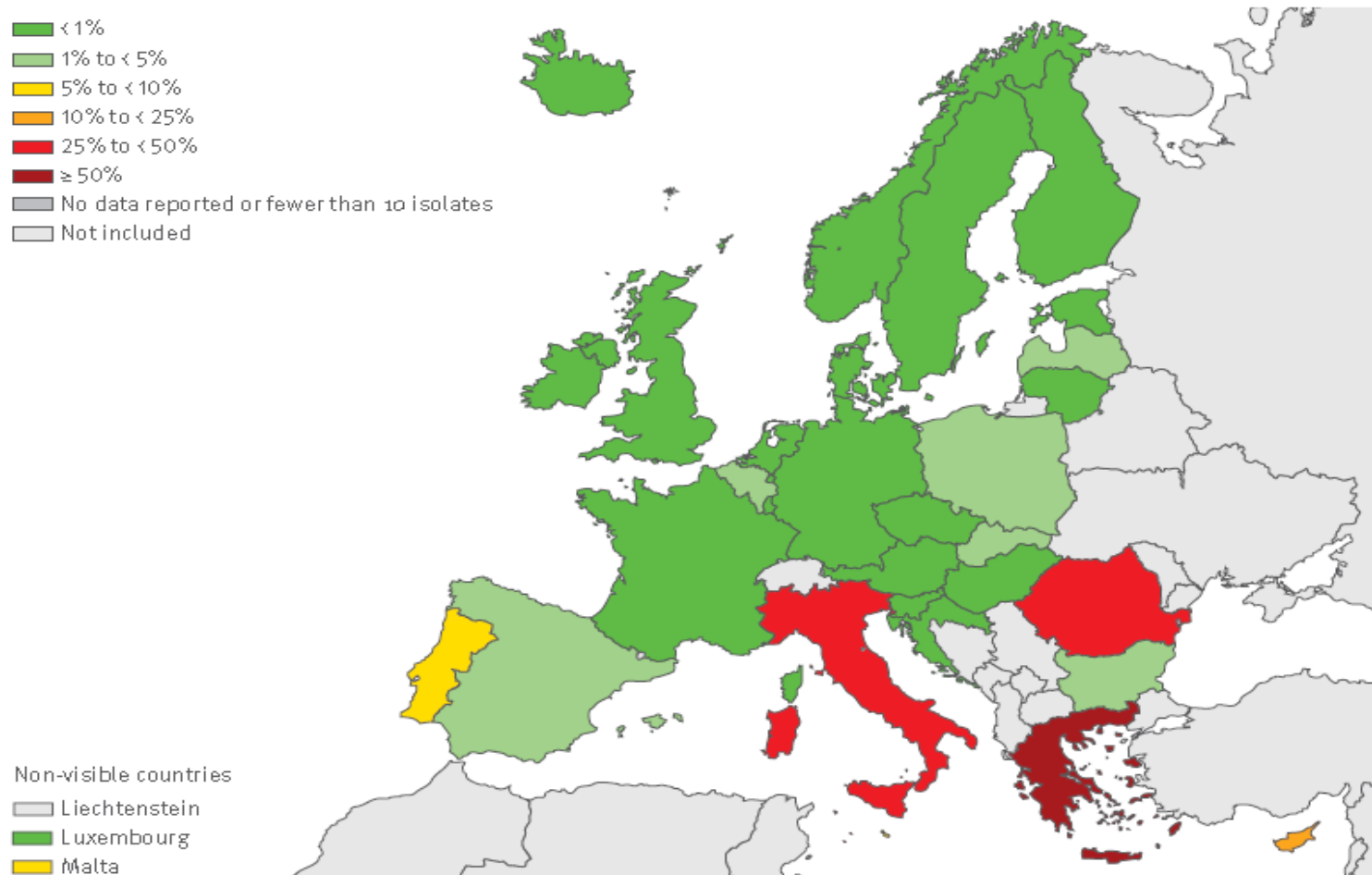
# Antibiotics & resistance

- Antibiotics kill bacteria (not virus)
- Antibiotic resistance (AMR) means that antibiotics can not kill the bacteria
- According to WHO AMR is one of the greatest threats to public health



# We are already in the post-antibiotic era in Europe

**Figure 3.11.** *Klebsiella pneumoniae*. Percentage (%) of Invasive Isolates with resistance to carbapenems, EU/EEA countries, 2016



# We can reduce antimicrobial resistance

- Avoid wrong and unnessecary use
- Right drug, dose, and duration
- Vaccinate
- Making more accurate and rapid diagnoses
- Prohibit AB as growth promoters in husbandry

# Antibiotics in agriculture

- Animals: 70% prophylaxis
  - frequent use
  - low dosages
  - low hygiene
  - crowding
  - transportation
- 43 mill AB doses/day
- Illegal use widespread

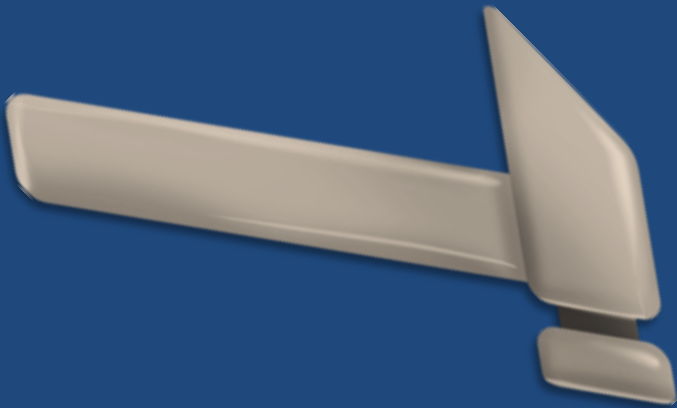


# Dear president Trump



# What happens when we give antibiotics?

- We can kill the pathogenic bacteriae
- But, simultaneously we select resistant bacteria from the normal bacterial flora



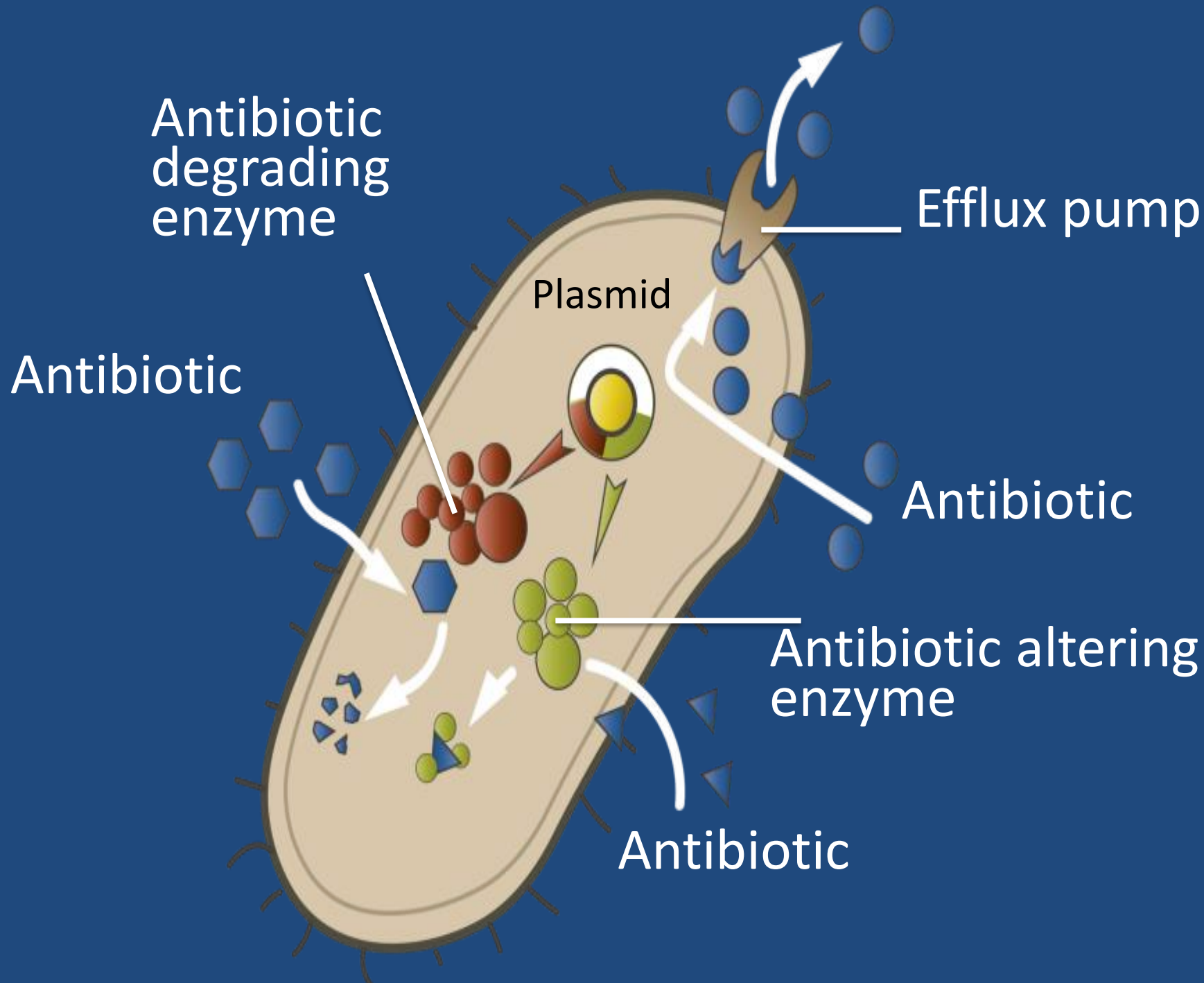




**MRSA**



**CAMRSA**



There is light in the tunnel?



# Antibiotic stewardship programs leads to reduction of

- Antibiotic use
- Antibiotic resistance
- Hospital stay
- Antibiotic associated diarrhoea
  - Clostridium difficile
- Reduced **costs**



# Core elements in antibiotic stewardship programs

- Easily available antibiotic guidelines
  - App
- Increase **compliance to guidelines**
- **Shortening** of duration of therapy
- **De-escalation** of broad-spectrum antibiotics

# Which intervention works?

- Education?
  - physicians, general population
- Restrictions
- Academic detailing
- Audit and feed-back
- Digital systems with decision support
  - automatic stoporder

To avoid resistance you  
must finish the antibiotic course

- No, it is a myth
- It is an evidence free area
- The longer treatment, the more resistance

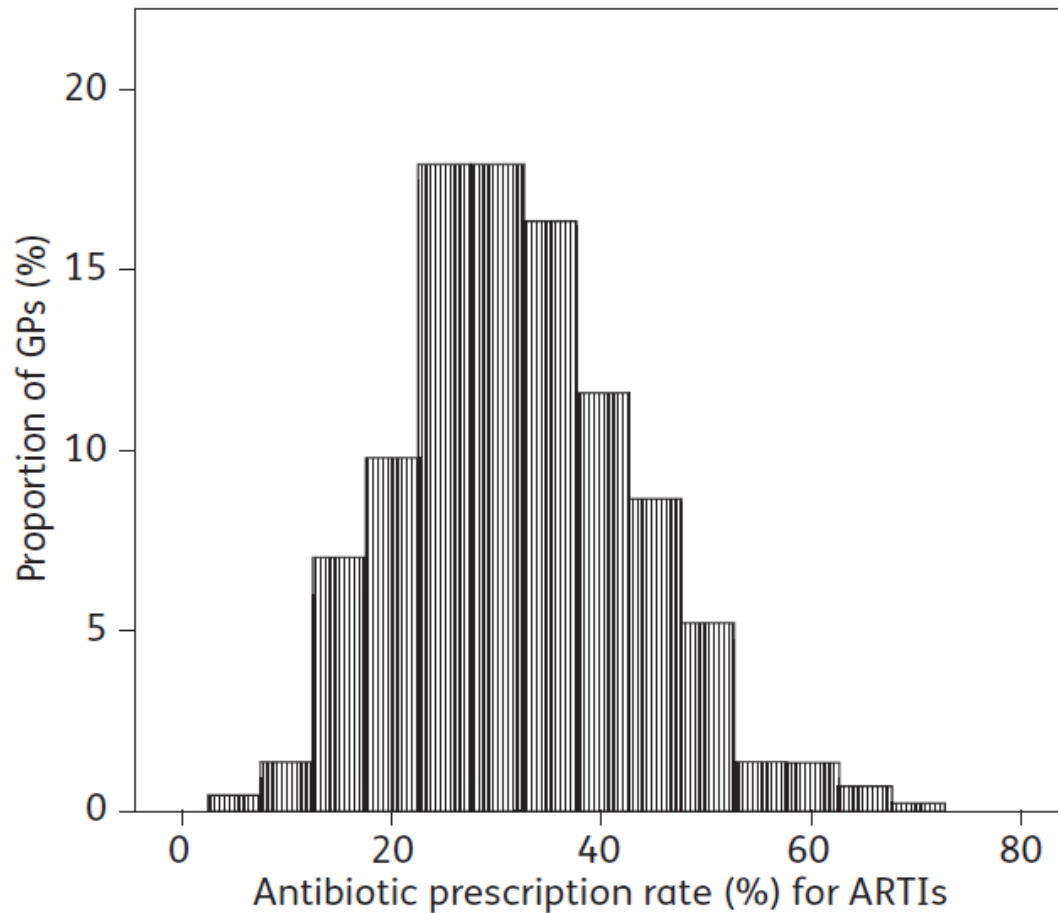
# Killing a myth

	<b>Guidelines</b>	<b>New evidence</b>
<b>Pneumonia</b>	<b>7-14</b>	<b>3-5</b>
<b>Ventilator associated pneumoniae (VAP)</b>	<b>10-14</b>	<b>7-8</b>
<b>Pyelonephritis (Severe renal infection)</b>	<b>10-14</b>	<b>7</b>
<b>Peritonitis (Severe abdominal infection)</b>	<b>7-10</b>	<b>4</b>
<b>Exacerbation of chronic bronchitis</b>	<b>7-10</b>	<b>&lt;5</b>

# Human medicine can decrease resistance and prolong life of current antibiotics

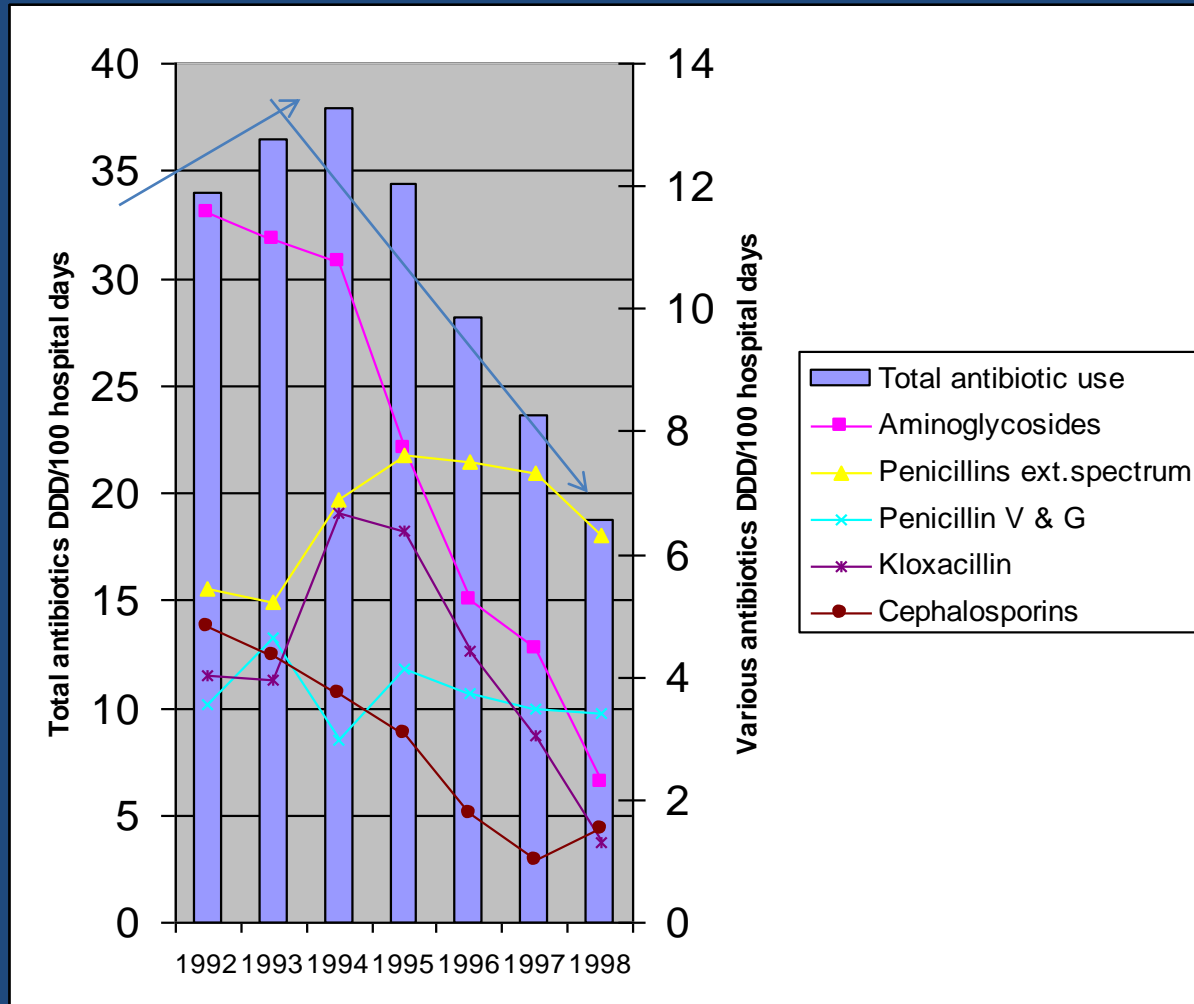
- Sustainable interventions
  - Digital support systems
- Political/administrative Leadership commitment
  - National action plans (one health approach)
- More rapid and precise diagnostic tools

# Variation in antibiotic use. Respiratory tract infections Norway

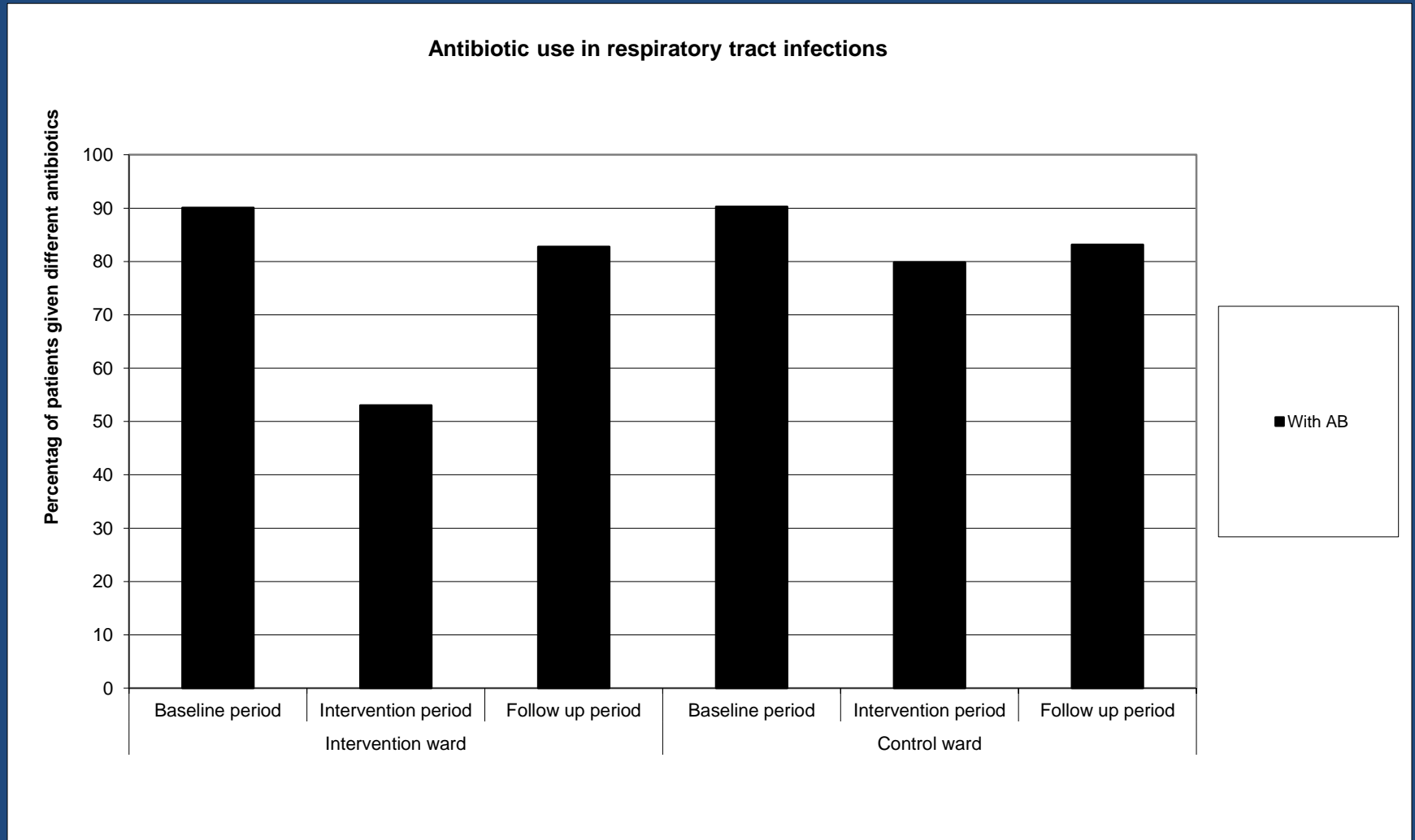


**Figure 2.** Distribution of 440 GPs' antibiotic prescription rates for ARTIs.

# Improved use of antibiotics in a paediatric dept.

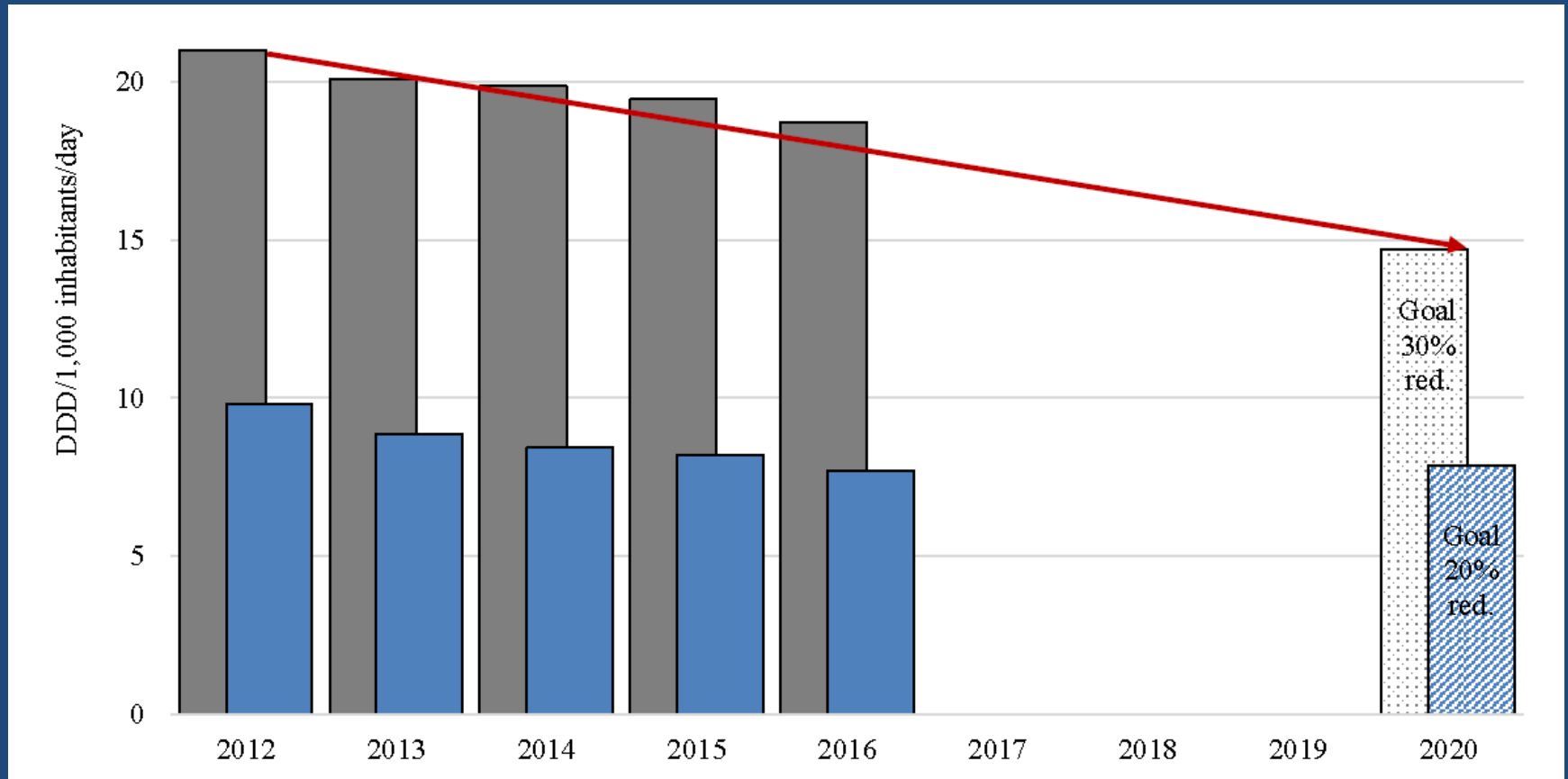


# Effects of interventions are not sustainable





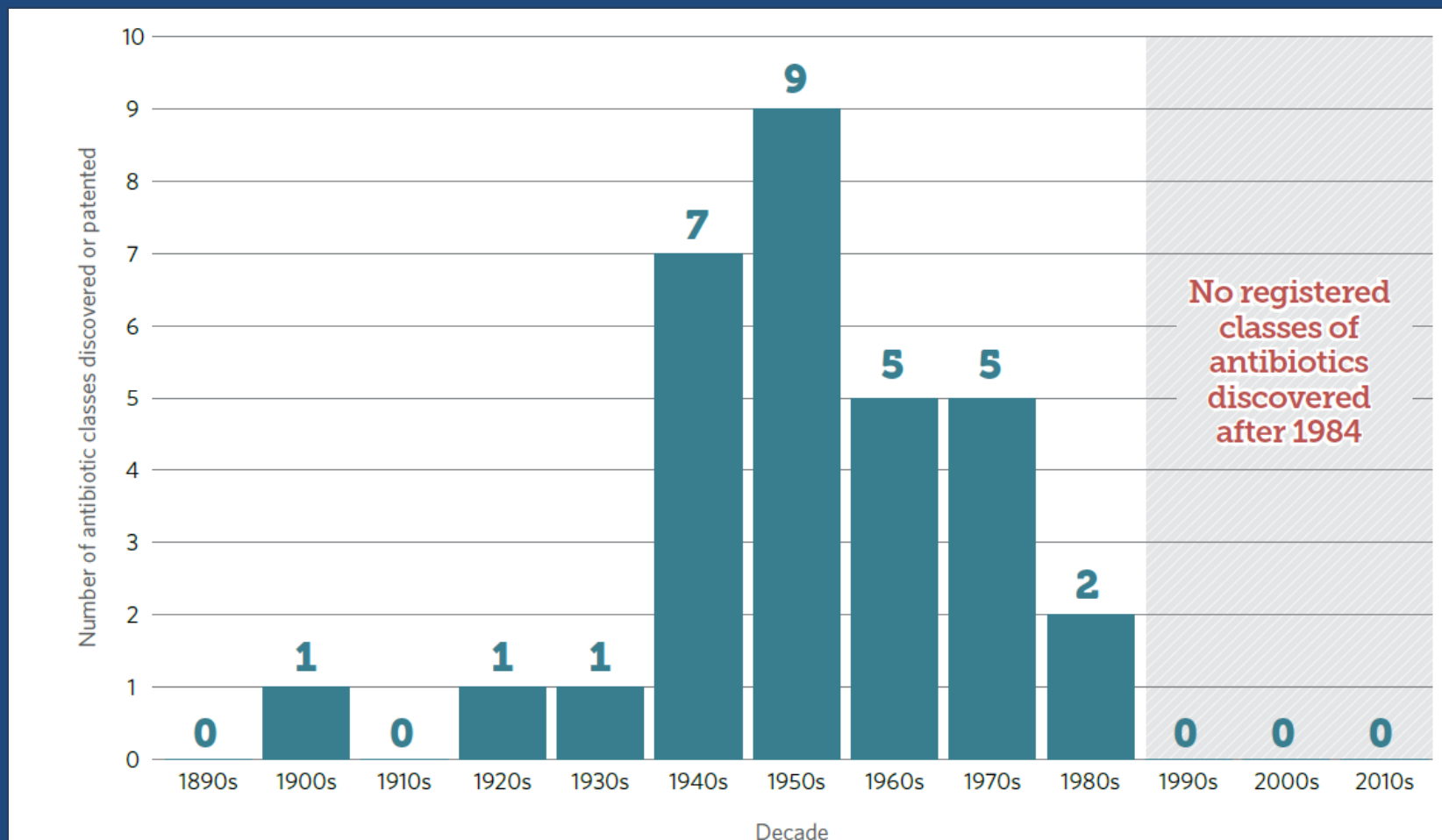
# Aim 30 % reduction in AB 2012-2020



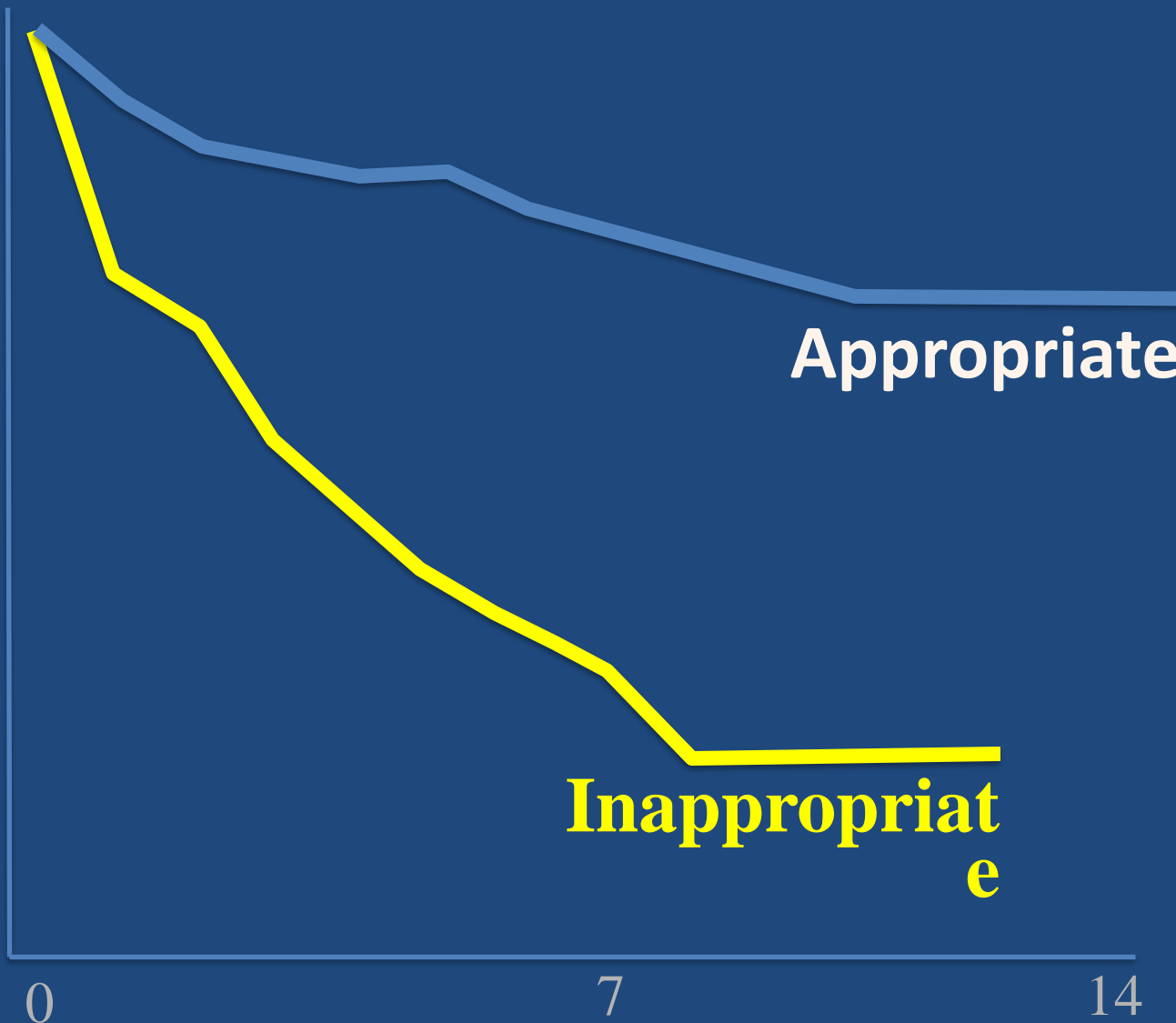
# To avoid resistance you must finish the antibiotic course

- No, it is a myth (lie)
- It is evidence free area
- The longer treatment, the more resistance

# No new antibiotics the last decades



**SURVIVAL**



**Appropriate**

**Inappropriate**

**DAYS**

0

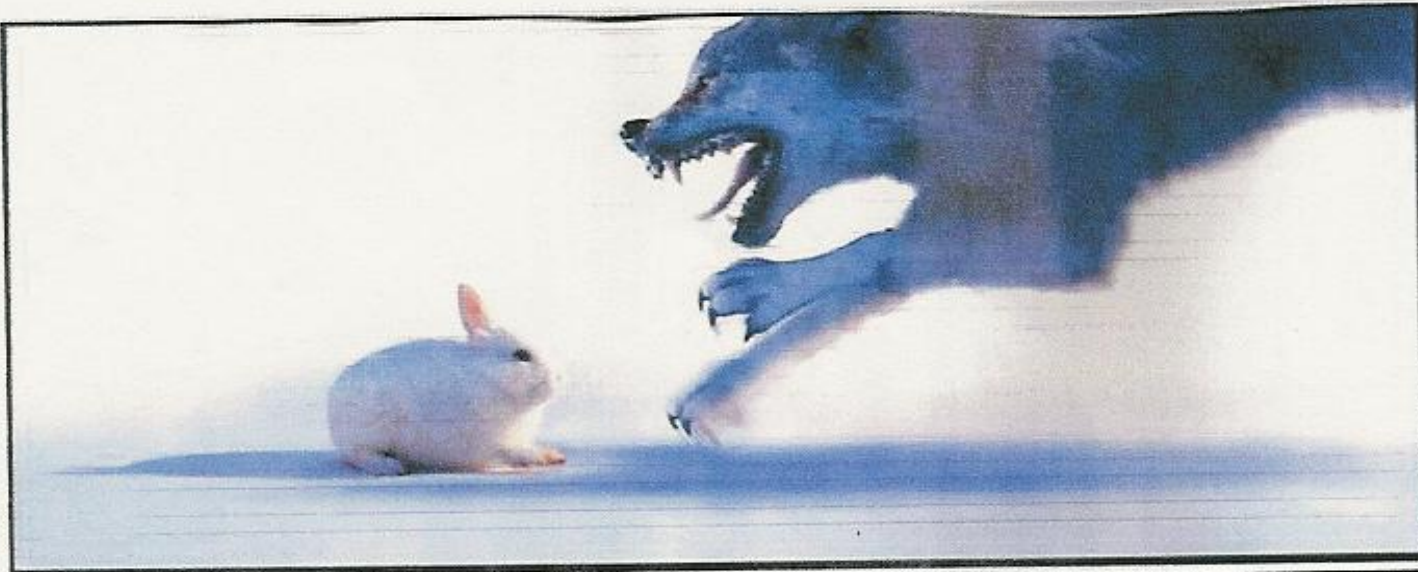
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# Take home message

- Rational antibiotic use lead to reduction of antimicrobial resistance (AMR) and costs
- Profylactic AB use in animals shou be prohibited
- Vaccination can reduce AMR
- The myth that finishing the antibiotic course does not prevent antibiotc resistance!

Thank you





# Revision of antibiotics after 48-72 h.

- > 85 % of bacteriological samples available
- Allows narrowing (de-escalation) of broad-spectrum therapy
- Leads to less resistance



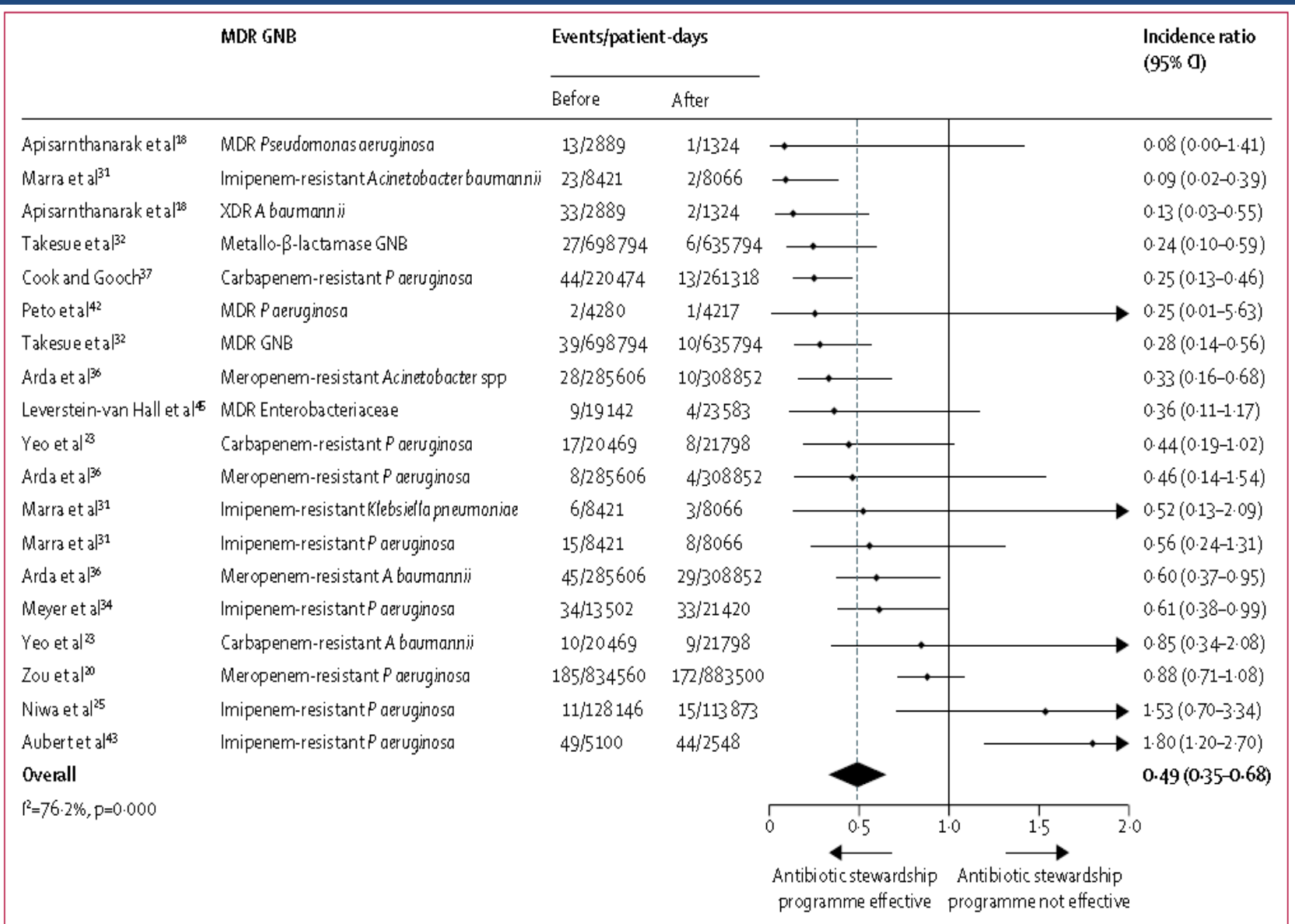
# Duration of treatment (days) in hospitals

Gap between of knowledge and practice

	<b>Guidelines</b>	<b>New evidence</b>
<b>Pneumonia</b>	<b>7-14</b>	<b>3-5</b>
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<b>Gram-neg. sepsis</b>	<b>10-14</b>	<b>8</b>

# Rational antibiotic use is

- Giving effective antibiotics with the most limited impact on the normal bacterial flora.
  - Choice of antibiotics
  - Dosage
  - Duration



**Figure 2: Forest plot of the incidence ratios for studies of the effect of antibiotic stewardship on the incidence of MDR GNB**  
 GNB=Gram-negative bacteria. MDR=multidrug-resistant. XDR=extensively drug-resistant.