



Zakład Medycyny Rodzinnej
Uniwersytetu Medycznego
w Łodzi

Family Medicine for English language students of Medical University of Lodz

Seminary 9

Use and misuse of medication

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Our timetable for today

1.1 Medication use and misuse

1.2 Medication use and misuse in acute conditions

1.3 Medication use and misuse in chronic conditions

1.1 Who is responsible for medication misuse in acute and chronic conditions

1.2 Common errors in medication

1.3 The role of OTC drugs

2.1 Patient compliance - general definition

2.2 The prevalence of patient compliance

2.3 How can I know whether the patient is adherent or not?

3.1 Factors influencing patient compliance

3.2 How to enhance patient compliance— students' project

3.3 How to enhance patient compliance— presentation of projects and group discussion

Historical perspective

- **1928** Alexander Fleming observed antibacterial activity of *Penicillium notatum*
- **1941** first human successfully treated with penicillin
- **1945** Alexander Fleming, Howard Florey and Ernst Chain were awarded the Nobel Prize for Medicine





THE LANCET

Volume 375 Number 9501 Pages 945-1000 October 24, 2009

www.thelancet.com

100 911



"... effective professional and public strategies to encourage appropriate prescribing of antibiotics should be studied and implemented. If not, we will lose the miracle drugs of the 20th century."

See Article page 979

Editorial

Surveillance in Cambodia
September 14

Comment

Antibiotic resistance: a global threat
September 14

Research Letters

Antibiotic resistance in China
September 14

Seminars

Global
September 14

Public Health

Dissemination of genetic information
September 14

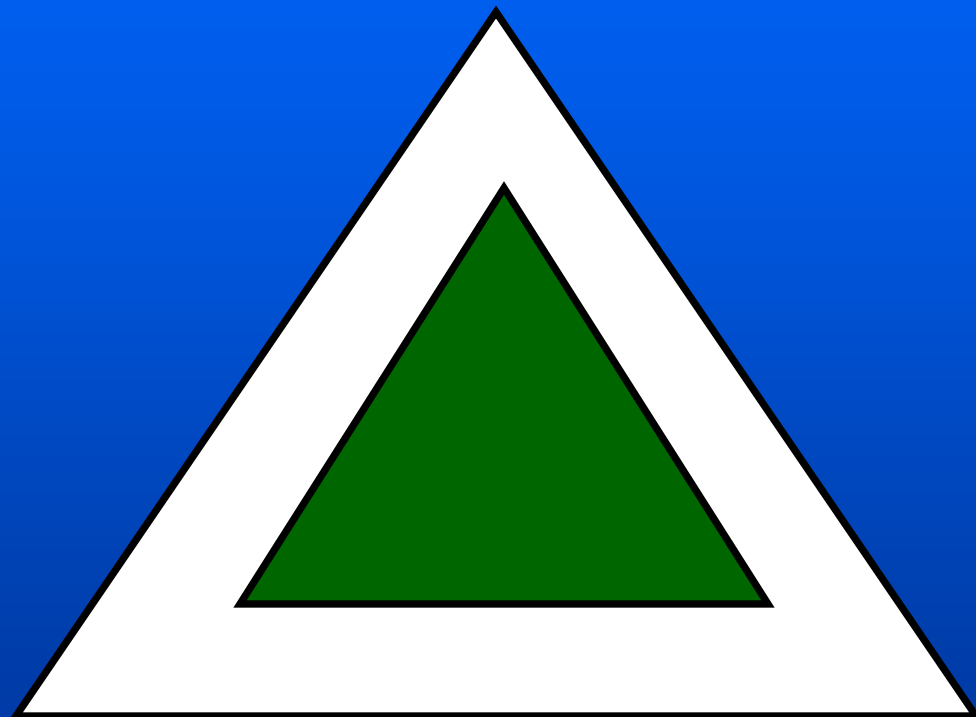
Printed in Great Britain by the Lancet Group, London
Printed in the USA by Elsevier, Philadelphia, PA

Caution!
We may lose
the miracle
drugs of the
20th century!

Answer:
"Think globally,
act locally"

Reasons for medication misuse: human factor
Who is responsible for that?

Patient



Doctor

Pharmacist

Conditions for justified antibiotic use

1. Diagnosis = infection
2. Pathogen = bacteria
3. Appropriate antibiotic
4. Appropriate dosage and duration
5. Benefit >> harm



Antibiotic misuse

1. Diagnosis = infection
2. Pathogen = bacteria
3. Appropriate antibiotic
4. Appropriate dosage and duration
5. Benefit >> harm

Allergy!

Viruses: The common causes of colds and URTI are viruses but the rate of antibiotic prescription in URTI is 61 and 63%, respectively Cantrell R *et al.*, Clin Ther, 2002; 24(1):170-82.

Aminoglycosides!

Reasons for antibiotic misuse (1)

Otitis media

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graph TD; OM[Otitis media] --> NL[The Netherlands]; OM --> RE[The Rest of Europe & USA];
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The Netherlands

- antibiotics are **not** the first line therapy
- **31%** patients given antibiotics
- **3%** penicillin-resistant *S. pneumoniae* strains

The Rest of Europe & USA

- the leading cause for antibiotic treatment in children
- **>90%** patients given antibiotics
- **53%** penicillin-resistant *S. pneumoniae* strains in France

Appelman CLM *et al.*, Utrecht: Dutch College of Family Doctors, 1990
Hoberman A *et al.*, Clin Pediatr, 2002; 41:373-90.
Pichichero ME *et al.*, Ann Otol Rhinol Laryngol Suppl, 2000; 183:1-12.
Schindler AG *et al.*, Int J Pediatr Otolaryngol, 2004; 68:29-36.

Reasons for antibiotic misuse (2)

Patient

- Don't understand the nature of illness
- Expect to be treated
- Need to return to work
- Similar symptoms treated with antibiotics in the past

Doctor

- Patient satisfaction/pressure
- Time pressure
- Diagnostic uncertainty
- Lack of follow-up

Reasons for antibiotic misuse (3)

Human factor: OTC antibiotics

- Sweden:

- 0.3% of patients claim to obtain their antibiotic without a prescription

Svensson E et al., Scand J Infect Dis, 2004; 36(6-7):450-2.

- Spain:

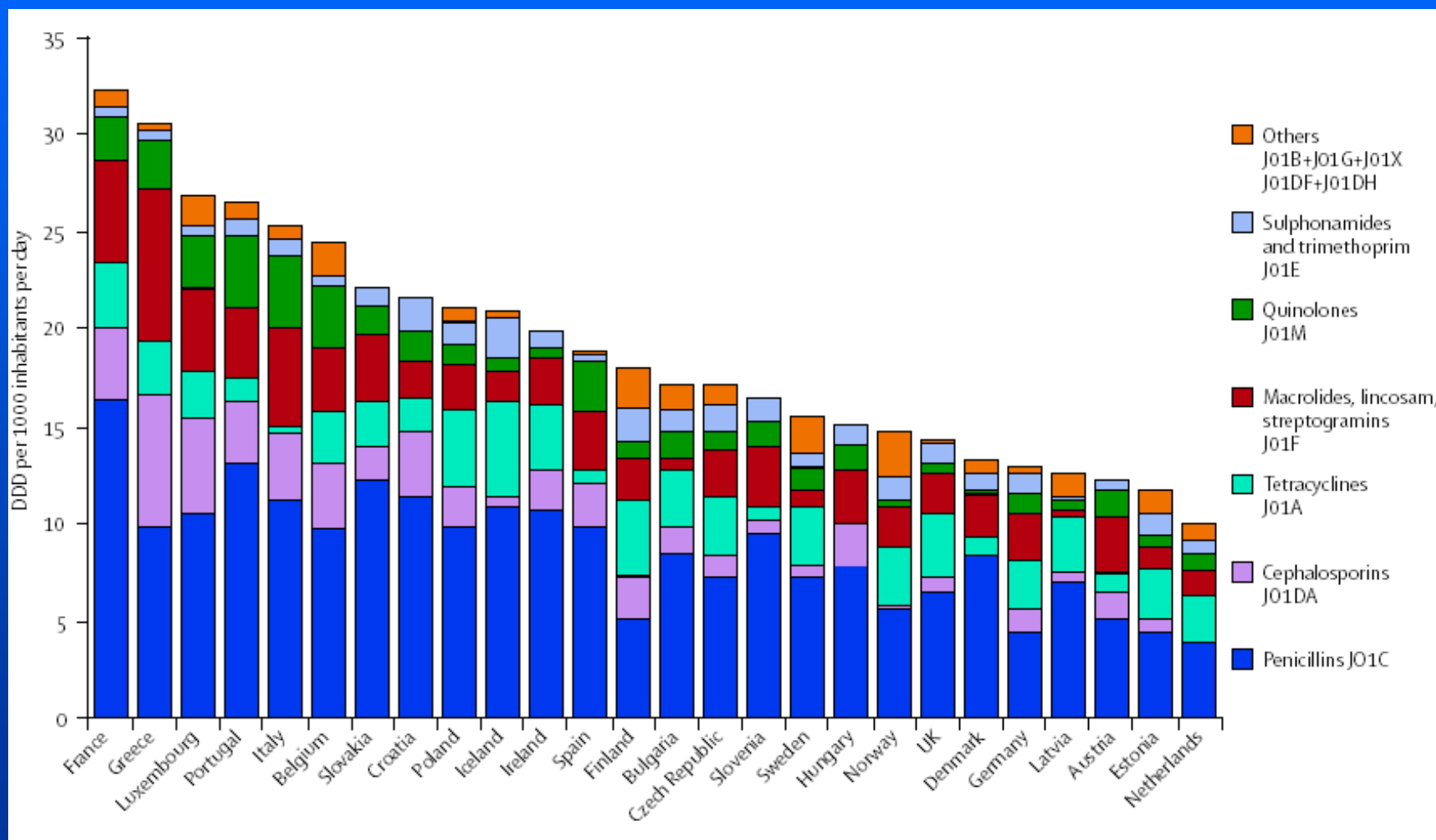
- only 66% of antibiotics found in the households were prescribed by the physicians

Orero A et al., Med. Clin, 1997; 109(20):782-5.

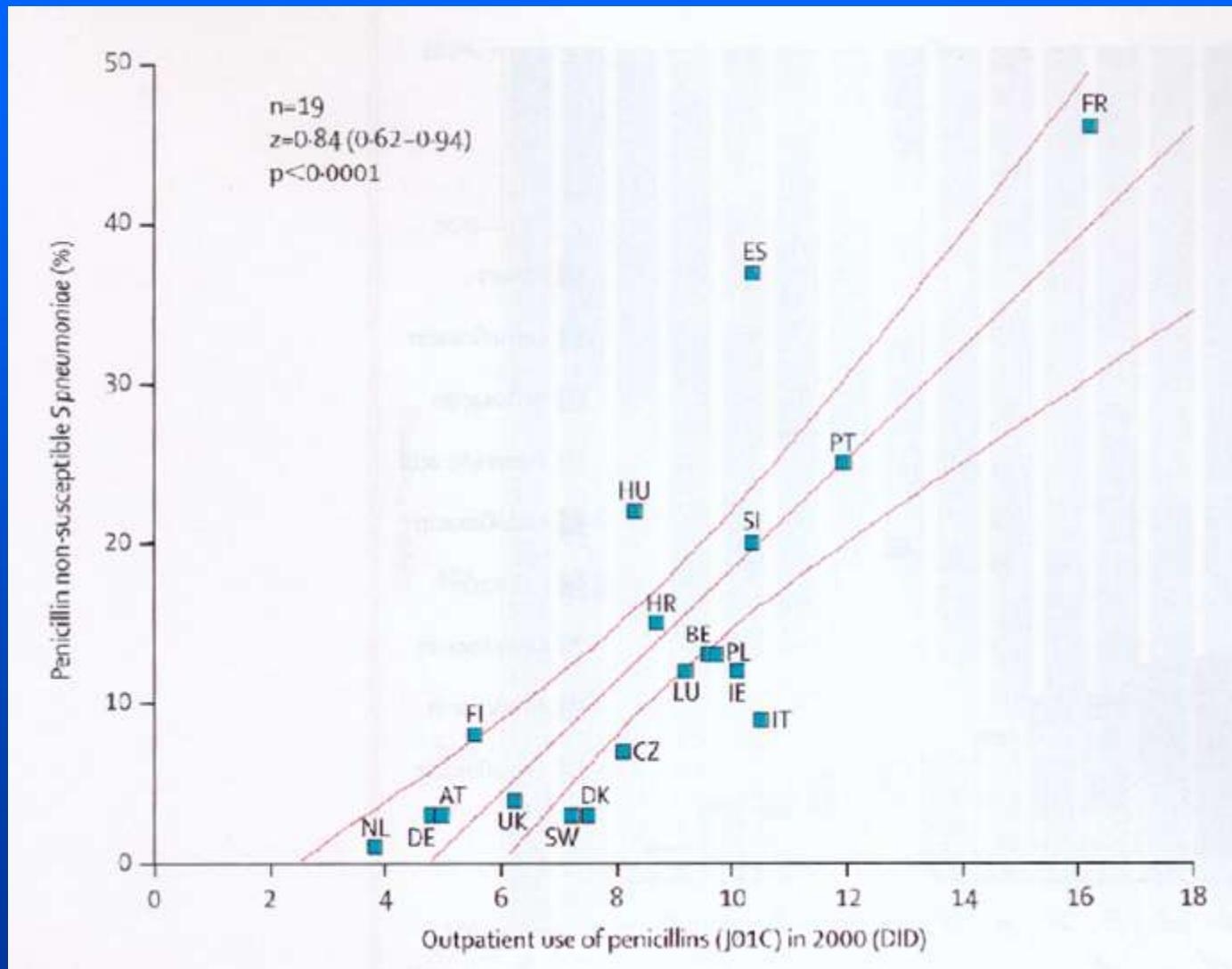
- 65.9% of pharmacists report dispensing antibiotics without prescription!

Caamano F et al., Gac Sanit, 2005; 19(1):9-14.

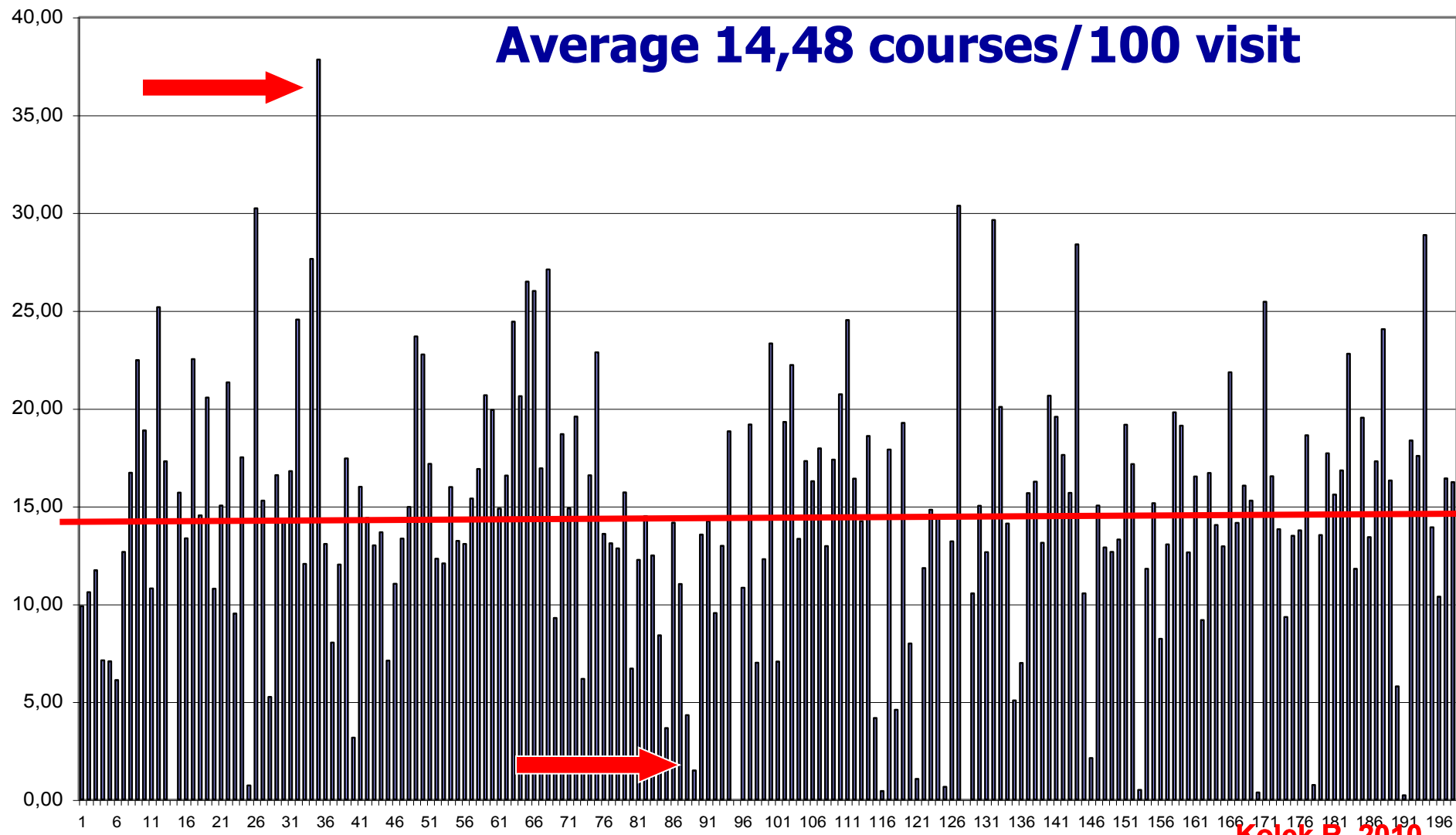
Antibiotic use in Europe



Antibiotic use and resistance in Europe



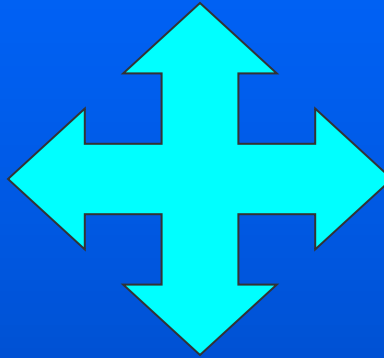
An average amount of antibiotic course prescribed by GP's in Opole region, Poland, between 01.11.2005 and 30.04.2006



Racjonal antibiotic therapy

Clinical presentation

Bacteria



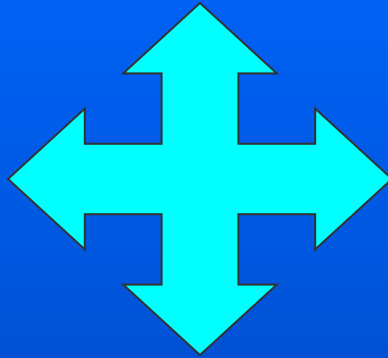
Virus



Racjonal antibiotic therapy

Clinical presentation

Bacteria



Virus



Pharyngitis – Centor's criteria

Symptom	points
Fever >38 ⁰	+ 1
Lack of cough	+ 1
Cervical lymphadenopathy	+ 1
Swallowed tonsils, tonsillar exudates	+ 1
Age < 15 y	+ 1
Age > 45 y	- 1

Score

risk

Guidance

- 1 - 0

2-3%

No antibiotic treatment

1

4-6%

No antibiotic treatment

2

10-12%

Test + treatment for (+)

3

27-28%

Test + treatment for (+)

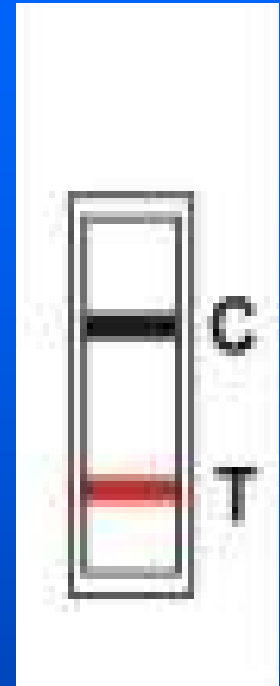
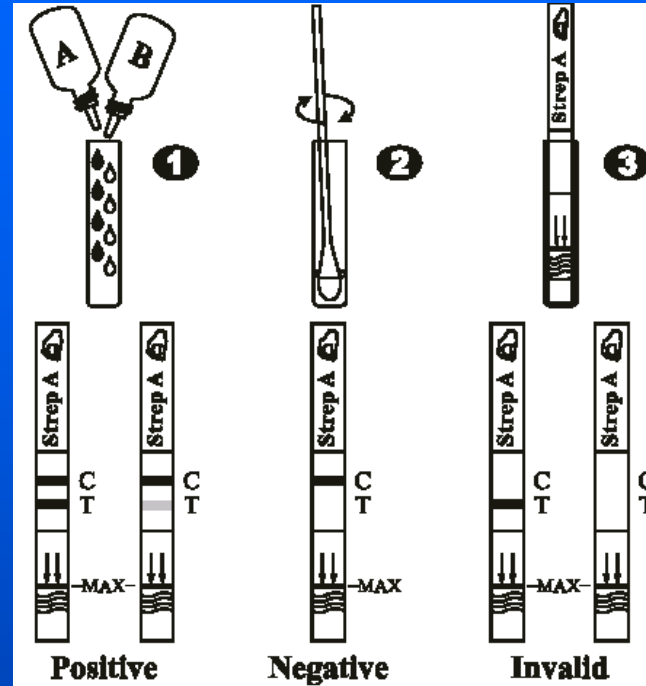
4-5

38-63%

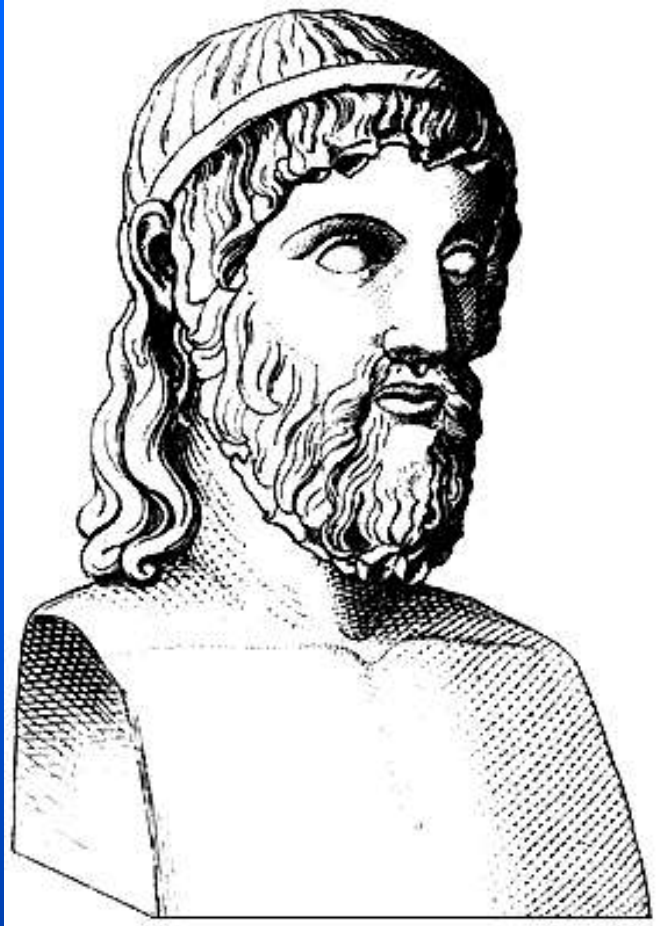
Antibiotic treatment

of GABHS

Pharyngitis – point-of-care tests



- **ACON On-Call™ Strep A Rapid Test Strip**
- **ScreenMed Strep A Test**
- **BD Link2™ Strep A**



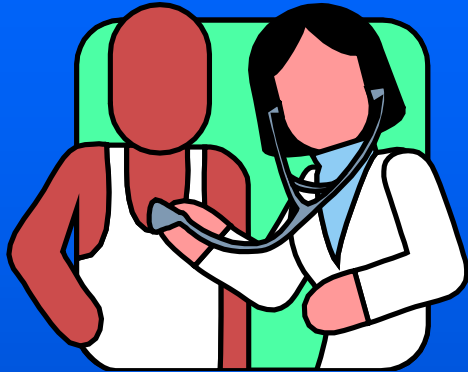
Hippocrates

V - IV century B C

How could he know?

keep watch also on the
faults of the patients,
which often make them
lie about the taking of
things prescribed

Stages of the ideal therapeutic process



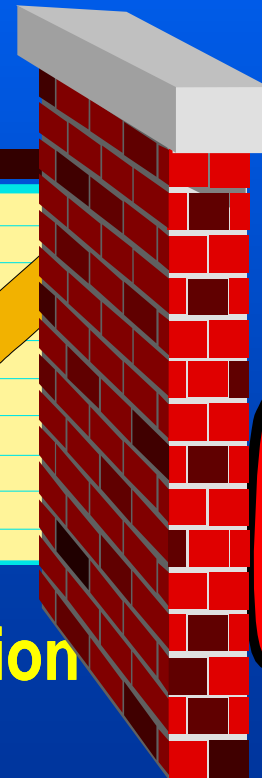
examination



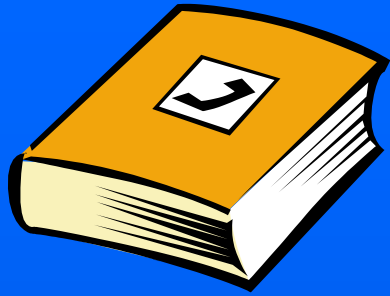
diagnosis



prescription

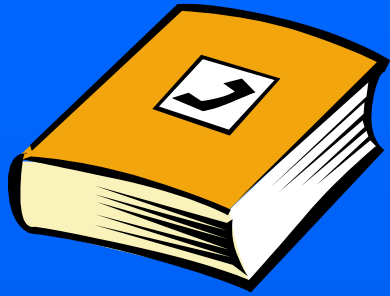


completion



Definitions of patient compliance

The extent to which a person's behaviour
(in terms of taken medications, following
diets, or executing life-style changes)
coincides with medical or health advice



Definitions of patient compliance

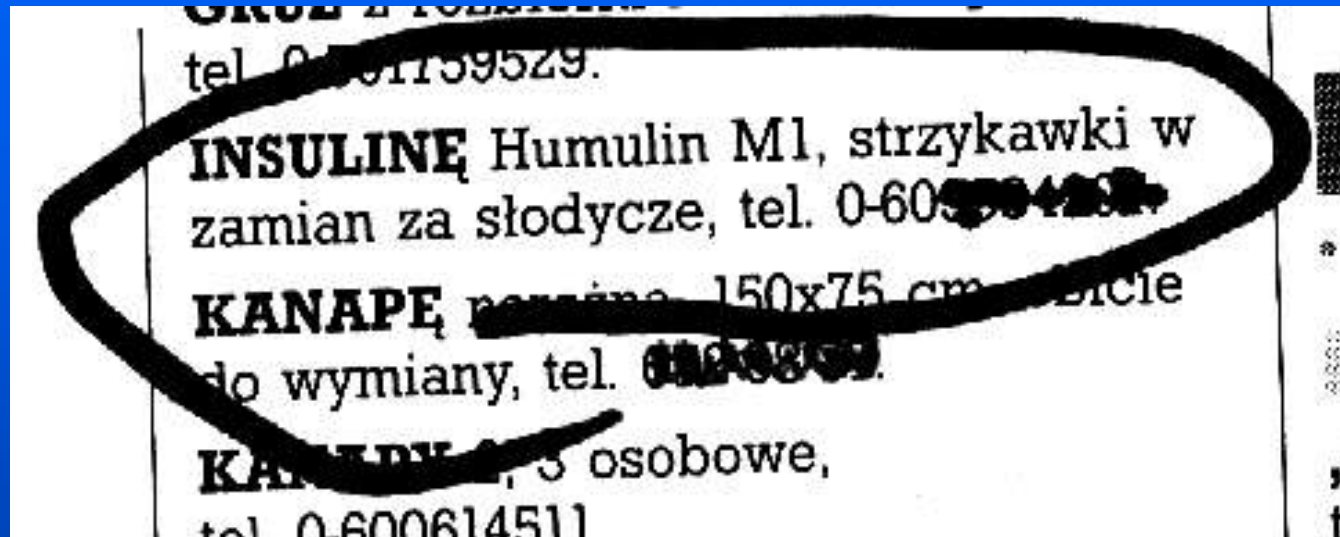
the extent to which

the **time history**

of drug administration corresponds to

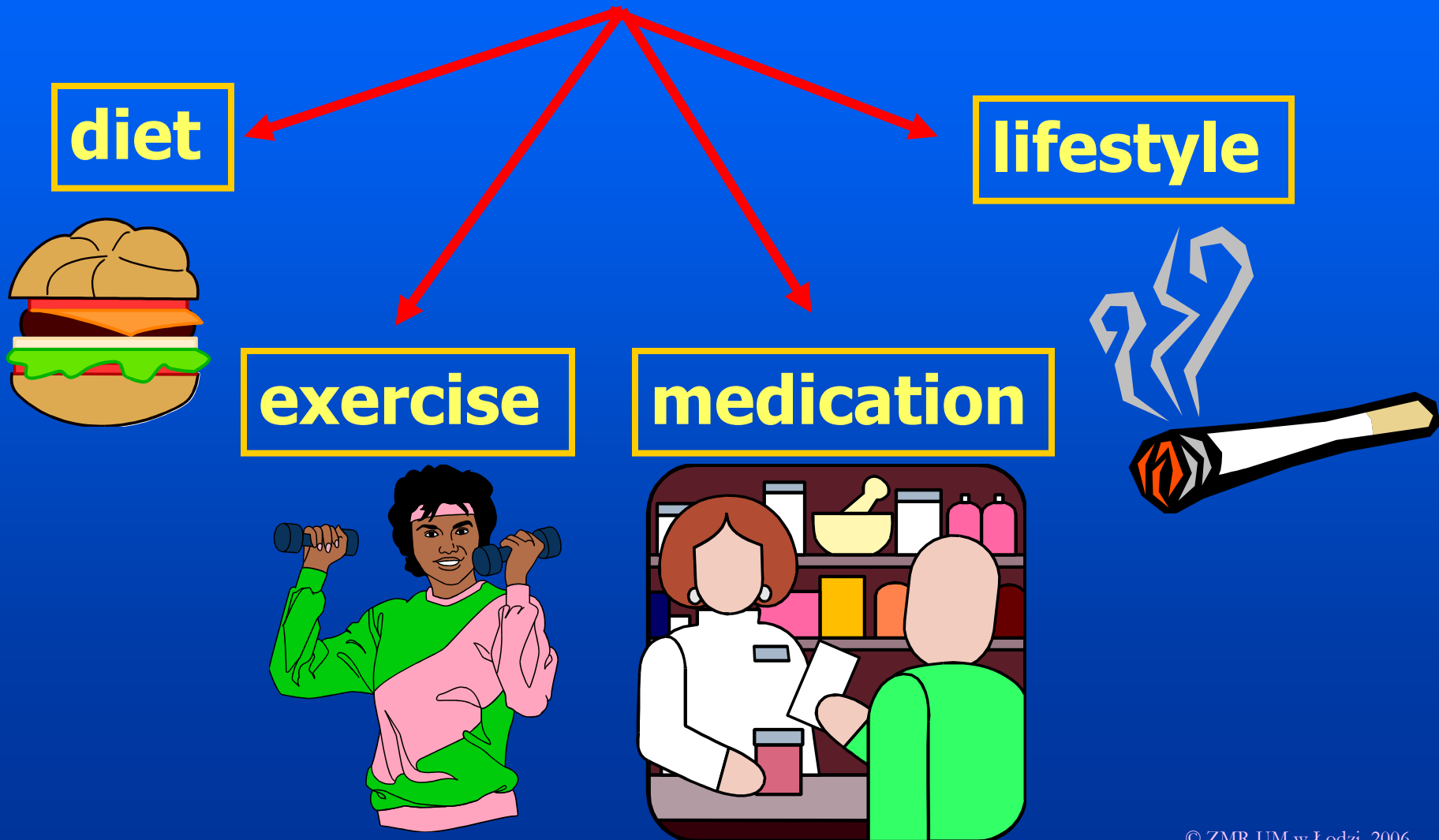
the prescribed regimen

Non-compliance

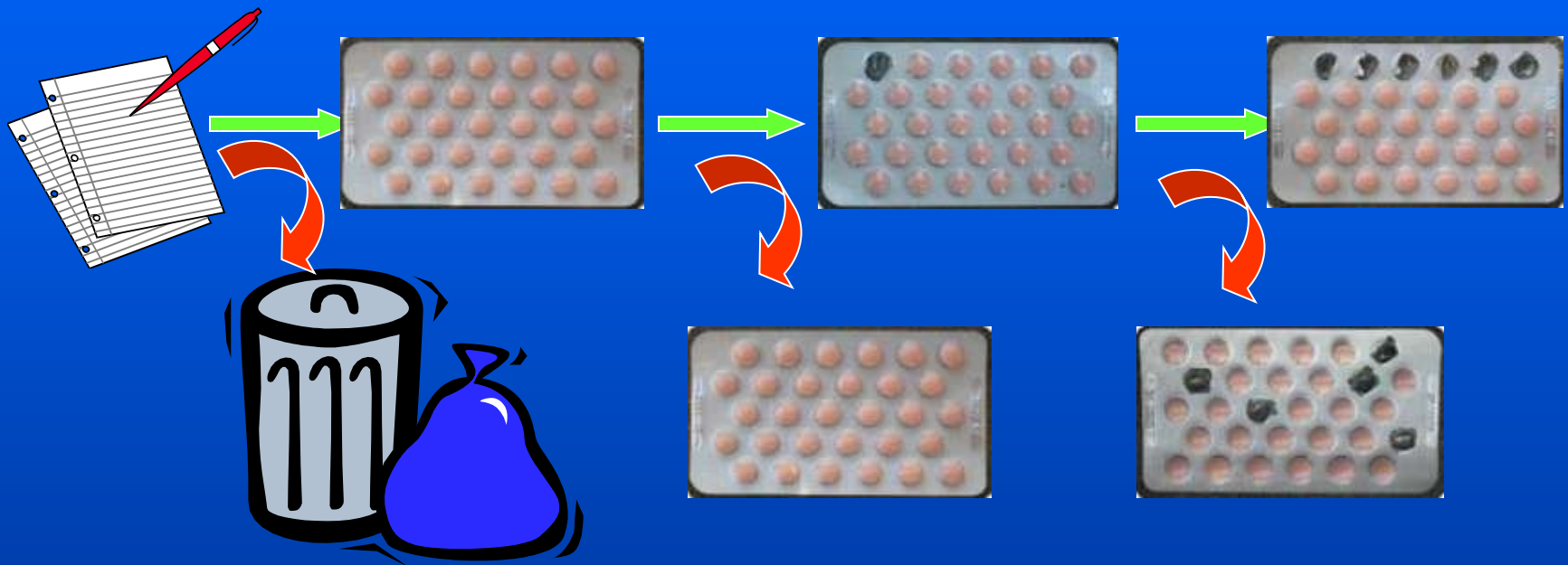


- **any** deviation by a patient from a doctor's instruction

Non-compliance



What happens with your prescription?



Causes of non-compliance with antibiotics (1)

- lack of belief that antibiotic is necessary
- cost of antibiotic
- formulation
- rapid improvement of symptoms

63% (UK)-96% (Spain) of patients who stop treatment prematurely did this because they felt better !

- forgetfulness
- frequent dosing
- side effects

Branthwaite et al., J Int Med. Res 1998; 24: 229-38.
Pechere JC. Clin Infect Dis 2001; 33 Suppl 3: S170-3.
al-Shammari et al., J R Soc Health 1995; 115(4):231-4.

Causes of non-compliance with antibiotics (2)

Patients' beliefs:

- *lack of belief that antibiotic is necessary*
- *interactions with drugs*
- *interactions with drugs alcohol*
- *harm for immune system*

Patients' beliefs of Taiwan residents:

- *it's harmful to follow physicians' directions when taking antibiotics - 40,8%*
- *taking less antibiotics than prescribed is more healthy - 92,6%*

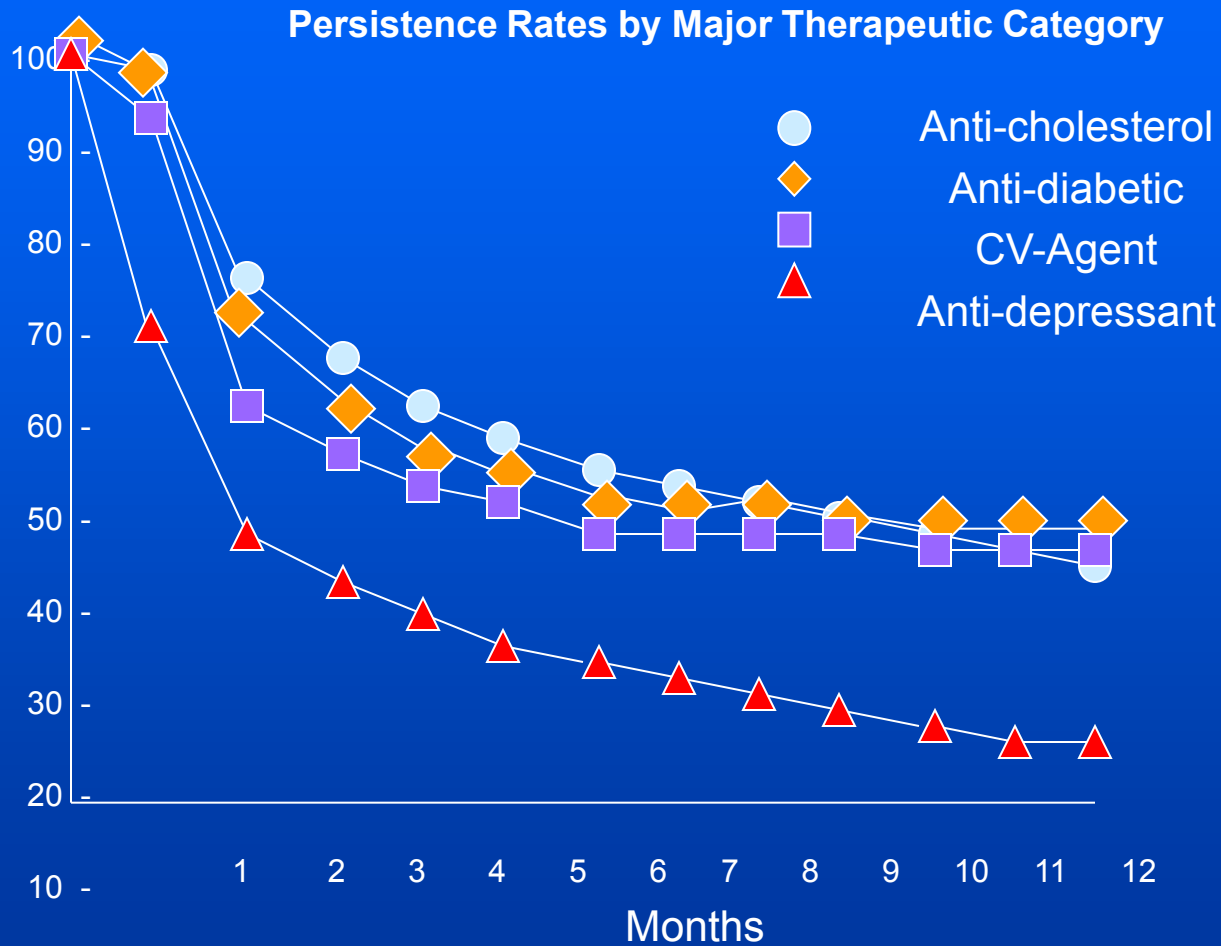
Patterns of non-compliance with antibiotics

- **Failure to buy/ obtain medicines**
- **Failure to start therapy**
- **Delay in starting therapy**
- **Unintentional omission of single doses**
- **Conscious omission of single doses**
- **Regular change in frequency of doses**
- **Regular changes in time intervals between doses**
- **Periodic dose increase**
- **Prematurely stopping the therapy**

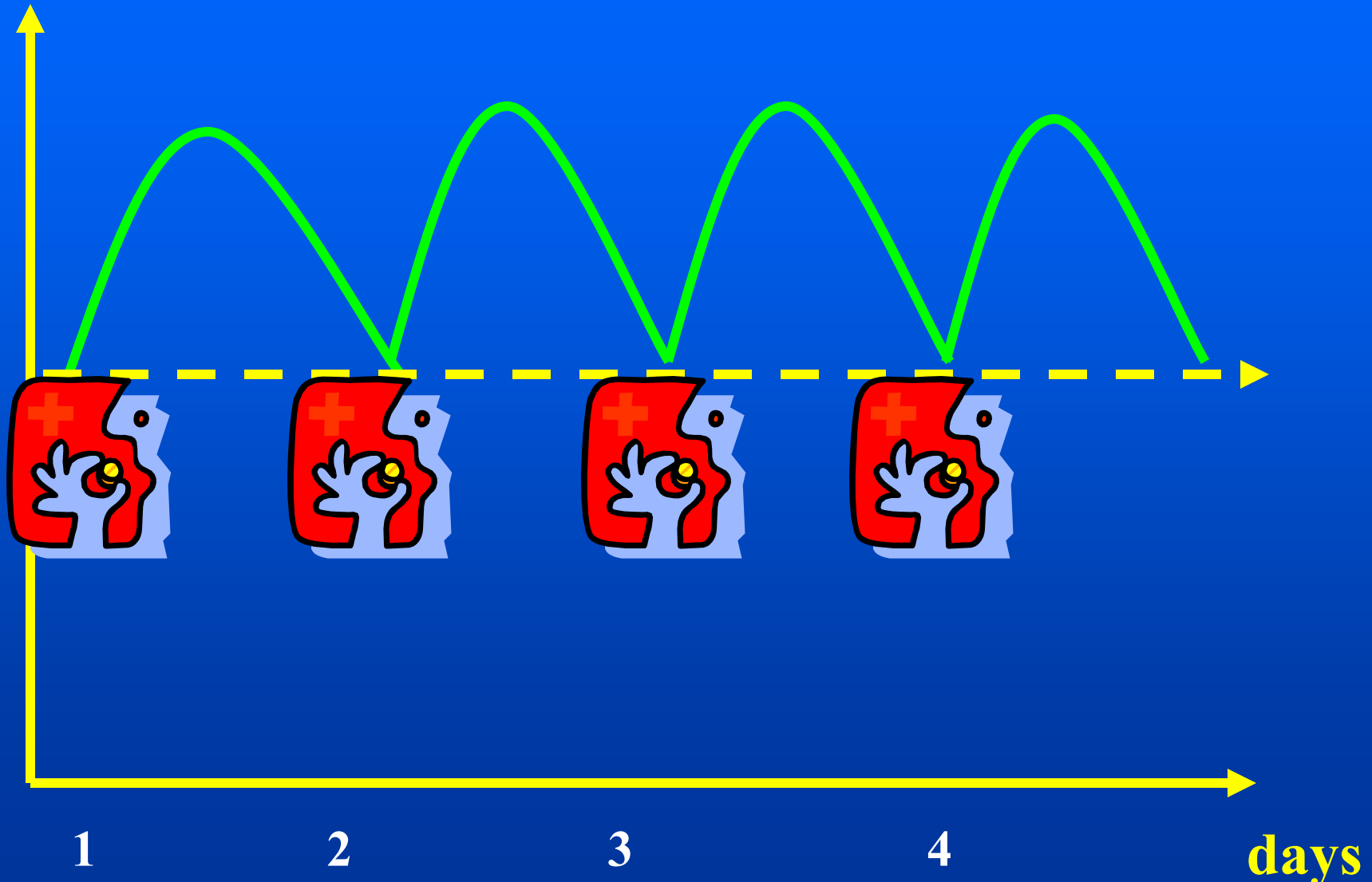
Compliance rates drop with time



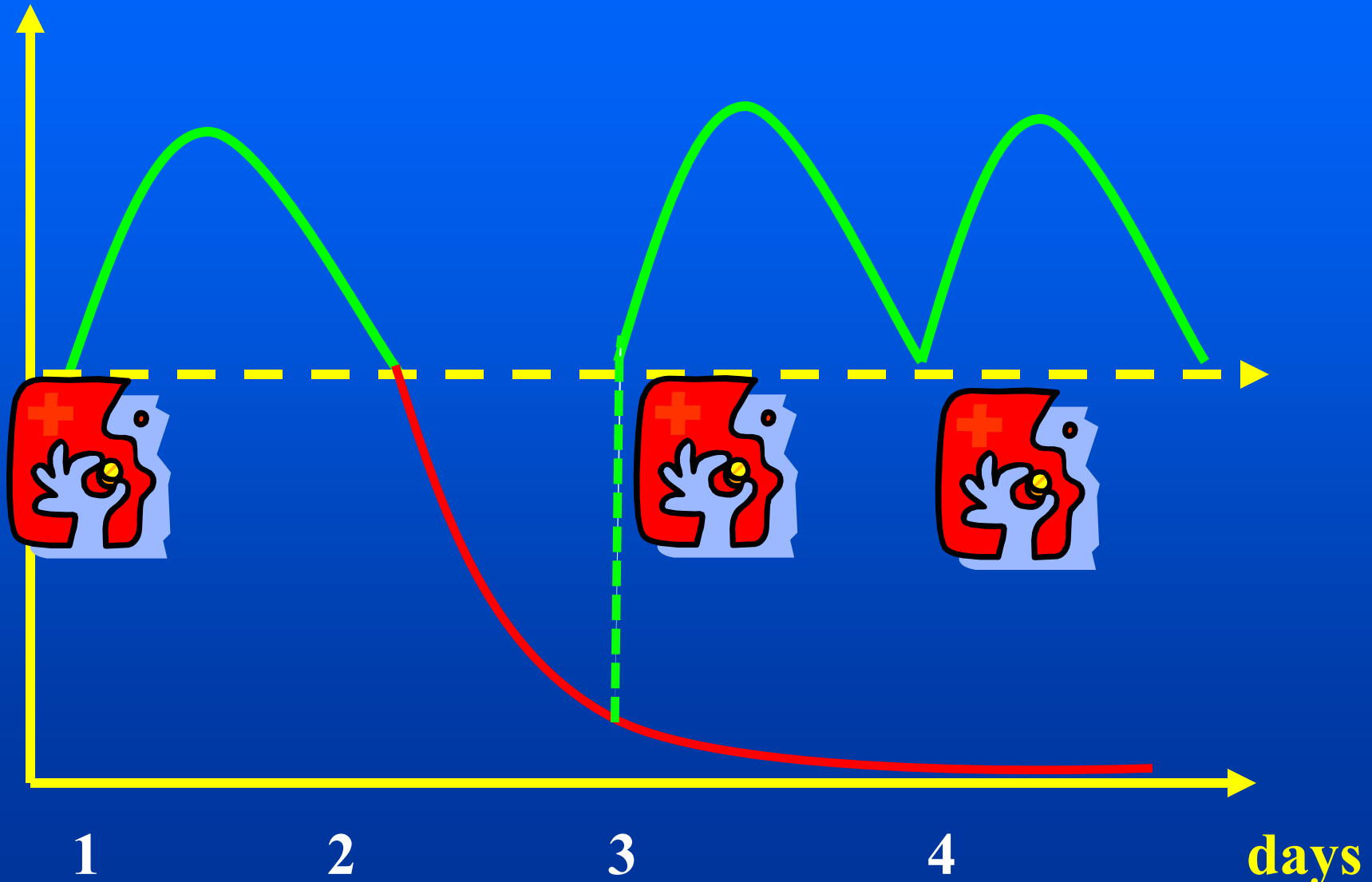
% of Patients Remaining on Therapy



Patterns of non-compliance

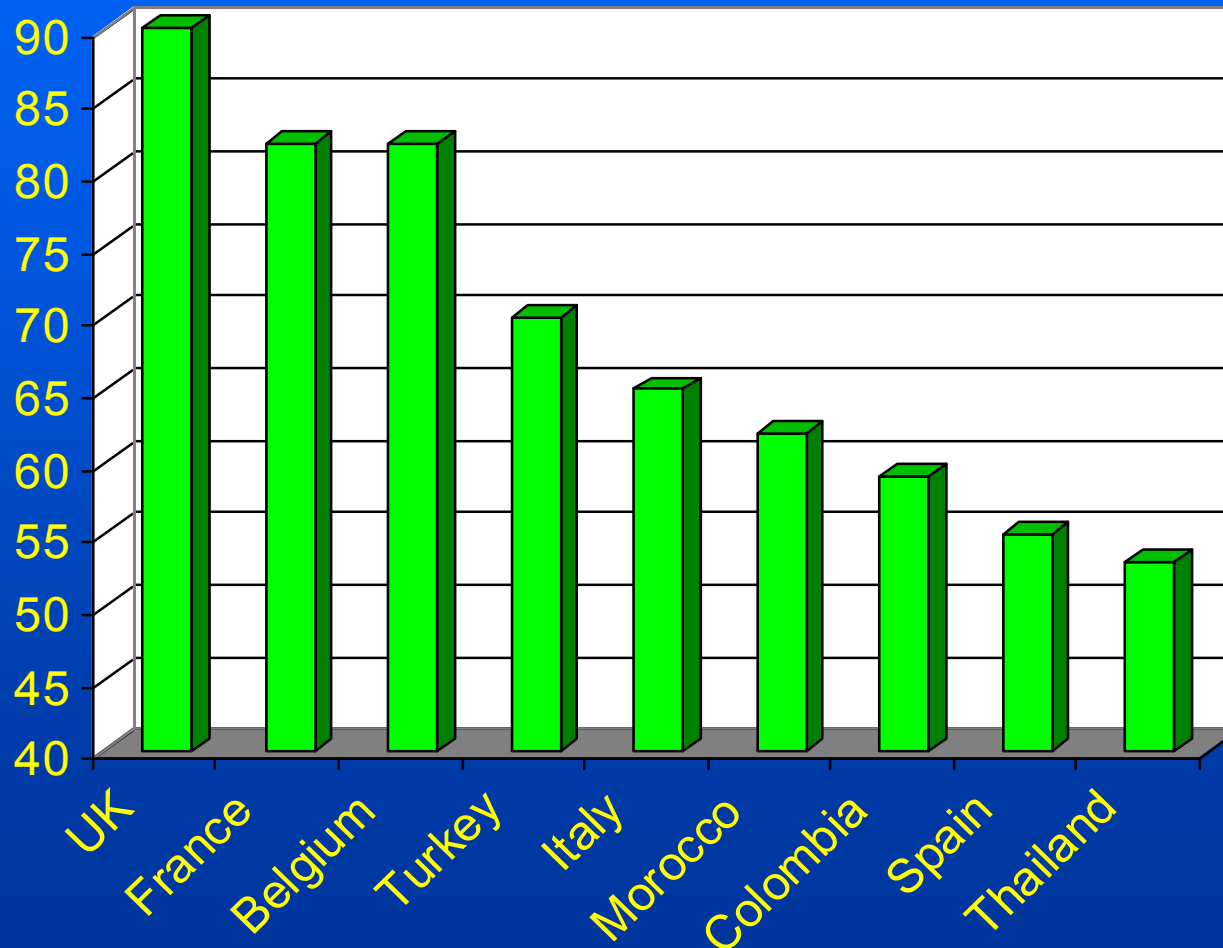


Patterns of non-compliance



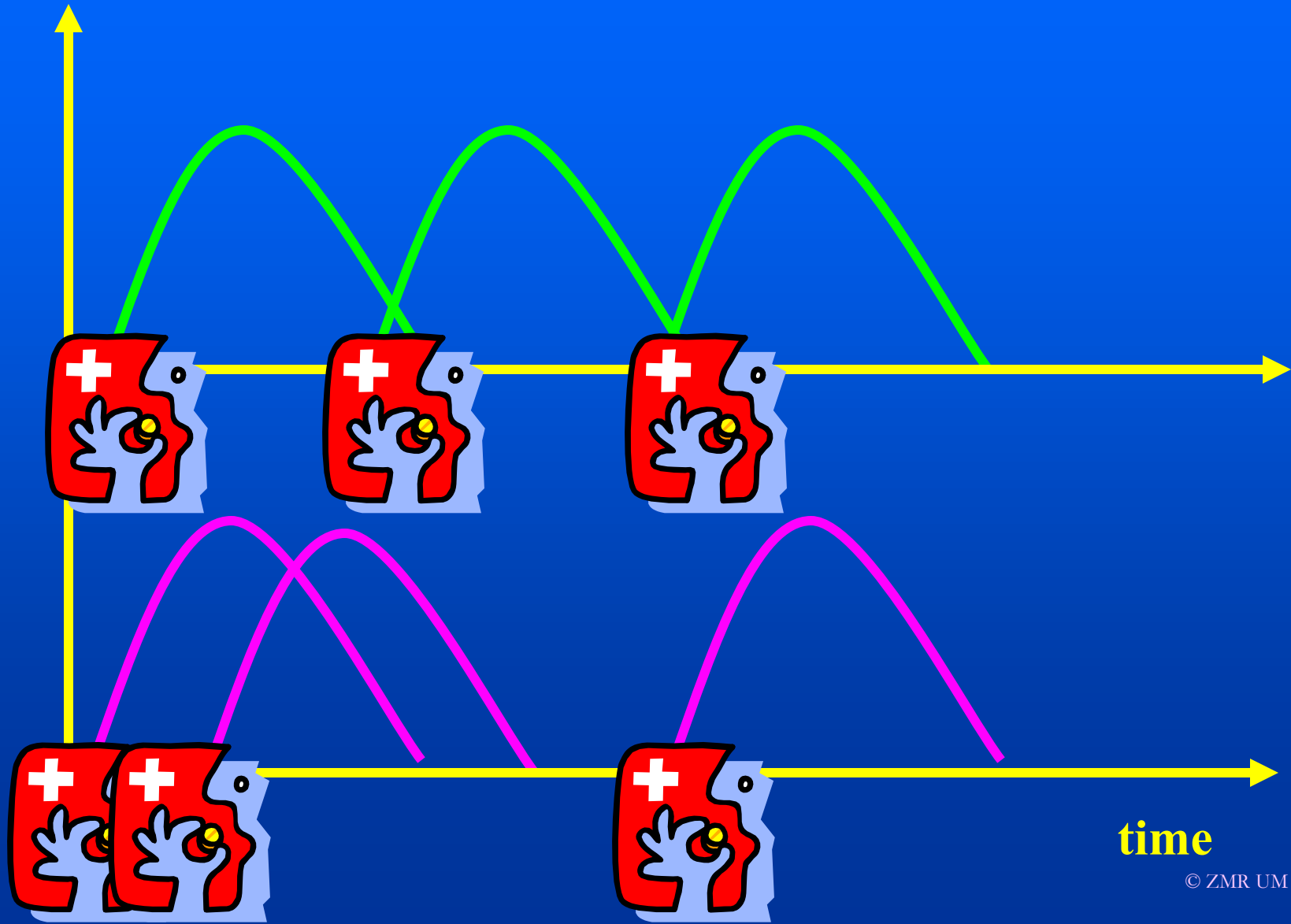
Non-compliance with antibiotics: prematurely stopping the treatment

Patients claiming to have finished the course (%)



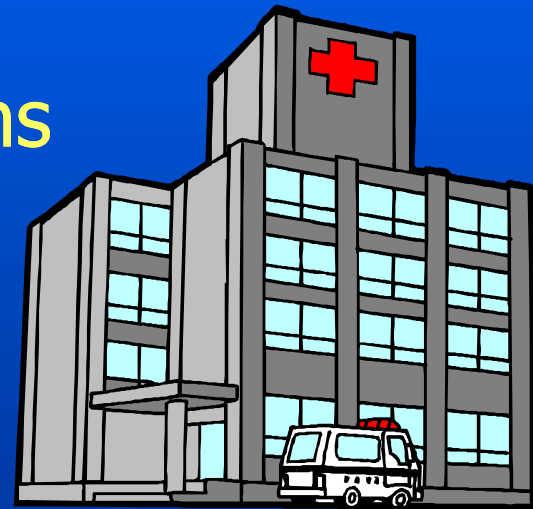
Pechere JC, Clin Infect Dis, 2001; 33 Suppl. 3:S170-3.

Patterns of noncompliance



Consequences of non-compliance with medication

- patient health status
- need for additional consultations
- need for extra drugs
- hospital admissions
- costs (\$ 100 billion/year in USA)



Effect of compliance on UTI recurrence rate in children

- Compliant - 3,0 episodes/year
- Partially compliant - 4,8 episodes/year
- Non-compliant - 7,2 episodes/year

Daschner et al., Acta Paediatr Scand 1975; 64: 105-8.

Consequences of non-compliance with antibiotics

Undercompliance:

- recurrent disease
- development of complications
- emergence of antibiotic-resistant strains



Consequences of non-compliance with antibiotics

	Compliance	Penicillin-resistant pneumococci
France	Low	Frequent
Germany	High	Rare

Consequences of non-compliance with antibiotics

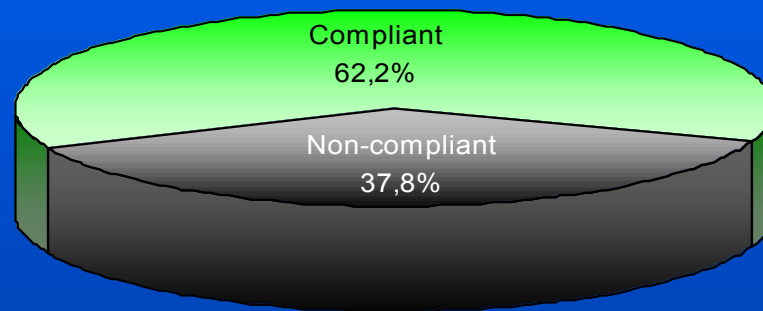


Overcompliance:

- adverse effects
- superinfections
- costs

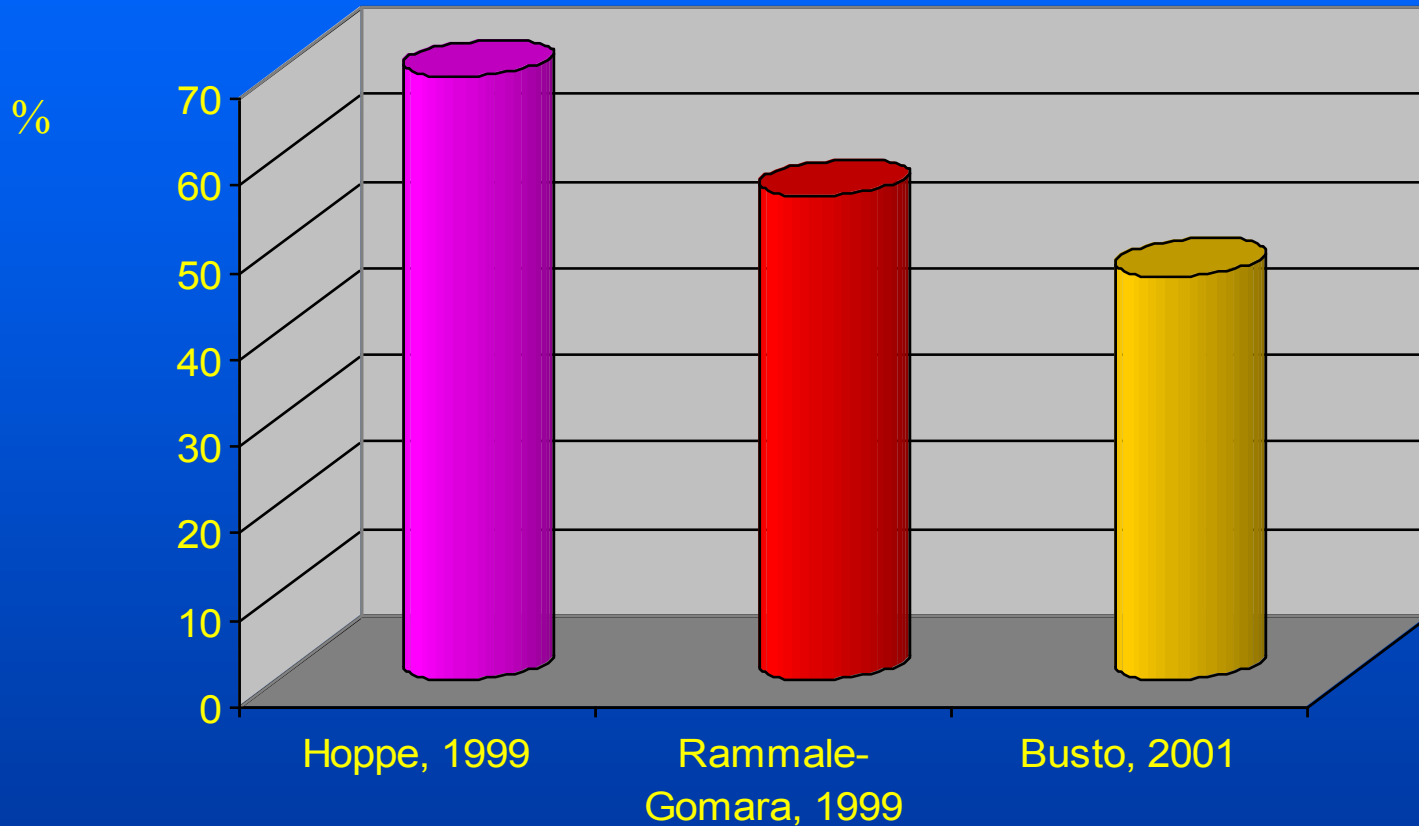
Non-compliance with antibiotics in outpatient settings: a meta-analysis

Overall non-compliance = 37.8%

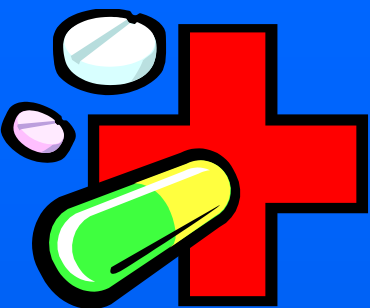


Mean use of leftovers = 28.6%

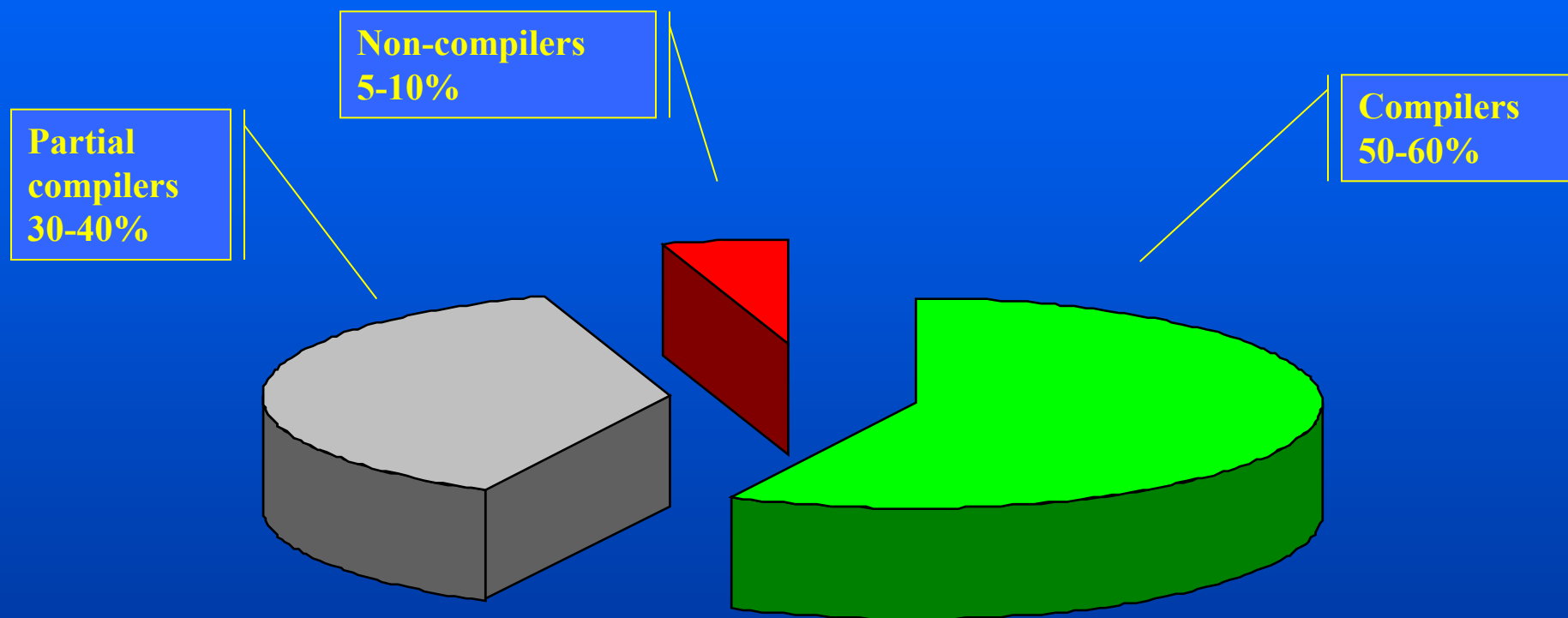
How many children are compliant with antibiotics?



Hoppe et al., *Pediatr Infect Dis* 1999; 18(12): 1085-91.
Rammalle-Gomara et al., *Aten Primaria* 1999; 24(6): 364-7.
Busto et al., *Aten Primaria* 2001; 27: 554-8.



Non-compliance in chronic conditions (e. g. HTA)



(P. Rudd et a., 1992)

Consequences of non-compliance

Unplanned pregnancies



errors with oral contraceptives:

- **3% of married women**
- **6% of not married ones**
- **34 - 55% of teenagers**

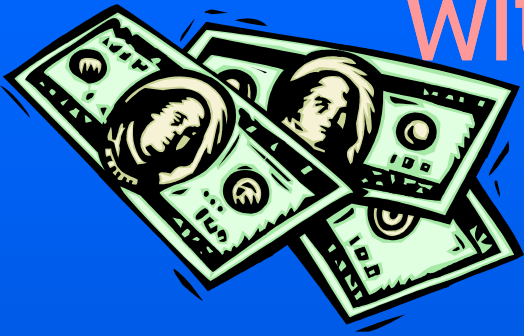


Managing compliance

**Physicians seldom
use techniques effective
in the improvement
of patient compliance**

Cockburn et al., Med. J Aust 1987; 147(7): 324-8.

Factors influencing compliance with antibiotics in RTIs



Low price of antibiotics

- **but even free of charge** antibiotics do not guarantee 100% compliance

- **social insurance vs reduced cost**
the same % of compliant patients

Reyes et al., J Clin Epidemiol 1997; 50: 1297-304.

- **clinical trails!**

Factors influencing compliance with antibiotics in RTIs



Short-term therapy

The nationwide study on compliance of German pediatric patients with oral antibiotic therapy

≤ 7 days

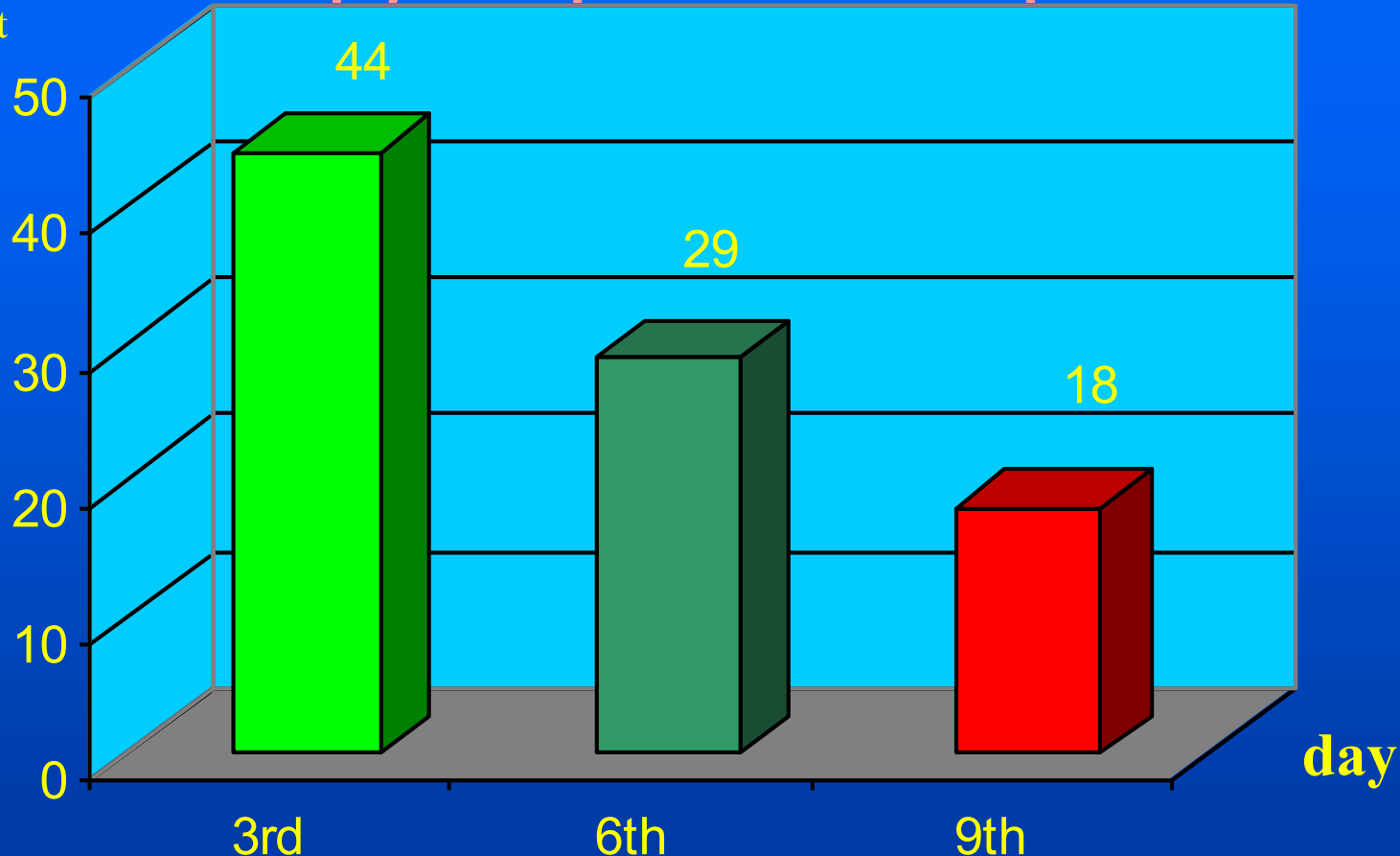
>

> 8+ days

Hoppe et al., *Pediatr Infect Dis* 1999; 18(12): 1085-91

Effect of duration of antibiotic therapy on patient compliance

% of compliant patients

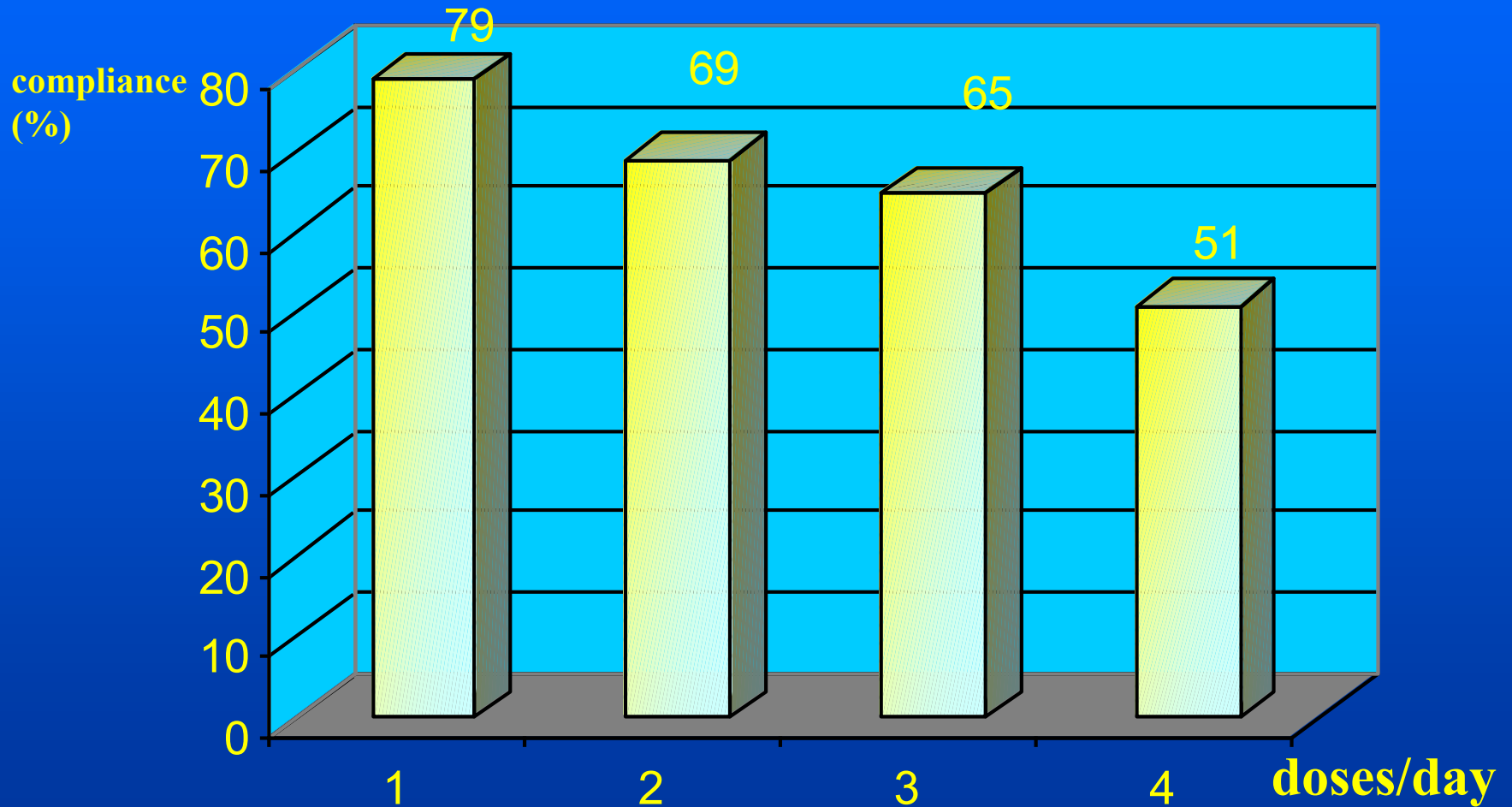


10 day penicillin treatment for streptococcal infections

Bergman et al., N Eng J Med 1963; 268(24): 1334-8.

Factors influencing compliance

frequency of doses



Factors influencing compliance
with antibiotics

frequency of doses
increasing the number

of daily doses by one

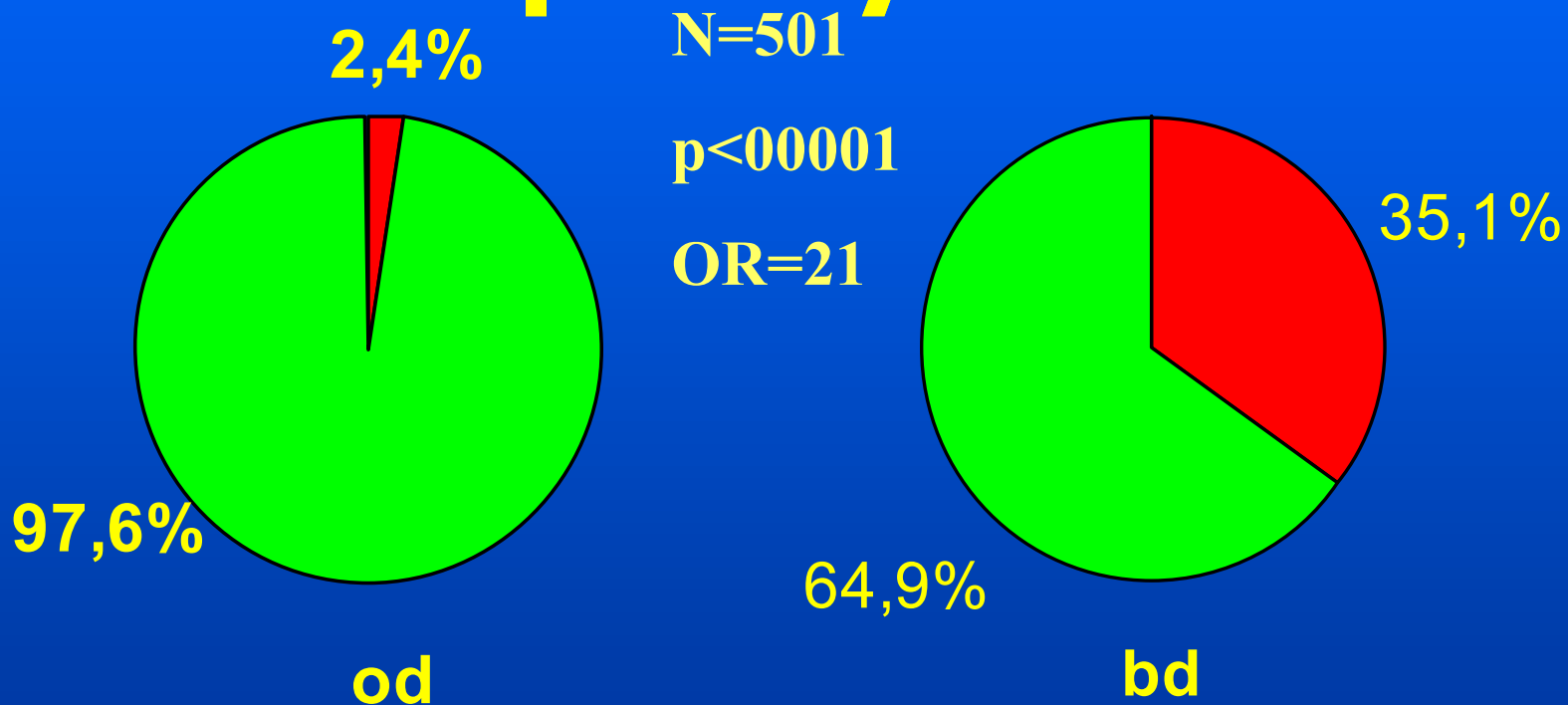
(in the range 1-4)

increased the probability of a patient

being non-compliant by 72%

Factors influencing compliance with antibiotics in RTIs

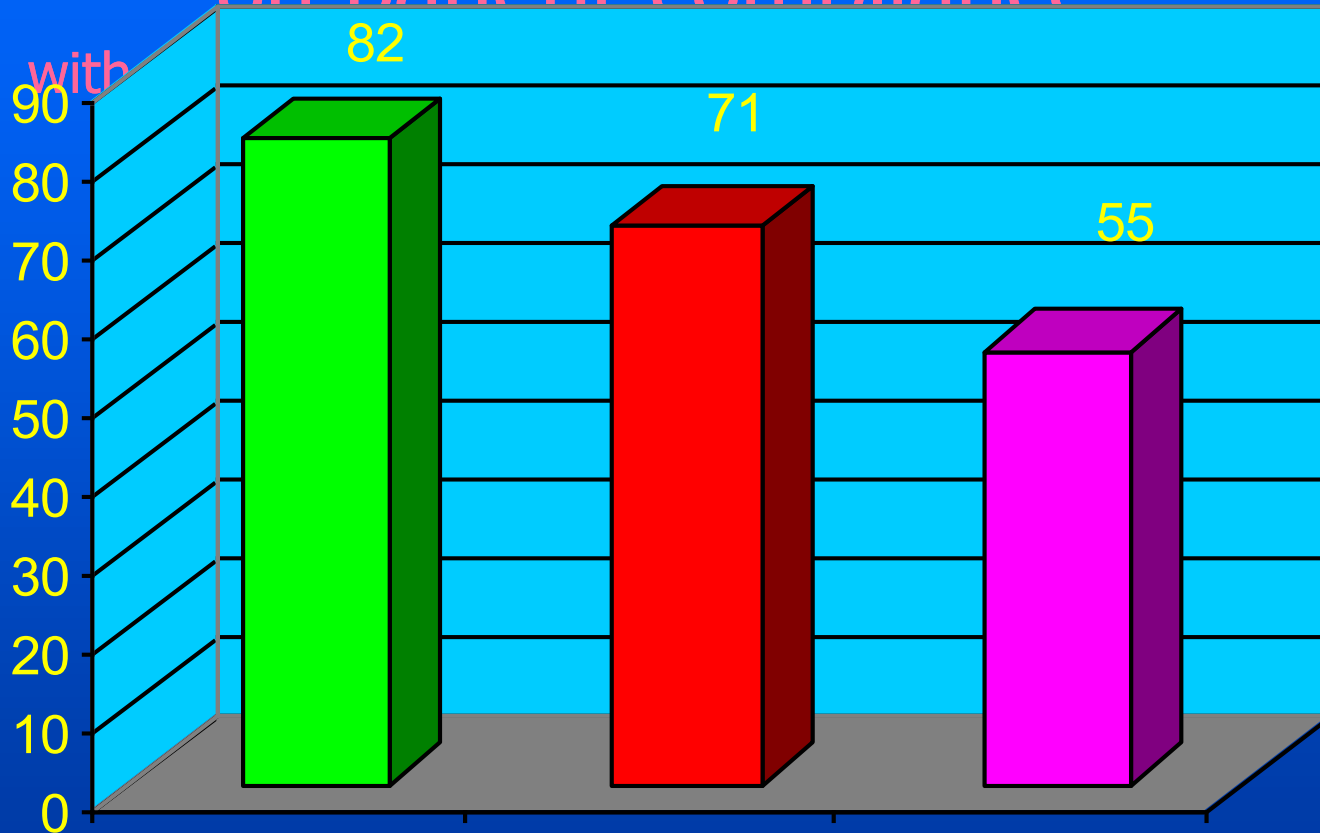
frequency of doses



Kardas, J Applied Res 2003; 3(2): 201-6.

Effect of antibiotic formulation on patient compliance

% of patients taking medication by day 4th



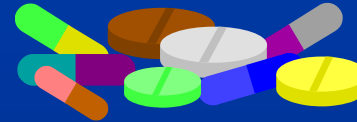
syrup



sachets



tablets



Factors influencing compliance with antibiotics in RTIs

Easy-to-use packaging

Over **10%** of patients in geriatric ward had difficulties with opening at least one commonly used drug packaging



Nikolaus et al., J Clin Pharmacol 1996; 49: 255-9.



Predicting compliance

**Physicians are unable to predict
which patient
will comply
and which one will not**

Eraker et al., *Ann Intern Med* 1997; 1984:258-68.
Cockburn et al., *Med. J Aust* 1987; 147(7): 324-8.

Conclusion:

everyone should be addressed!



Non-compliance - what can be done?

**There is no single method
for solving the problem
of noncompliance....**

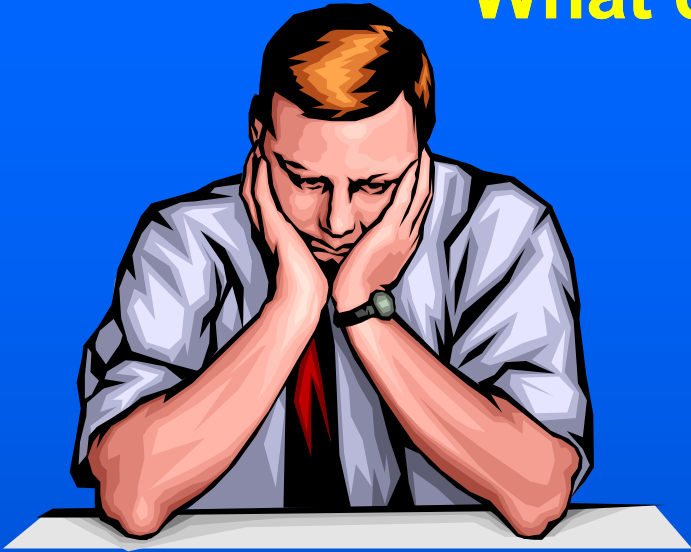


Non-compliance - what can be done?

**... but it would be helpful
to make the treatment**

- **“user-friendly”**
- **“intelligent”**

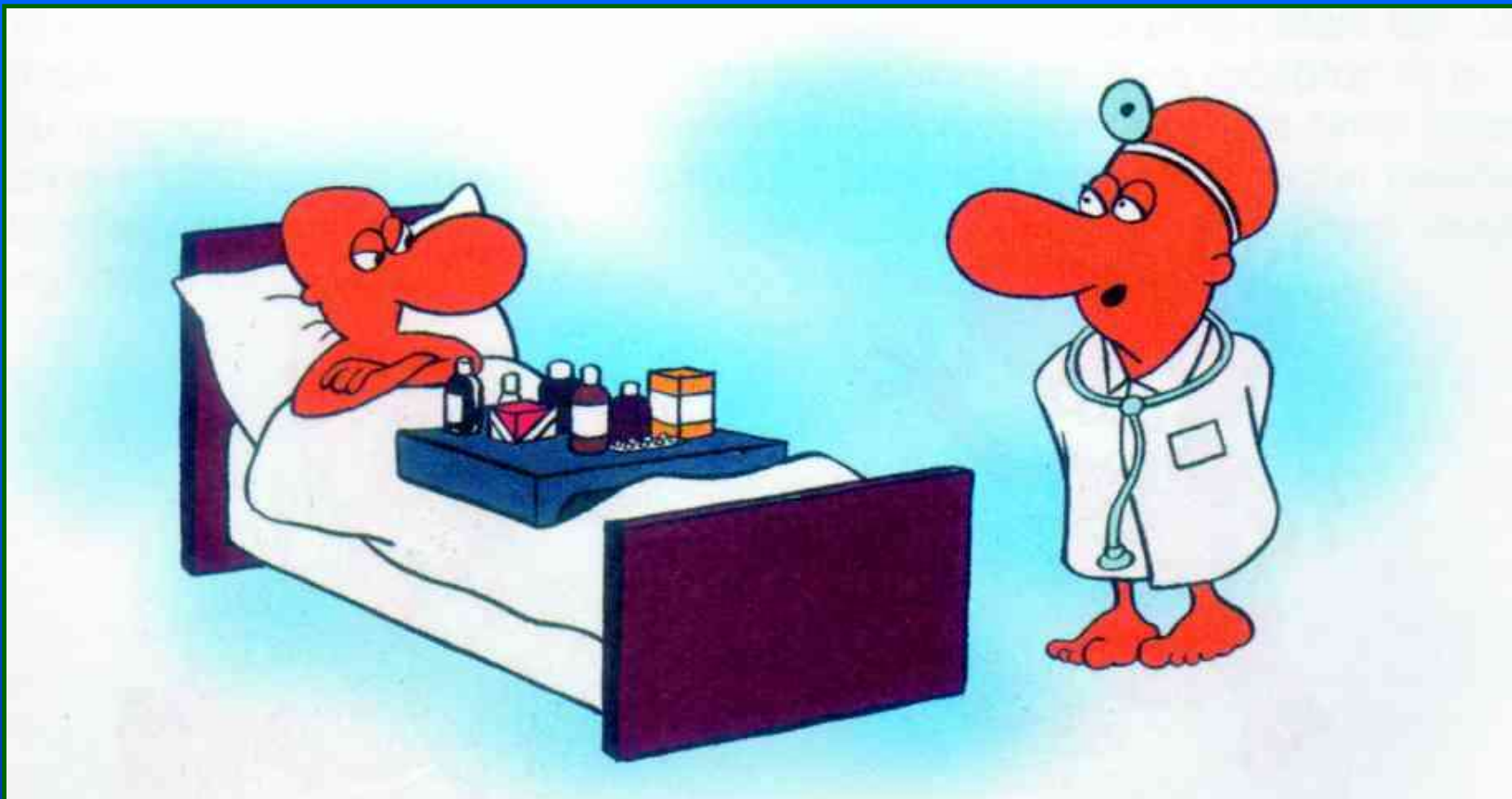
What doctors can do?



*Teach your patient simple skills
on how to follow a dosing plan,
and reinforce the message at every visit*

Cramer J., Heart 2002; 88: 203-206

Nieprzestrzeganie zaleceń terapeutycznych - *i co dalej?*



lekarz może odstąpić od leczenia, jeśli pacjent nie stosuje się do zaleceń lekarza...

Zajdel J, Gaz Lek 2010, 1 (229): 26-7.

Interwencje sprzyjające przestrzeganiu zaleceń terapeutycznych: **edukacja**



Interwencje sprzyjające przestrzeganiu zaleceń: **współudział i samokontrola**



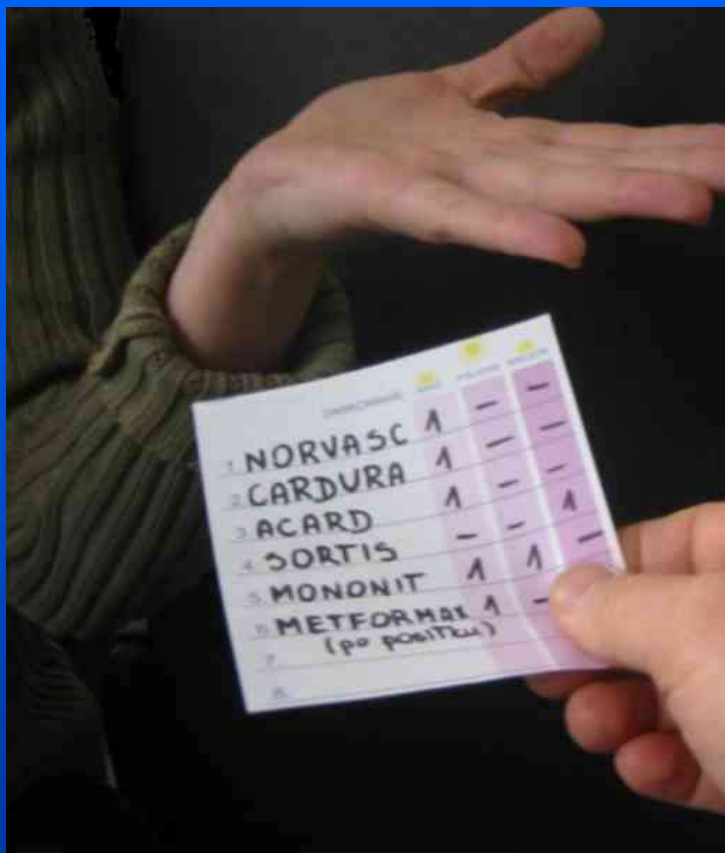
- aktywny współudział pacjenta w terapii
- nadzór i kontrola ze strony lekarza

Interwencje sprzyjające przestrzeganiu zaleceń terapeutycznych: przypomnienia



- pomoc rodziny i osób trzecich
- *reminders*
- powiązanie przyjmowania leków z innymi czynnościami

Zalecenia terapeutyczne – zawsze pisemnie



Zalecenia terapeutyczne – zawsze pisemnie

Lek	Rano	Południe	Wieczór	Uwagi
Aaaaaaa	1	1	1	na czczo
Bbbbbbb	1	-	1/2	po posiłku
Ccccccc	2	-	-	1/2 godz. przed posiłkiem