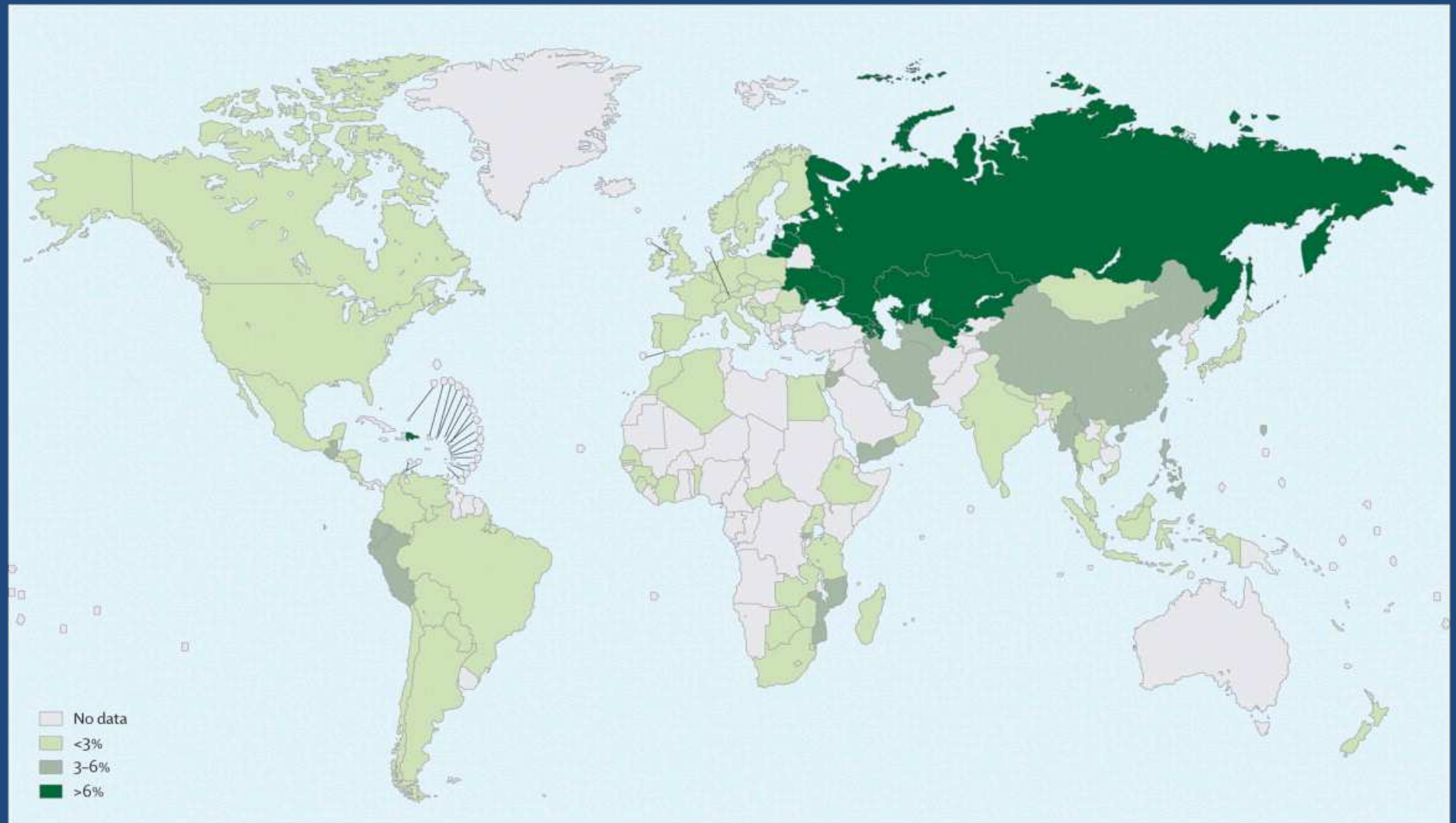


# The threat of drug resistant tuberculosis in eastern Europe

Alexander Panteleev  
Head of the HIV/TB department  
City TB Hospital # 2, St-Petersburg, Russia

14<sup>th</sup> November 2009  
XII EACS conference  
Cologne, Germany

# Distribution of multidrug-resistant tuberculosis among new TB cases, 1994–2007

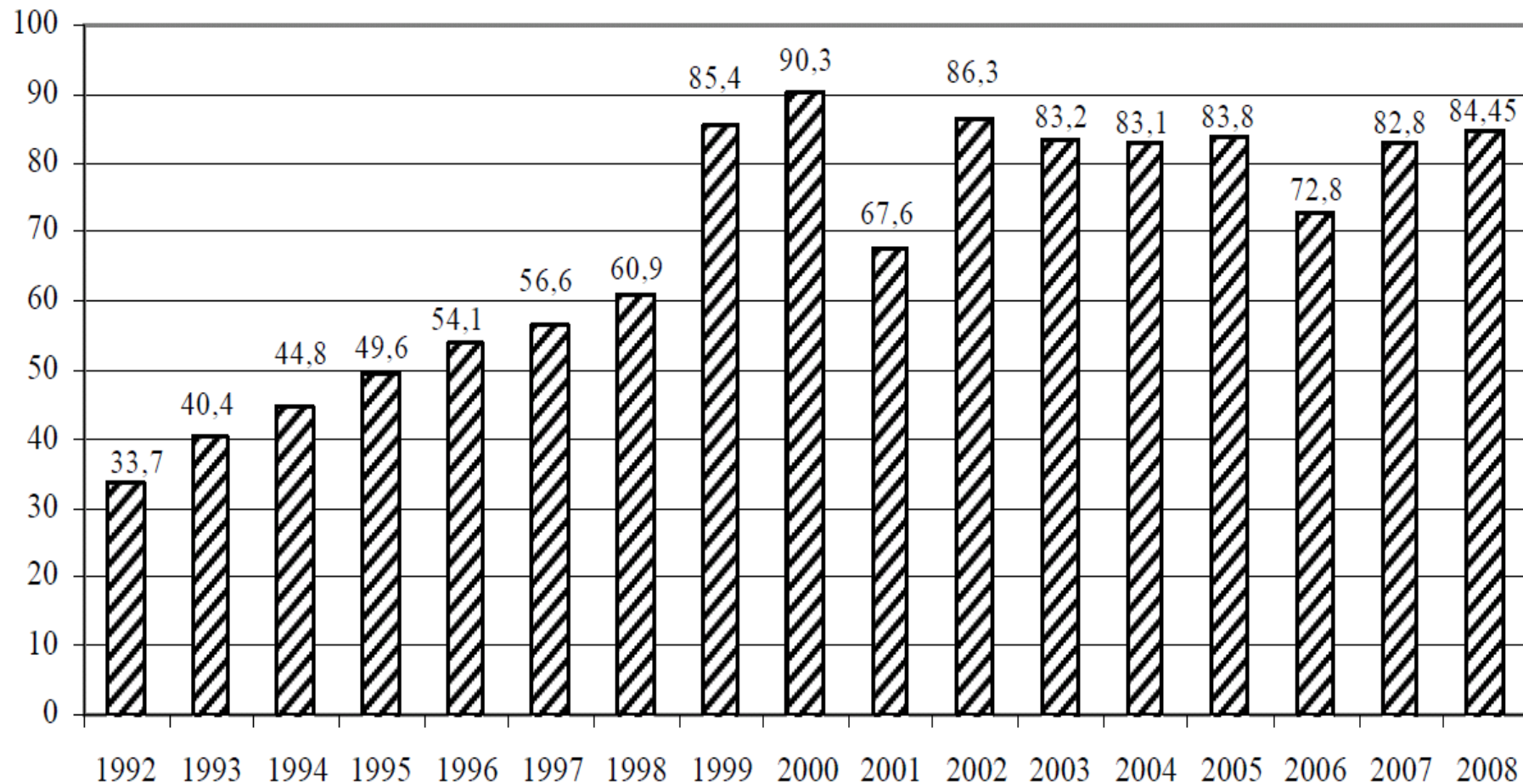


## Incidence of TB in the countries of former USSR, 2006

• Latvia	57	Per 100.000 population
• Lithuania	62	
• Ukraine	83	
• Kazakhstan	134	

# Incidence of TB in Russia 1992-2008

per 100.000 population

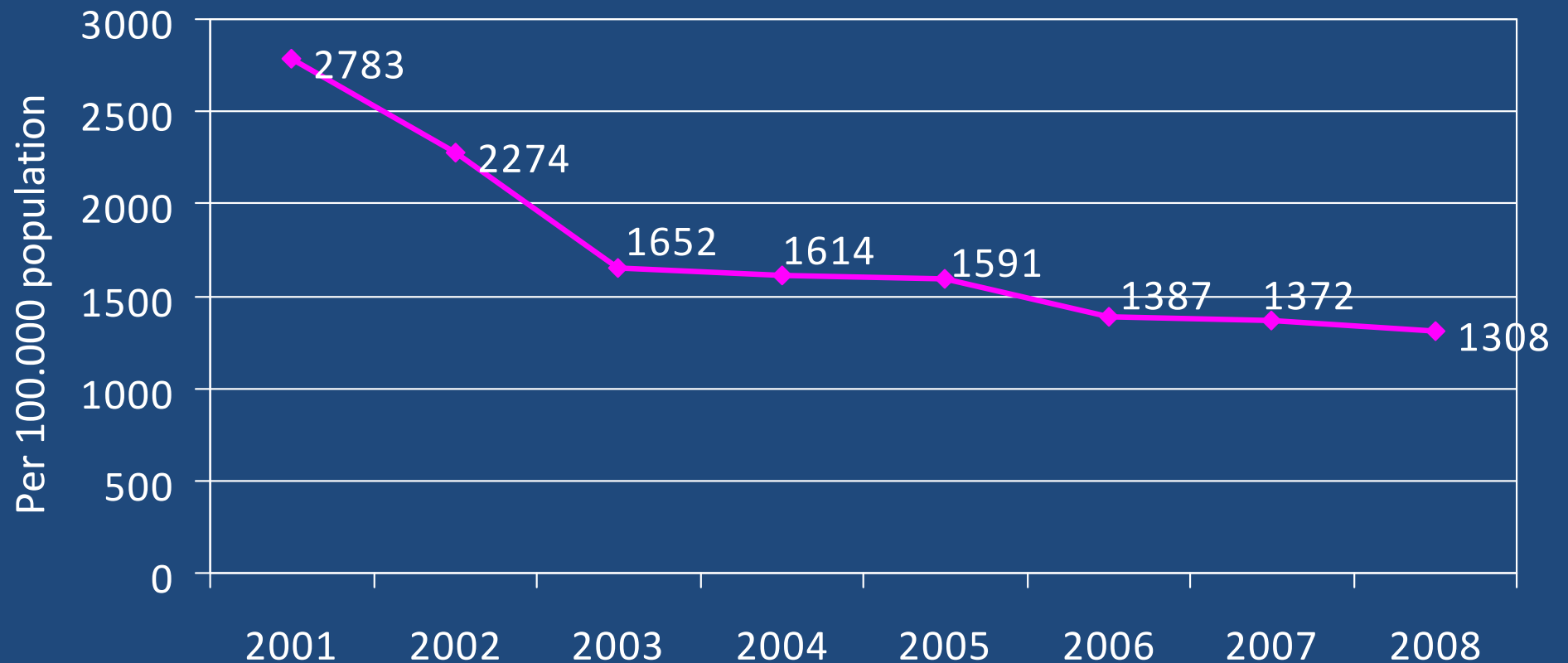


Ministry of health Russia, 2008

# Tuberculosis in Russia in 2008

	Per 100.000
Incidence, general population	84
Incidence, penitentiary system	1308
Prevalence, general population	194

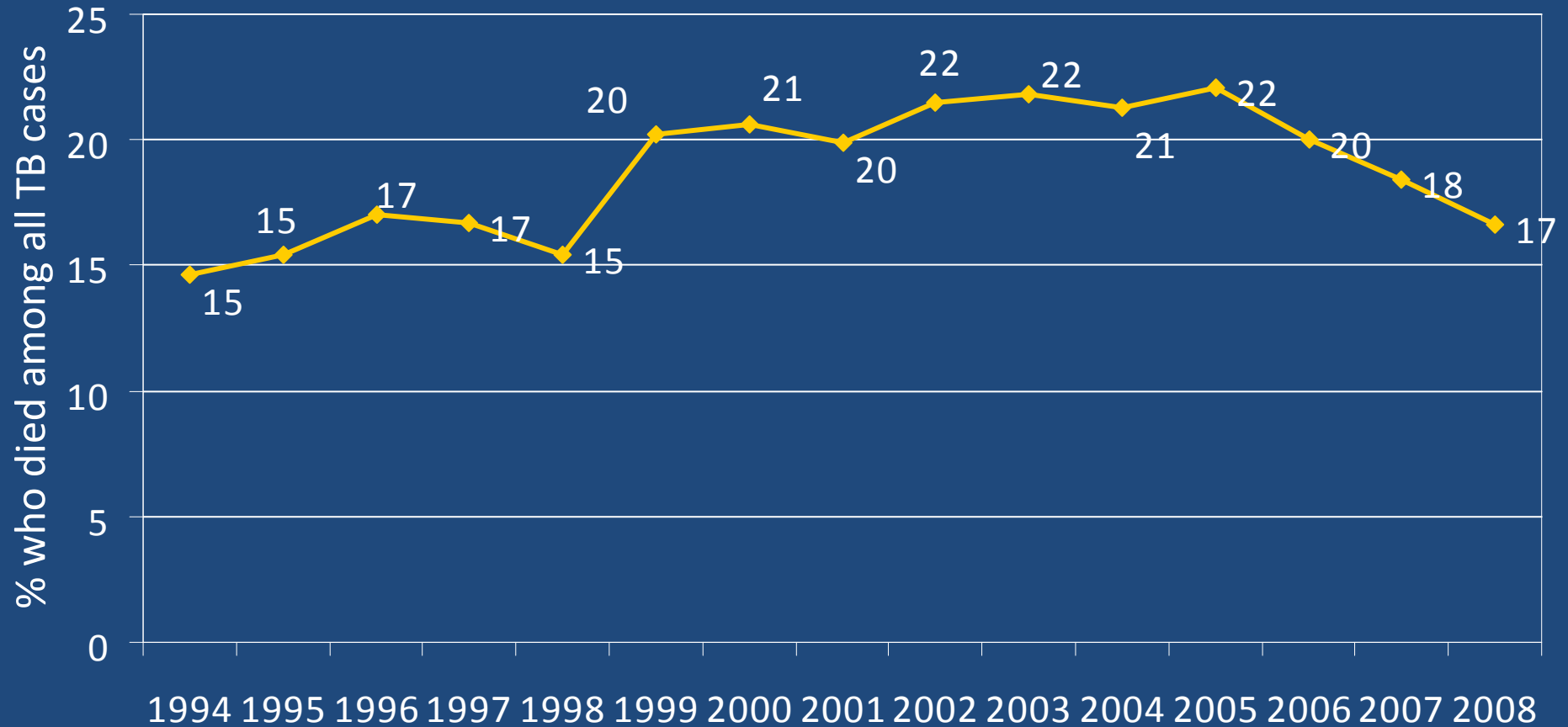
# TB incidence in Russian prisons per 100.000 population



Ministry of health Russia, 2008

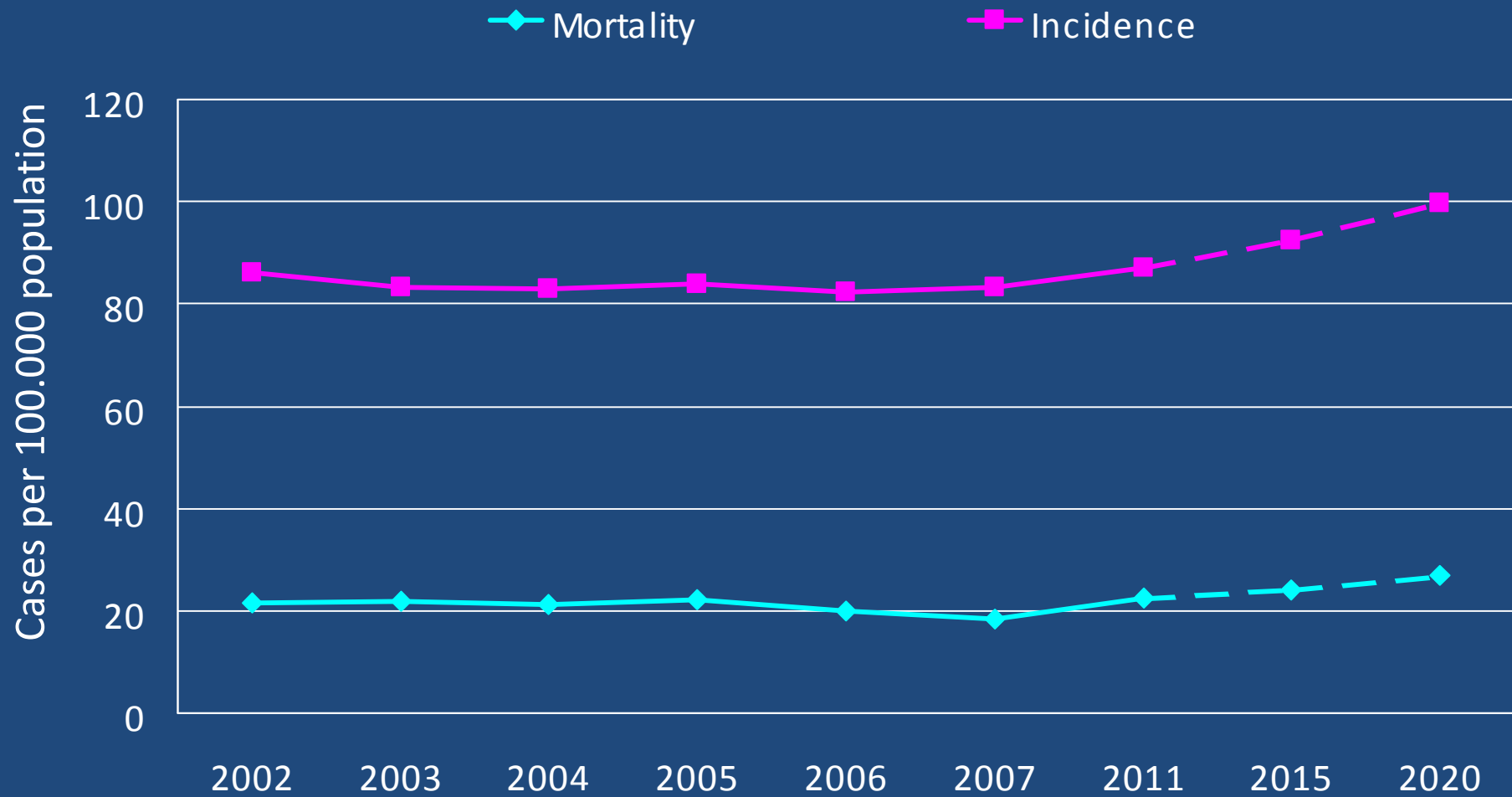
# TB mortality in Russia

## 1994 - 2008



Ministry of health Russia, 2008

# Prognoses of TB development in Russia

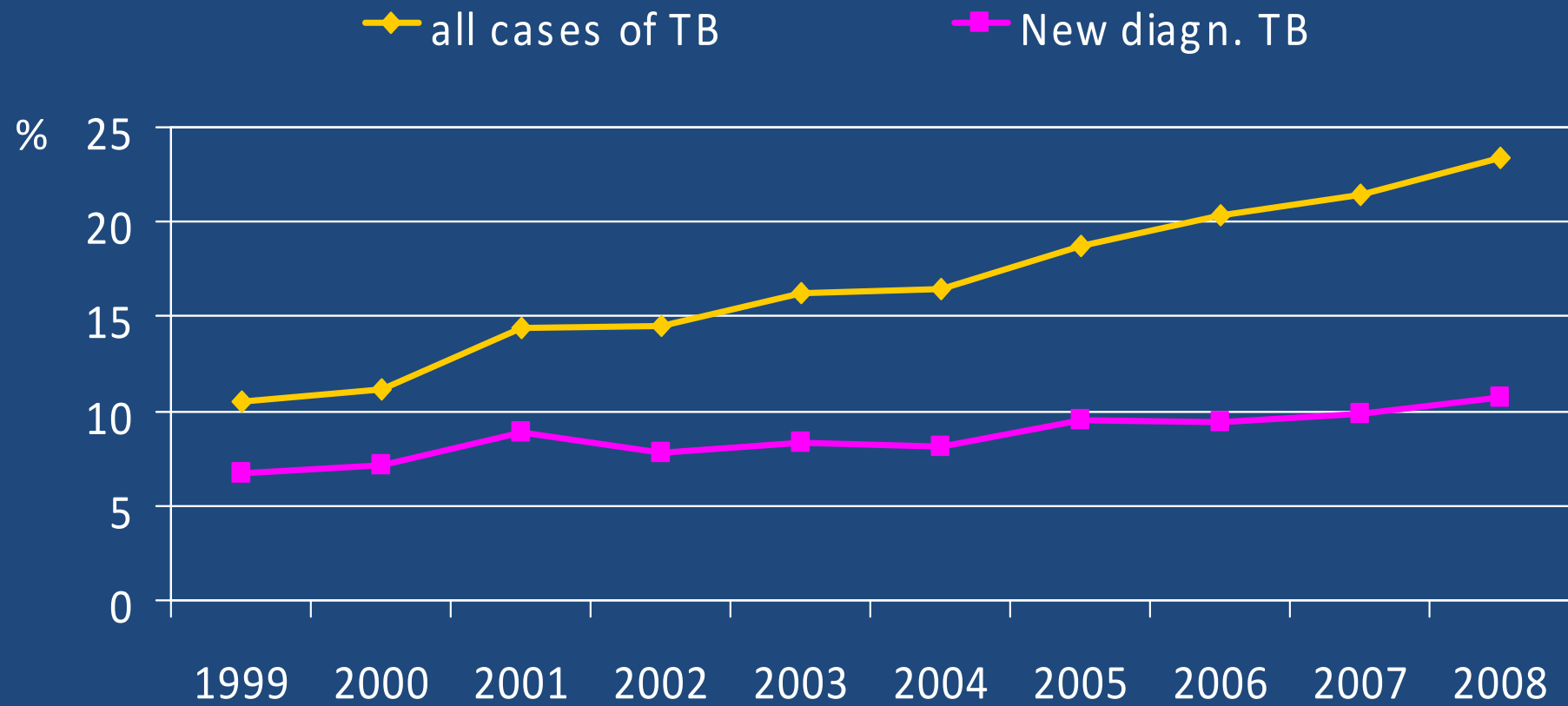


Ministry of health Russia, 2008

## Proportion of MDR-TB cases among all TB cases in eastern Europe

Country	%
Azerbaijan	36
Kazakhstan	32
Republic of Moldova	29
Uzbekistan	24
Russian Federation	21
Estonia	20
Ukraine	19
Lithuania	17
Belarus	16
Latvia	14

# MDR-TB in Russia 1999-2008

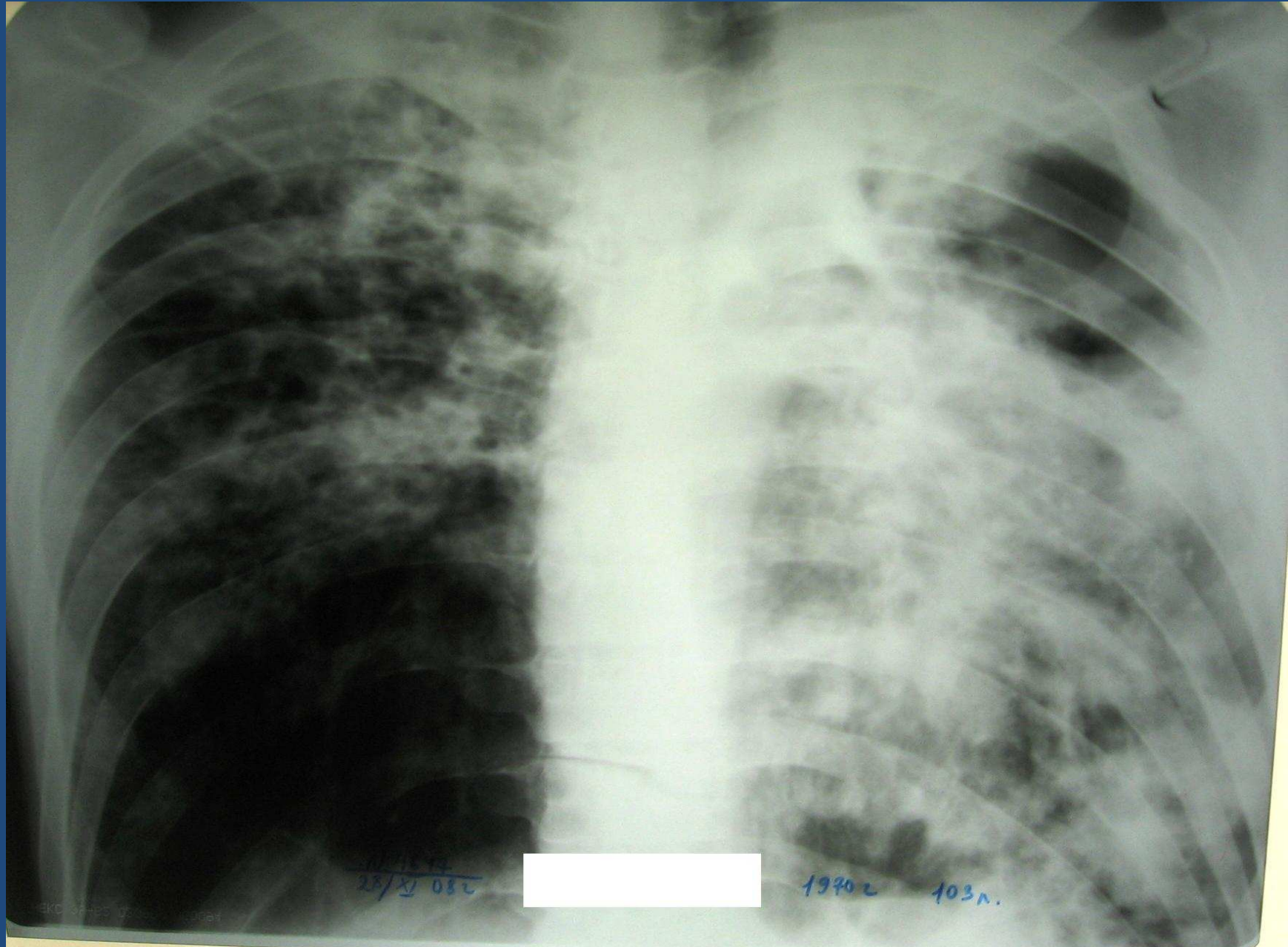


Ministry of health Russia, 2008

# Causes of MDR-TB

- High proportion of chronically-ill patients
  - TB disease > 1 year
- Among all TB cases, high frequency of chronic forms
  - E.g. 2008: 120.000 new TB cases + >100.000 chronic cases
- “Old” drugs and limited options of new drugs on the market
  - E.g. Isoniazid used > 40 years
- Low living standards
- Migration
- Prisons

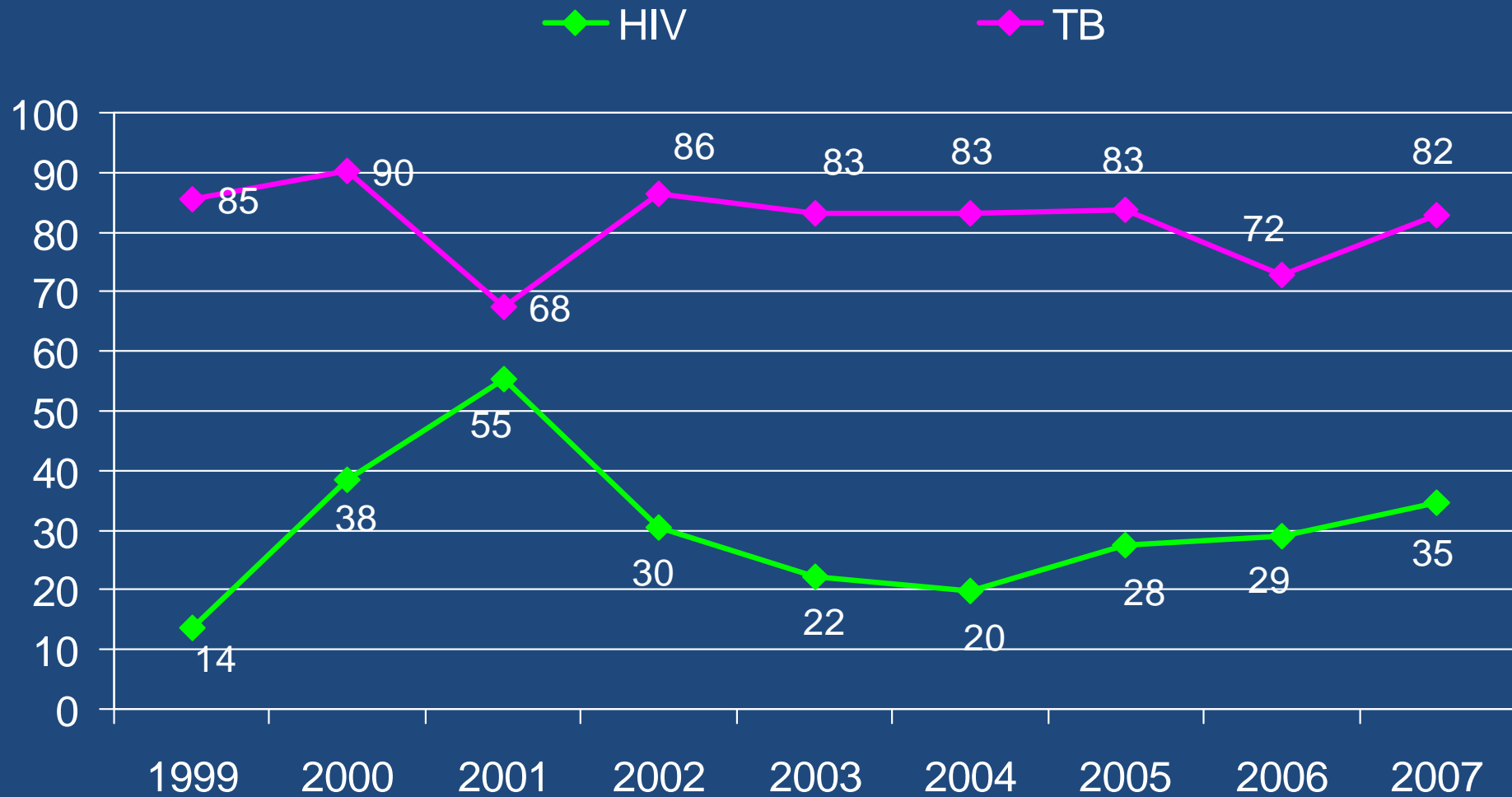
# Example of chronically-ill TB patient



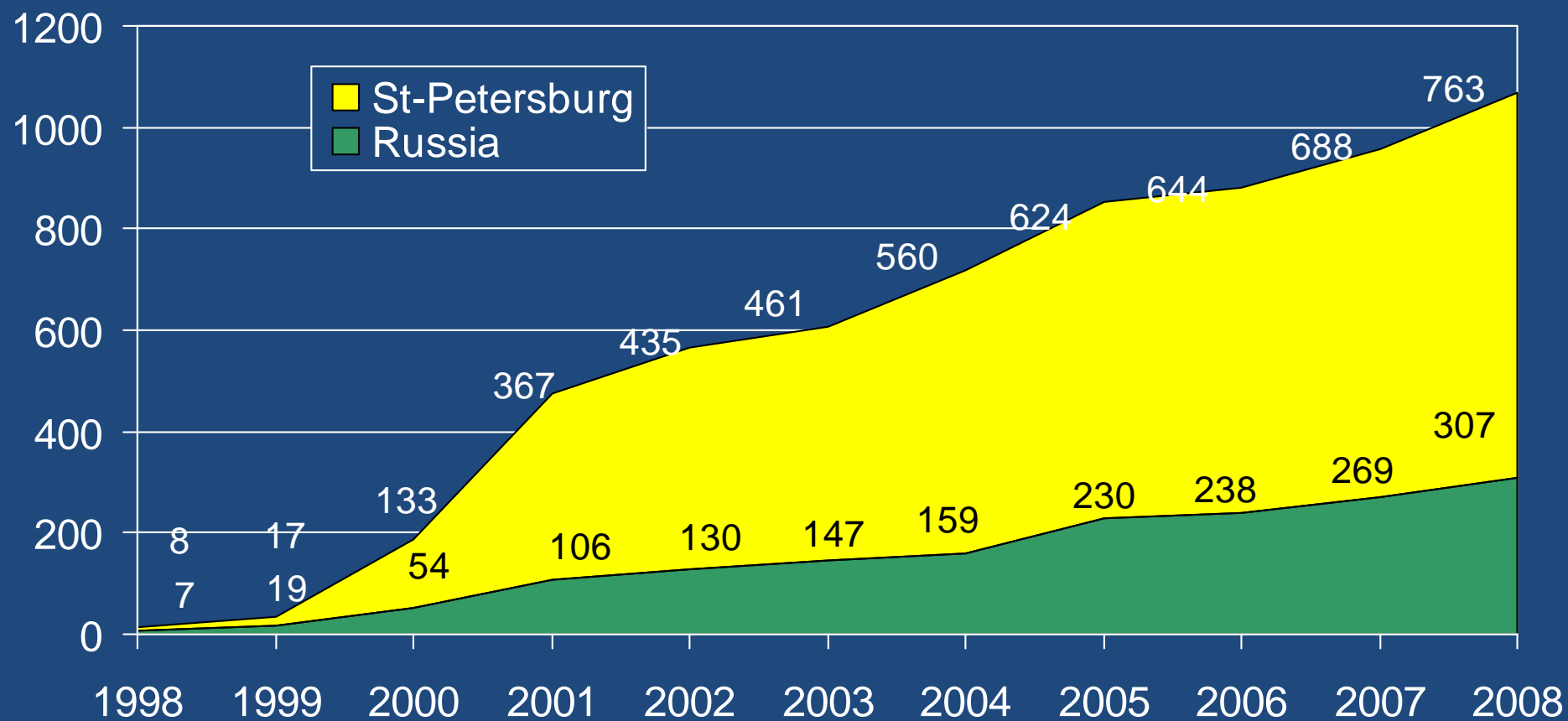
# Causes of MDR-TB

- Deterioration of health care system
- Using of inadequate treatment regimens
- Impossible to complete isolation of patients and the absence of compulsory treatment
- Low patients' compliance
  - Low education
  - IDU and alcohol
- HIV epidemic

# New cases of HIV and TB in Russia 1999-2007, per 100.000 population

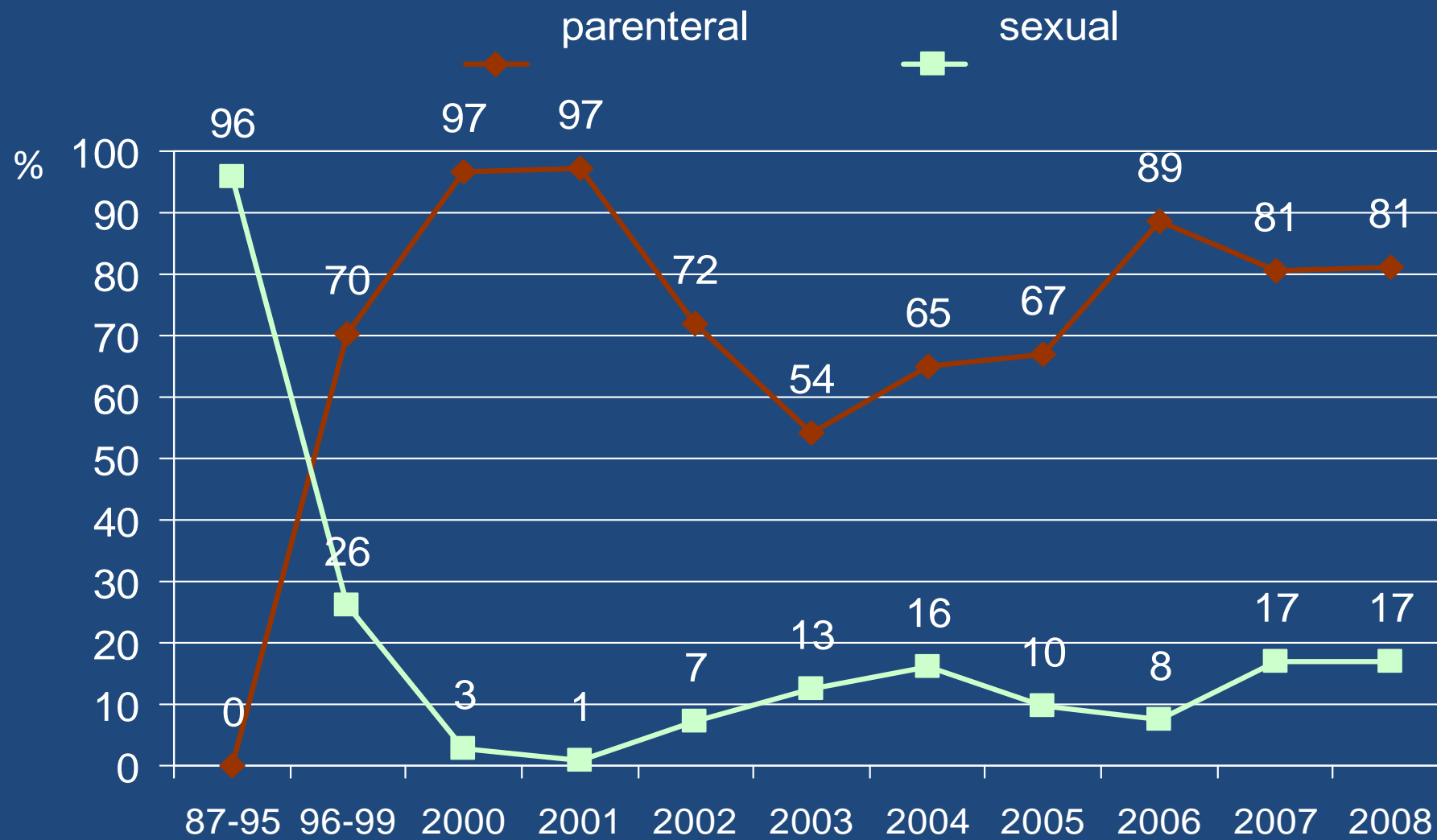


# Prevalence of HIV in Russia and in St-Petersburg 1998-2008, per 100.000 population

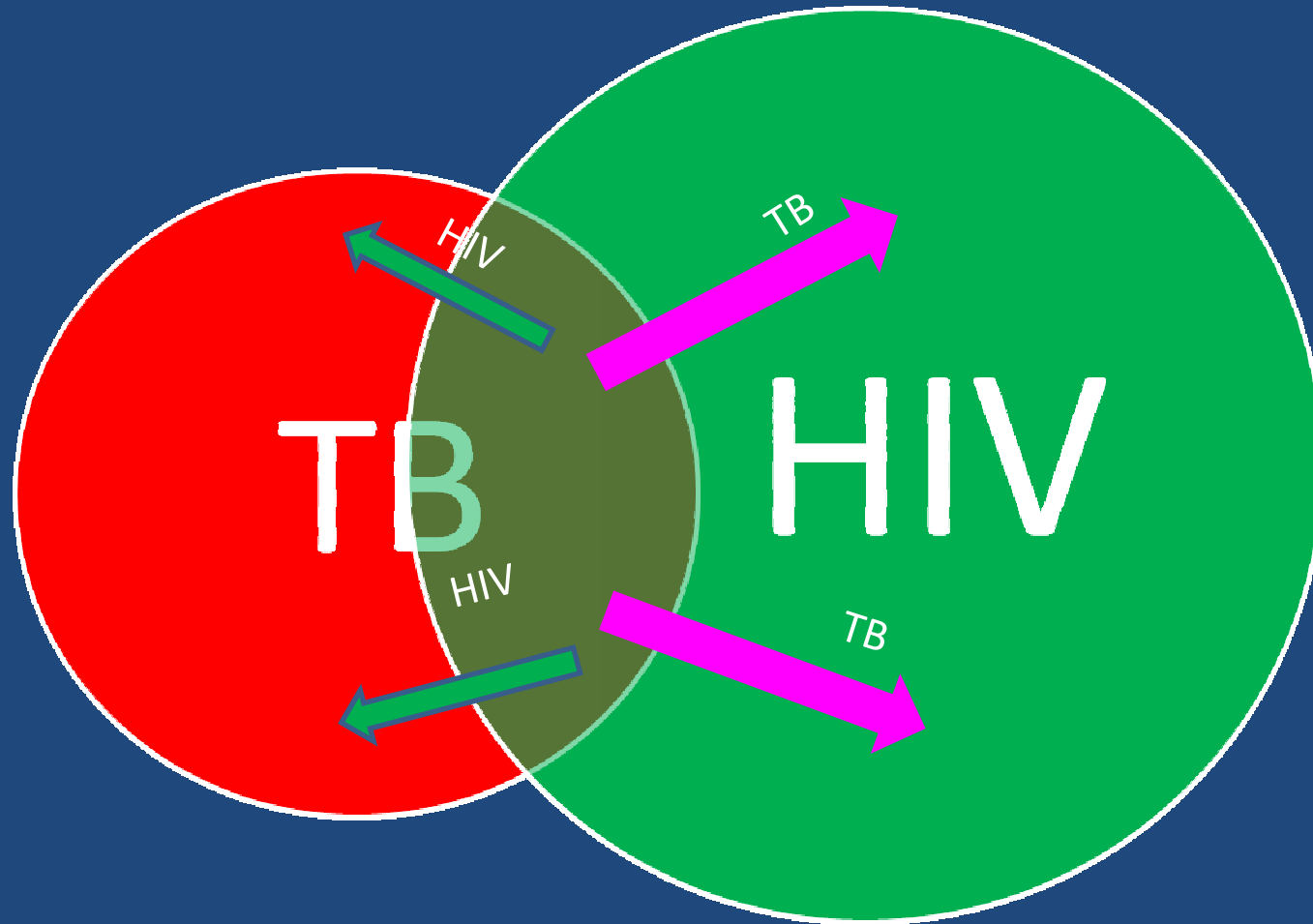


# Transmission of HIV infection

## 1987-2008 St-Petersburg, Russia



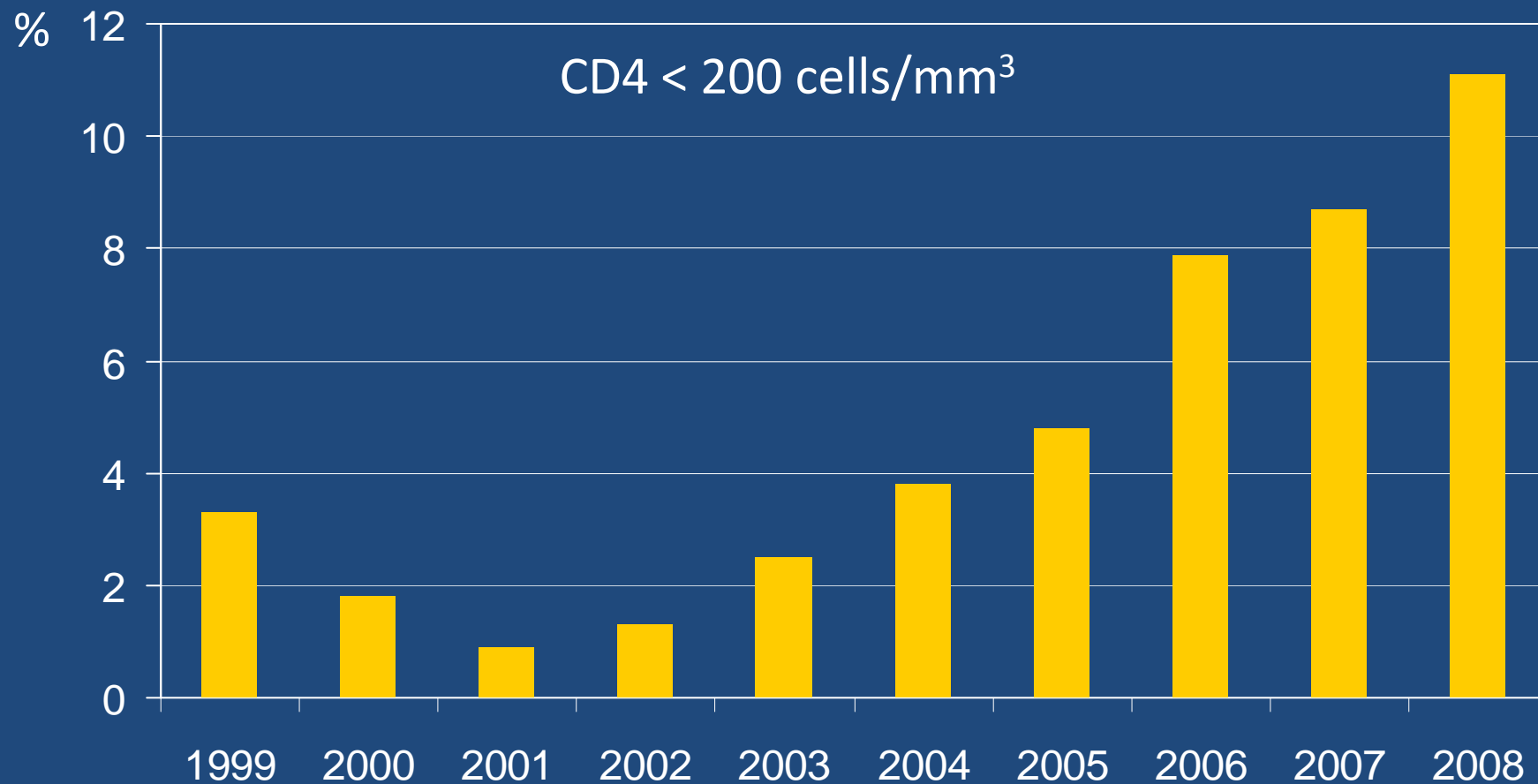
# Two epidemics in Russia



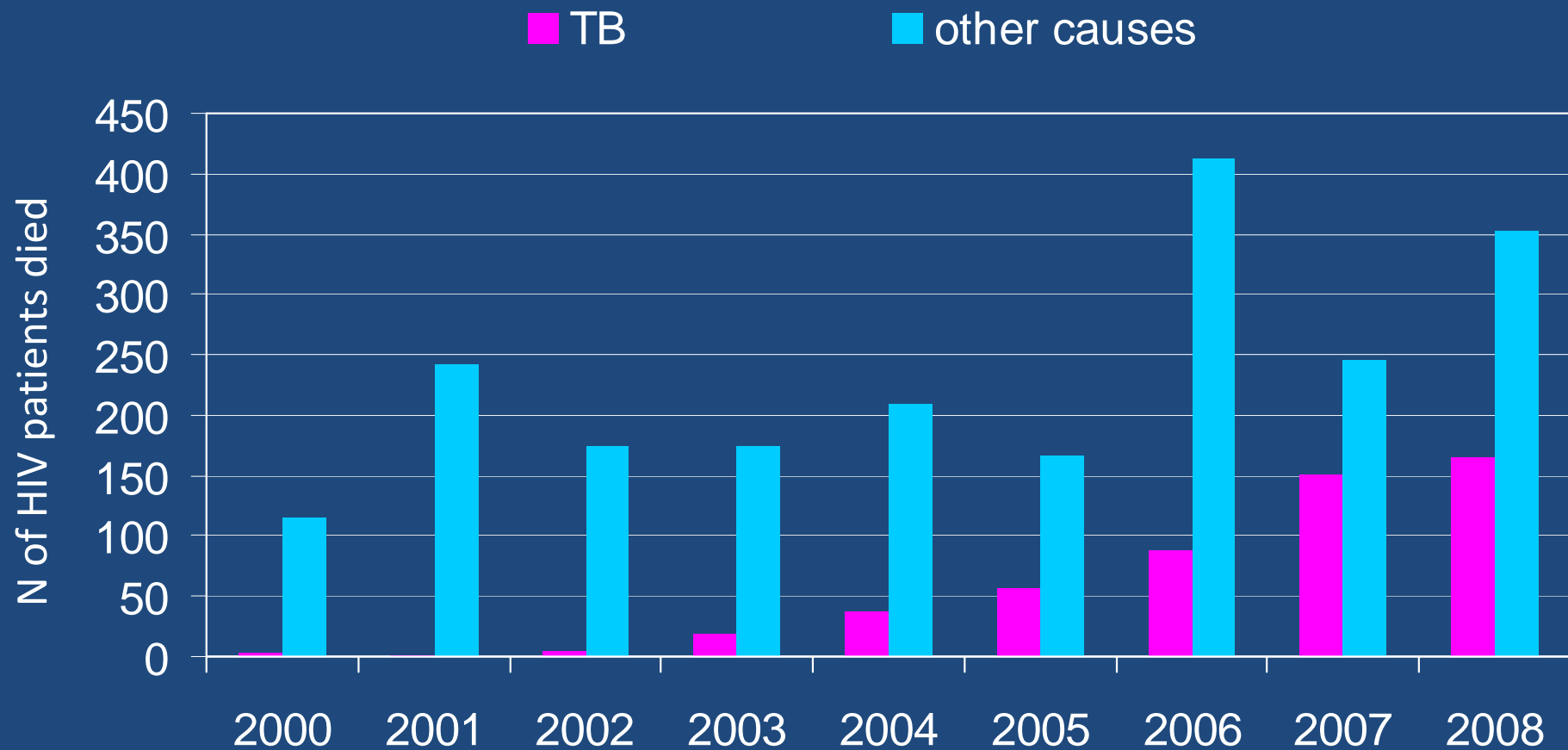
# Stages of HIV/TB epidemic development in St. Petersburg

- 1 stage (1999 - 2001) – first cases of HIV infection in TB patients
- 2 stage (2002 - 2004) – increase in the number of HIV/TB patients - the appearance of cases with simultaneous detection of tuberculosis and HIV-infection
- 3 stage (2005 - 2007) – increase in the cumulative number of HIV/TB patients, increasing of TB cases among patients with established HIV-infection
- 4 stage (from 2008) – extensive spread of TB among HIV-patients associated with the increasing number of patients with advanced HIV infection

# Frequency of recording of HIV-infected patients at a late stage in Russia 1999 - 2008

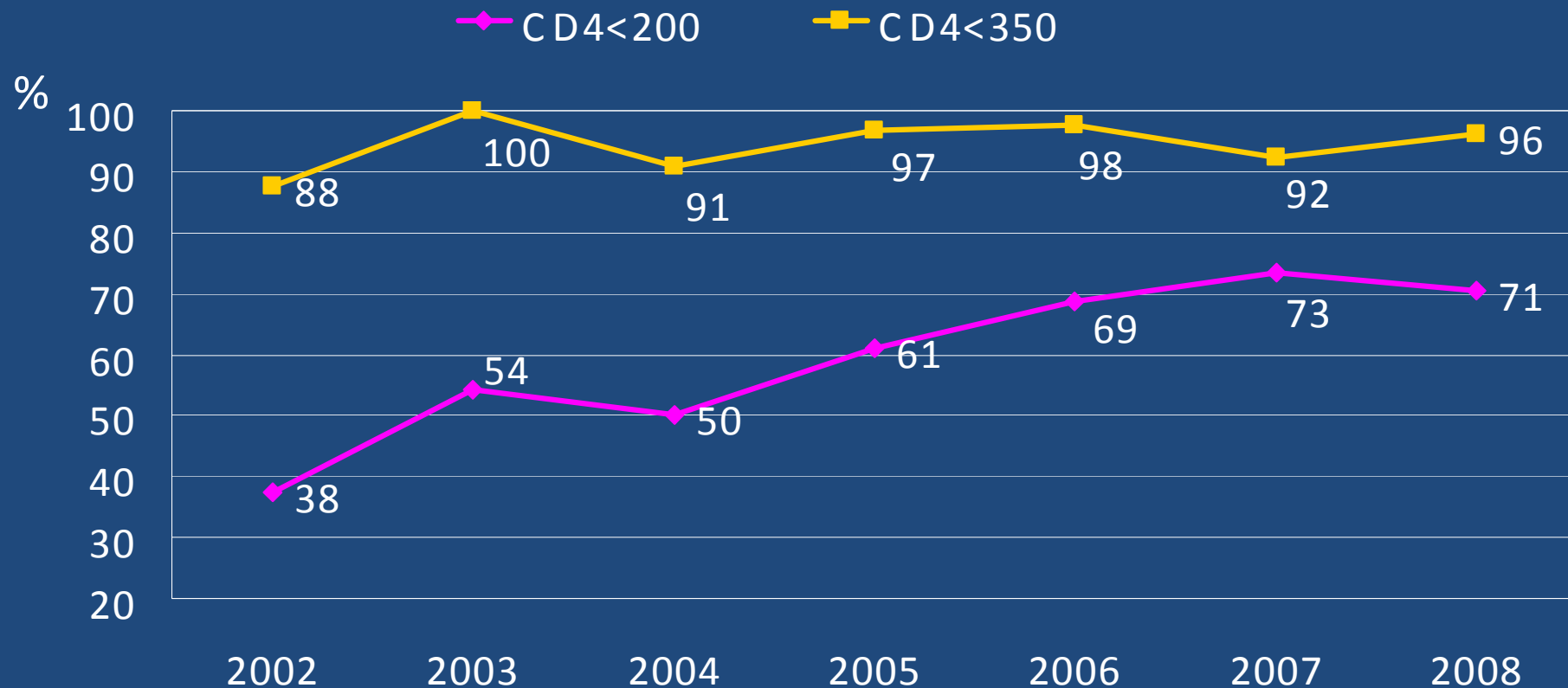


# TB mortality among overall mortality of HIV-patients 2000-2008 St-Petersburg, Russia



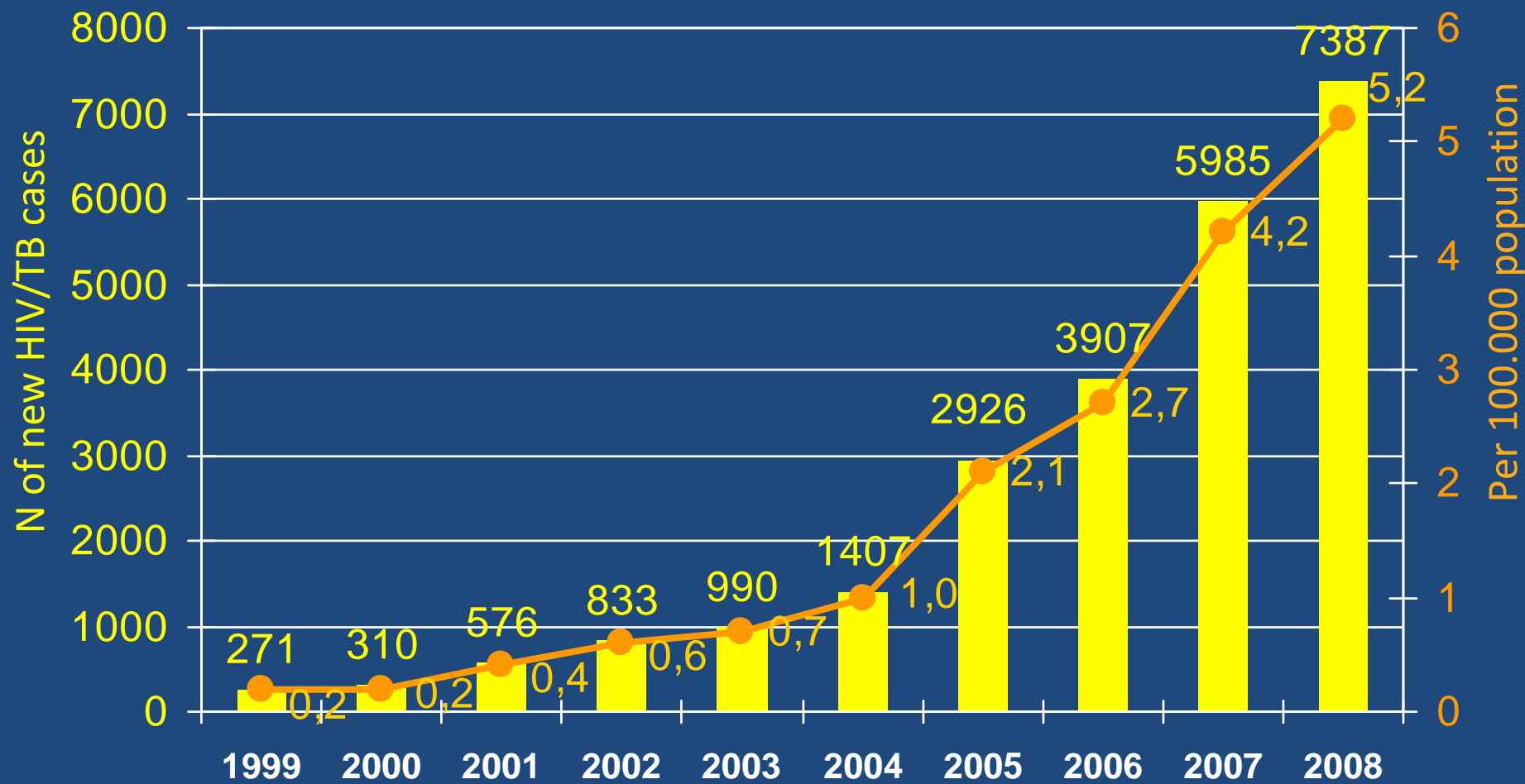
# Proportion of HIV/TB patients with CD4 < 200 and CD4 < 350 cells/mm<sup>3</sup> at TB diagnosis

## TB hospital #2 St-Petersburg, Russia

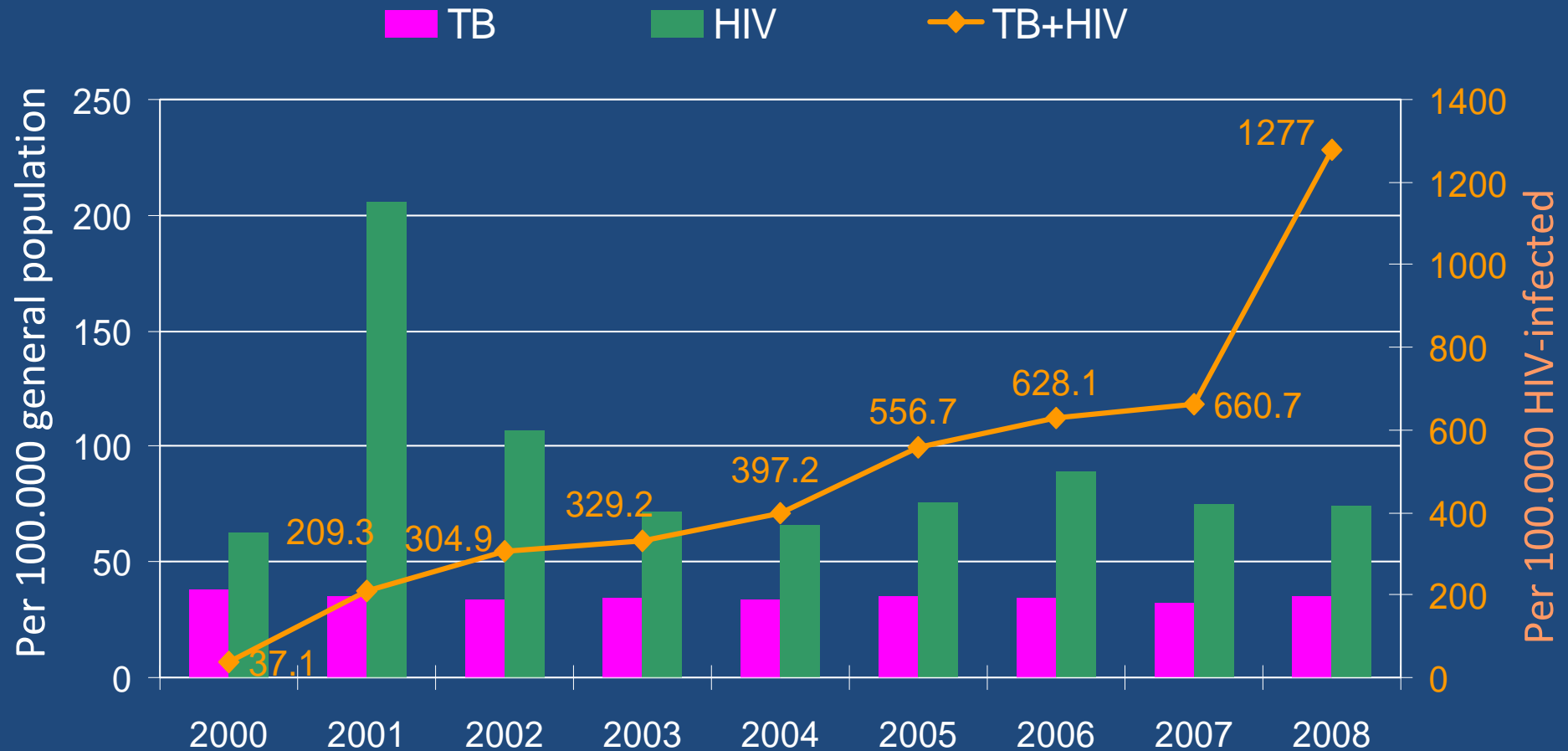


# New cases of HIV/TB in Russia 1999-2008

■ cases      ● per 100.000 population

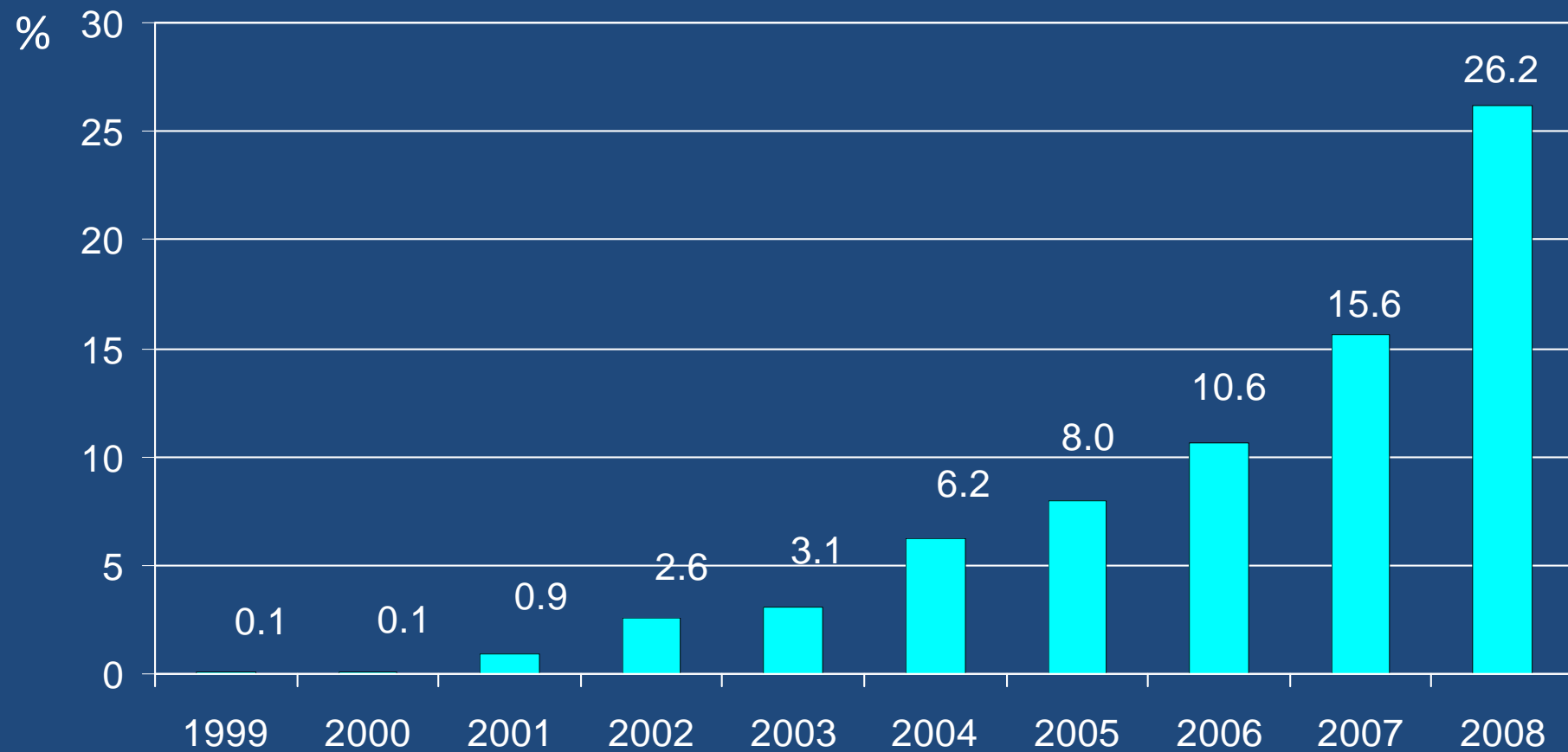


# Incidence of HIV and TB in general population and incidence of TB in HIV-population 2000-2008 St.-Petersburg, Russia

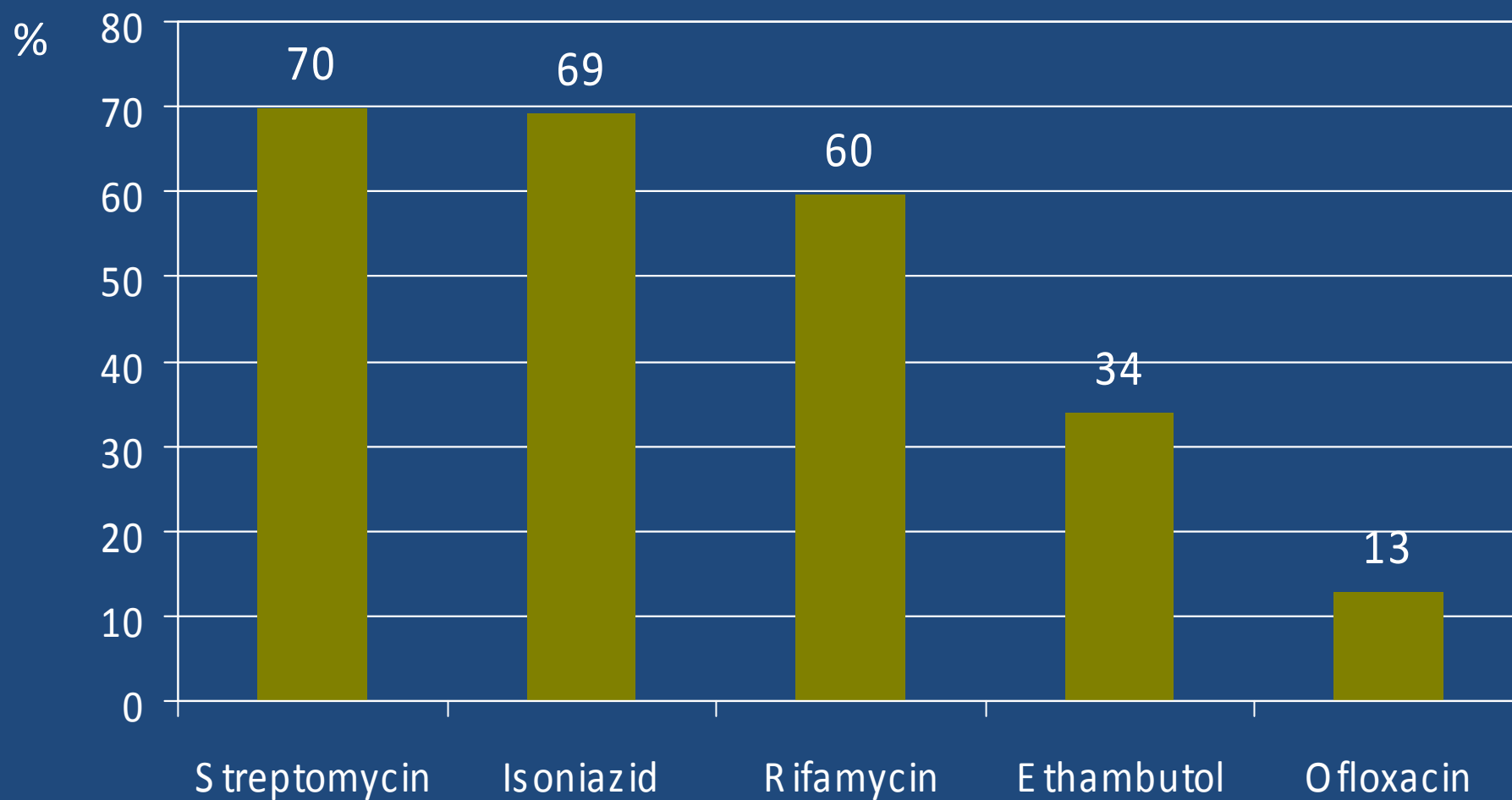


# Proportion of HIV cases among newly diagnosed TB cases

## TB hospital #2 St-Petersburg, Russia



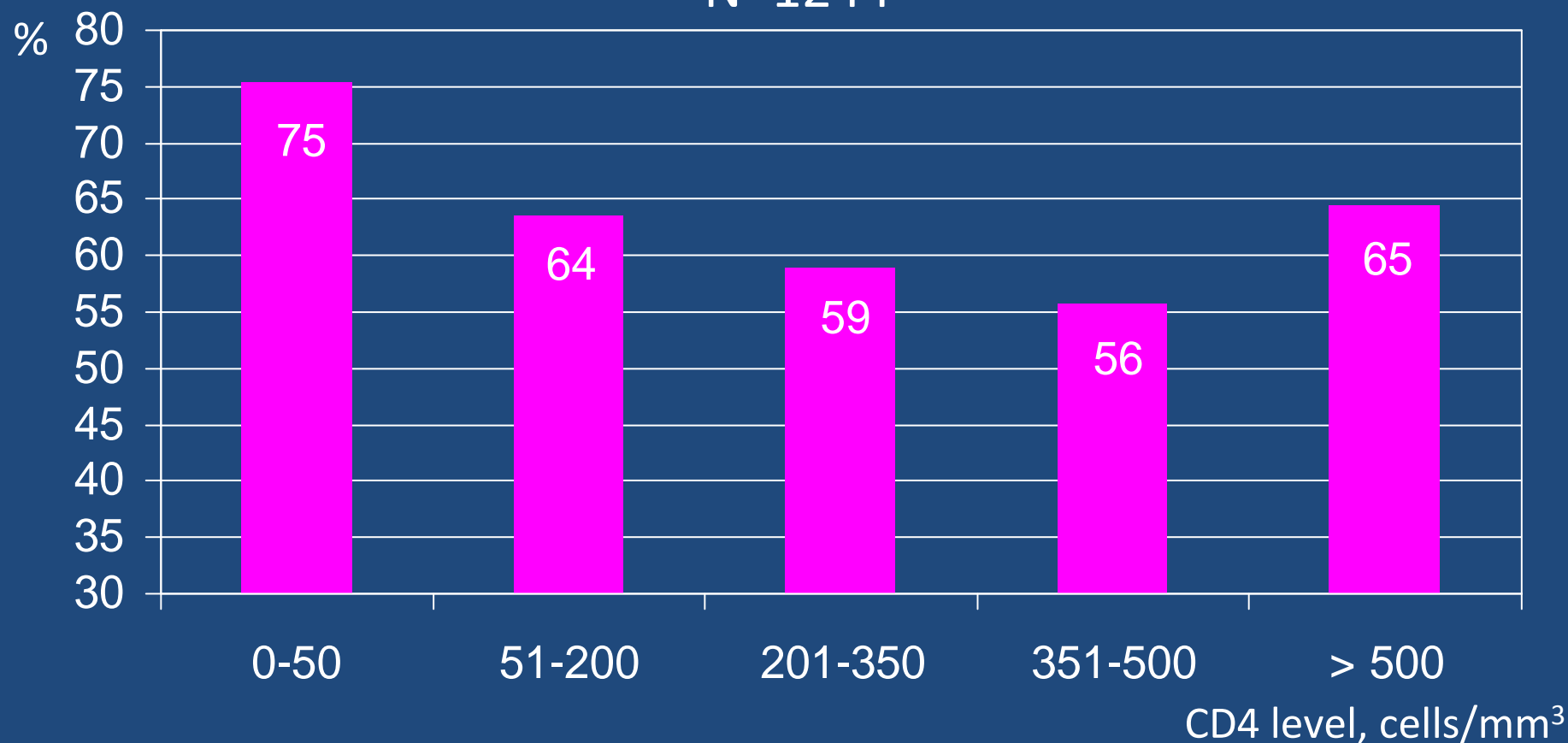
## Frequency of drug resistance in HIV/TB patients TB hospital #2 St-Petersburg, Russia



# Frequency of MBT-positive tuberculosis in HIV-infected patients according to the CD4 cells level

TB hospital #2 St-Petersburg, Russia

N=1244



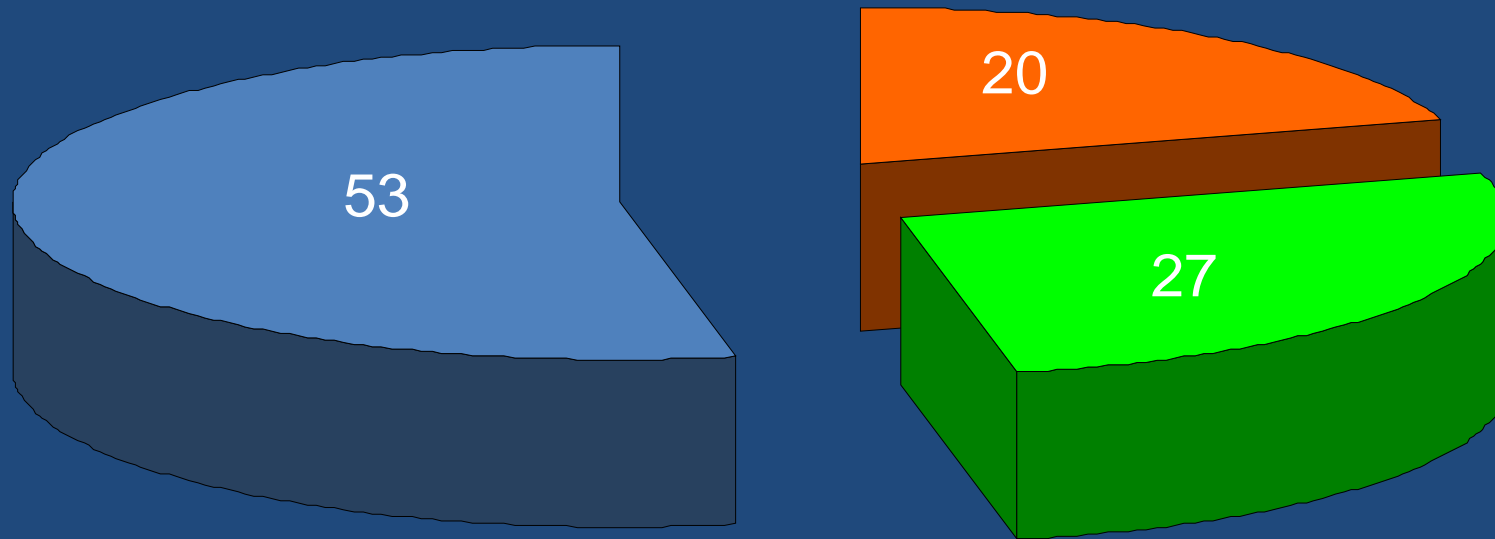
MBT-positive – *Mycobacteria tuberculosis* detected by microscopy and/or culture

# Detection of MBT in HIV/TB patients

## TB hospital #2 St-Petersburg, Russia

MBT was detected in 827 patients (67%) out of total 1244 HIV/TB patients

■ culture    ■ microscopy    ■ culture + micro



# Drug resistance in HIV/TB patients

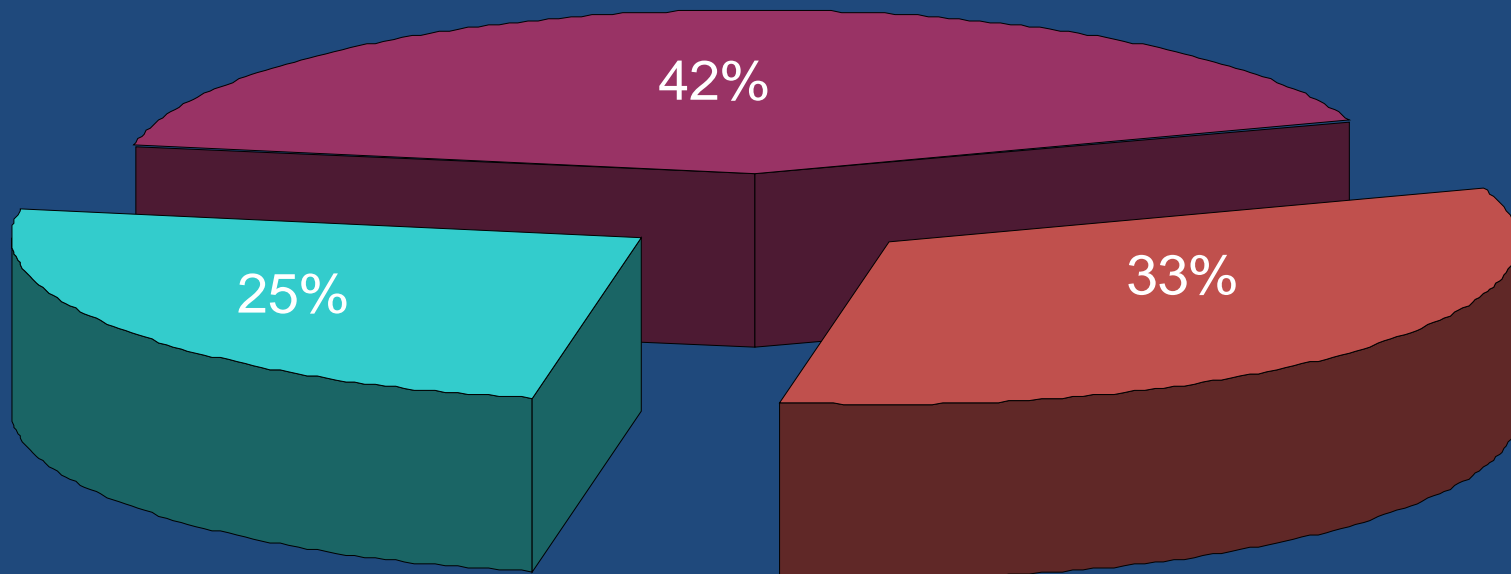
TB hospital #2 St-Petersburg, Russia

N culture positive = 604

■ Sensitive

■ Primary DR

■ Secondary DR



# Drug resistance in HIV/TB patients

TB hospital #2 St-Petersburg, Russia

## MDR

N tested 604

**56%**

## XDR

N tested 284

**10%**

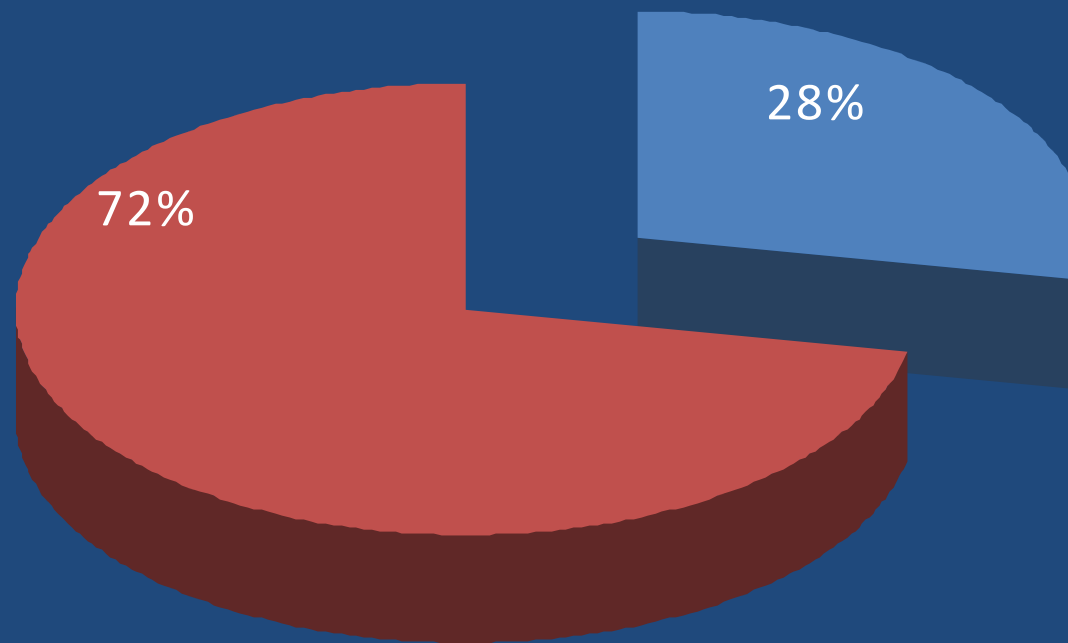
# XDR-TB in HIV/TB patients

TB hospital #2 St-Petersburg, Russia

N with XDR-TB = 29

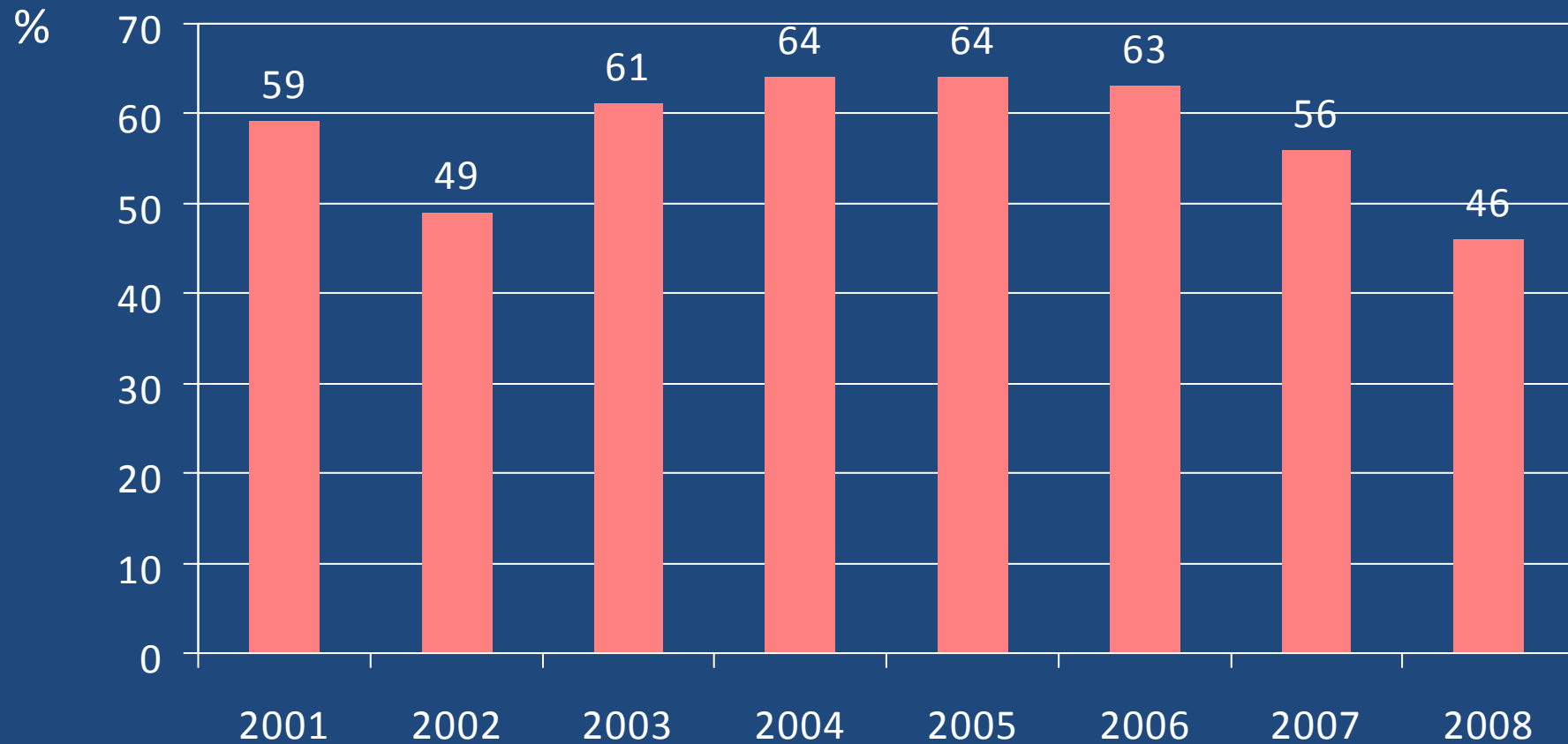
■ Primary DR

■ Secondary DR



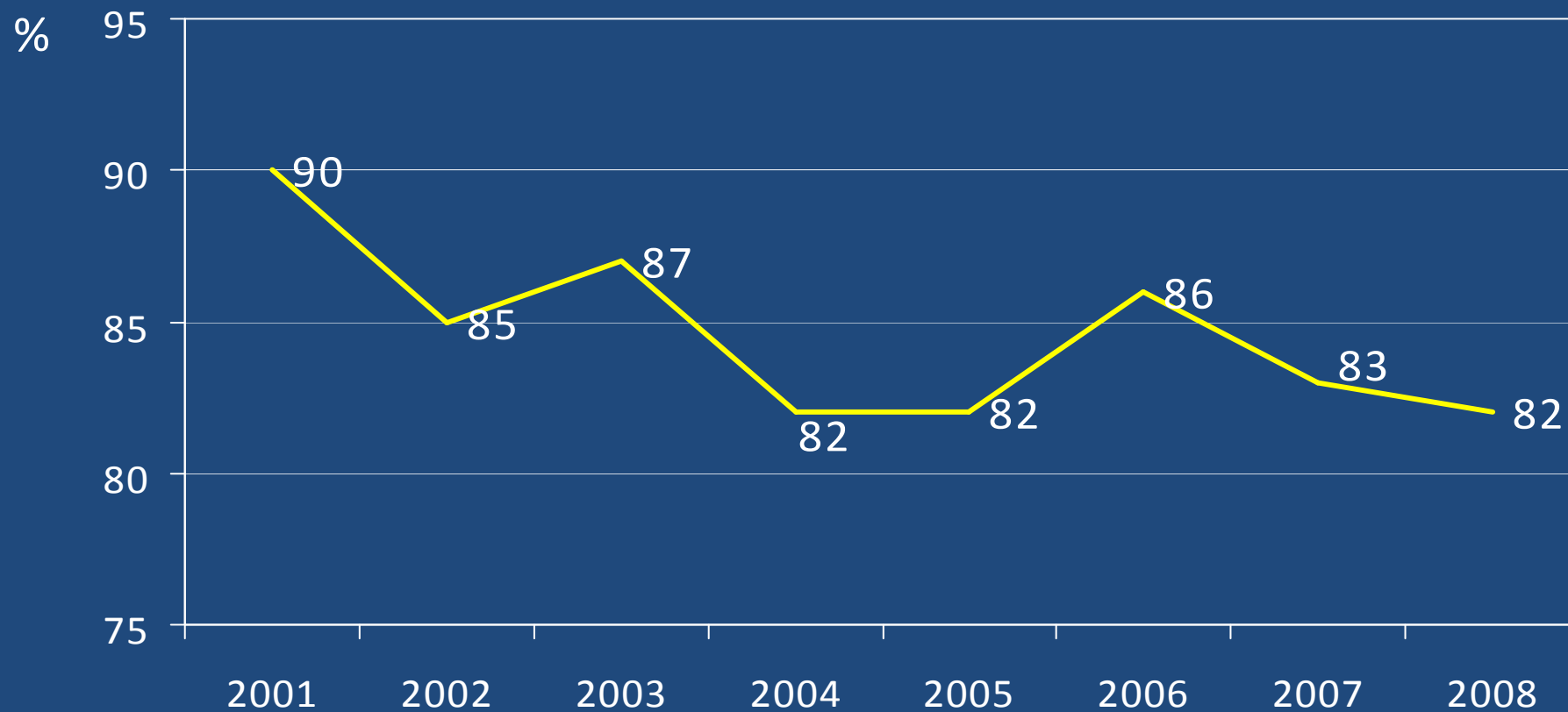
# Proportion of HIV/TB patients with MDR-TB

## TB hospital #2 St-Petersburg, Russia



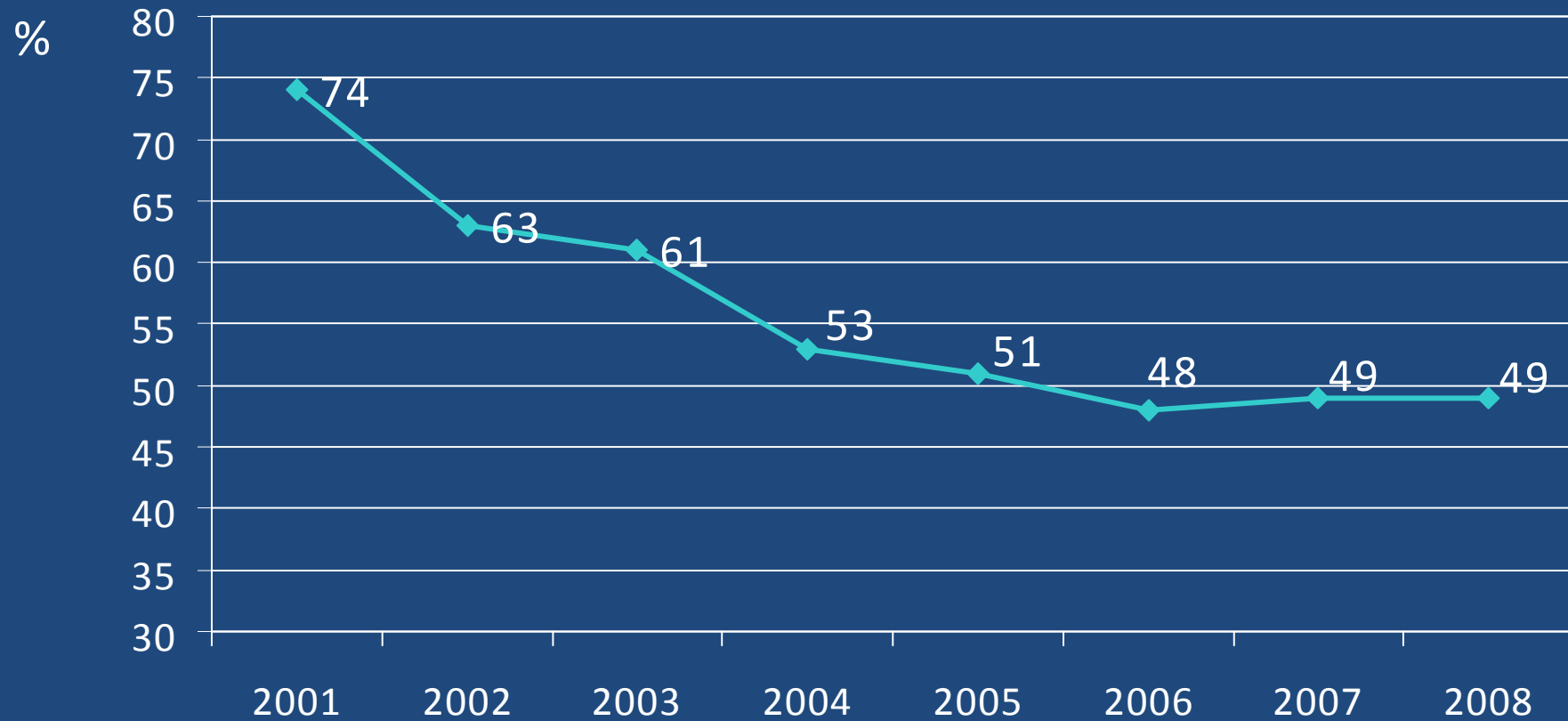
# Proportion of IDUs among HIV/TB patients

TB hospital #2 St-Petersburg, Russia



# Proportion of patients with prison anamnesis

TB hospital #2 St-Petersburg, Russia



# Clinical aspects of MDR-TB among HIV/TB patients

- Problems with rapid detection of drug resistance, therefore drug choice relays on:
  - Presence of MDR-TB depends on prison anamnesis
  - The more lung tissue involved, the more chances to have MDR-TB
  - Lack of treatment effect

# Outcomes of TB treatment in HIV-infected patients according to MDR

TB hospital #2 St-Petersburg, Russia

Outcome	MDR+ N = 347 %	MDR- N = 257 %
Cured and/or treatment completed	2	9
Relapse	32	19
Chronically forms	28	21
Death within 1 <sup>st</sup> year of treatment	26	22
Death after 1 <sup>st</sup> year of treatment	38	16
Lost to follow-up	12	29

# Forms of TB relapses HIV/TB infected patients according to MDR

TB hospital #2 St-Petersburg, Russia

MDR in the initial TB case	Relapse	
	Pulmonary	Extrapulmonary
MDR + N = 347	34 %	66 %
MDR – N = 257	63 %	37 %

# Cumulative mortality of HIV/TB patients according to drug resistance

2001 - 2009 TB hospital #2 St-Petersburg, Russia

	MDR +	MDR -	XDR+	XDR-
Mortality, %	65	39	63	38

# Treatment of tuberculosis in HIV-infected patients

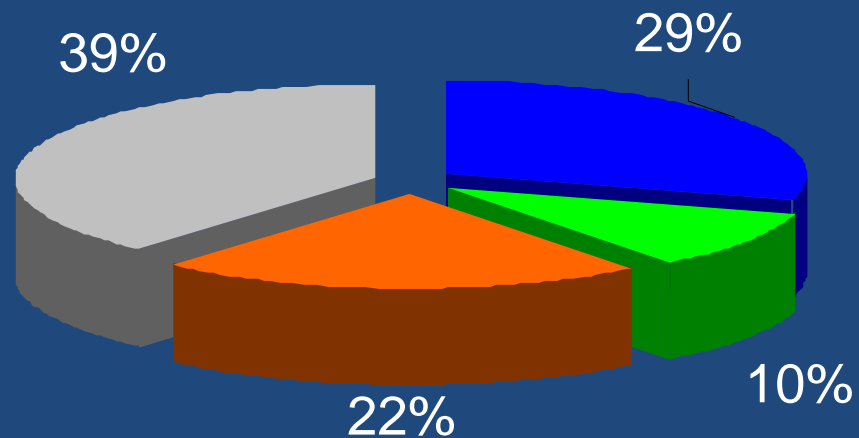
St-Petersburg, Russia

- Start TB treatment as soon as possible
- Use of adequate treatment regimens
  - using parenteral drugs
- Use of pathogenetic methods of treatment
  - Collapsotherapy
- Timely start of HAART

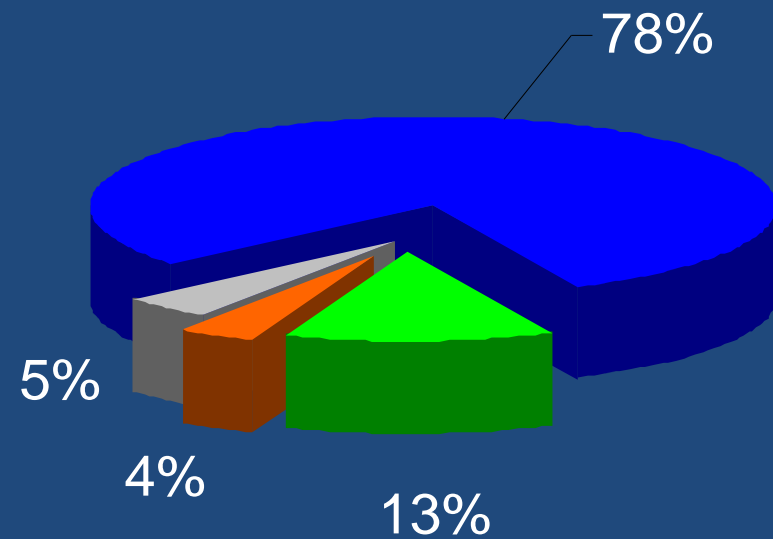
# HAART in patients with HIV/TB

TB hospital #2 St-Petersburg, Russia

## HAART +



## HAART -



# Efficacy of anti-TB treatment and HAART according to drug resistance

TB hospital #2 St-Petersburg, Russia

Outcome	MDR + HAART- %	MDR + HAART+ %	MDR - HAART- %	MDR - HAART+ %
Cured	1,2	4,4	2,6	22,6
Relapses	31,0	33,8	19,7	24,5
Chronical forms	21,7	14,7	20,5	11,3
Death within the 1 <sup>st</sup> year of treatment	37,7	33,8	33,3	18,7
Death after the 1 <sup>st</sup> year of treatment	35,5	29,9	16,1	10,3
Lost to follow-up	14,3	13,2	23,9	22,6

# Conclusions

- Problem of tuberculosis is extremely actual in the countries of eastern Europe
- Prevalence of MDR-TB (and XDR-TB) is rapidly increasing
- The rapid spread of HIV infection and overlapping risk groups lead to the worsening of TB situation

# Conclusions

- Access to HAART is the key to a better prognosis
- Concurrent use of adequate TB treatment and HAART is the way to limit HIV/TB epidemic

For more information please check:  
[www.tb-hiv.ru](http://www.tb-hiv.ru)

Thank you !