

VACCINATION AGAINST HEPATITIS A IN CATALONIA

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Generalitat of Catalonia**

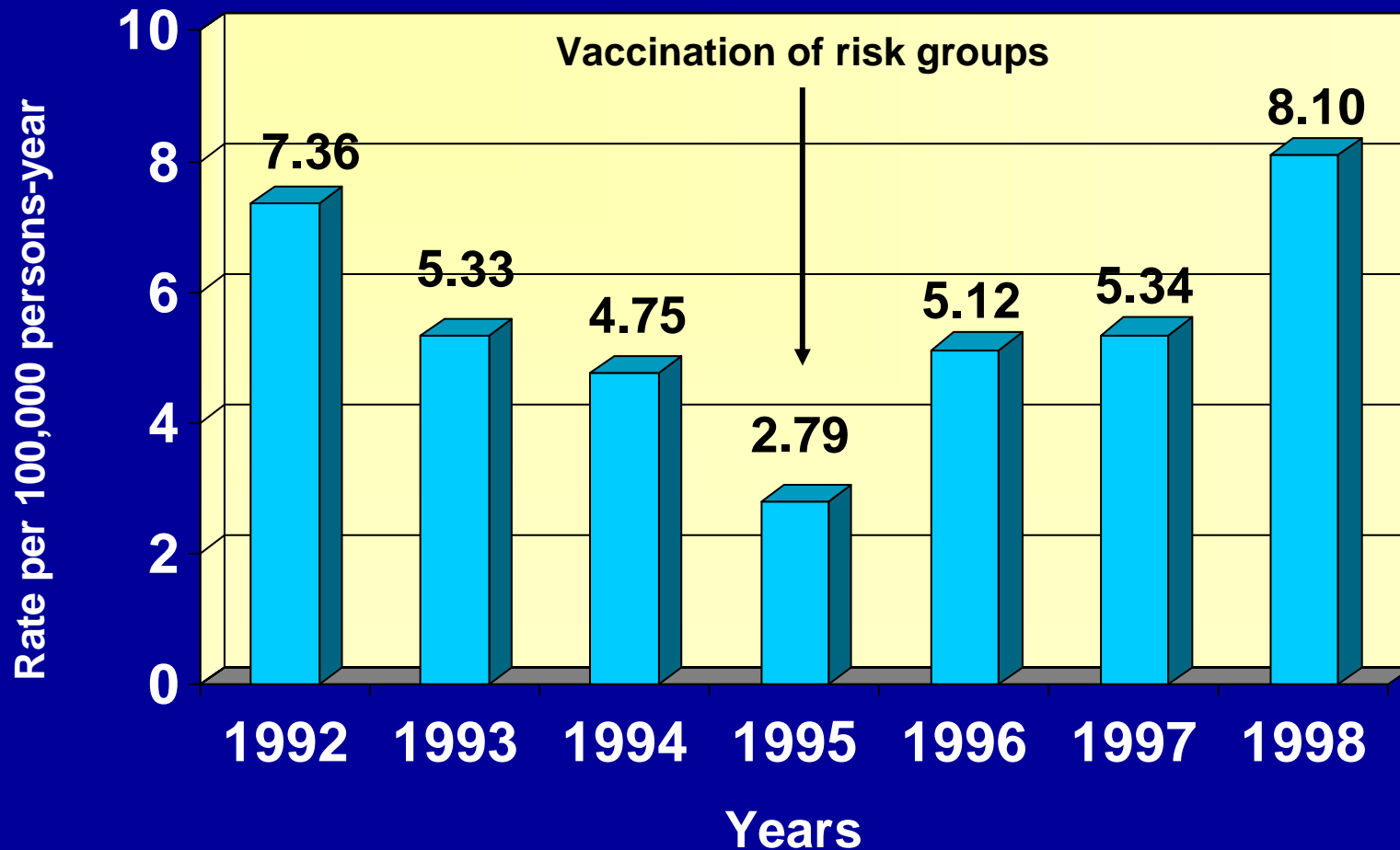


RECOMMENDATIONS FOR HEPATITIS A VACCINATION IN CATALONIA

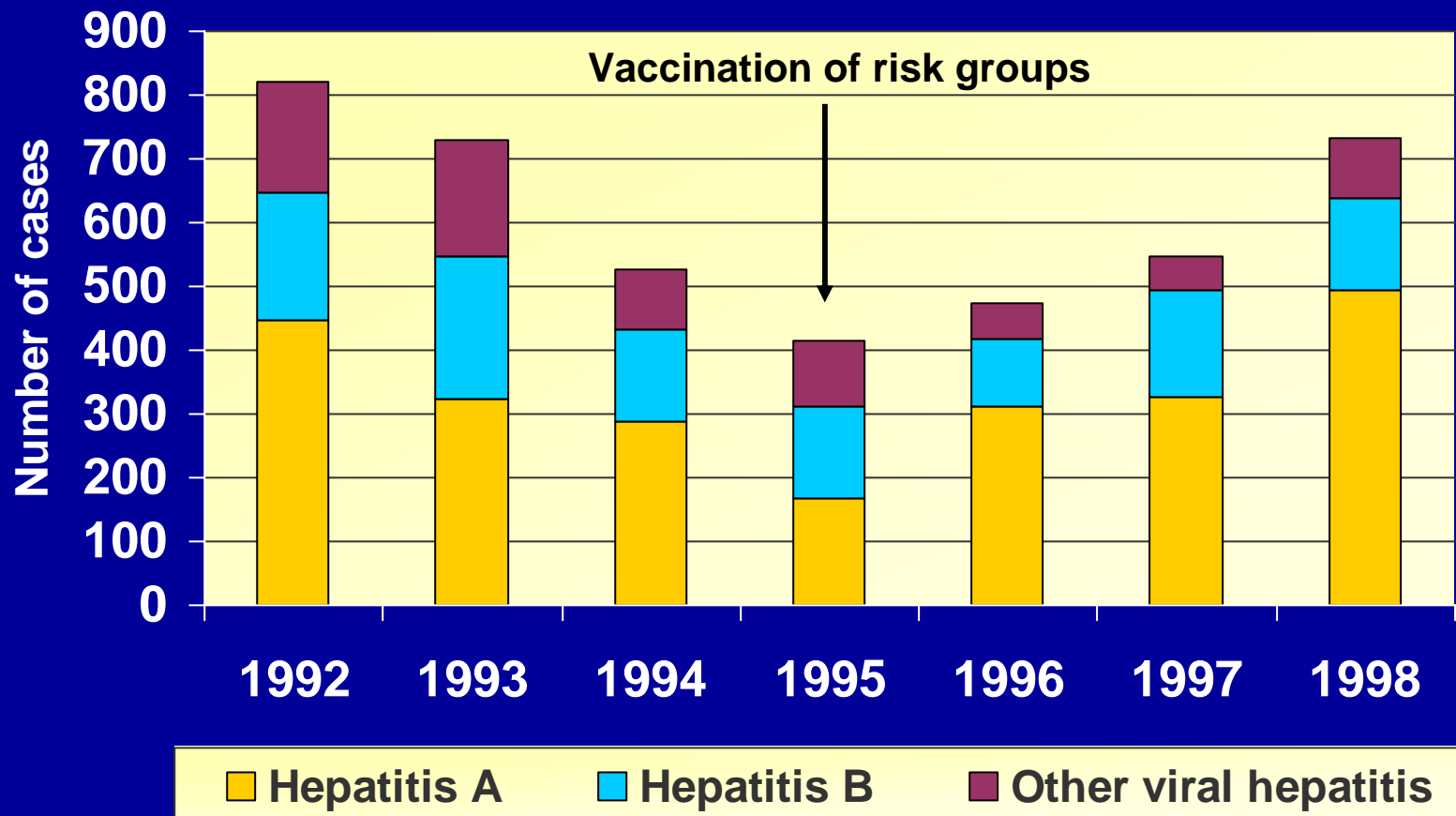
1995  Vaccination of risk groups

- ◆ International travellers to regions of endemic disease
- ◆ Homosexual men
- ◆ Users of intravenous drugs
- ◆ Sewage workers
- ◆ Patients receiving factor VIII concentrates
- ◆ Exposed to non-human primates
- ◆ Staff of day-care centres
- ◆ Staff of institutions for developmentally disabled persons
- ◆ People >30 years old with chronic liver disease
- ◆ People infected by hepatitis C virus

REPORTED MORBIDITY OF HEPATITIS A. CATALONIA, 1992-1998



EVOLUTION OF REPORTED VIRAL HEPATITIS. CATALONIA, 1992- 1998



RECOMMENDATIONS FOR HEPATITIS A VACCINATION IN CATALONIA

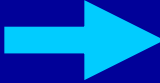
1995 → Vaccination of risk groups

1998 → Universal vaccination of preadolescents

RATIONALE FOR HEPATITIS A UNIVERSAL VACCINATION

- ◆ **Limited impact of selective vaccination of risk groups**
- ◆ **Immediate impact of universal vaccination on clinical cases**
- ◆ **Potential of mass vaccination to eliminate the disease**
- ◆ **Combined A+B vaccine available**
- ◆ **Well-established hepatitis B vaccination program of preadolescents in schools**
- ◆ **Low cost of the program**
- ◆ **Acceptable cost-effectiveness and cost-benefit ratios of the program**

NET PRESENT VALUE AND COST-BENEFIT RATIO*

 Length of protection: 25 years. Cohort of 67,441 pre-adolescent vaccinated at 12 years and followed for 25 years. Discount rate: 5%

Cost of vaccination program	336,567 €
Cost of hepatitis A without vaccination	995,096 €
Cost of hepatitis A with vaccination	124,821 €
Benefit of vaccination program	870,275 €
Net present value	+533,708 €
Cost-benefit ratio	2.58

*Cost of hepatitis A vaccine= 1.98 euros

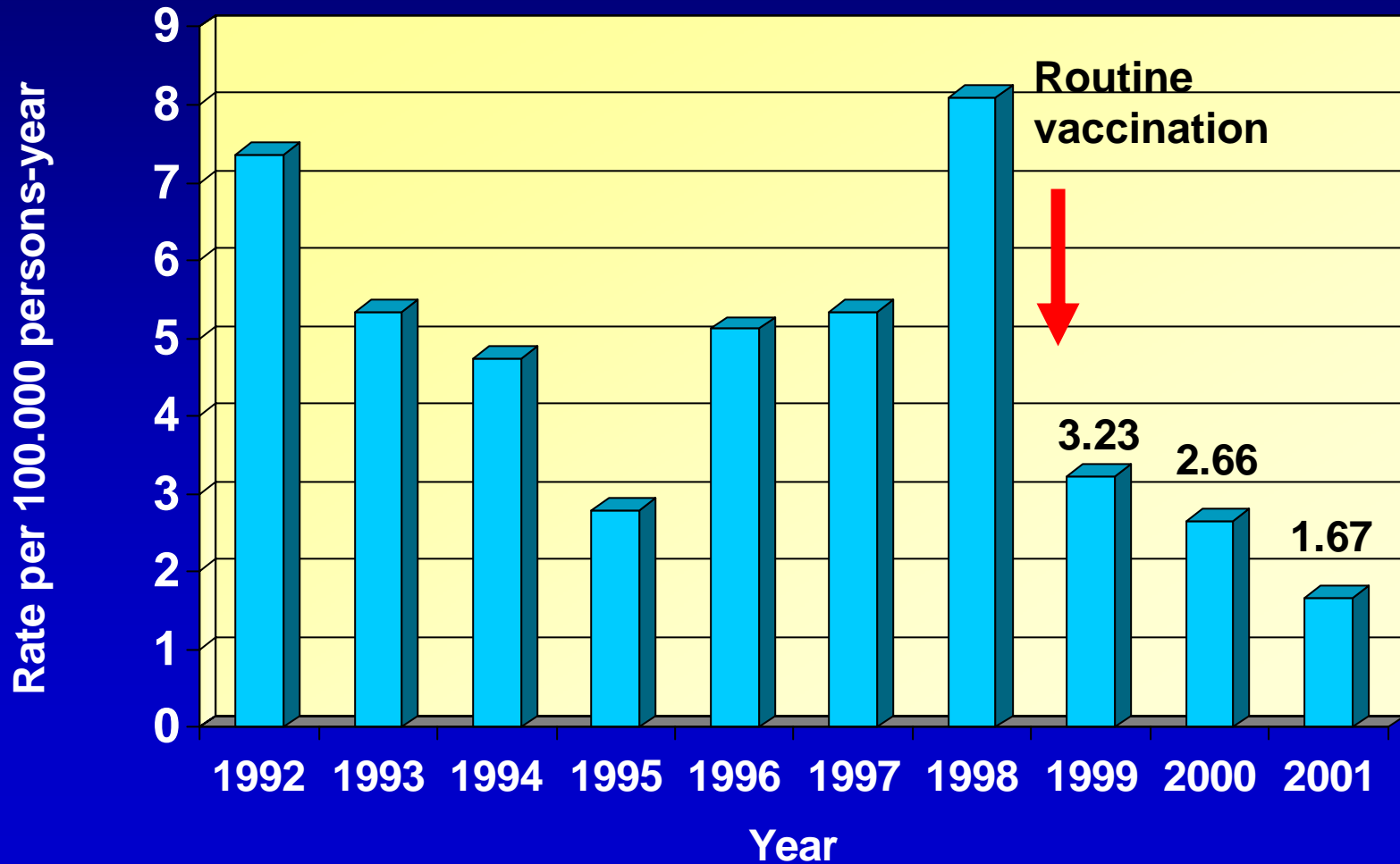


[cost of combined hepatitis A+B vaccine] - [cost of hepatitis B vaccine]

SENSITIVITY ANALYSIS OF THE MAIN VARIABLES INFLUENCING THE RESULTS

Variations in the variables	Cost per case avoided	Cost per year of life gained	Cost per year of life adjusted for disability gained	Benefit/Cost Ratio
BASE CASE	<0 (saving)	<0 (saving)	<0 (saving)	2.58
INCREMENTAL PRICE OF A+B VACCINE				
3.31 euros/dose	<0 (saving)	<0 (saving)	<0 (saving)	1.54
5.05 euros/dose	<0 (saving)	<0 (saving)	<0 (saving)	1.0
11.12 euros/dose	3,229	37,152	31,478	0.45
15 euros/dose	5,219	60,047	50,875	0.34
INCIDENCE RATE OF HEPATITIS A				
7.5 per 100,000	<0 (saving)	<0 (saving)	<0 (saving)	1.01
22.5 per 100,000	<0 (saving)	<0 (saving)	<0 (saving)	3.87
30 per 100,000	<0 (saving)	<0 (saving)	<0 (saving)	5.17
37.5 per 100,000	<0 (saving)	<0 (saving)	<0 (saving)	6.45

IMPACT OF ROUTINE HEPATITIS A VACCINATION ON THE GLOBAL INCIDENCE OF THE DISEASE



VACCINATION EFFECTIVENESS (I)

- ◆ Vaccination effectiveness (VE)

$$VE = 1 - RR$$

$$RR = \frac{\text{Incidence rate in vaccinated cohorts}}{\text{Incidence rate in non vaccinated cohorts}}$$

- ◆ 95% CI of VE were calculated using Taylor series

DISTRIBUTION OF HEPATITIS A CASES IN NON VACCINATED AND VACCINATED COHORTS

BORN YEAR	CASES YEAR 1997	CASES YEAR 1998	CASES YEAR 1999	CASES YEAR 2000	CASES YEAR 2001
1984	Children 13 years old 10	Children 14 years old 13			
1985	Children 12 years old 5	Children 13 years old 1	Children 14 years old 1		
1986	Children 11 years old 6	Children 12 years old 4	Children 13 years old 1	Children 14 years old 1	
1987		Children 11 years old 3*	Children 12 years old 2***	Children 13 years old 2**	Children 14 years old 0
1988			Children 11 years old 0	Children 12 years old 0	Children 13 years old 0
1989				Children 11 years old 0	Children 12 years old 1**

* All three cases occurred before the beginning of vaccination

** The cases had not been vaccinated

*** Vaccination status unknown in one case; the other had not been vaccinated.

VACCINATION EFFECTIVENESS (II)

Cases in vaccinated cohorts	1
Pers-yr in vaccinated cohorts	446,995 pers-yr
Incidence rate in vaccinated cohorts	0.2×10^{-5} pers-yr
Cases in non vaccinated cohorts	49
Pers-yr in non vaccinated cohorts	648,591 pers-yr
Incidence rate in non vaccinated cohorts	7.55×10^{-5} pers-yr

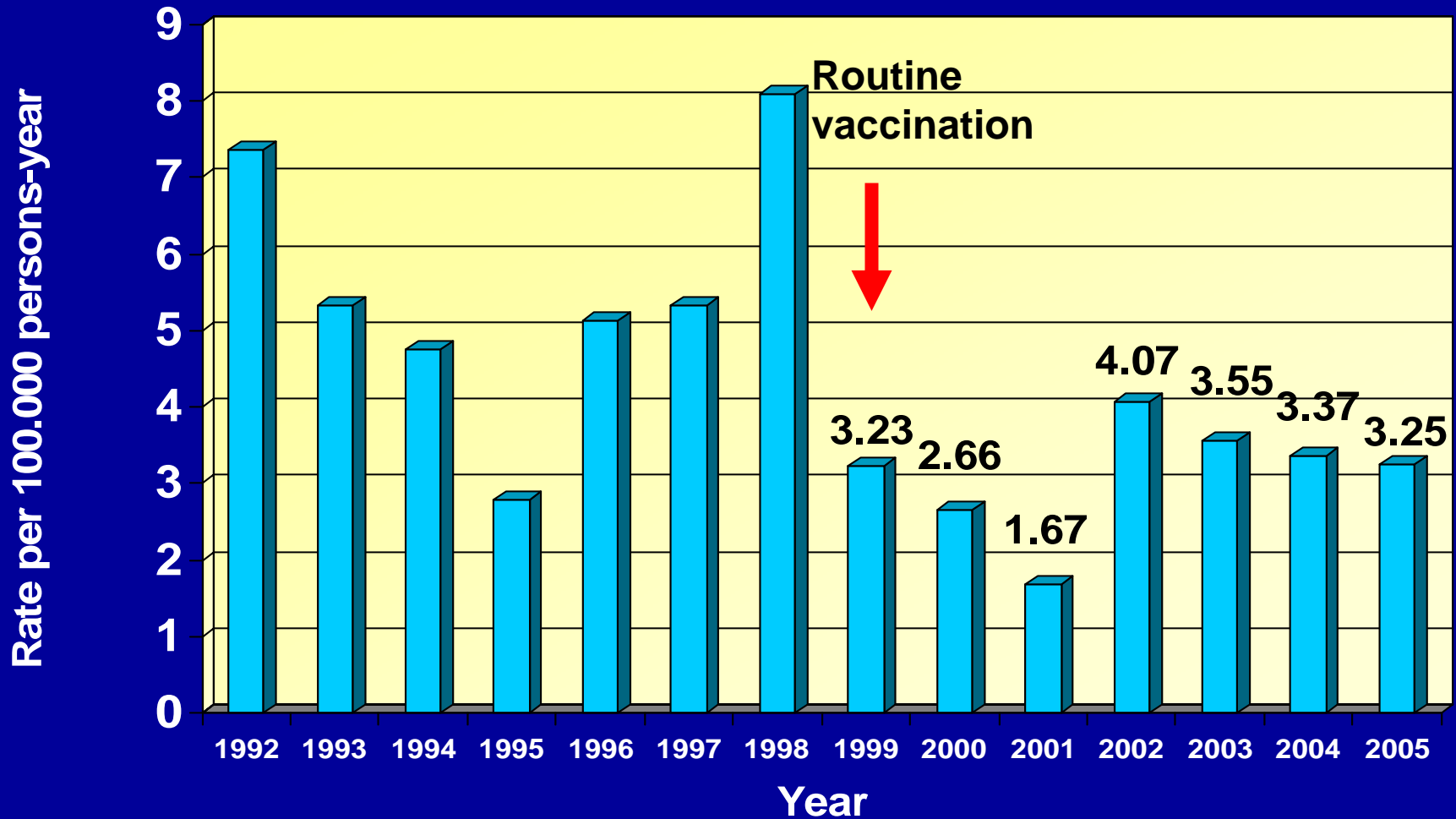
$$RR = 0.0296$$

$$VE = 97.0\%$$

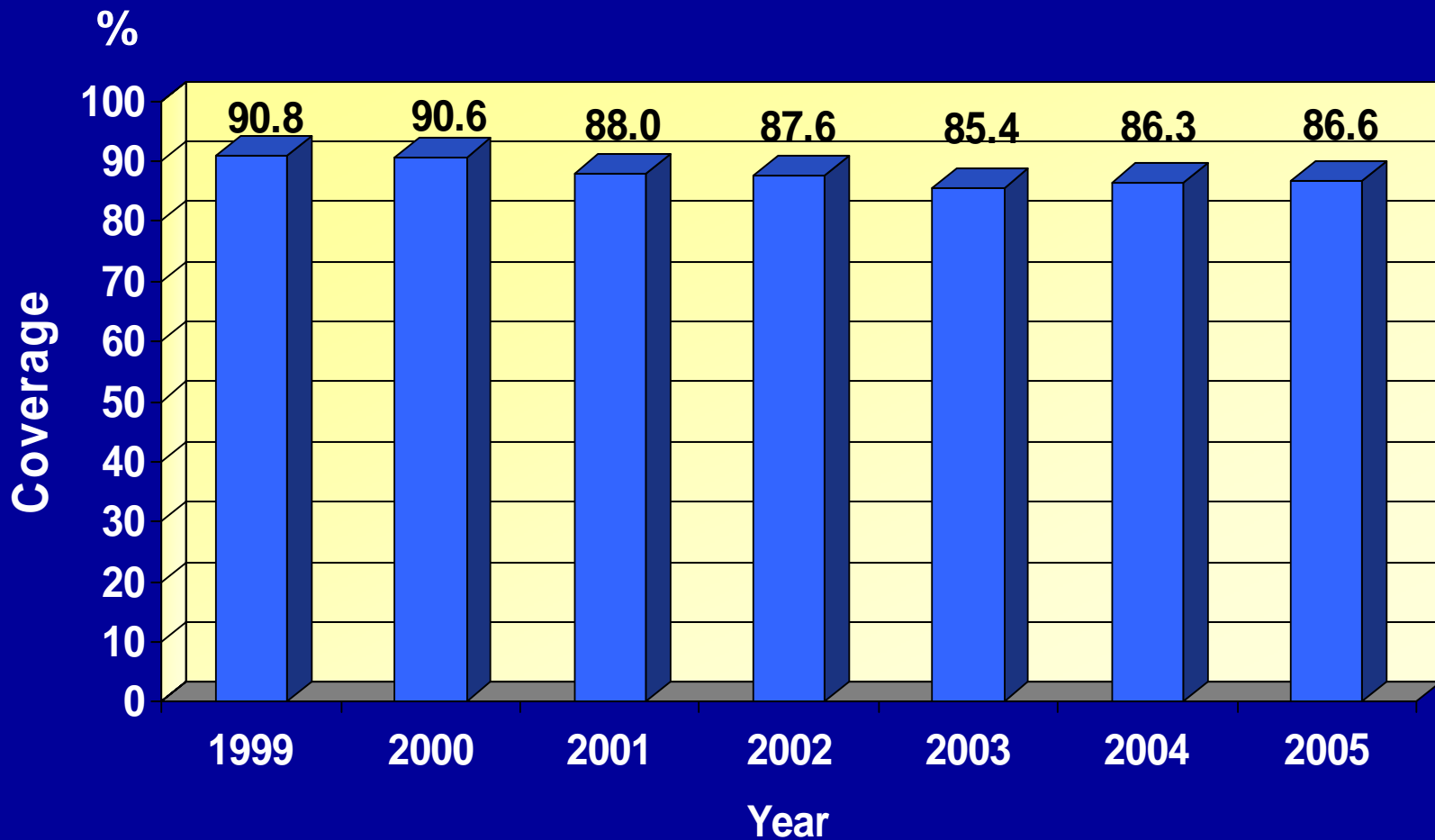
$$95\% \text{ CI} = 78.5\% - 99.6\%$$

HOW HAS THE SITUATION EVOLVED?

IMPACT OF ROUTINE HEPATITIS A VACCINATION ON THE GLOBAL INCIDENCE OF THE DISEASE



REPORTED HEP A+B IMMUNIZATION COVERAGES (THREE DOSES). CATALONIA 1999-2005

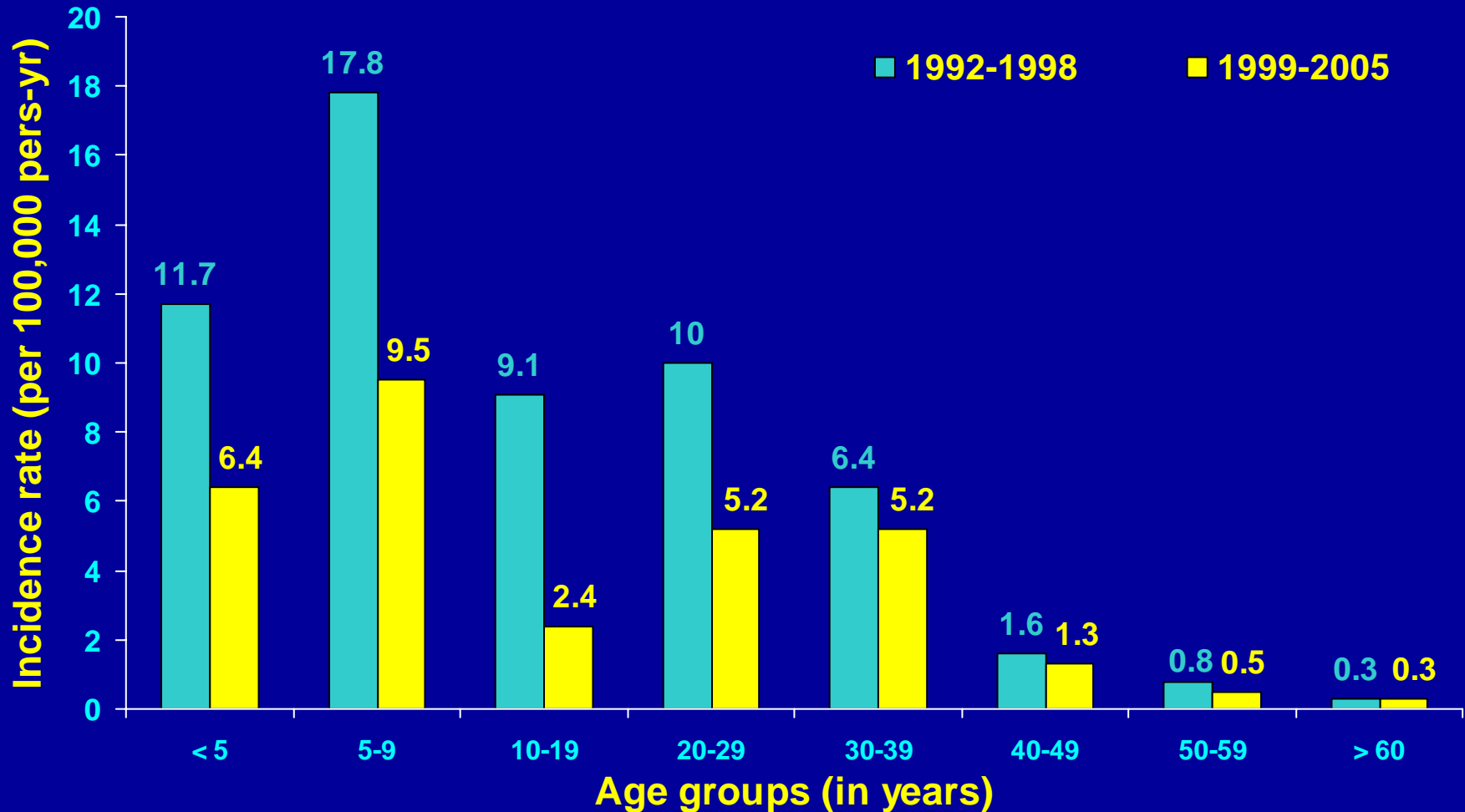


DISTRIBUTION OF REPORTED RATES* OF HEPATITIS A BEFORE AND AFTER ROUTINE VACCINATION

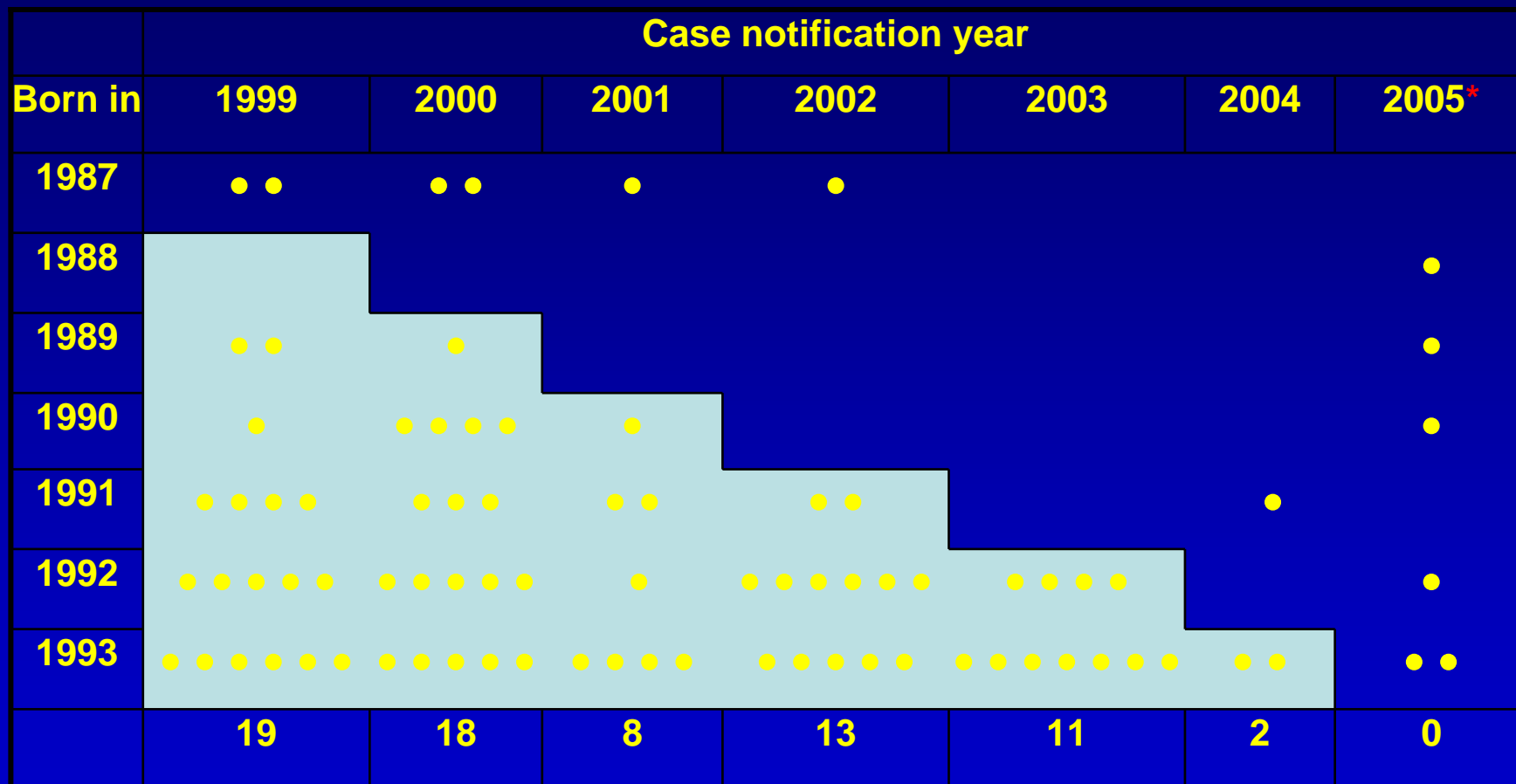
Age group	Before vaccination 1992 – 1998		After vaccination 1999 – 2005		RR (95%CI)
	1992	1998	1999	2005	
< 5	11.7	219	6.4	146	1.8 (1.5 - 2.3)
5 - 9	17.8	353	9.5	192	1.9 (1.6 - 2.3)
10 - 19	9.1	511	2.4	113	3.8 (3.1 - 4.7)
20 - 29	10.0	695	5.2	377	1.9 (1.7 - 2.2)
30 - 39	6.4	416	5.2	396	1.2 (1.1- 1.4)
40 - 49	1.6	92	1.3	81	1.3 (0.9 - 1.8)
50 - 59	0.8	38	0.5	28	1.6 (0.9 - 2.7)
≥ 60	0.3	32	0.3	34	0.9 (0.6 - 1.7)
TOTAL	5.5	2356	2.9	1367	1.9 (1.6 - 2.4)

*Per 100,000 pers-yr

DISTRIBUTION OF REPORTED INCIDENCE RATES OF HEPATITIS A INCIDENCE BEFORE AND AFTER ROUTINE VACCINATION



REPORTED CASES OF HEPATITIS A IN VACCINATED AND NON VACCINATED COHORTS



• Cases

■ Vaccinated cohorts

■ Unvaccinated cohorts

* 3 cases are immigrants and 1 gypsy

PREVENTED FRACTION

(PF)



Proportion of the hypothetical load of disease (in the 6-19 years age group) that has been prevented by vaccination

$$PF = \text{Coverage} \times (1 - RR)$$

$$PF = 0.91 \times 0.981 = 89.3\%$$

CONCLUSIONS

- 1. The incidence rate of hepatitis A in the general population has fallen by 47.3 % in the seven years following introduction of vaccination compared with the seven previous years.**
- 2. By age group, the greatest fall in hepatitis A incidence (73.6%) occurred in the 10-19 years age group (corresponding to the vaccinated cohorts) followed by the 20-29 years age group(48%)**

- 3. The effectiveness of the vaccination programme 7 years after the beginning was 98% and the prevented fraction of hepatitis A in children (6-19 years old) is estimated at 89%**
- 4. The reduction in the incidence in non vaccinated age groups supports the indirect effects of the vaccination program suggested by other authors**

STUDY PARTICIPANTS

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