

# **EVALUATION OF THE SCHOOL-BASED HEPATITIS B VACCINATION PROGRAMME IN CATALONIA (SPAIN)**

**Prof. L. Salleras  
Department of Public Health  
University of Barcelona  
Hospital Clínic Barcelona**

**Hepatitis B vaccine: Long term efficacy,  
Booster policy, and Impact of Mutants on  
Hepatitis B Vaccination Programmes**

**Viral Hepatitis Prevention Board Meeting**

**Sevilla, Spain. March 11-12 2004**

**MASS HEPATITIS  
VACCINATION OF  
PRE-ADOLESCENTS  
OF 12 YEARS IN  
SCHOOLS OF  
CATALONIA**

• **1991**      **Hepatitis B**

• **1998**      **Hepatitis A + B**

# DESCRIPTIVE EPIDEMIOLOGY OF HEPATITIS B IN CATALONIA IN THE PRE-VACCINATION ERA

- ♣ **ANNUAL REPORTED MORBIDITY**
  - ◆ **3.3 per 100,000 inhabitants**
- ♣ **ANNUAL ESTIMATED MORBIDITY**
  - ◆ **20 per 100,000**
- ♣ **PREVALENCE OF MARKERS (  $\geq$  25 years)**
  - ◆ **HBsAg: 1 per 100 (60,000)**
  - ◆ **Anti-HBs : 20 per 100**
- ♣ **SEROEPIDEMIOLOGICAL PATTERN**
  - ◆ **Intermediate type**

# HEPATITIS B VACCINATION PROGRAMMES IN CATALONIA

- ♣ **BEGUN IN 1984**
  
- ♣ **CONCENTRATED ON**
  - ◆ **High risk groups**
  - ◆ **Newborns of HBsAg+ mothers**
  
- ♣ **LIMITED IMPACT ON**
  - ◆ **Incidence of the disease**
  - ◆ **Long term consequences**

# UNIVERSAL HEPATITIS B VACCINATION IN CATALONIA (December 1990)

**Three options of mass vaccination**

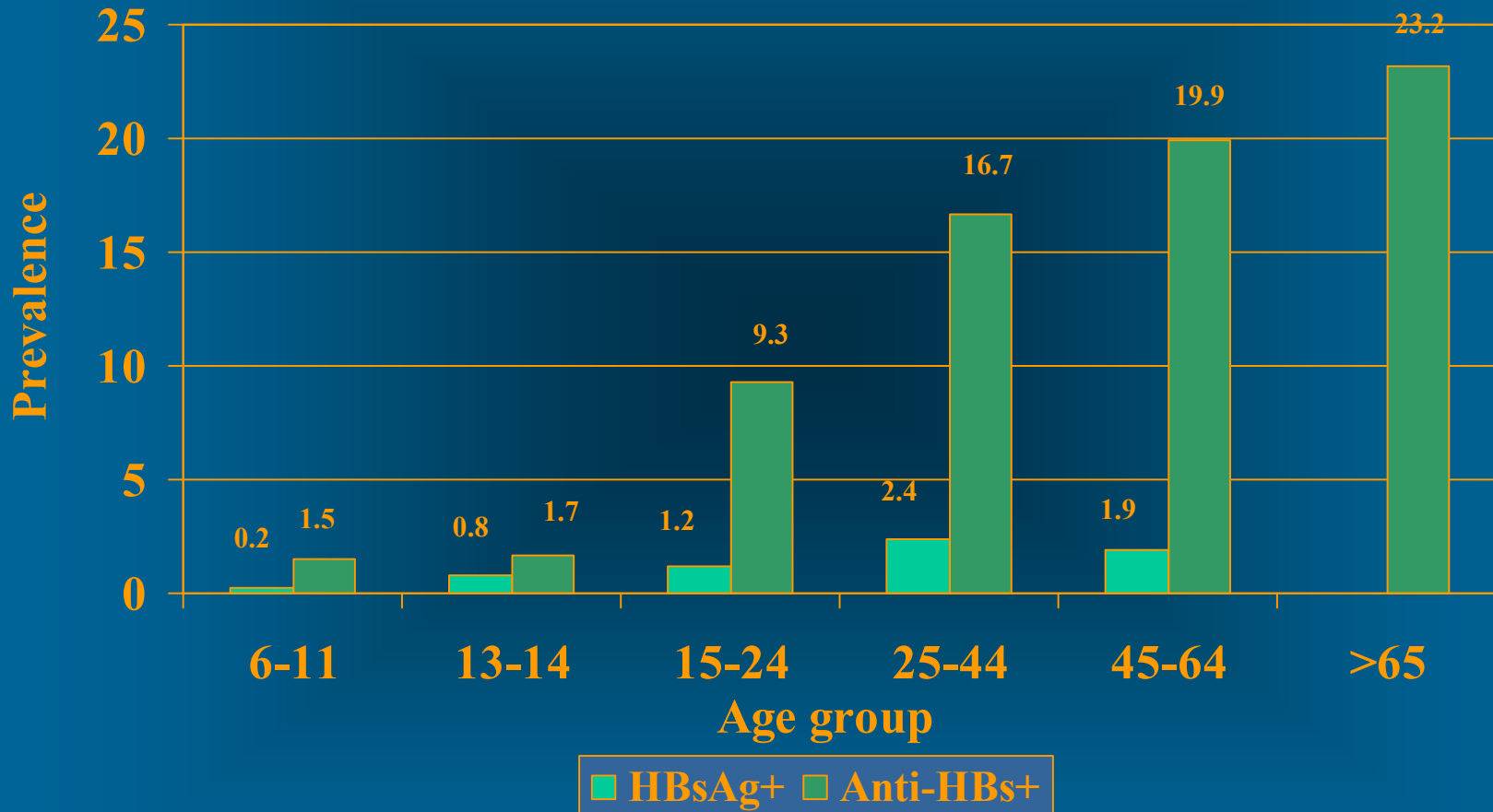


**Infant**  
**Pre-adolescent**  
**Infant + pre-adolescent**

# **RATIONALE FOR UNIVERSAL HEPATITIS B VACCINATION OF PRE-ADOLESCENTS IN SCHOOLS Catalonia 1990**

- 1. High risk of infection and disease during adolescence and early adulthood and a low risk in infants and younger children.**
- 2. Rapid impact of the vaccination on disease incidence rates.**
- 3. Presumed high vaccination coverages in schools.**
- 4. Efficiency of the intervention.**

# PREVALENCE OF HEPATITIS B MARKERS IN THE POPULATION OF CATALONIA (1989)



Source: Salleras L, Bruguera JM, Vidal J et al. Prevalence of Hepatitis B markers in the population of Catalonia (Spain). Rationale for universal vaccination of adolescents. Eur J Epidemiol, 1992; 8: 640-644.

# ESTIMATED RISK OF PERINATAL TRANSMISSION OF THE HEPATITIS B VIRUS IN CATALONIA 1999

<b>Number of births per year</b>	<b>60,000</b>
<b>Pregnant women</b>	
HBsAg+(1.2 per 100)	720
HBeAg+ (5 per 100)	36
HBeAg- (95 per 100)	684
<b>Infectious mothers*</b>	<b>134</b>
<b>Infant chronic carriers**</b>	<b>120</b>
<b>Estimated prevalence of HBsAg+ at birth***(%)</b>	<b>0.2 per 100</b>

\* 90% of HBsAg+ and HBeAg+ and 15% of HBsAg+ and HBeAg-

\*\* 90% of infected subjects at birth

\*\*\* Without vaccination programme



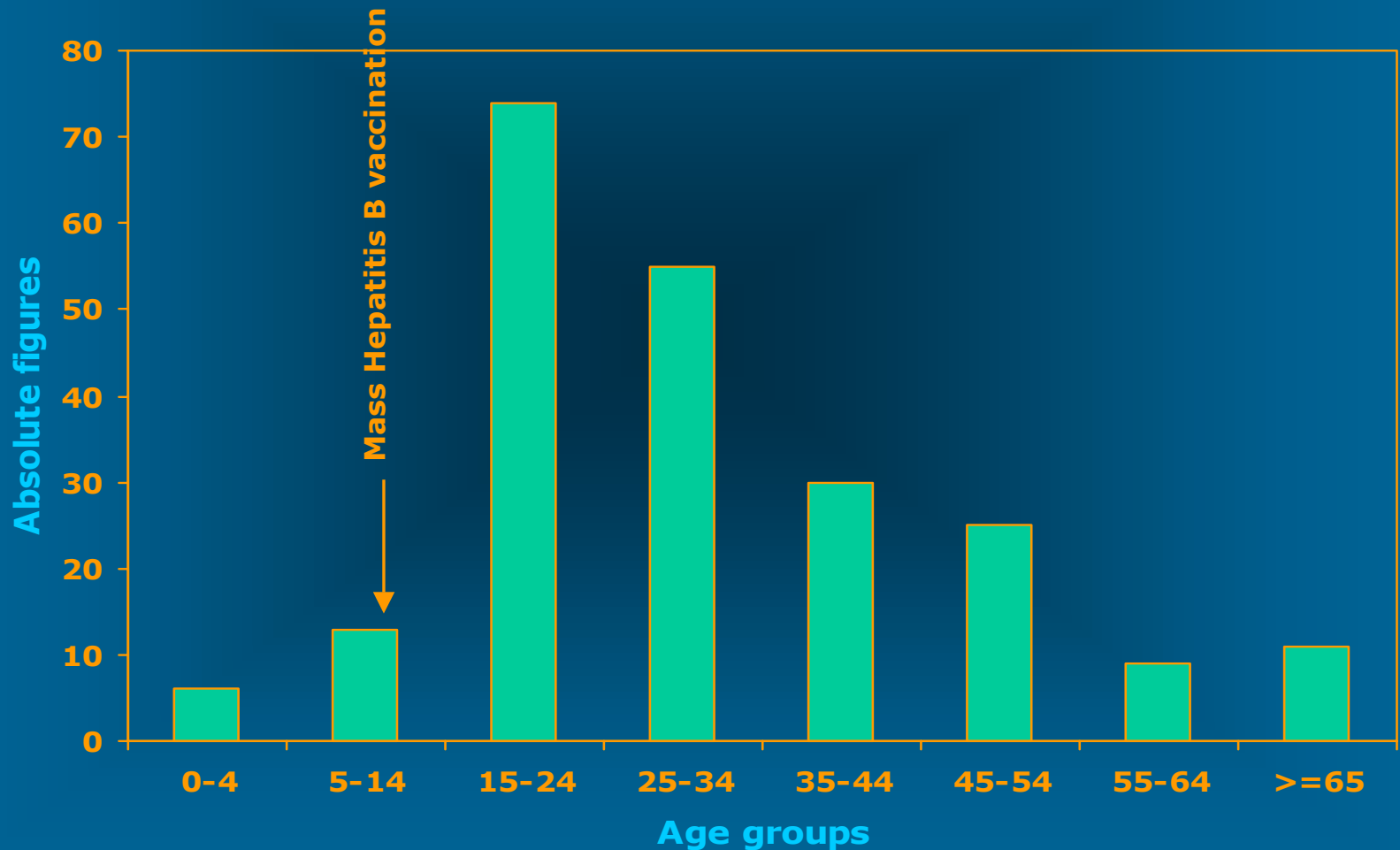
## PREVALENCE OF CHRONIC CARRIERS OF HBsAg AT BIRTH AND IN THE 6-11 YEARS AGE GROUP CATALONIA 1989

<b>Age</b>	<b>Prevalence of HbsAg+ x 100</b>
<b>At birth*</b>	<b>0.2 per 100</b>
<b>At 6-11 years**</b>	<b>0.2 per 100</b>

\*Estimated from the prevalence of HbsAg+ mothers, 1989.

\*\*Seroepidemiological survey in the child population 1989.

# HEPATITIS B REPORTED MORBIDITY BY AGE CATALONIA 1990



# **SCHOOL-BASED VACCINATION PROGRAMMES IN SCHOOLS**

**♣ Established 1988**

**♣ MMR at 11 years**

**♣ Td at 14 years**

**♣ High vaccination coverage achieved**

# **COST-EFFECTIVENESS ANALYSIS OF HEPATITIS B VACCINATION STRATEGIES IN CATALONIA (SPAIN)**

<b>VACCINATION STRATEGY</b>	<b>COST-EFFECTIVENESS RATIO Cost/infection avoided (in 1991 pts )</b>
<b>Vaccination of infants</b>	<b>254.000 pts</b>
<b>Vaccination of infants and pre-adolescents</b>	<b>182.000 pts</b>
<b>Vaccination of pre-adolescents</b>	<b>129.000 pts</b>

**Source: Antoñanzas et al. Cost-effectiveness of hepatitis B vaccination strategies in Catalonia (Spain). Pharmacoeconomics 1995; 7: 428-43.**

# PRE-ADOLESCENT UNIVERSAL HEPATITIS B VACCINATION PROGRAMME

- ♣ **LAUNCHED IN OCTOBER 1991**
  
- ♣ **VACCINATION OF PRE-ADOLESCENTS OF 12 YEARS IN SCHOOL**
  - ◆ **No pre-vaccination screening for markers**
  - ◆ **3 doses of vaccine (0, 1 and 6 months)**
    - ◆ **Engerix B 10µg HBsAg**
  
- ♣ **ANNUAL COST OF THE PROGRAMME**
  - ◆ **3.1 million Euros in 1991 prices**

# HEALTH AND OPERATIONAL TARGETS OF PRE-ADOLESCENT HEPATITIS B VACCINATION PROGRAMME Catalonia 1991

Type of target	Indicator	Situation in Catalonia 1989	Situation to attain by the year 2000	
			Objectives	Quantification
Operational target	Vaccination coverage of pre-adolescents in schools	---	High level of coverage	>90 per 100
Health target	Prevalence of hepatitis B virus infection (antiHBc+) in 15-24 years age group	9.3 per 100	90% reduction	<1 per 100

# EVALUATION OF OPERATIONAL AND HEALTH TARGETS OF THE PROGRAMME

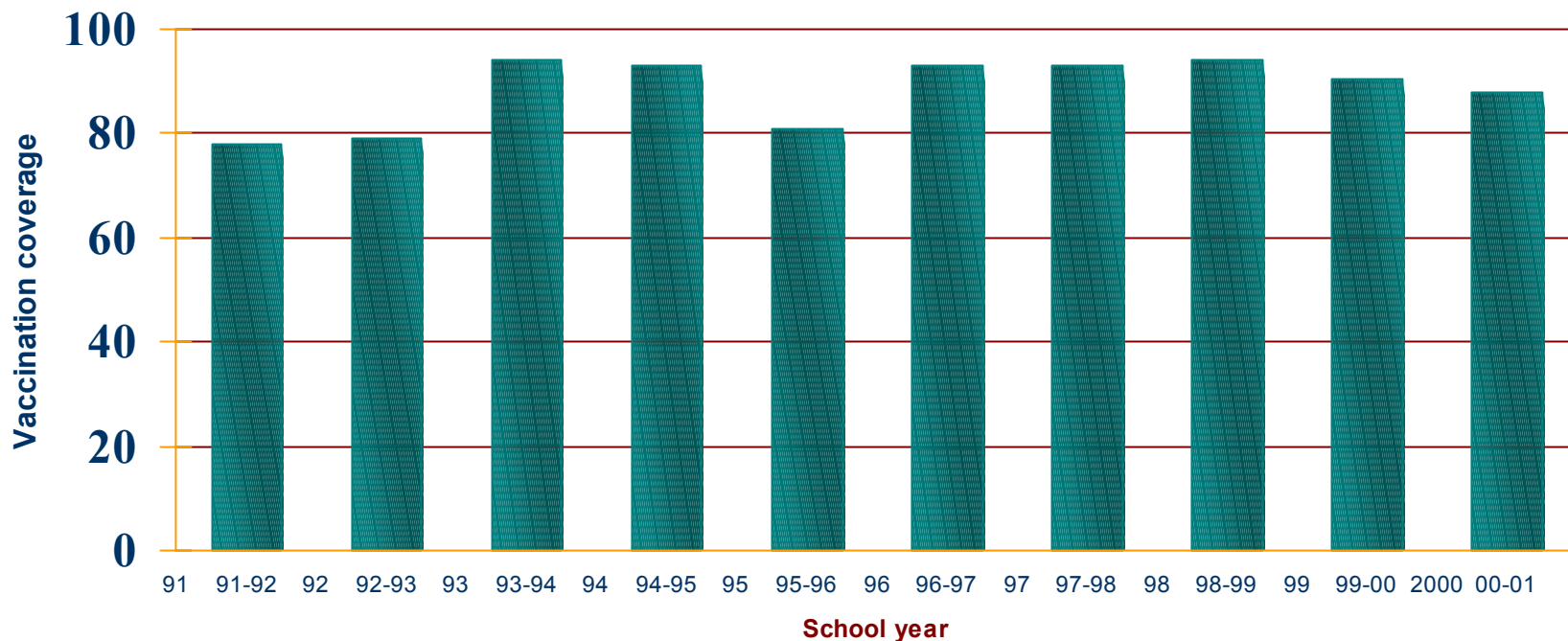
## ♣ OPERATIONAL TARGET: VACCINATION COVERAGE

- ◆ **Administrative data: Vaccine administered to school children**
- ◆ **Serological data: Prevalence of vaccine-induced immunity (anti-HBs+ and anti-HBc-) in adolescents of 14 years**

## ♣ HEALTH TARGET: PREVALENCE OF HEPATITIS B VIRUS INFECTION IN 15-24 YEARS AGE GROUP

- ◆ **Serological data: Prevalence of antiHBc+ in the 15-24 years age group.**

# VACCINATION COVERAGE (VACCINES ADMINISTERED) IN PRE-ADOLESCENTS OF 12 YEARS WITH THE HEPATITIS B VACCINE Catalonia 1991-2000





# PREVALENCE OF HEPATITIS B VACCINE INDUCED IMMUNITY IN ADOLESCENTS OF 14 YEARS Catalonia (Spain) 1986-2001

YEAR	n	Hepatitis B vaccine-induced immunity (antiHBs+ antiHBc-)		
		Number	X100	95%CI
1986	479	-	-	-
1996	299	281	94.0*	91.3-96.7
2001	305	287	94.1*	91.5-96.7

\* P<0.001 against 1986

SOURCE: Serological surveys. General Directorate of Public Health. Department of Health and Social Security. Autonomous Government of Catalonia

# PREVALENCE OF HEPATITIS B VIRUS INFECTION SUSCEPTIBILITY IN ADOLESCENTS OF 14 YEARS Catalonia (Spain) 1986-2001

Year	n	Hepatitis B virus infection susceptibility (anti-HBs- & anti-HBc-)		
		Number	Prevalence x 100	95%CI
<b>1986</b>	<b>479</b>	<b>467</b>	<b>97.5</b>	<b>96.1 - 98.9</b>
<b>1996</b>	<b>299</b>	<b>16</b>	<b>5.4*</b>	<b>2.8 - 8.0</b>
<b>2001</b>	<b>305</b>	<b>17</b>	<b>5.6</b>	<b>3.0 - 8.2</b>

- p < 0.001 against 1986
- SOURCE: Serological surveys. General Directorate of Public Health. Department of Health and Social Security. Autonomous Government of Catalonia

# PREVALENCE OF HEPATITIS B VACCINE INDUCED IMMUNITY IN ADOLESCENTS OF 14 YEARS ACCORDING TO THE NUMBER OF DOSES RECEIVED Catalonia (Spain) 2001

Number of doses received	n	Hepatitis B vaccine induced immunity (anti-HBs+, anti-HBc-)		
		Number	X100	95% CI
3 doses	322	312	96.9	95.0-98.8
2 doses	21	20	95.2	86.1-100
<b>TOTAL</b>	<b>343</b>	<b>332</b>	<b>96.8</b>	<b>94.9-98.7</b>

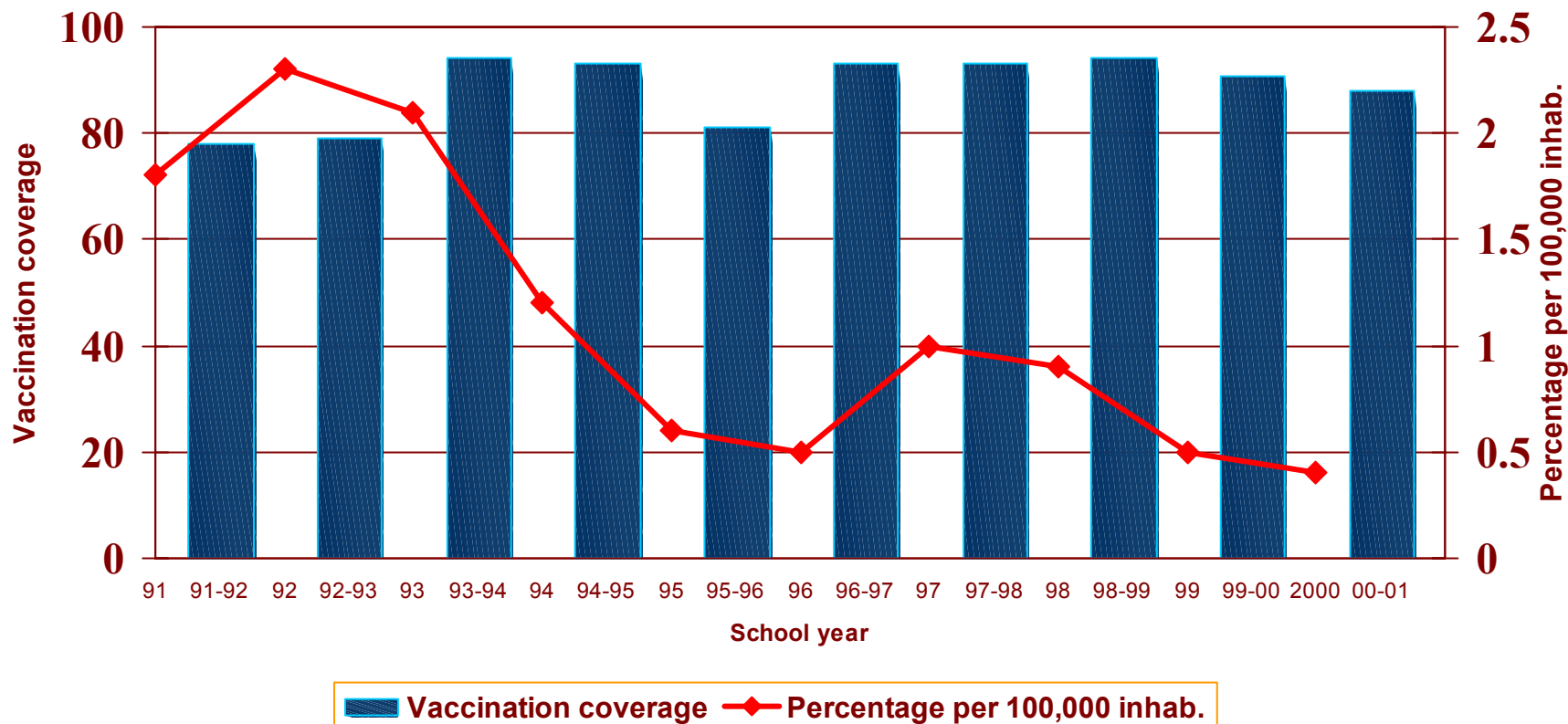
SOURCE: Serological surveys. General Directorate of Public Health. Department of Health and Social Security. Autonomous Government of Catalonia

# PREVALENCE OF HEPATITIS B VIRUS INFECTION IN THE 15-24 YEARS AGE GROUP Catalonia 1986-2001

Year	n	Prevalence of anti-HBc		
		Number	Per 100	95% CI
<b>1986</b>	<b>72</b>	<b>7</b>	<b>9.3</b>	<b>2.6-16.0</b>
<b>1996</b>	<b>118</b>	<b>4</b>	<b>3.3</b>	<b>0.1-6.5</b>
<b>2001</b>	<b>207</b>	<b>2</b>	<b>0.9</b>	<b>0-2.2</b>

Source: Serological surveys 1980 and 2001. General Directorate of Public Health. Department of Health and Social Security. Autonomous Government of Catalonia.

# HEPATITIS B MORBIDITY IN THE 10-19 YEARS AGE GROUP AND VACCINATION COVERAGE OF PRE-ADOLESCENTS OF 12 YEARS WITH THE HEPATITIS B VACCINE Catalonia 1991-2000



# COMPARISON WITH OTHER MASS HEPATITIS B VACCINATION PROGRAMMES OF PREADOLESCENTS

The results of the Catalan Programme compare favorably with similar programmes

## Vaccination coverage

- ◆ Italy
- ◆ Canada
- ◆ U.S

## Effectiveness of the programme

- ◆ Israel
- ◆ China
- ◆ Taiwan
- ◆ South Africa
- ◆ Gambia
- ◆ Some Pacific Islands

# IN SUMMARY

- ♣ **HEPATITIS B VACCINATION PROGRAMME OF PRE-ADOLESCENTS OF 12 YEARS 1990-2001**
  - ◆ High level of coverage (94%)
  - ◆ 90% reduction in prevalence of HBcAg+ in 15-24 years old
  - ◆ 80 reduction in incidence of the disease in 10-19 years age group.