Serogroup B Meningococcal Disease Epidemiology

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VRBPAC

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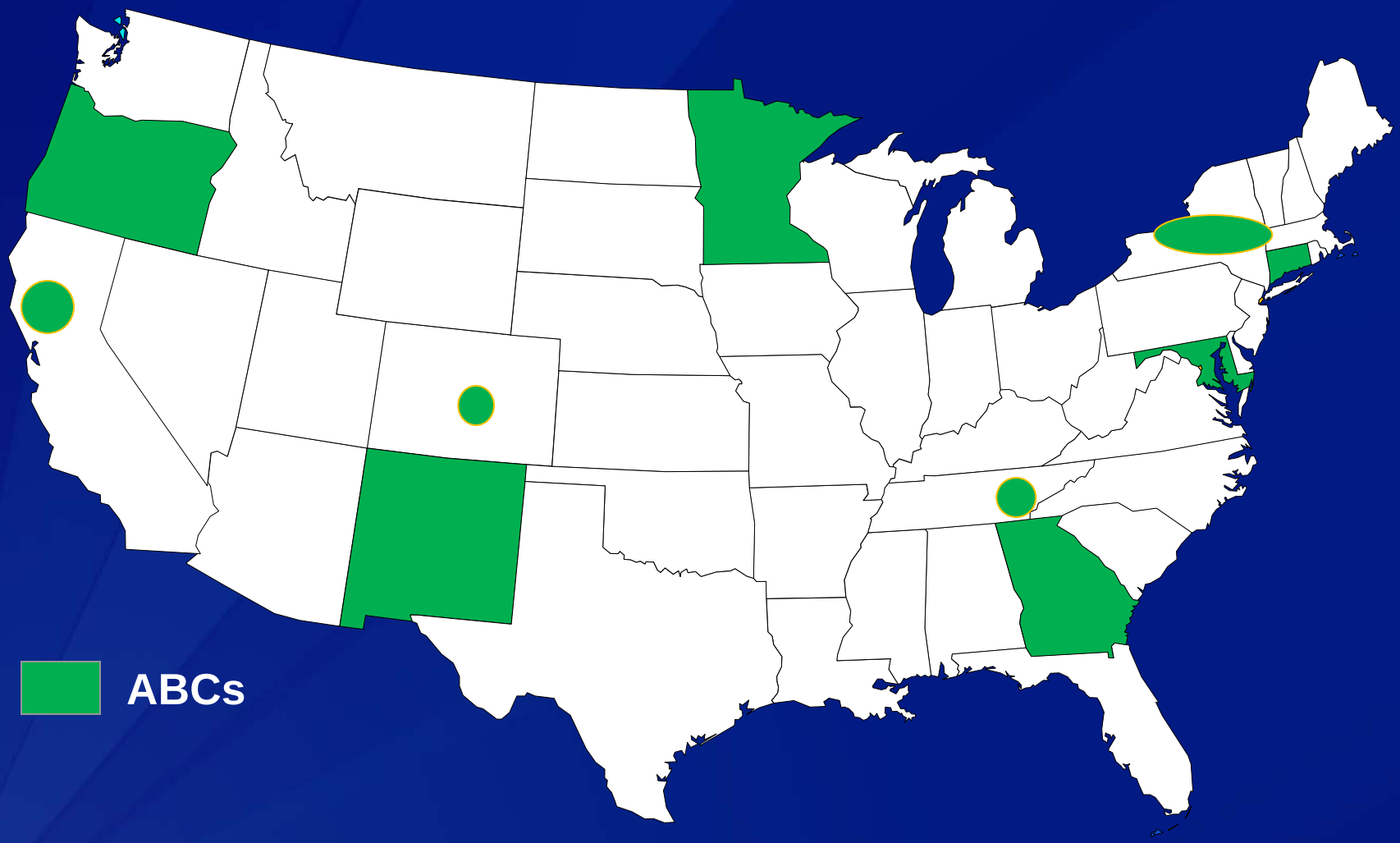
National Center for Immunization and Respiratory Diseases
Division of Bacterial Diseases/Meningitis and Vaccine Preventable Diseases Branch

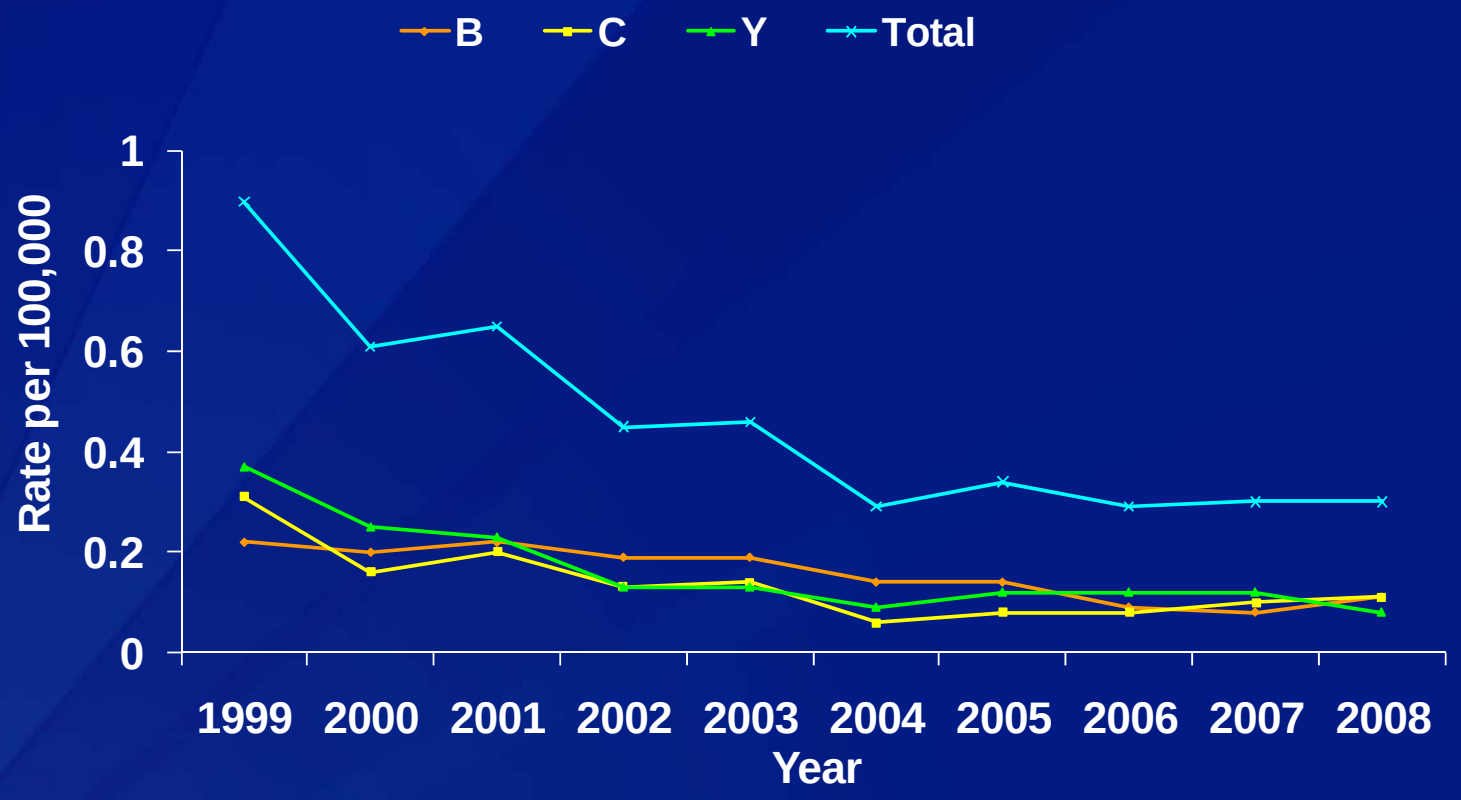
US EPIDEMIOLOGY

Active Bacterial Core surveillance (ABCs)*



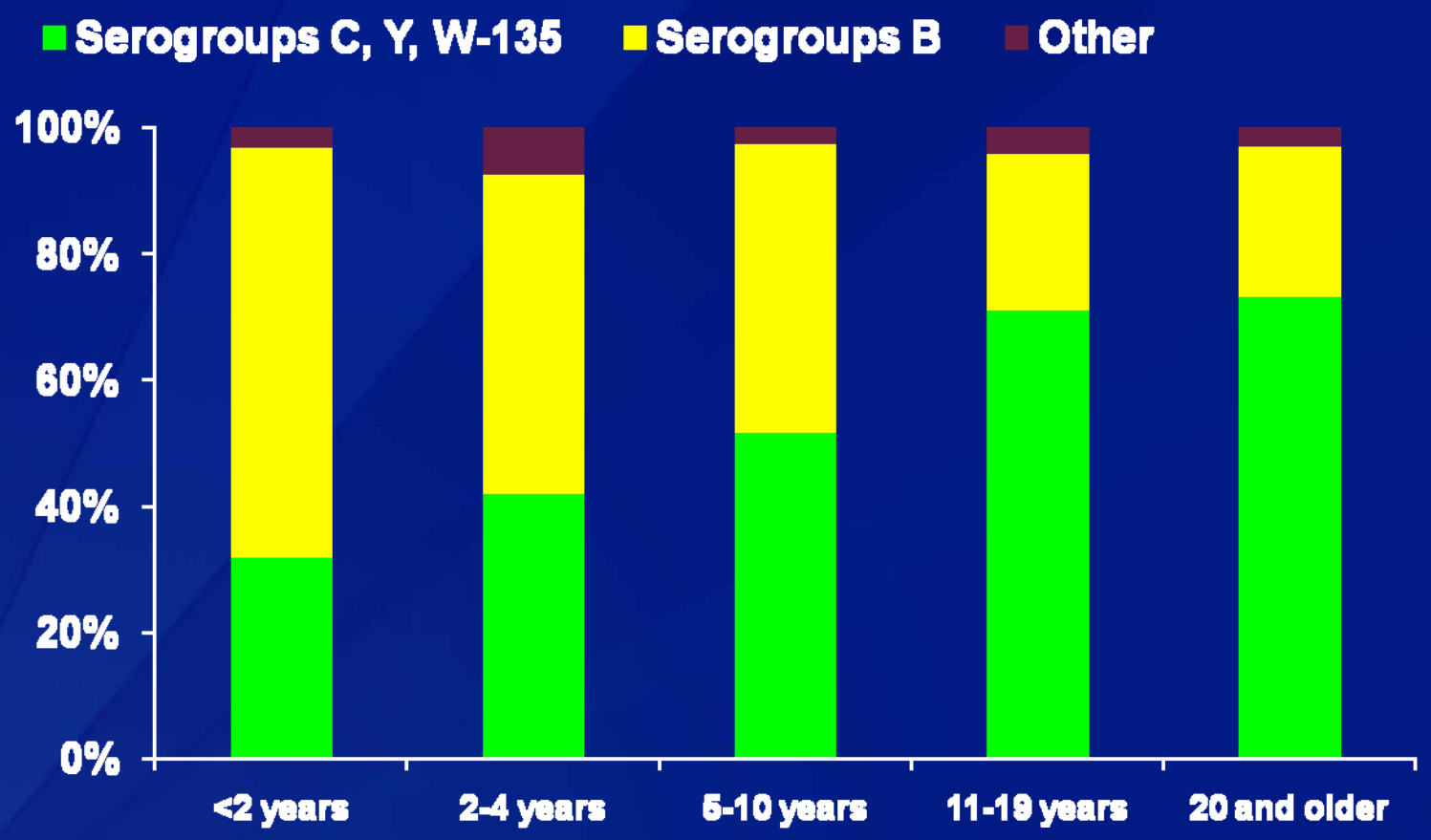
*Represents approximately 13% of US population (40 million population size)

Meningococcal Disease Incidence, United States - 1999-2008



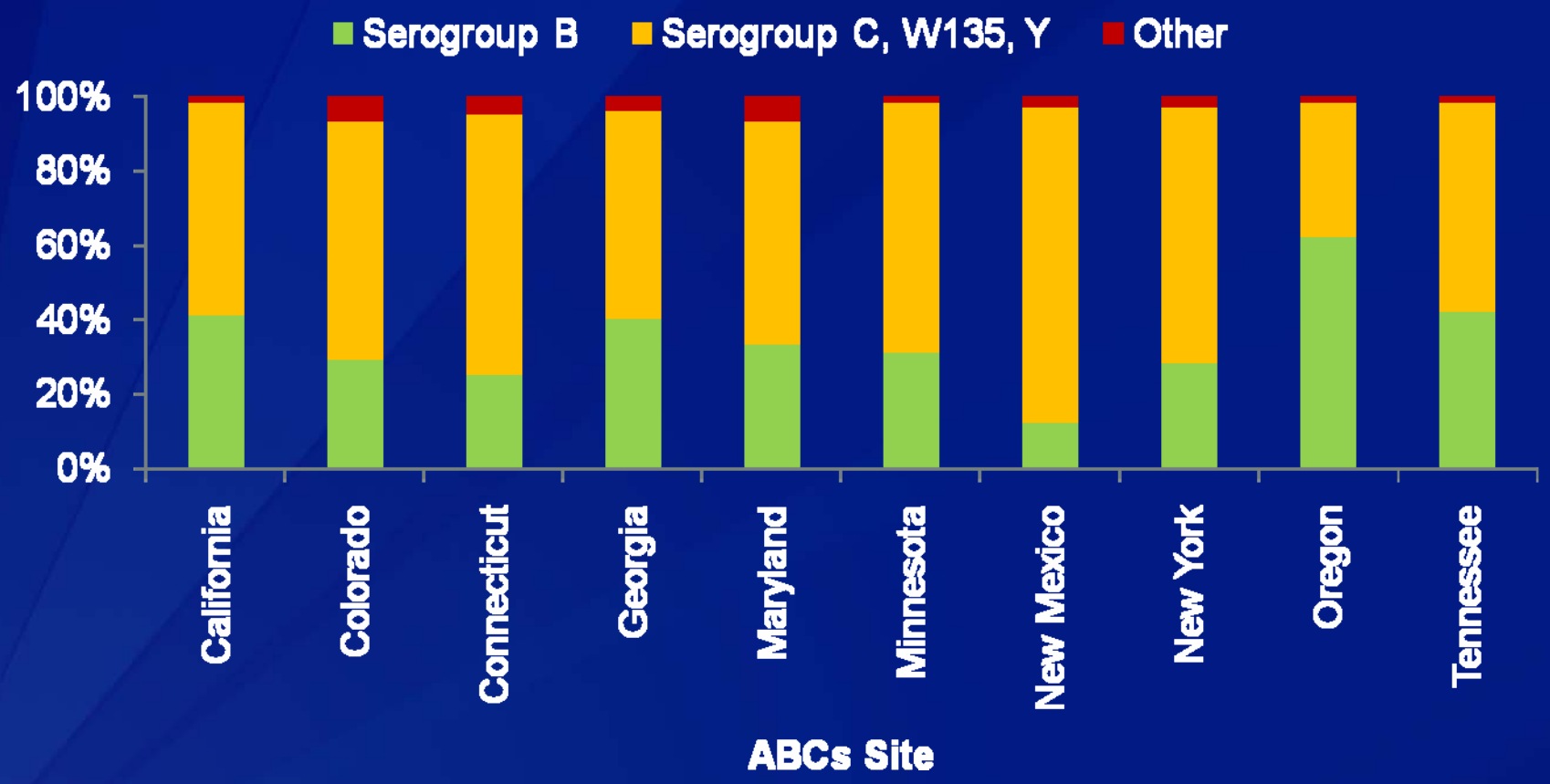
Active Bacterial Core surveillance system, incidence excluding Oregon estimated to U.S. population of 49 states and Oregon incidence added in for 50 state estimate

Proportion of Meningococcal Disease Cases by Age Group and Serogroup – 2000-2009



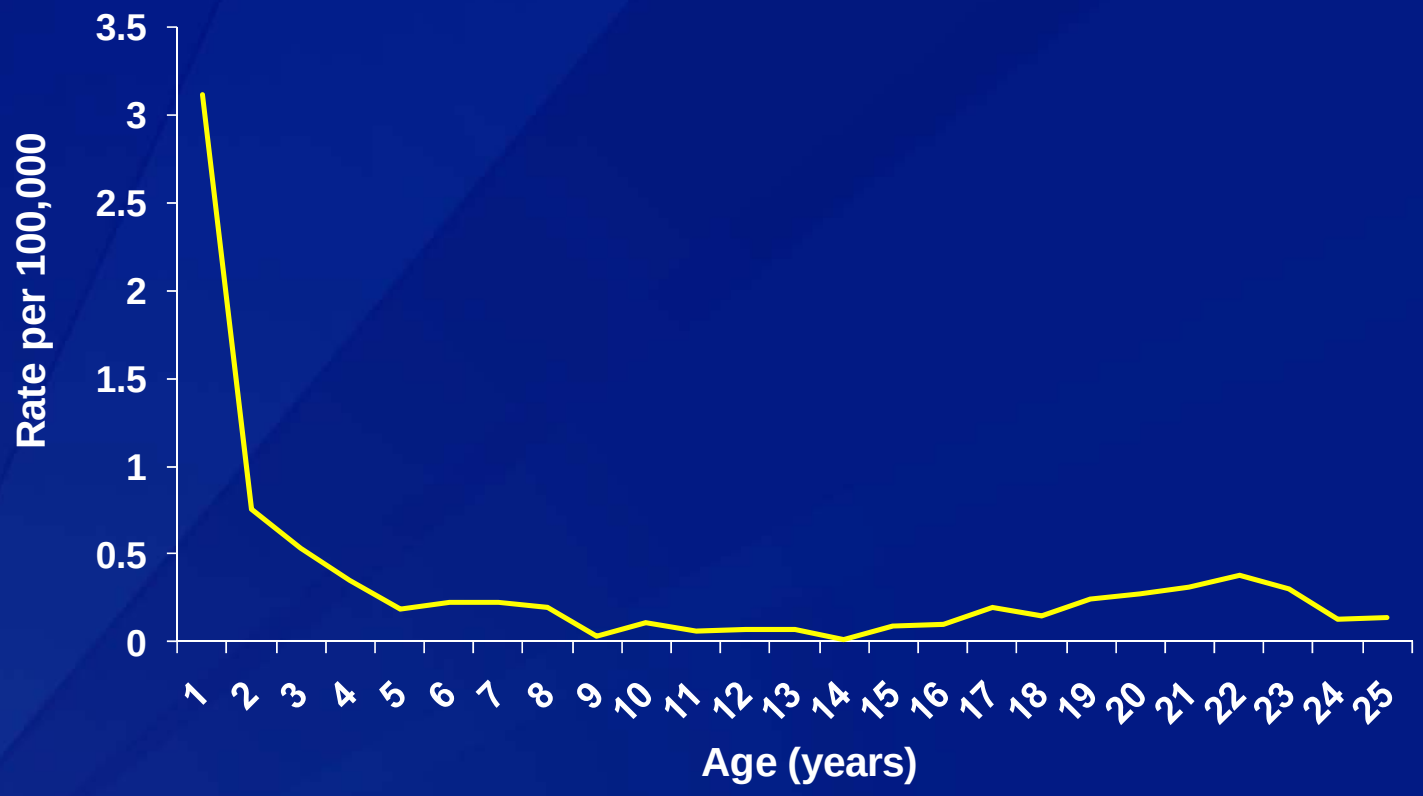
Active Bacterial Core surveillance, excludes Oregon

Proportion of Meningococcal Disease Cases by ABCs Site and Serogroup – 2000-2009



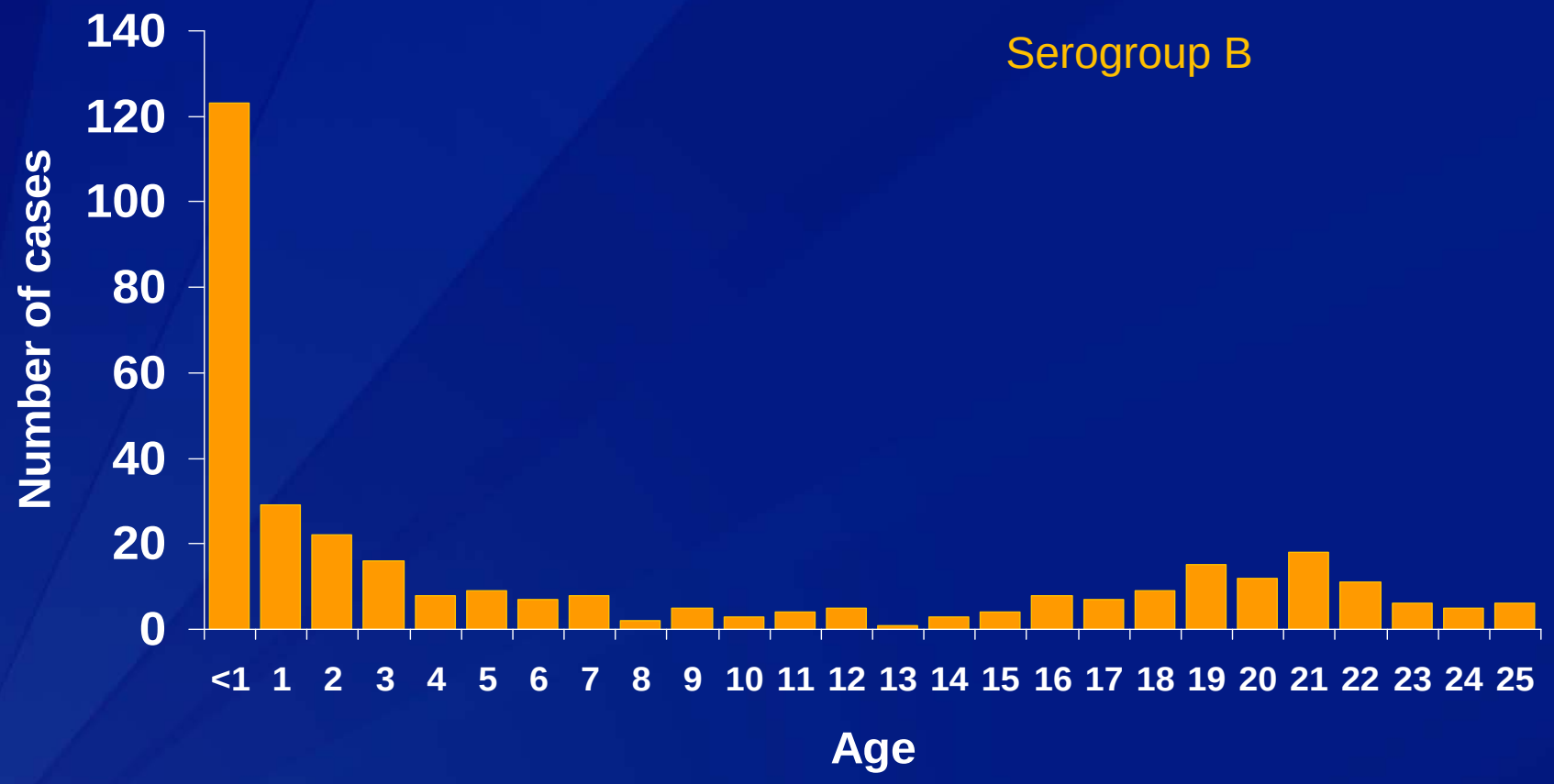
Active Bacterial Core surveillance

Annual Average Serogroup B Incidence by Age - 1999-2008



Active Bacterial Core surveillance system, incidence excluding Oregon estimated to U.S. population of 49 states and Oregon incidence added in for 50 state estimate

Estimated Annual Potential Serogroup B Cases Among Persons Aged 0-25 years*



*ABCs data 1998-2007, projected to 49 states with Oregon added back in to project to 50 states

Average Annual Cases by Serogroup in Children Aged <5 years

Age	B	C	Y
0-2 months	52	6	18
3-5 months	36	8	19
6-8 months	35	7	14
9-11 months	17	5	2
1 year	33	11	7
2 years	23	16	6
3 years	17	7	1
4 years	8	7	5

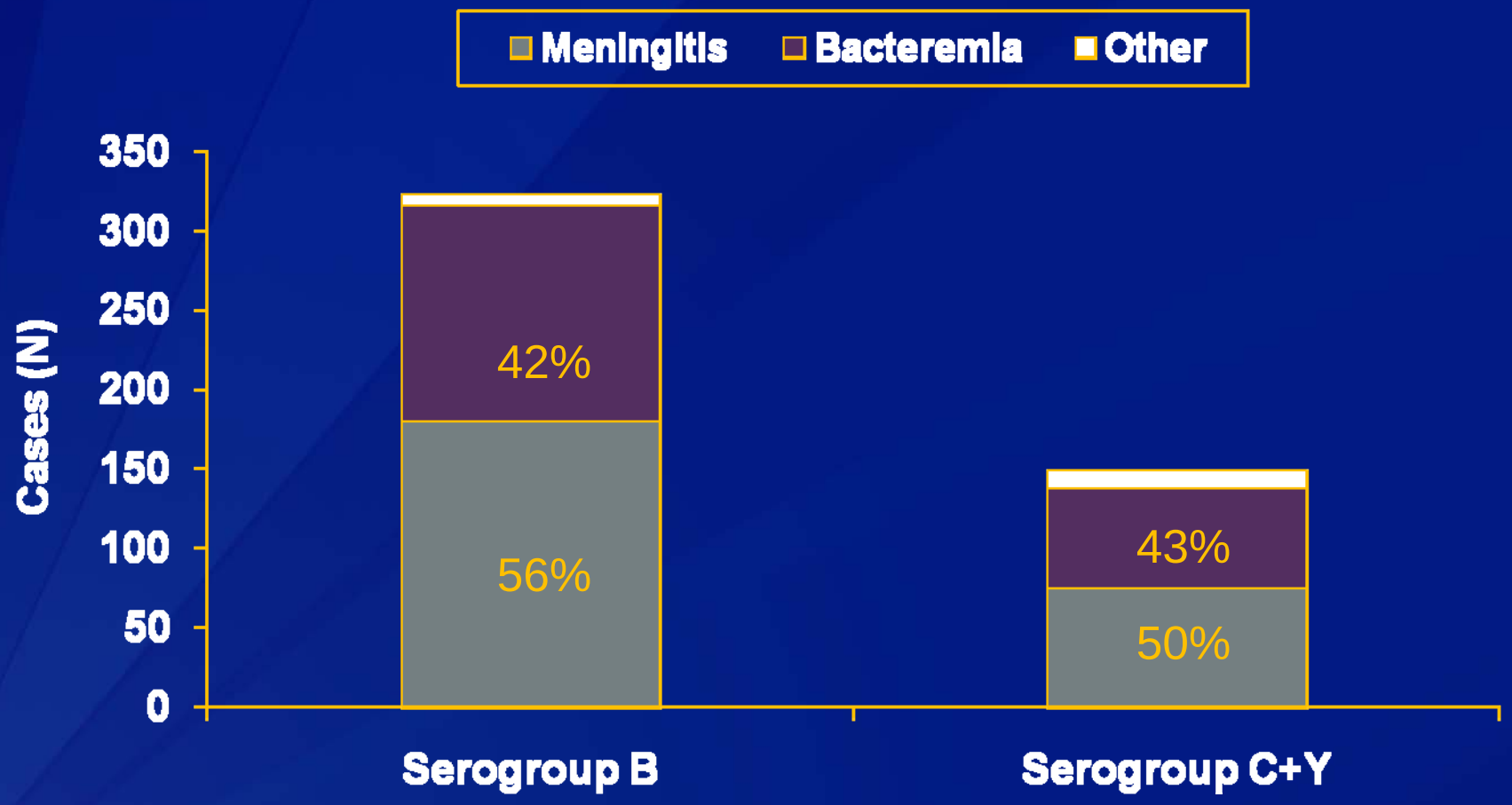
ABCs cases from 1999-2008 and projected to the U.S. population

Average Annual Deaths and Case-Fatality Ratios by Serogroup and Age - 1999-2008

Age	B	C	Y	Overall
<1 year	11 (8.3)	3 (11.4)	1 (1.7)	15 (6.7)
1-4 years	2 (2.7)	3 (7.1)	1 (4.8)	6 (3.9)
5-10 years	4 (12.4)	3 (7.3)	3 (20.0)	10 (10.9)
11-19 years	5 (8.7)	15 (15.8)	5 (6.0)	25 (10.5)
20+ years	26 (12.6)	40 (16.9)	47 (14.2)	122 (14.7)

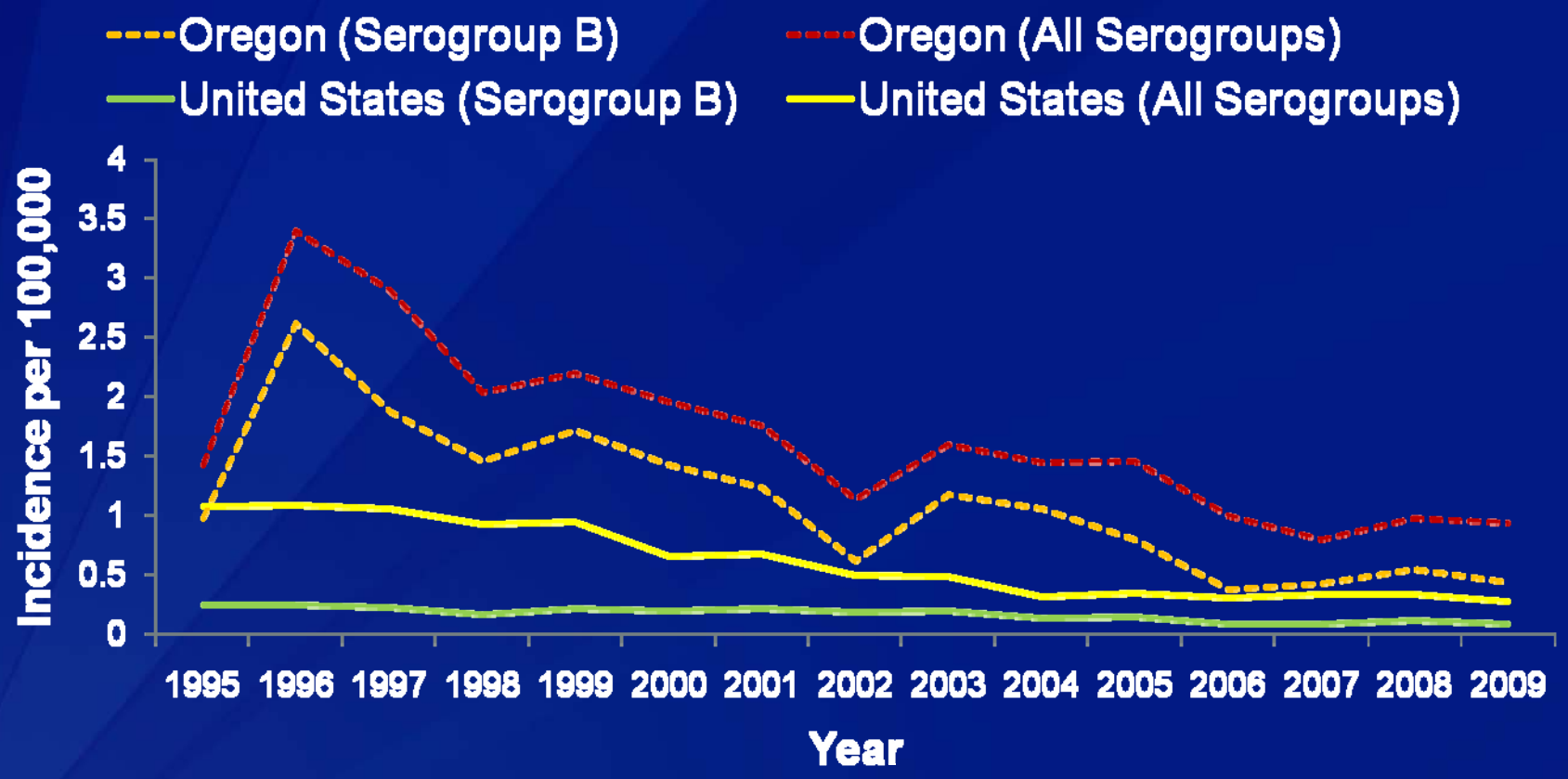
ABCs cases from 1999-2008 and projected to the U.S. population

Meningococcal Cases in Children <5 years by Serogroup and Syndrome - 1999-2008



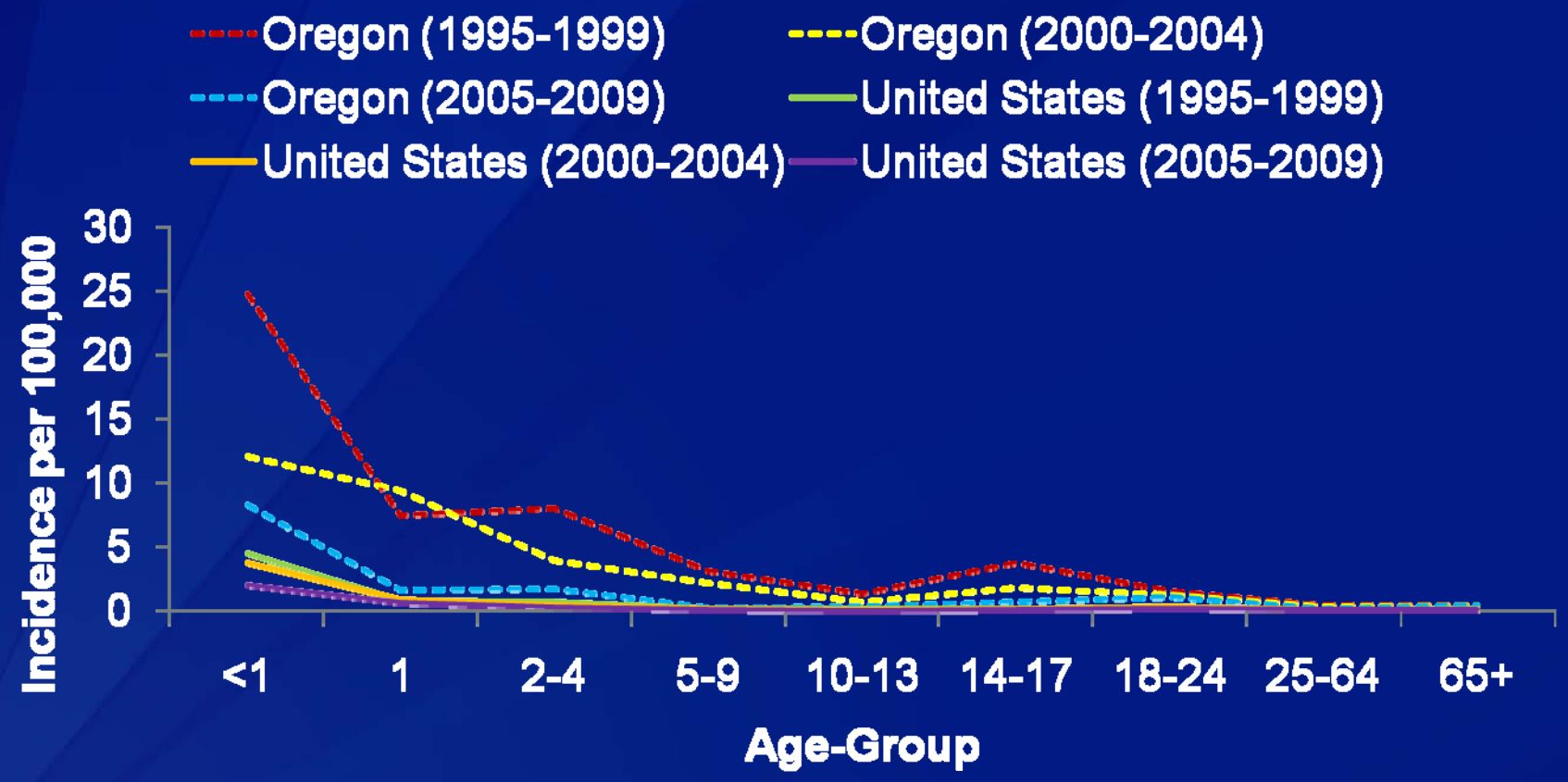
Active Bacterial Core surveillance

Incidence of Meningococcal Disease by Year, Oregon vs. United States, 1995-2009



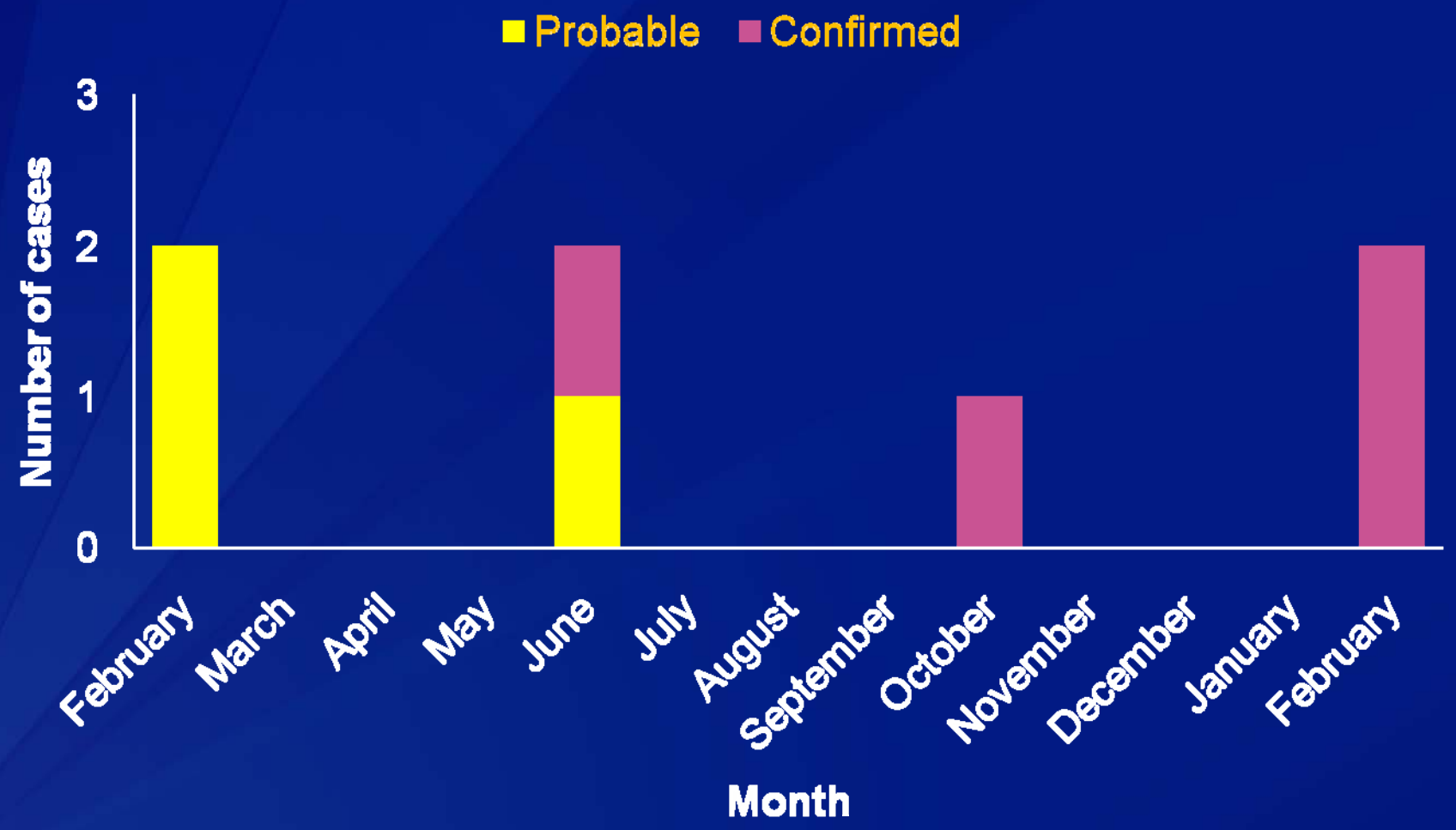
* ABCs data, estimated to the United States population

Incidence of Serogroup B Meningococcal Disease by Age Group, Oregon vs. United States



* ABCs data, estimated to the United States population

Serogroup B Cases by Month of Onset Among University A Students, 2009-2010 (n=7)



CARRIAGE

Carriage of serogroup B meningococcus in select surveys of contacts of case-patients

- 11.3% of 9354 household contacts of case patients in New Zealand[1]
- 9 (1.7%) of 530 adults in a university community in North Dakota[2]
- 13 (21%) of 61 daycare center attendees[3]

[1]Simmons, G., et al., European Journal of Clinical Microbiology & Infectious Diseases, 2001. 20(4):237-42.
[2]Wu, H.M., et al., N Engl J Med, 2009. 360(9):886-92.
[3]Katz et al. Clin Microbiol Infect. 2007 Sep;13(9):943-6.

Carriage of meningococci by serogroup in 15-17 year-old students – UK, 1999 and 2000

Serogroup	1999	2000	Ratio	p value
B	578 (4.11%)	687 (4.14%)	1.01	0.98
C	63 (0.45%)	25 (0.15%)	0.34	0.0013
W135	158 (1.12%)	236 (1.42%)	1.27	0.18
Y	136 (0.97%)	174 (1.05%)	1.09	0.43
Other/NG	1413 (10.05%)	1860 (11.22%)	1.12	0.071
Total isolates	2348 (16.70%)	2982 (17.98%)	1.08	0.30

*Maiden MJ et al. Lancet 2002;**359**:1829-30.

Meningococcal carriage by serogroup, among high school students in 2 counties with and without a history of meningococcal disease – Georgia, 1998

Serogroup	Hyper-sporadic county (n=1818) N (%)	Comparison county (n=912) N (%)
Y	67 (3.7)	24 (2.6)
B	23 (1.3)	15 (1.6)
Z	3 (0.17)	0 (0)
C	1 (0.05)	1 (0.1)
NG	45 (2.6)	16 (1.8)
Total	140 (7.7)	56 (6.1)

*Kellerman et al. JID 2002;186:40-8.

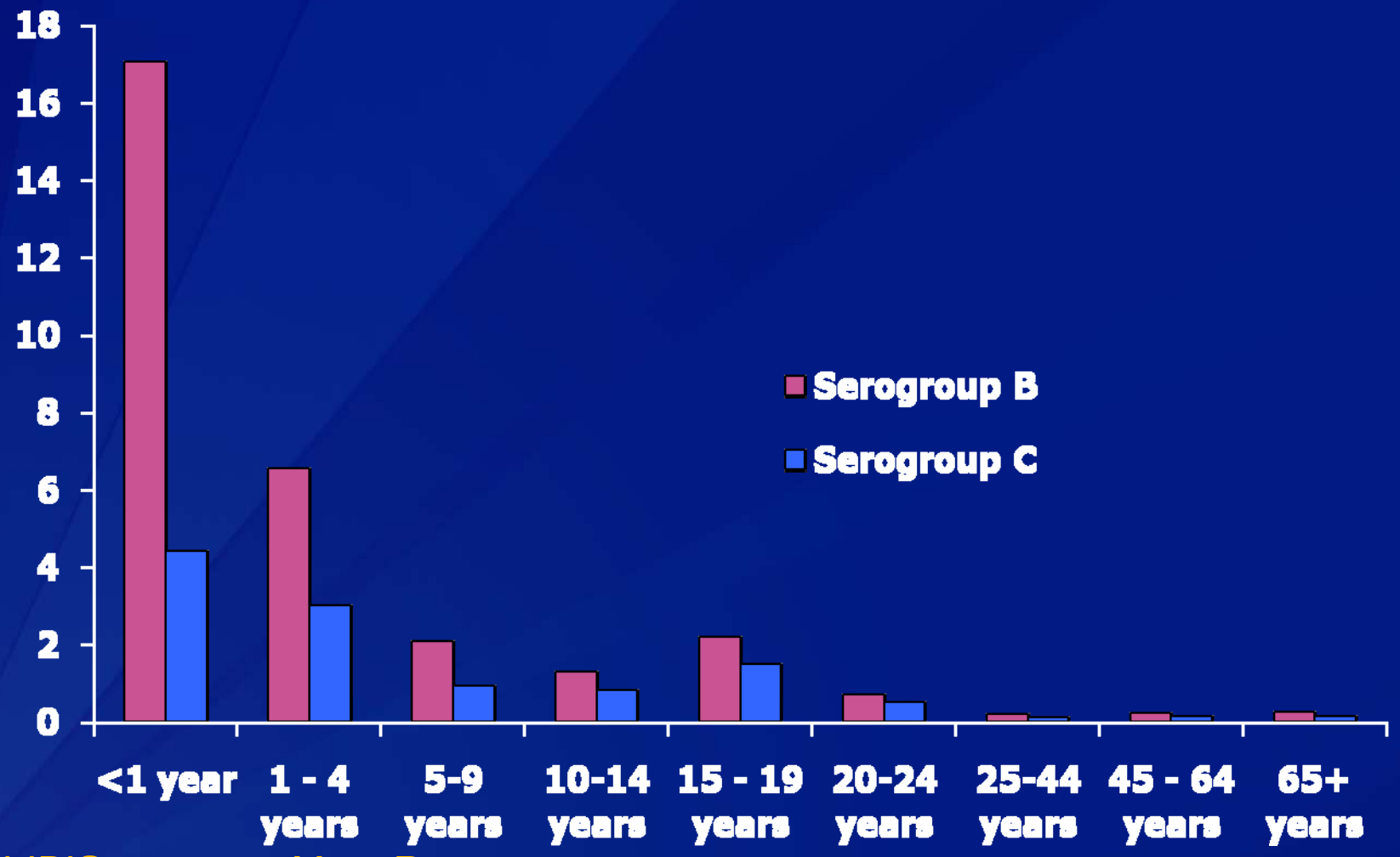
High school students with baseline meningococcal carriage by serogroup, vaccination status, and state – US, 2006

State	Group	Sample size	B		C		Y		NG		Total	
			N	%	N	%	N	%	N	%	N	%
All	Vaccinated	1731	6	0.35	0	0	6	0.35	49	2.83	61	3.52
	Control	1543	3	0.19	0	0	3	0.19	39	2.53	45	2.92
	Total	3274	9	0.27	0	0	9	0.27	88	2.69	106	3.24
MD	Vaccinated	795	0	0	0	0	6	0.75	29	3.65	35	4.40
	Control	611	0	0	0	0	2	0.33	19	3.11	21	3.44
	Total	1406	0	0	0	0	8	0.57	48	3.41	56	3.98
GA	Vaccinated	936	6	0.64	0	0	0	0	20	2.14	26	2.78
	Control	932	3	0.32	0	0	1	0.11	20	2.15	24	2.59
	Total	1868	9	0.48	0	0	1	0.05	40	2.14	50	2.68

GLOBAL EPIDEMIOLOGY

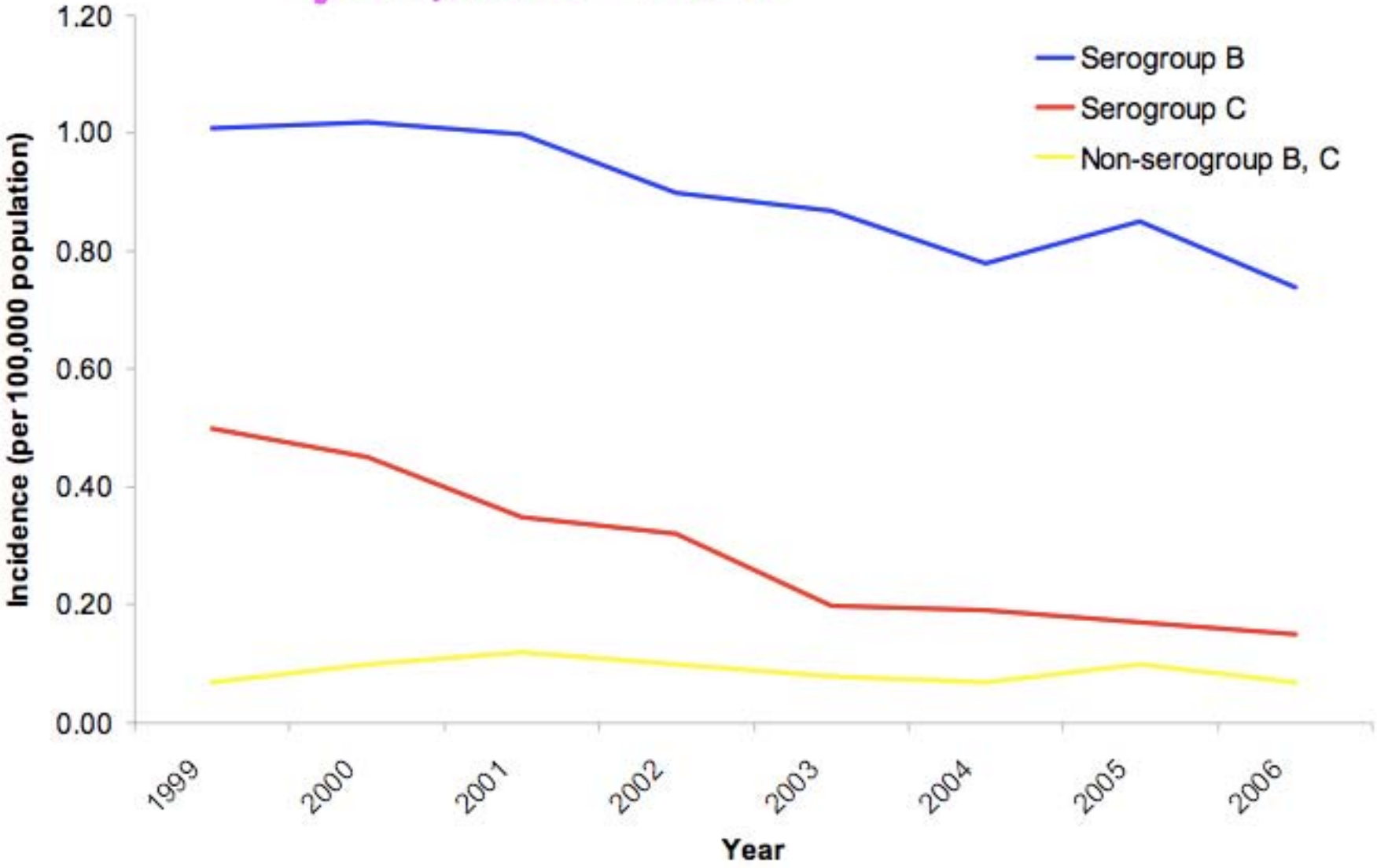
Global Serogroup Distribution

Age-specific Incidence of IMD by Serogroup for All EU Countries Combined, 1999 (baseline year)

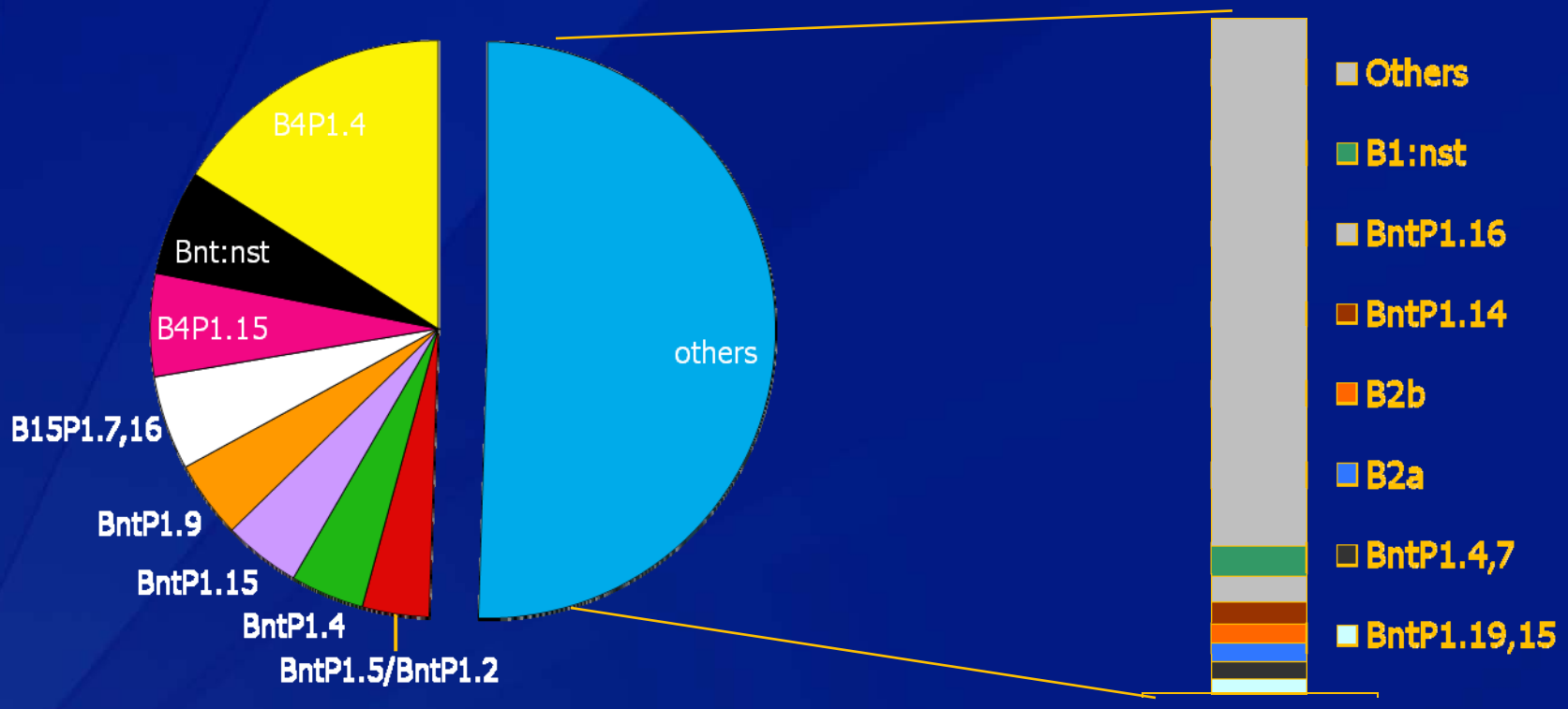


*EU-IBIS, courtesy Mary Ramsay

Serogroup specific incidence of IMD, by year, 1999 – 2006

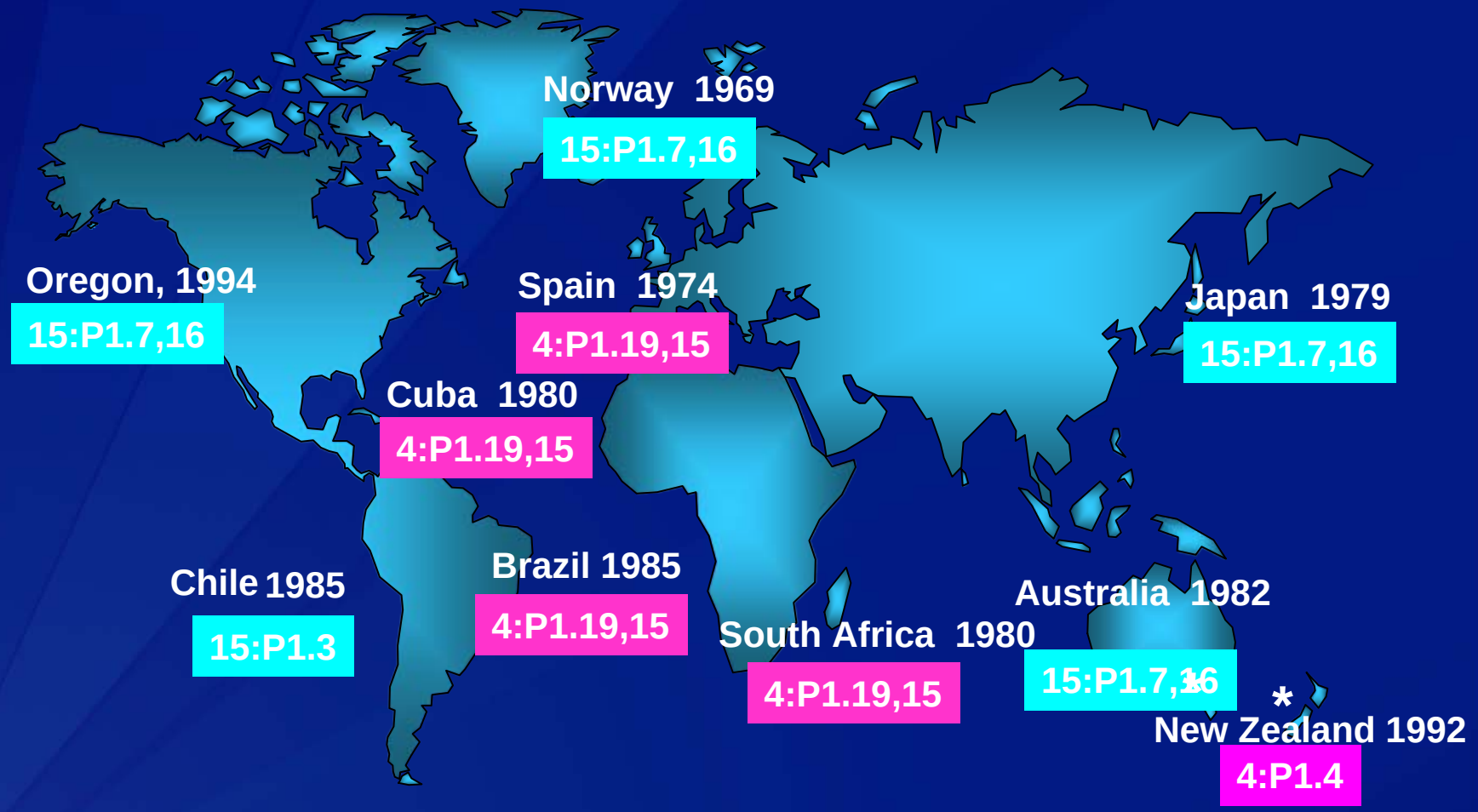


Serogroup B: Distribution by Major Phenotypes
All Countries and Years Combined, Europe



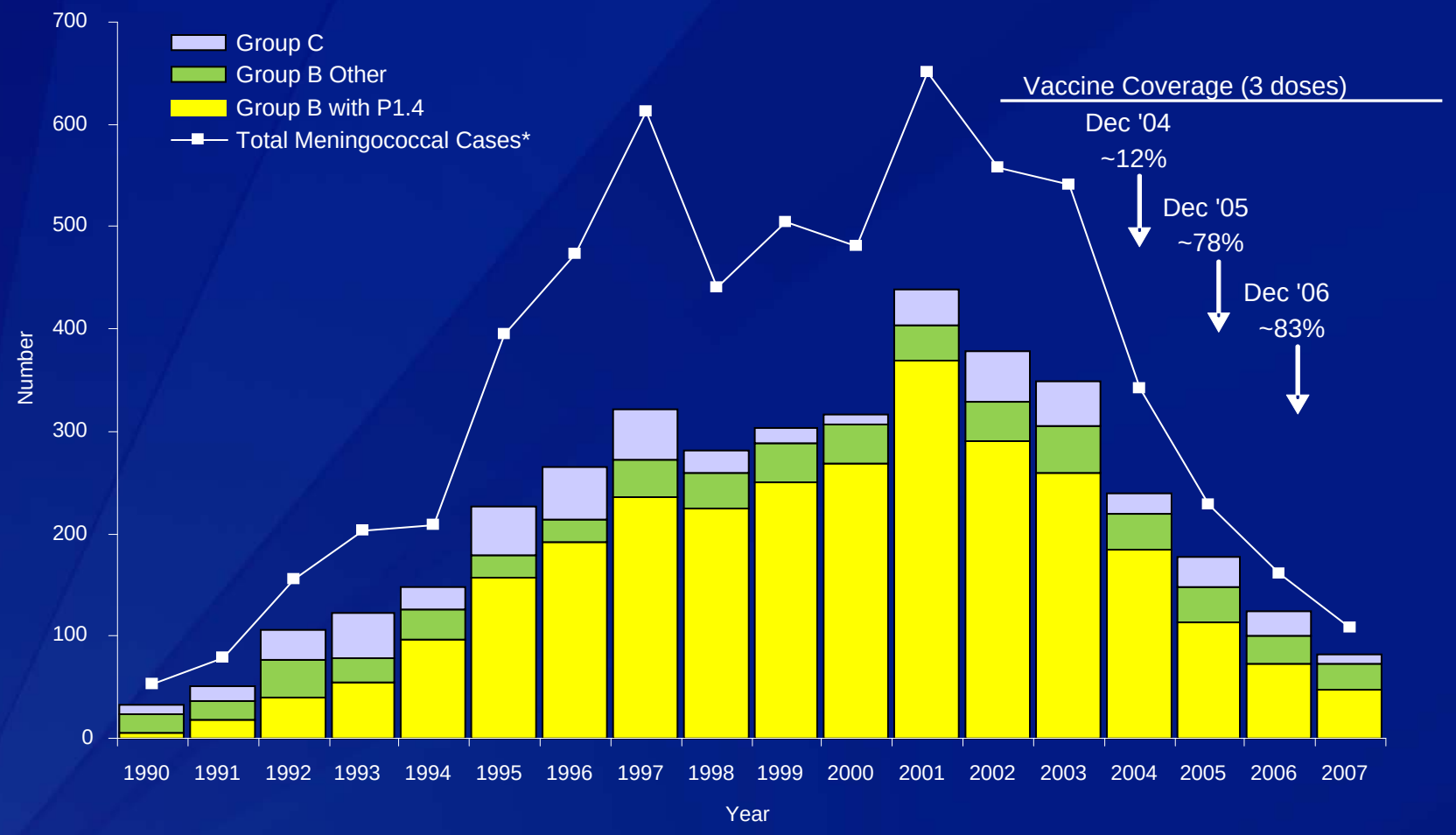
*EU-IBIS, courtesy Mary Ramsay

Distribution of Serogroup B ET-5 Epidemics



Modified from Caugant, APMIS 1998;106:505-525

New Zealand Meningococcal B Notified Cases, 1990-2007



D. Lennon, presented to SAGE WG 2010

Serogroup B OMV Vaccine Evaluations

Country	Vaccine	Doses	Efficacy/Effectiveness Estimate
Chile	4:P1.19,15	2	83%
Cuba	15:P1.7-2,3	2	51%
Norway	15:P1.7,16	2	57%
Brazil	4:P1.19,15	2	54%
New Zealand	4:P1.7-2,4	3	69-73%

Holst et al. Vaccine 2009.

Summary

- Appreciable burden of serogroup B disease in industrialized countries
- Youngest age groups at highest risk
- High degree of genetic diversity in endemic strains
- Notable clonal outbreaks
- Local epidemiology critical to informing vaccine policy

Thank You

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.