

The Epidemiology of Invasive Meningococcal Disease (IMD) over 16 years after start of Meningococcal Vaccine Programs in Canada

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Canadian Immunization Monitoring Program, ACTive
Programme canadien de surveillance active de l'immunisation

Disclosure

The Canadian Immunization Monitoring Program, Active (IMPACT) is a national surveillance initiative managed by the Canadian Paediatric Society and conducted by the IMPACT network of pediatric investigators.

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The Essence of Invasive Meningococcal Disease (IMD)

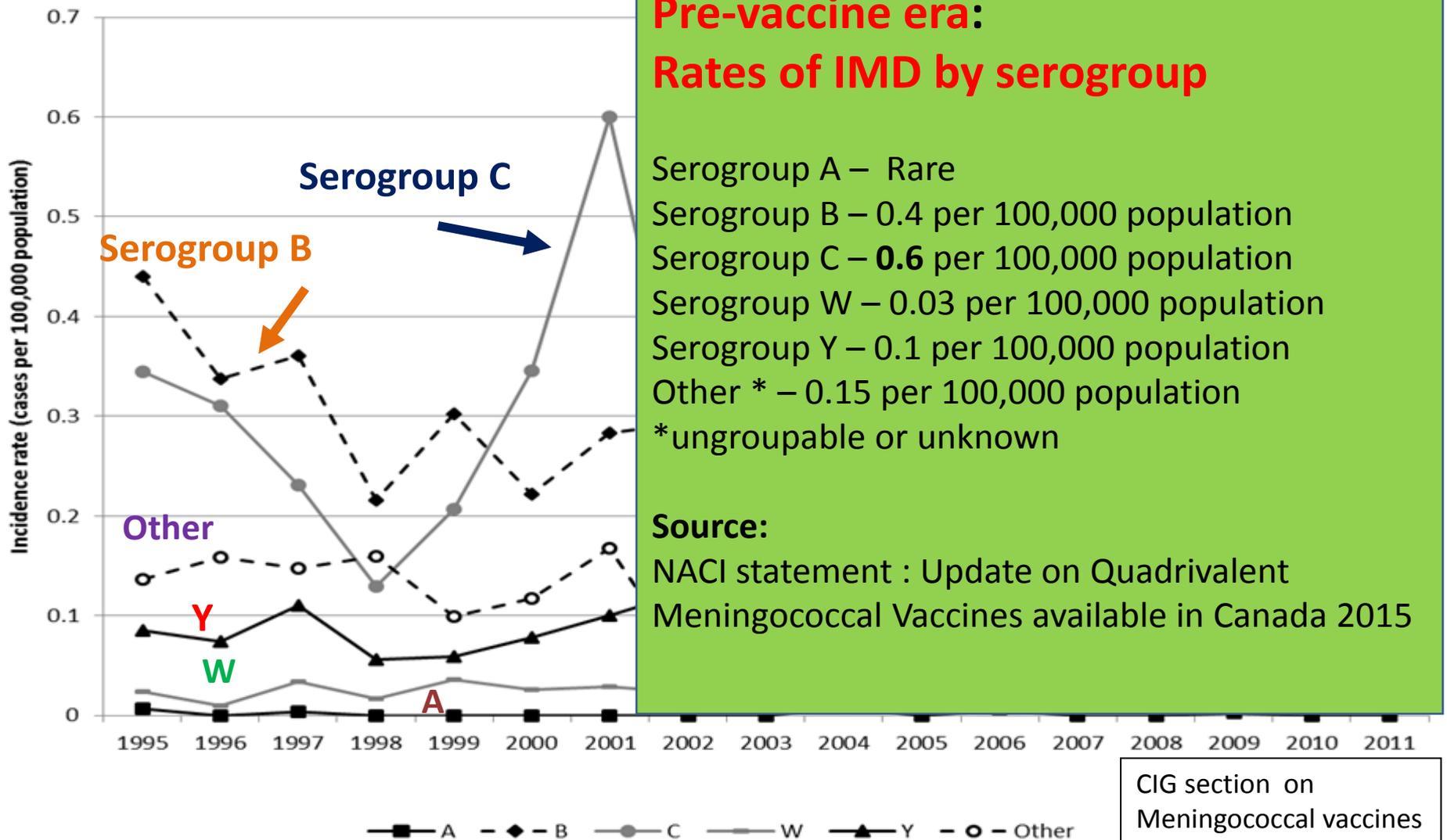
- Caused by *Neisseria meningitidis*
- Most often rapid onset with small vessel thrombus formation
- Major clinical manifestations
 - Bacteremia with/without disseminated intravascular coagulation
 - Acute sepsis with bacteremia and meningitis
 - Meningitis
- Major long term sequelae
 - Skin scarring, digit or limb amputation
 - Hearing loss and other neurologic sequelae



Photo #1 CDC.gov

Photos #2,3 courtesy of a patient

Incidence of IMD By Serogroup Canada –Pre-vaccine 1995-2001



CIG section on
Meningococcal vaccines

Meningococcal Vaccines in Publically Funded Programs

Meningococcal Conjugate C vaccine

Men-C-C

Started in infants in all Canadian jurisdictions 2002 to 2009

Given from 2 months of age

Meningococcal Conjugated Quadrivalent vaccine

Men-C-ACYW

**Various Jurisdictions since 2006
(IMPACT sites 2007 and later)**

Adolescent programs

Men-C-ACYW not in universal programs in Québec, Manitoba

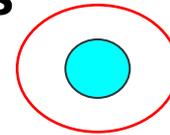
IMD Surveillance for Cases of Hospitalized in IMPACT Catchment areas in Canada



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Active case finding for hospital admissions

IMPACT + population based surveillance



- Both **adults and children** at all 12 IMPACT sites since 2002
 - Excludes areas without IMPACT sites
- Requires isolation of *Neisseria meningitidis* or molecular detection from sterile site
- IMD is a publically reportable disease across Canada – all numbers and cases verified with local public health
 - IMPACT nurses monitors gather clinical information on cases
 - Isolates from Provincial Laboratories are sent to the National Microbiology Laboratory – serogrouping and molecular identification
- **Objective** of surveillance is to **determine the impact of vaccine programs on disease rates** and clinical outcomes of invasive meningococcal disease



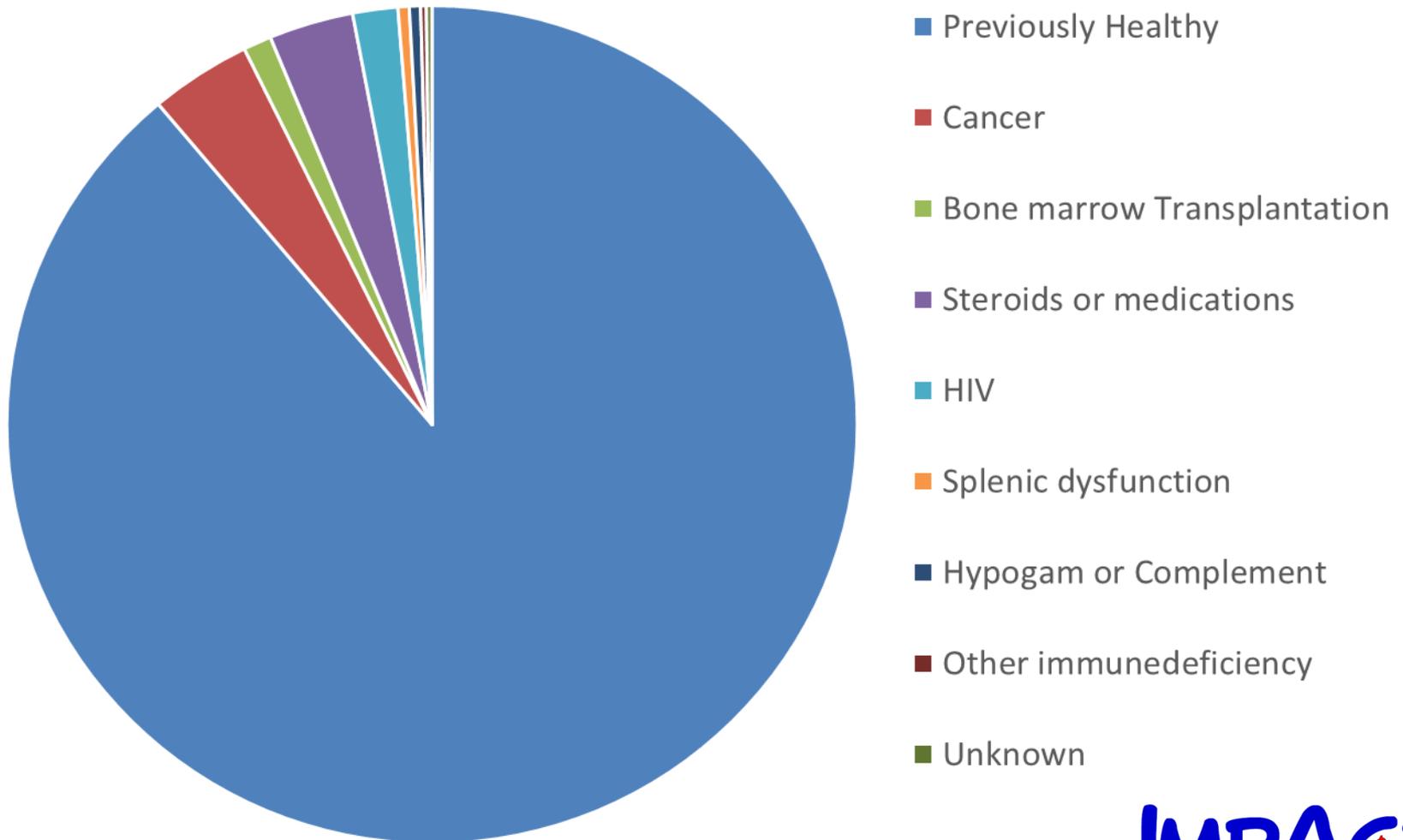
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(2002-2017) 16 Years

- Total number of patients: 1172, 50.4% female

Serogroup	Number	Median age (years)
B	655	11
C	186	30
W	72	21
Y	209	39
Other	9	27
Unknown	41	15

Healthy Persons Are The Most Commonly Affected! N= 467



IMPACT

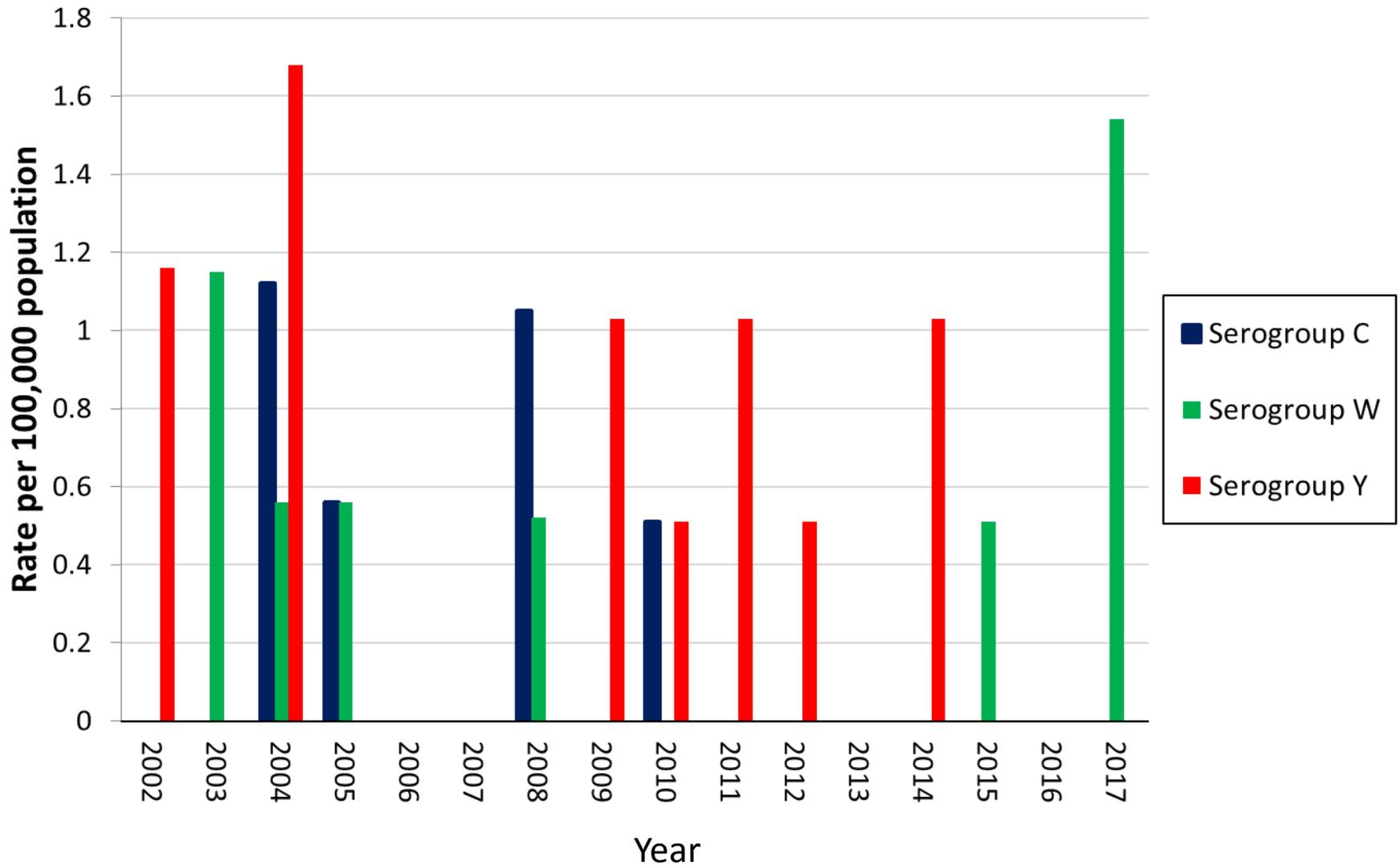
Rates of IMD by Age Group Over Time

Serogroup C

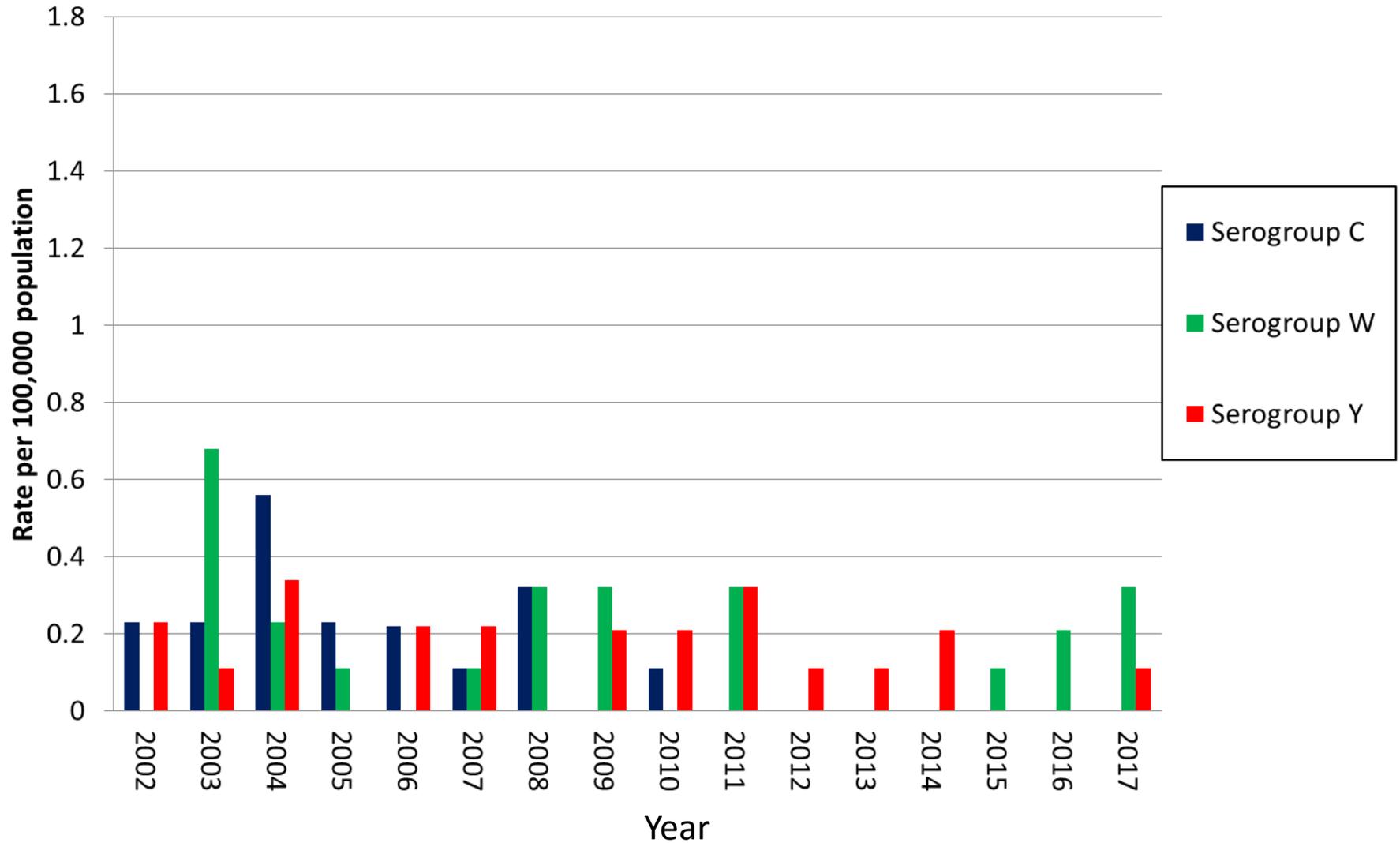
Serogroup W

Serogroup Y

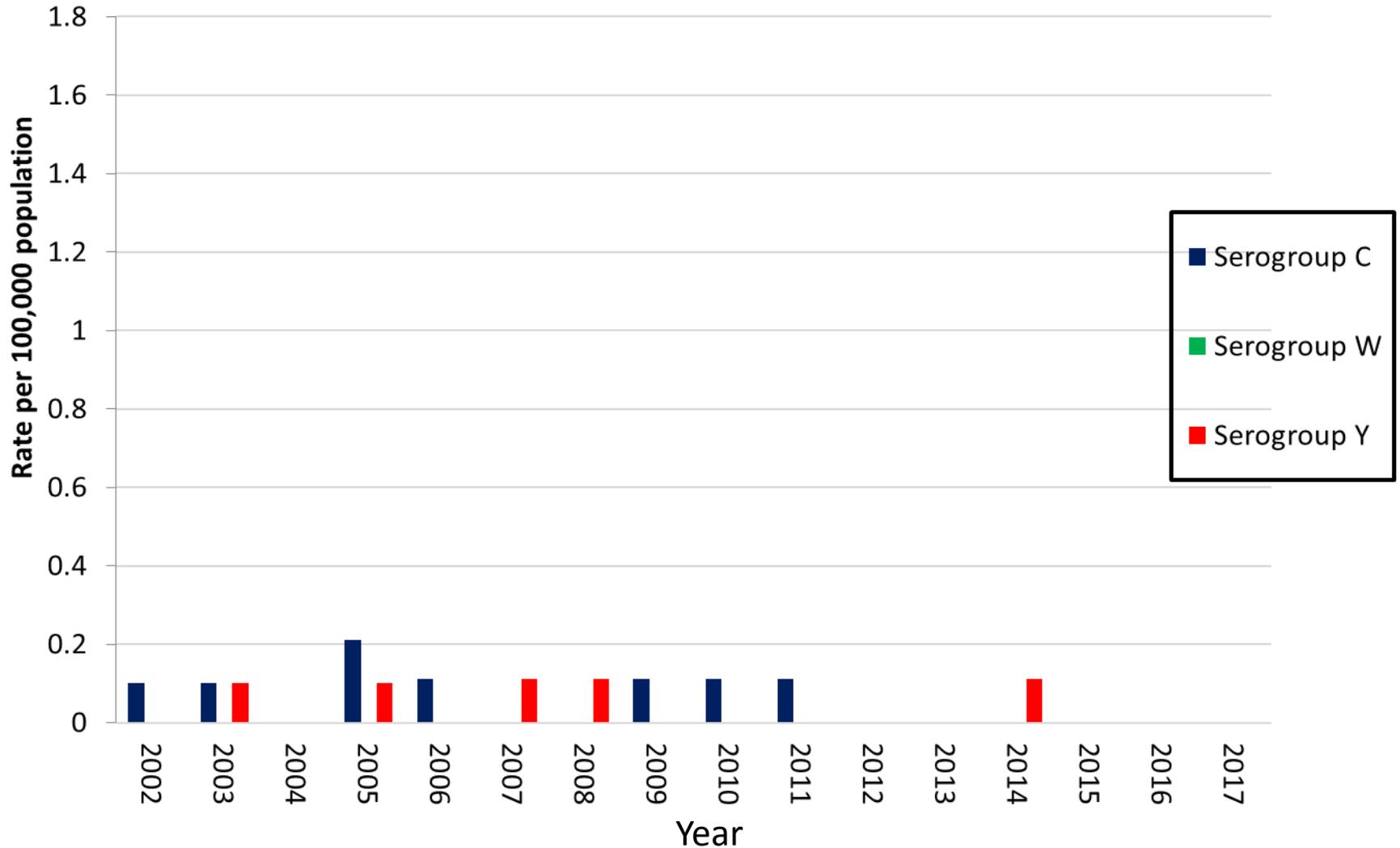
IMD < 1 year of age by Serogroup Over Time



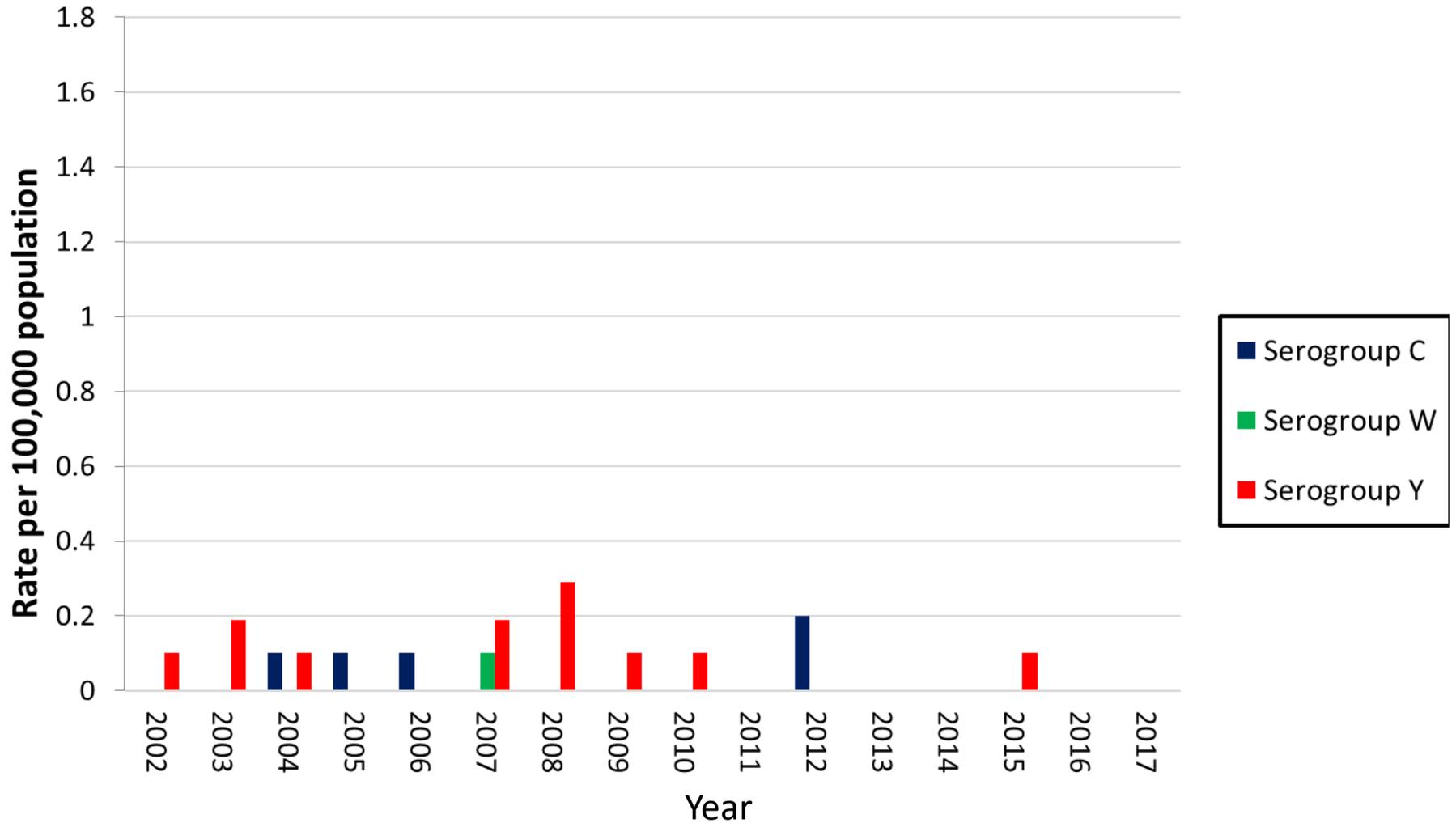
IMD 1-4 years of age by Serogroup Over Time



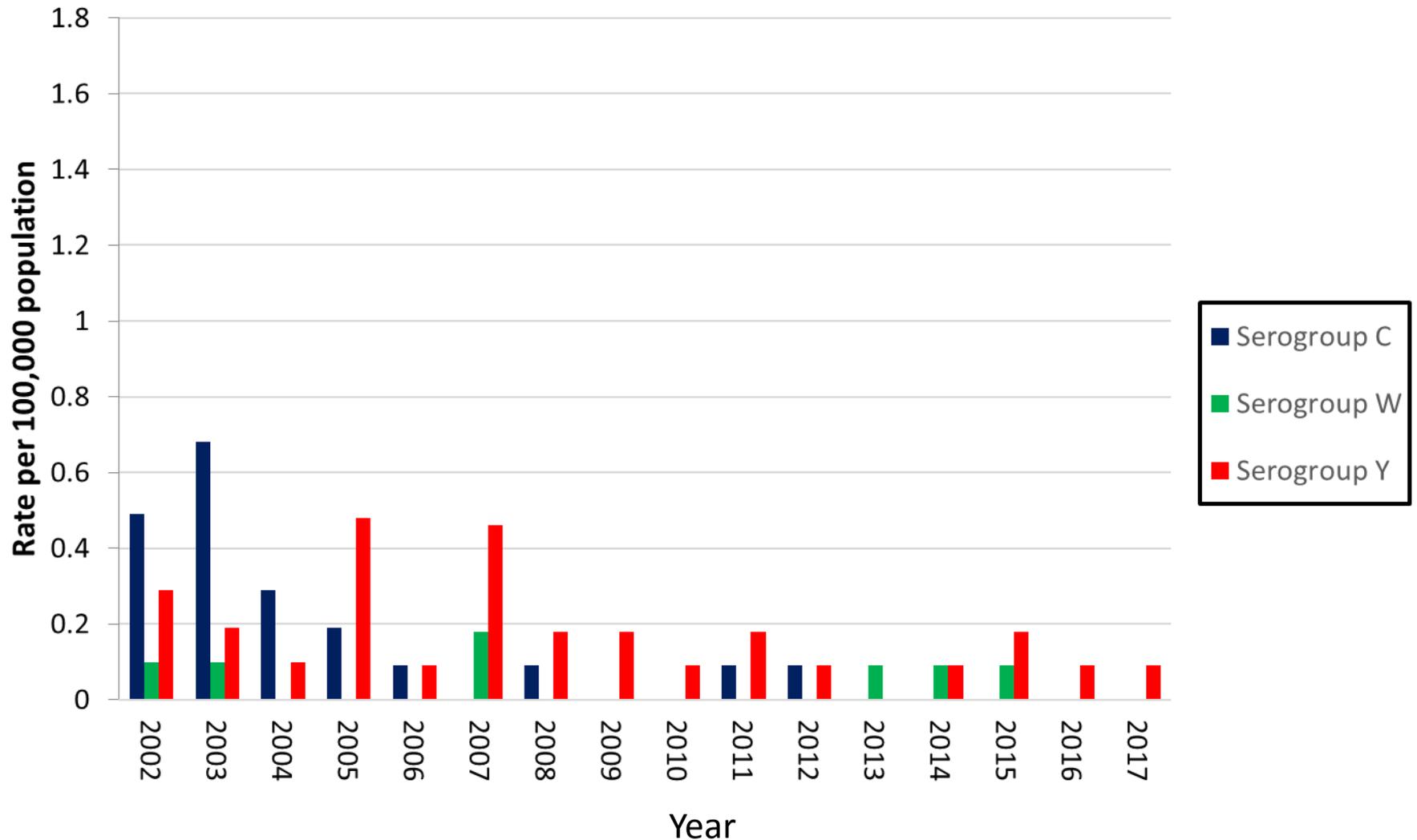
IMD 5-9 years of age by Serogroup Over Time



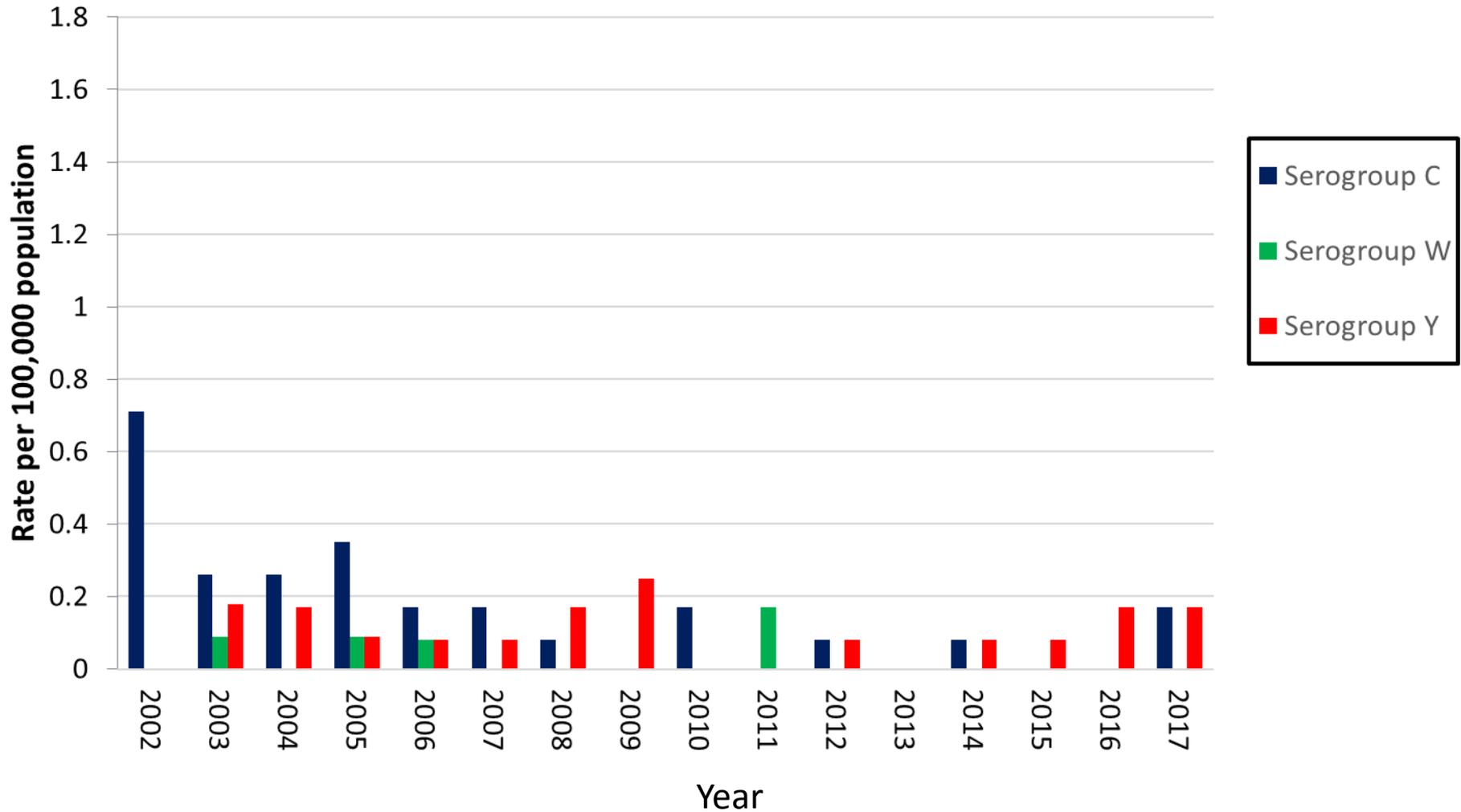
IMD 10 to 14 years of age by Serogroup Over time



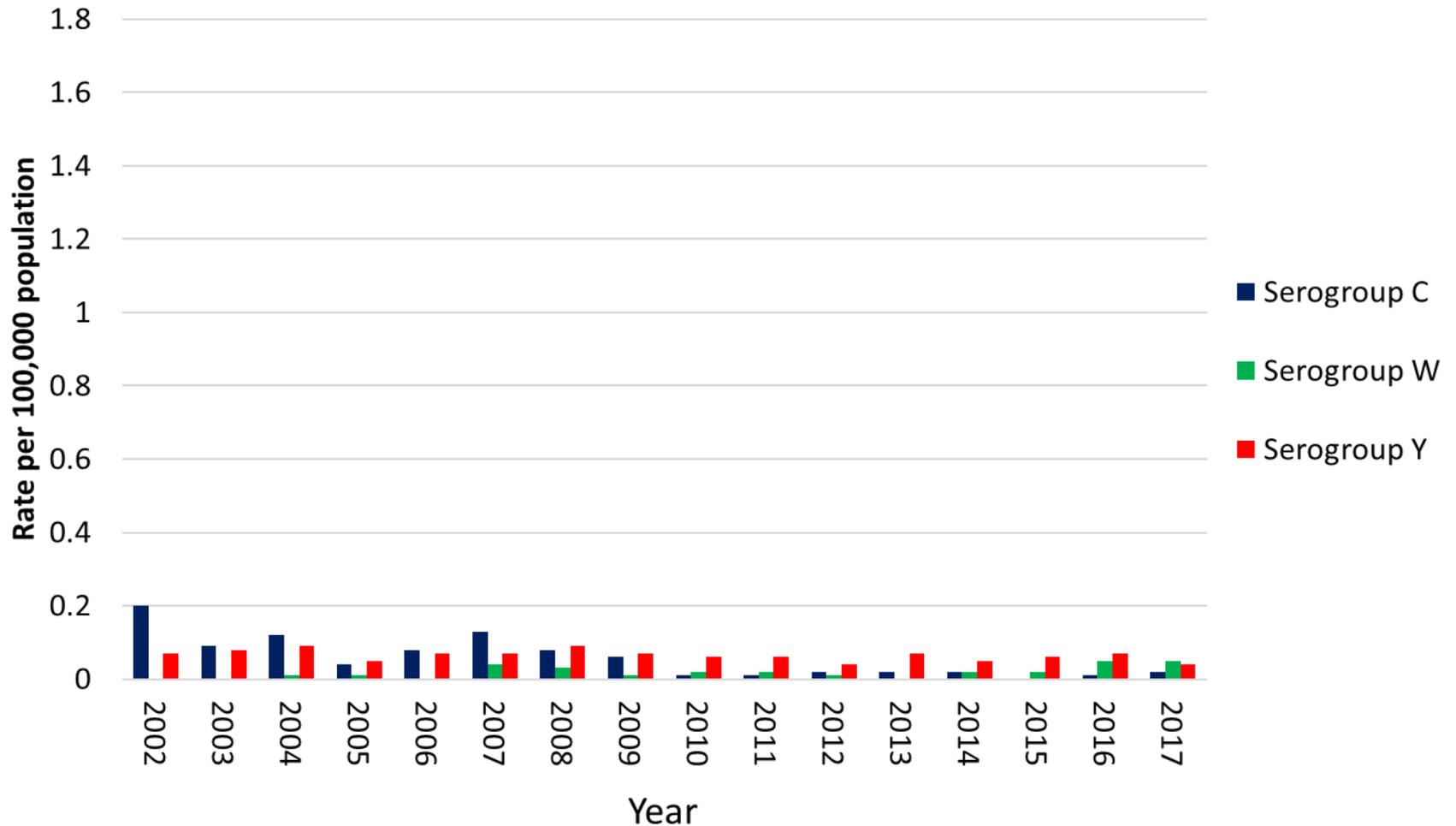
IMD 15 to 19 years of age by Serogroup Over time



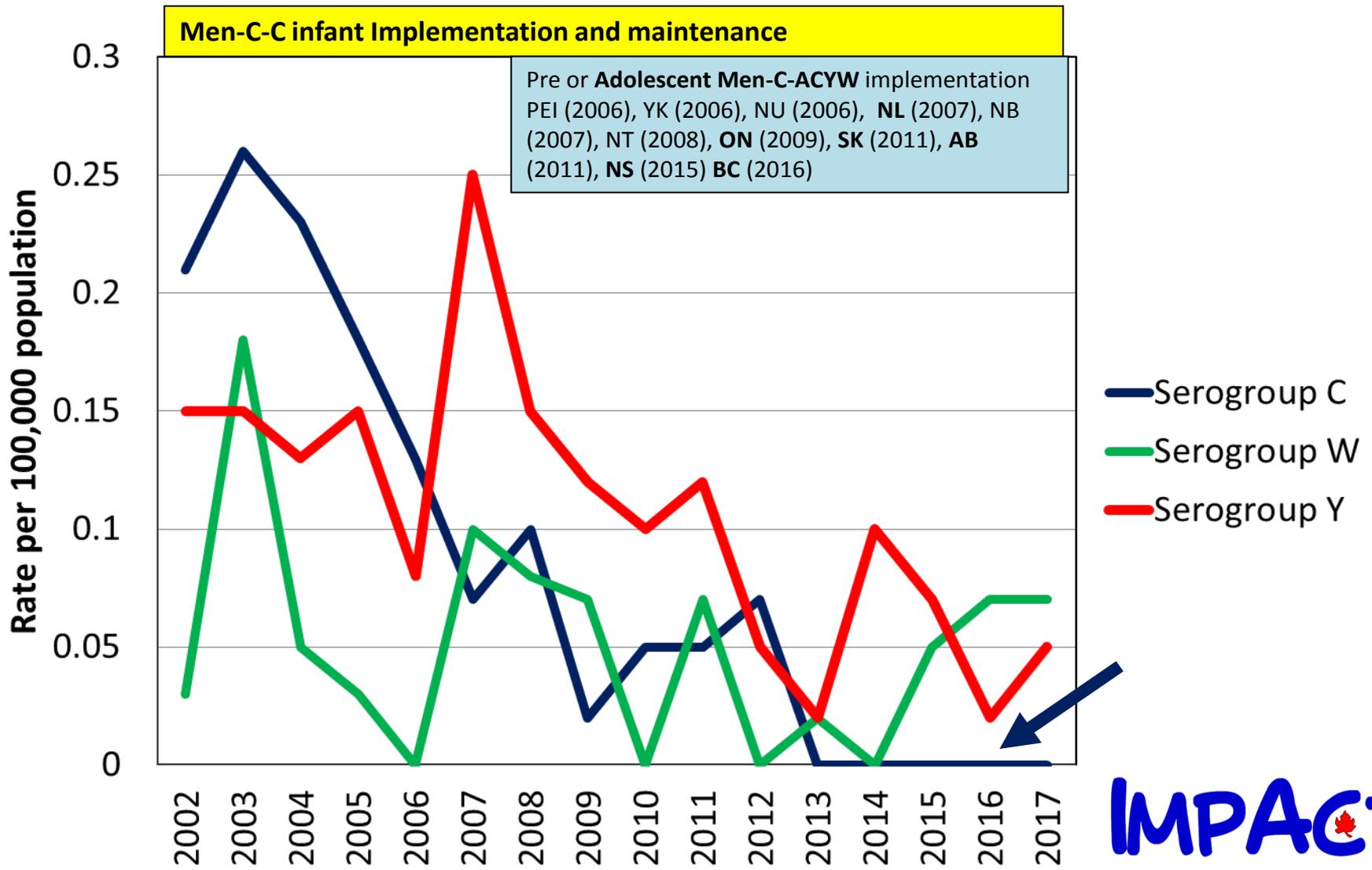
IMD 20 to 24 years of age by Serogroup Over time



IMD >25 years of age by Serogroup Over time

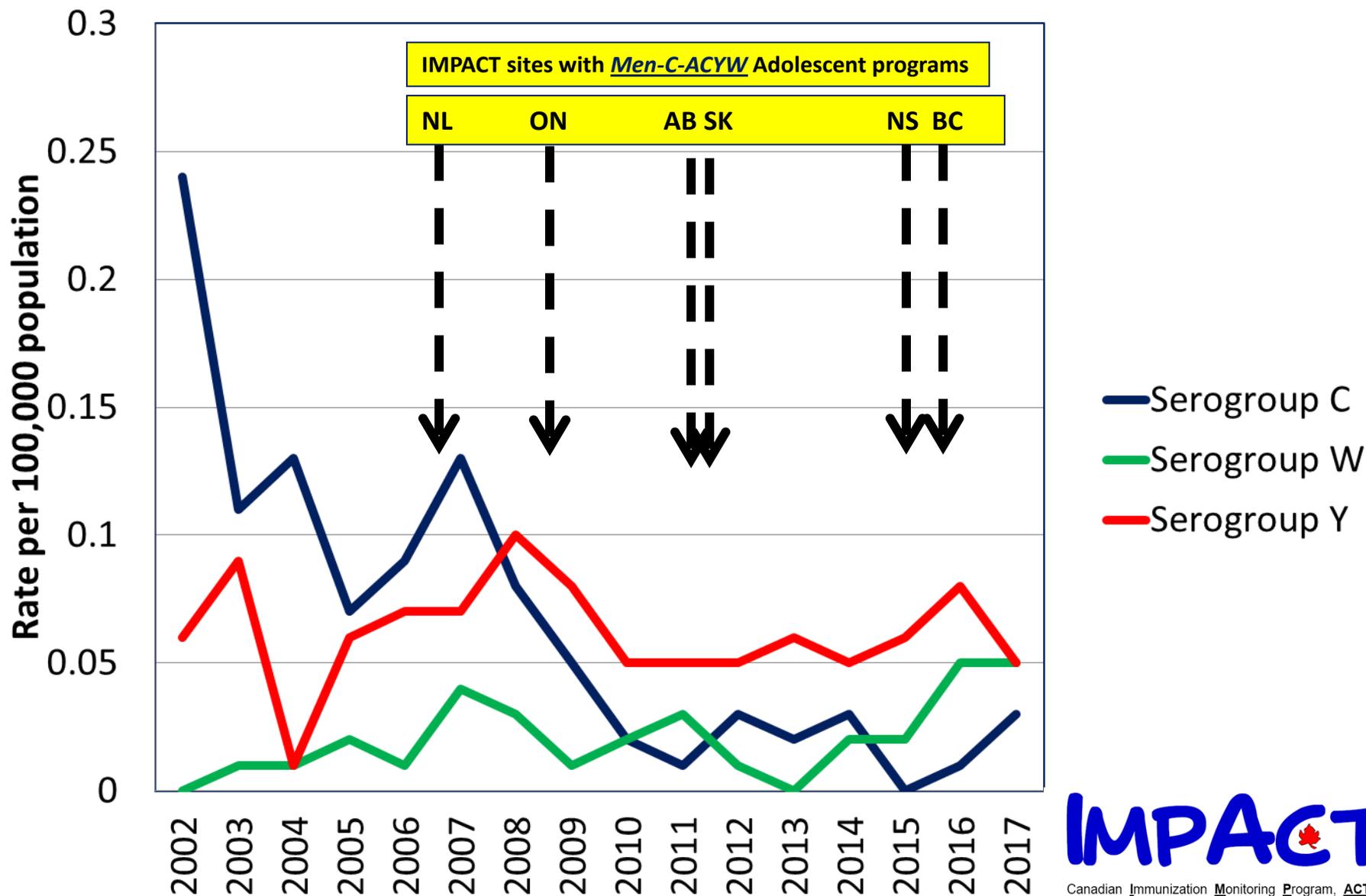


Children <19 years – IMD 2002-2017



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Adults – IMD 2002-17



The Effect of Vaccine on The Epidemiology of IMD Disease

Overall Incident Rates per 100,000 (95% CI)

All Serogroups

Age	2002	2017
0-4 years	2.61 (1.66 - 3.92)	1.27 (0.65 - 1.72)
5-9 years	0.31 (0.06 - 0.90)	0.21 (0.03 - 0.48)
10-14 years	0.20 (0.02 - 0.71)	0.10 (0.00 - 0.31)
15-19 years	1.67 (0.97- 2.67)	0.45 (0.15 - 0.74)*
> 19 years	0.48 (0.36 - 0.62)	0.17 (0.11 - 0.22)*

Serogroup C

0-4 years	0.23 (0.3- 0.82)	No cases
5-9 years	0.10 (0.00-0.57)	No cases
10 14 years	No cases	No cases
15-19 years	0.49 (0.16-1.14)	No cases
> 19 years	0.24 (0.16-1.14)	0.03 (0.01-0.05)

* Significant decrease in IMD

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Summary of Findings

1. The majority of persons with IMD are previously healthy.
2. Children less than 1 year of age still have the highest rates of disease due to C, Y and W serogroups.
3. Serogroup C disease has not been seen in the <19 year age group since 2012.
4. The age groups 15 to 19 years and over 19 years of age have had the most significant drop in IMD from 2002 to 2017, mainly due to serogroup C decreases.
5. The childhood group appears to have decreasing rates of disease due to serogroup Y. This has not yet occurred in adult age groups.



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<http://www.cps.ca/en/impact>

<http://www.cps.ca/fr/impact>