Immunization Update
& focus on meningococcal vaccine
PART 2

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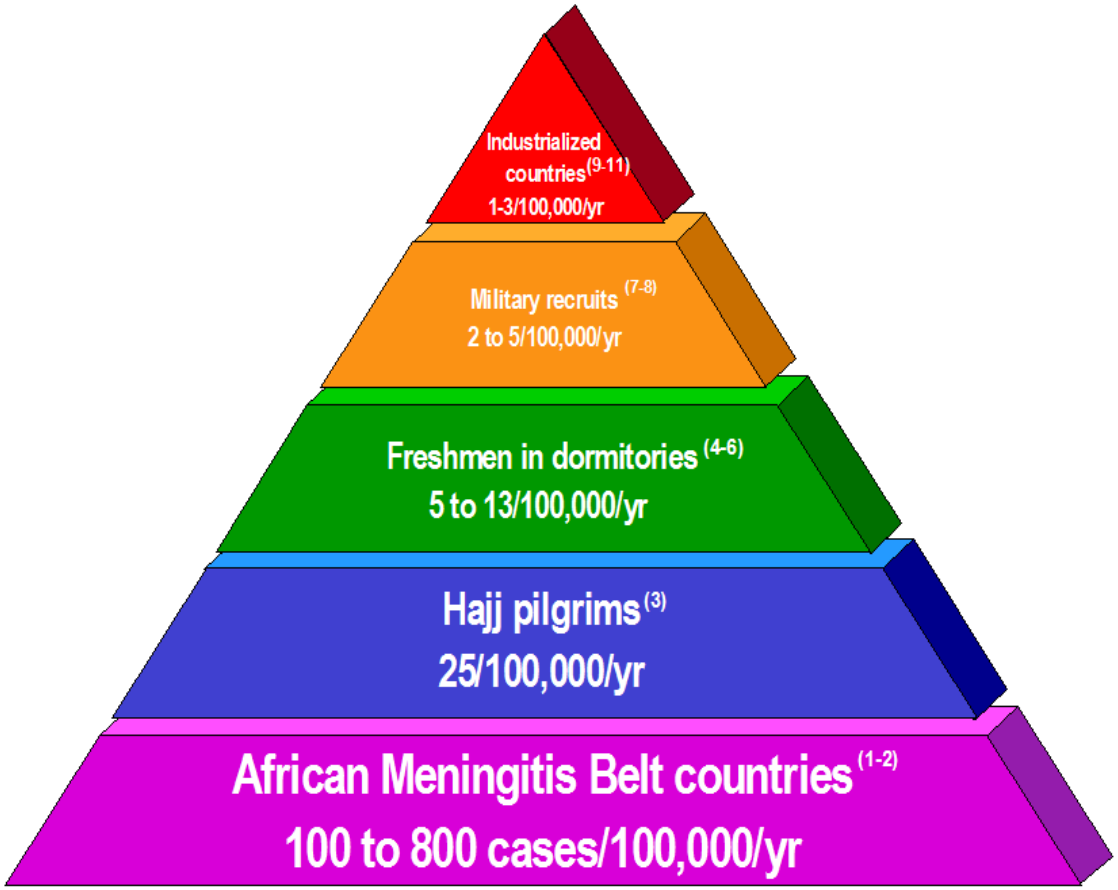
www.vacfa.uct.ac.za

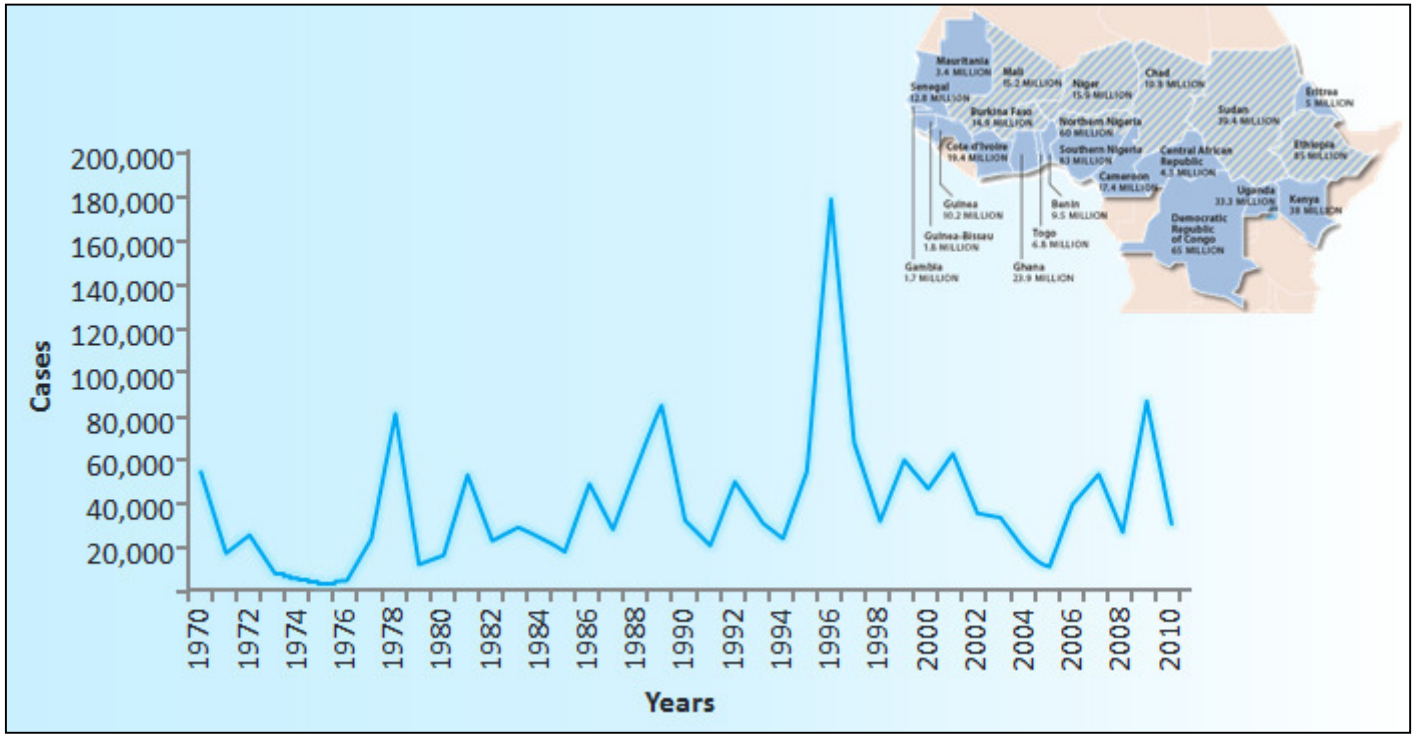
Meningococcal Disease in South Africa

Incidence of Meningococcal Disease



Memish A, Goubeaud A, Broker M, Malerczyk C, Shibl A. Invasive Meningococcal disease and travel. Journal of Infection and Public Health (2010) 3, 143—151

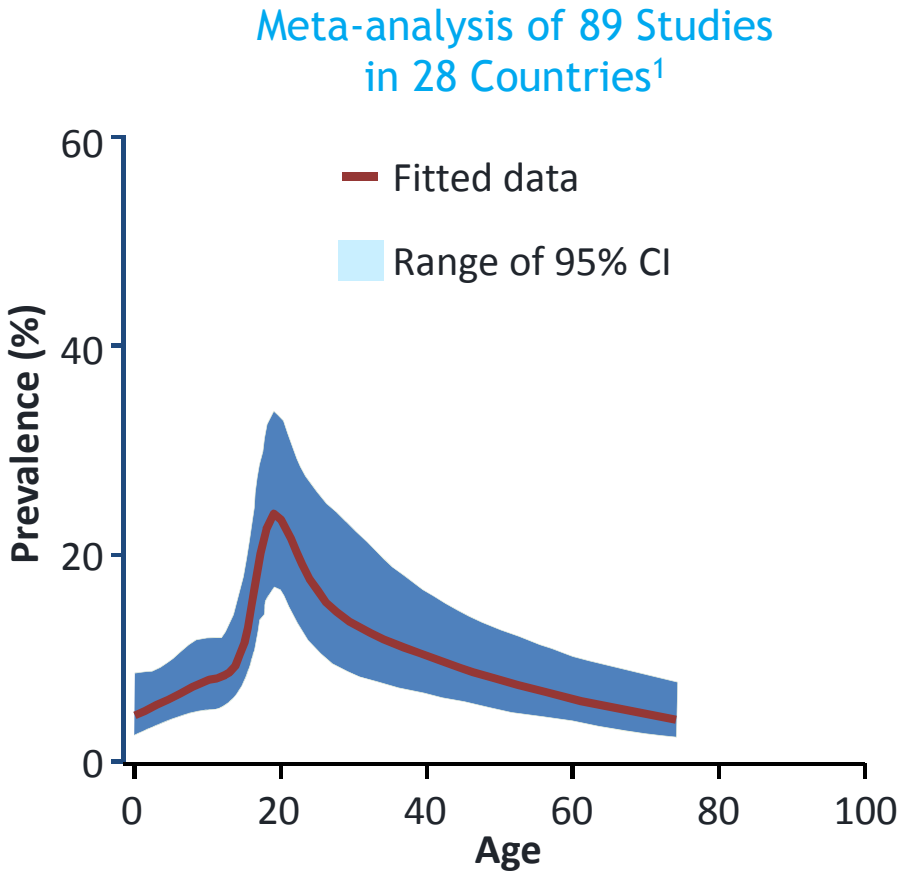
African Meningitis Belt cases 1970 - 2010



http://www.who.int/gho/epidemic_diseases/meningitis/en/;
http://www.path.org/menafrivac/meningitis-belt.php

Meningococcal carriage rates are low during infancy and peak at 19 Years of Age[1]

- Young adults are the most common source of transmission to the community[2]
- Up to 10% of adolescents and adults are asymptomatic transient carriers[3]



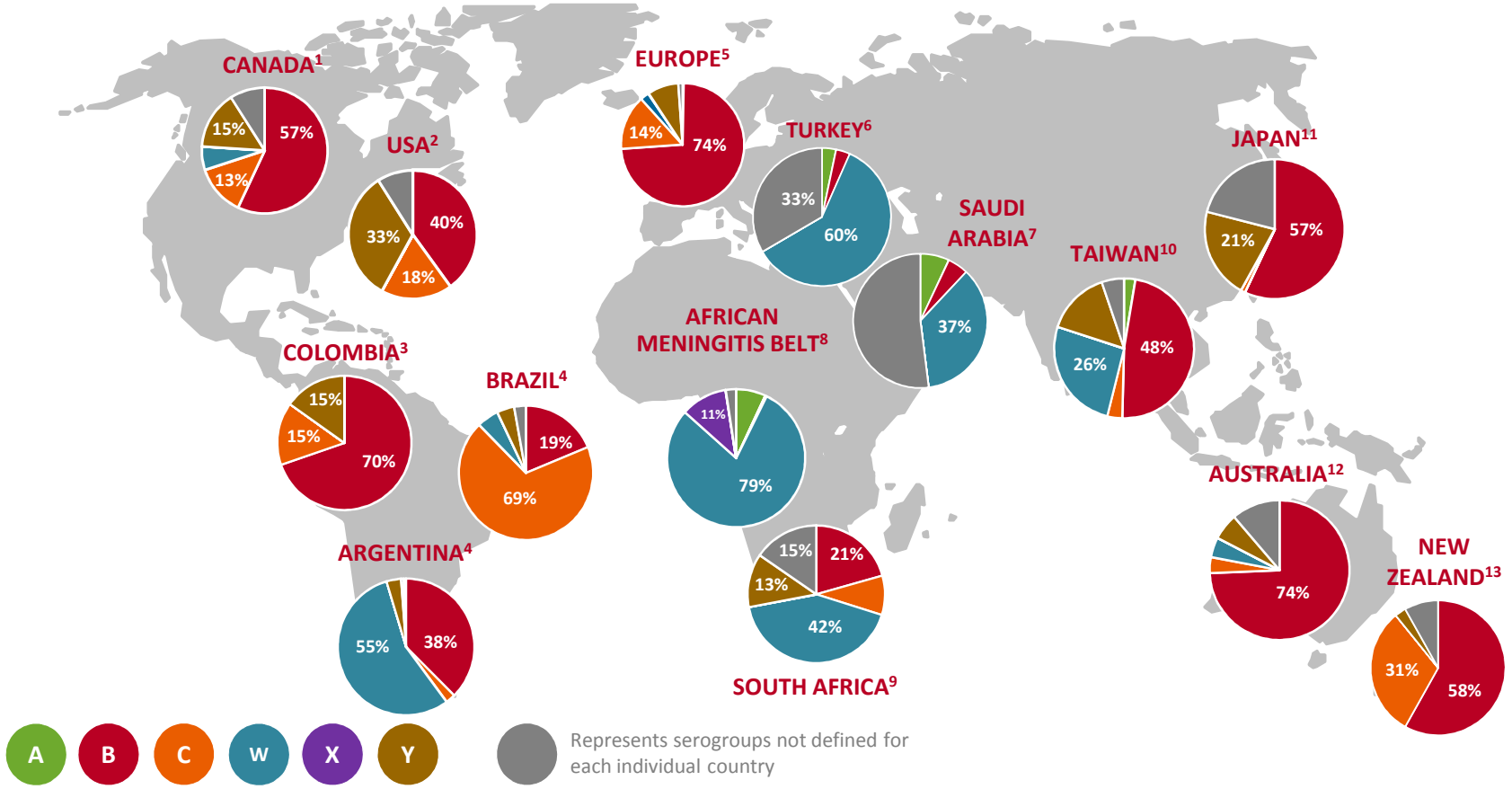
[1]Christensen H. *Lancet Infect Dis*. 2010;10(12):853;
[2]Pelton SI. *Pediatr Infect Dis J*. 2009;28(4):329;
[3]CDC. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases*. (*The Pink Book*.) 12th ed. 2012.

Poland. CID 2010

Clinically significant serogroups

Serogroup	Characteristics
A	• Leading cause of epidemic meningitis worldwide • Most prevalent serogroup in Africa and China • Rare in Europe and the Americas
B	• Major cause of endemic disease in Europe and the Americas • No vaccine available
C	• Major cause of endemic disease in Europe and North America • Multiple outbreaks in schools and communities
Y	• Associated with pneumonia, particularly in the elderly • Increased during the 1990s in the United States • Has become more common among infants and adolescents in recent years
W-135	• Small percentage of infections worldwide • Outbreaks associated with Hajj pilgrims starting in 2000

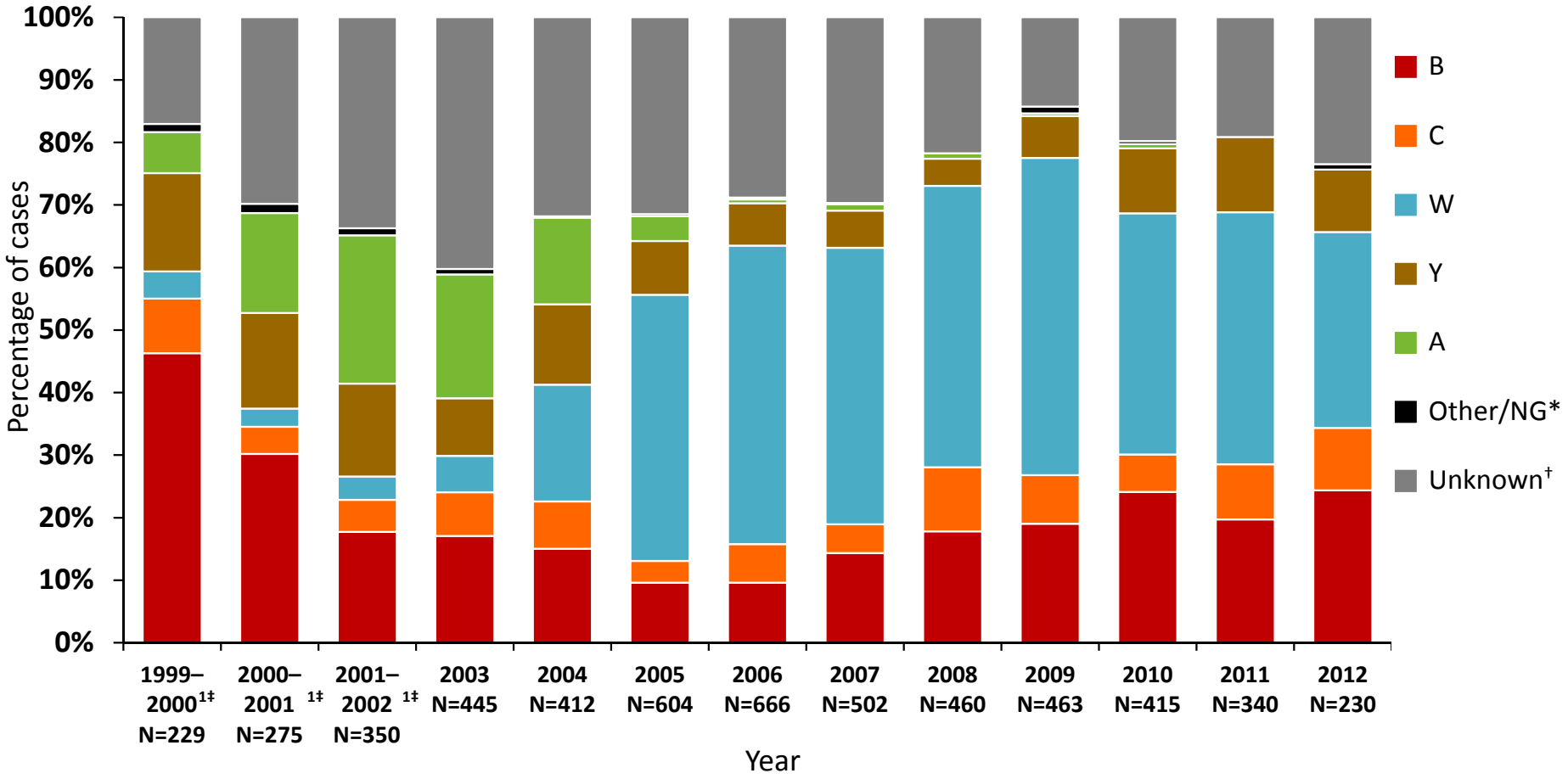
Global *Neisseria meningitidis* Serogroup Distribution Has Been Varied, Making Trends Unpredictable



1. National Advisory Committee on Immunization (NACI). *Can Commun Dis Rep*. 2013;36(ACS-1):1-40; 2. Centers for Disease Control and Prevention (CDC). Active bacterial core surveillance report, emerging infections program network, *Neisseria meningitidis*, 2012. Centers for Disease Control and Prevention (CDC) website. http://www.cdc.gov/abcs/reports-findings/survreports/mening11.pdf; 3. *Neisseria meningitidis* (aislaminetos invasores). Instituto Nacional de la Salud. Grupo de Microbiologia. Dec 2012; 4. Informe Regional de SIREVA II, 2012. Washington, DC: Organización Panamericana de la Salud; 2013; 5. European Centre for Disease Prevention and Control (ECDC). Surveillance of invasive bacterial diseases in Europe, 2011. Stockholm: ECDC; 2013; 6. Ceyhan M, et al. Poster presented at: 31st Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID); May 28-June 1, 2013; Milan, Italy; 7. Al-Mazrou YY, et al. *Saudi Med J*. 2004;25:1410-1413; 8. Intercountry Support Team - West Africa Week 49-52, 2012. World Health Organization website. *Meningitis Weekly Bulletin.* http://www.meningvax.org/files/BulletinMeningite2012_S49_52.pdf; 9. von Gottberg, A. *Comm Dis Surveill Bull*. 2012;10:60-63; 10. *Vyse A, et al. Epidemiol Infect. 2011;139:967-985*; 11. Takahashi H, et al. *J Med Microbiol*. 2004;53:657-662; 12. Lahra MM, et al. *Commun Dis Intell*. 2012;36:E251-262; 13. Lopez L, et al. The Epidemiology of Meningococcal Disease in New Zealand in 2012. Institute of Environmental Science and Research Ltd (ESR); 2013. Slide courtesy of Novartis

MenW has become the predominant cause of meningococcal disease

South Africa, 1999–2012



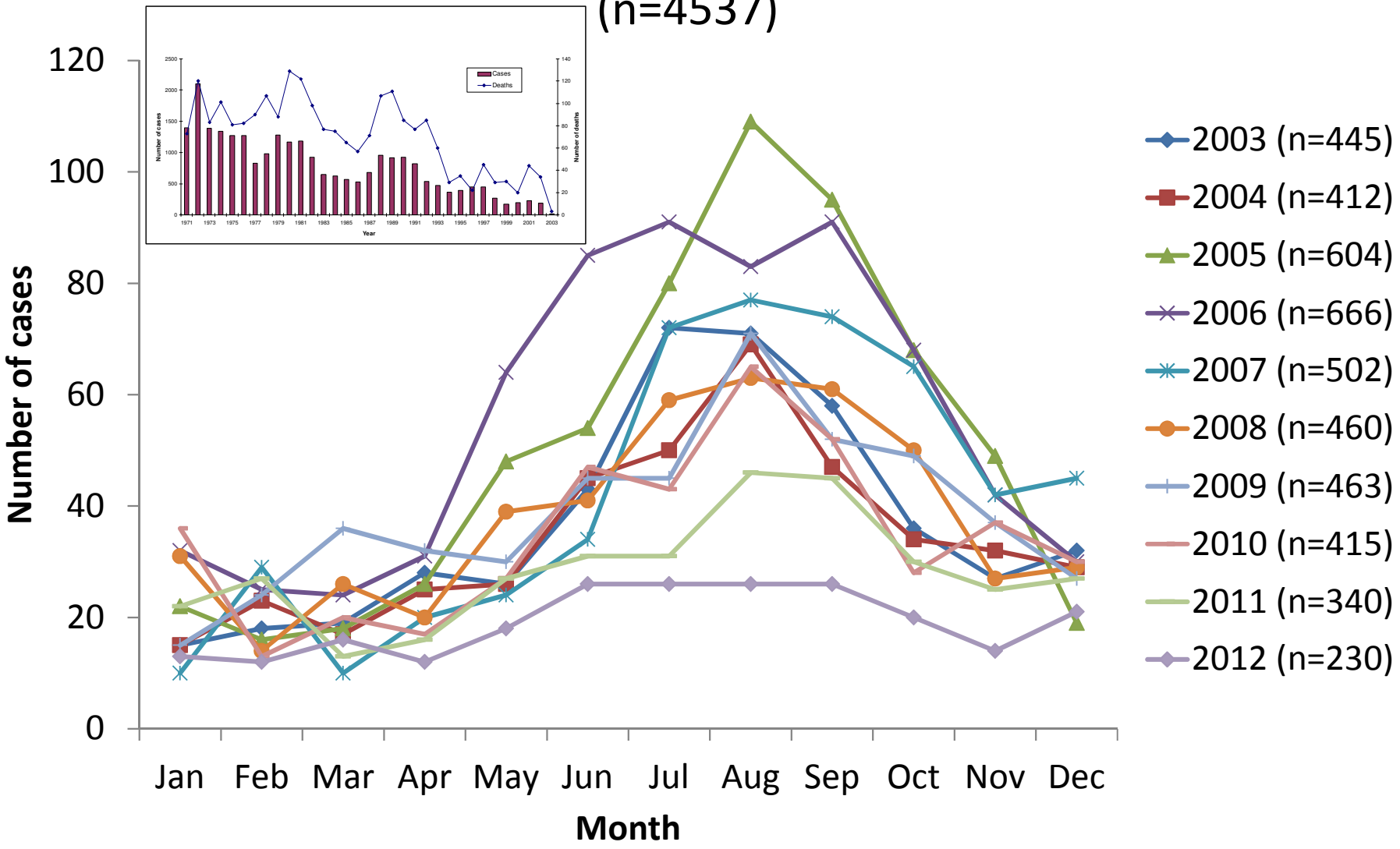
*May include serogroups e.g., X, E, Z, or non-groupable; †Serogroup not identified; ‡Year spans August through July.

Serogroup data from viable isolates and PCR results

1. Coulson GB, et al. Meningococcal Disease in South Africa, 1999–2002 *Emerg Infect Dis*. 2007;13:273-281; 2003-2012 data from GERMS-SA national surveillance, NICD, NHLS

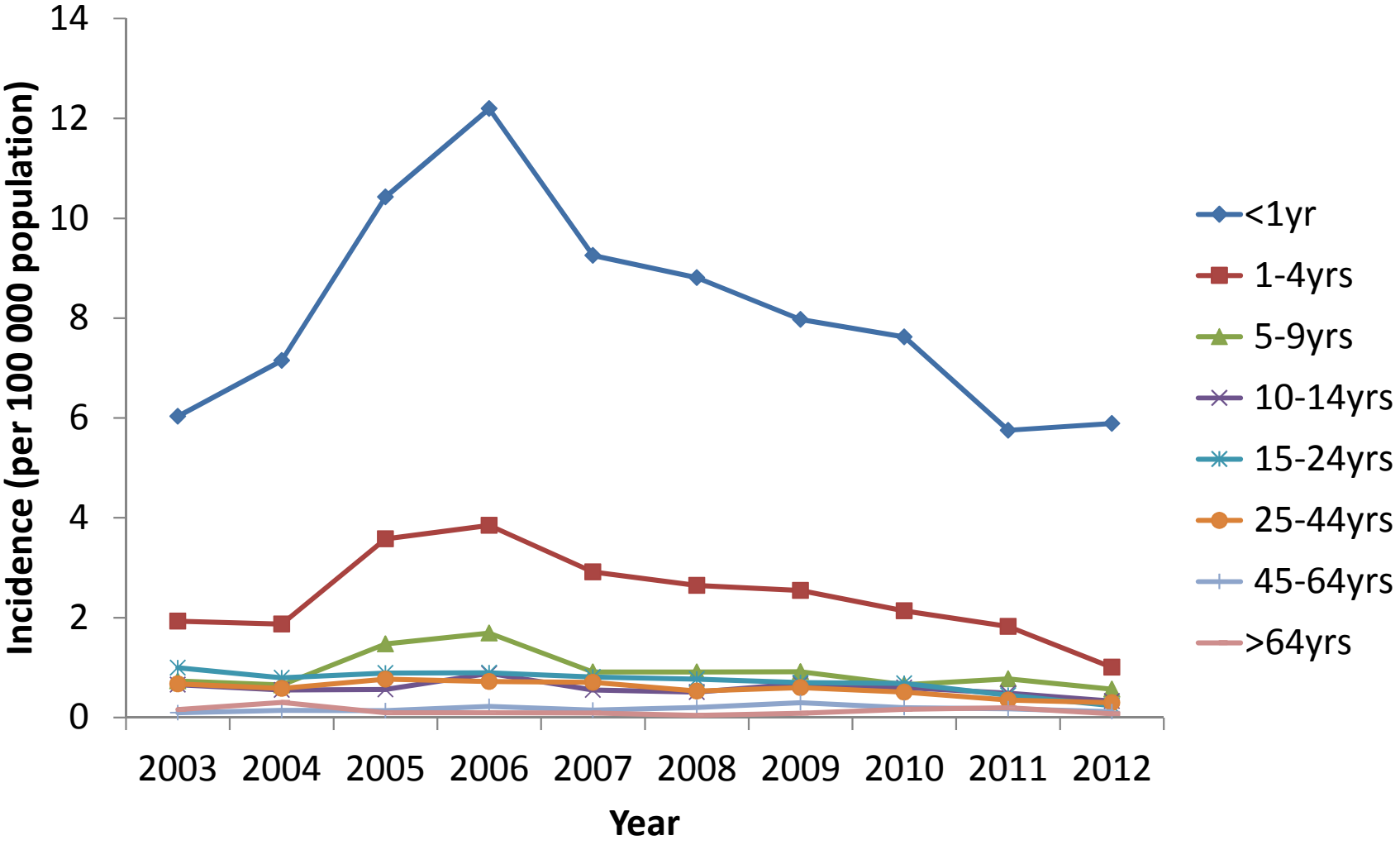
Slide adapted from Novartis

Number of cases of **laboratory-confirmed meningococcal disease** in South Africa reported to GERMS-SA by month and year, 2003 to 2012 (n=4537)



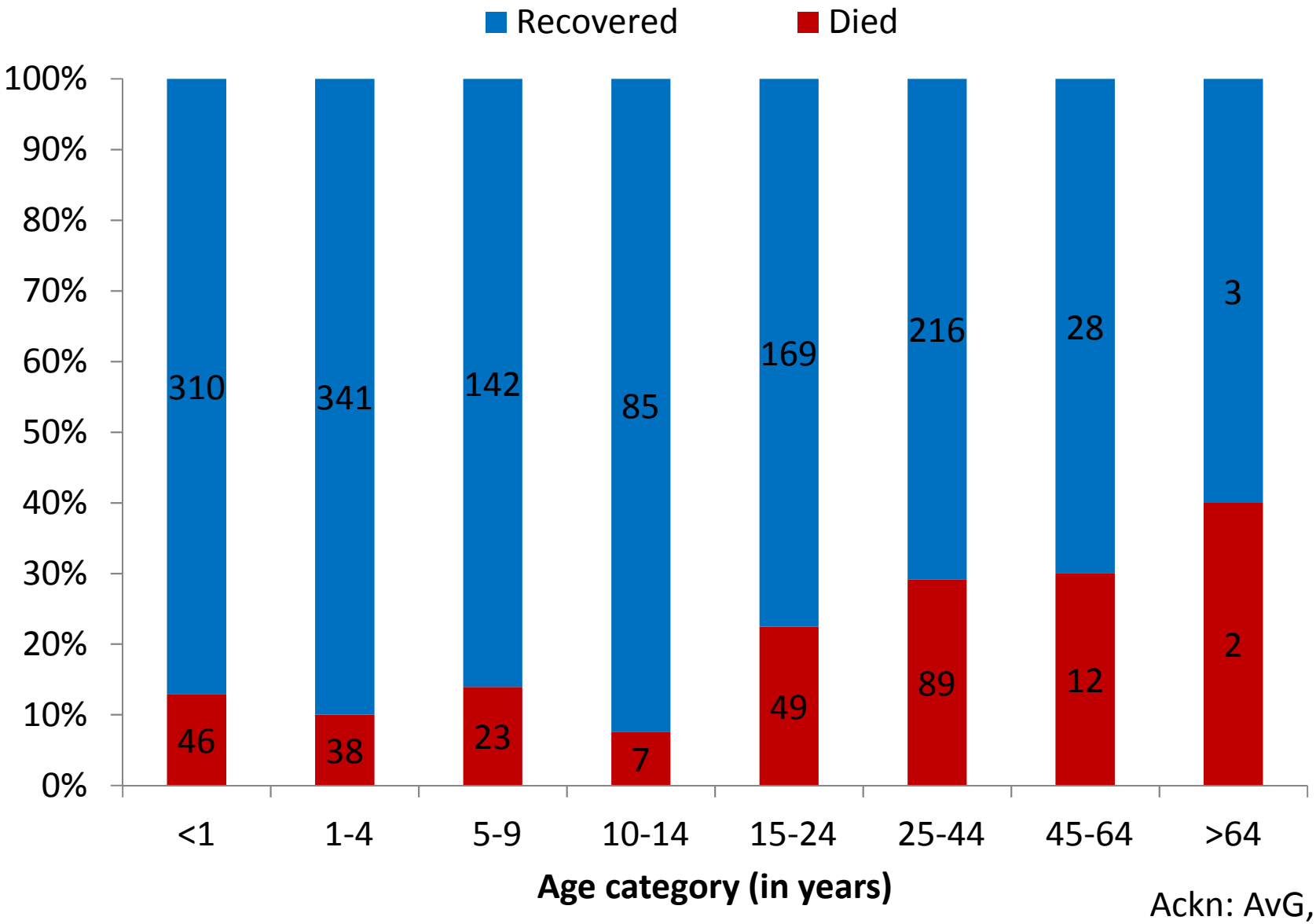
Ackn: AvG, NICD

Incidence of **invasive meningococcal disease** by age category, South Africa, 2003 to 2012 (n=4308, age unknown for 229 cases)



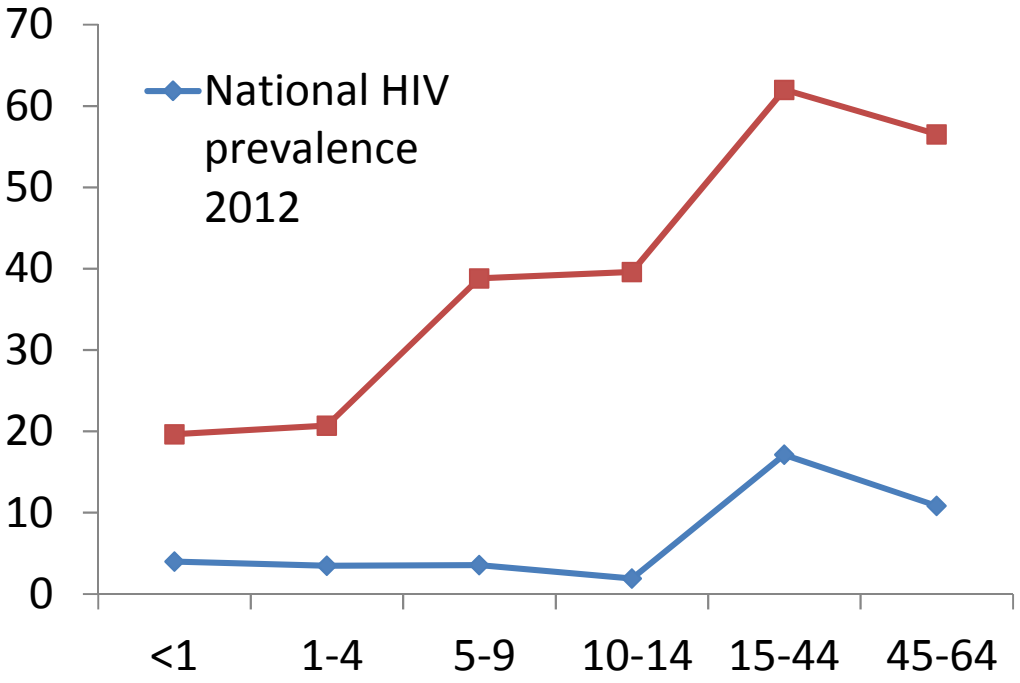
Ackn: AvG, NICD

Case-fatality ratio of **invasive meningococcal disease** by age category, South Africa, 2003-2012 (n=1560)



Ackn: AvG, NICD

HIV prevalence among patients with invasive meningococcal disease, 2003-2012 and population HIV prevalence, 2012, South Africa



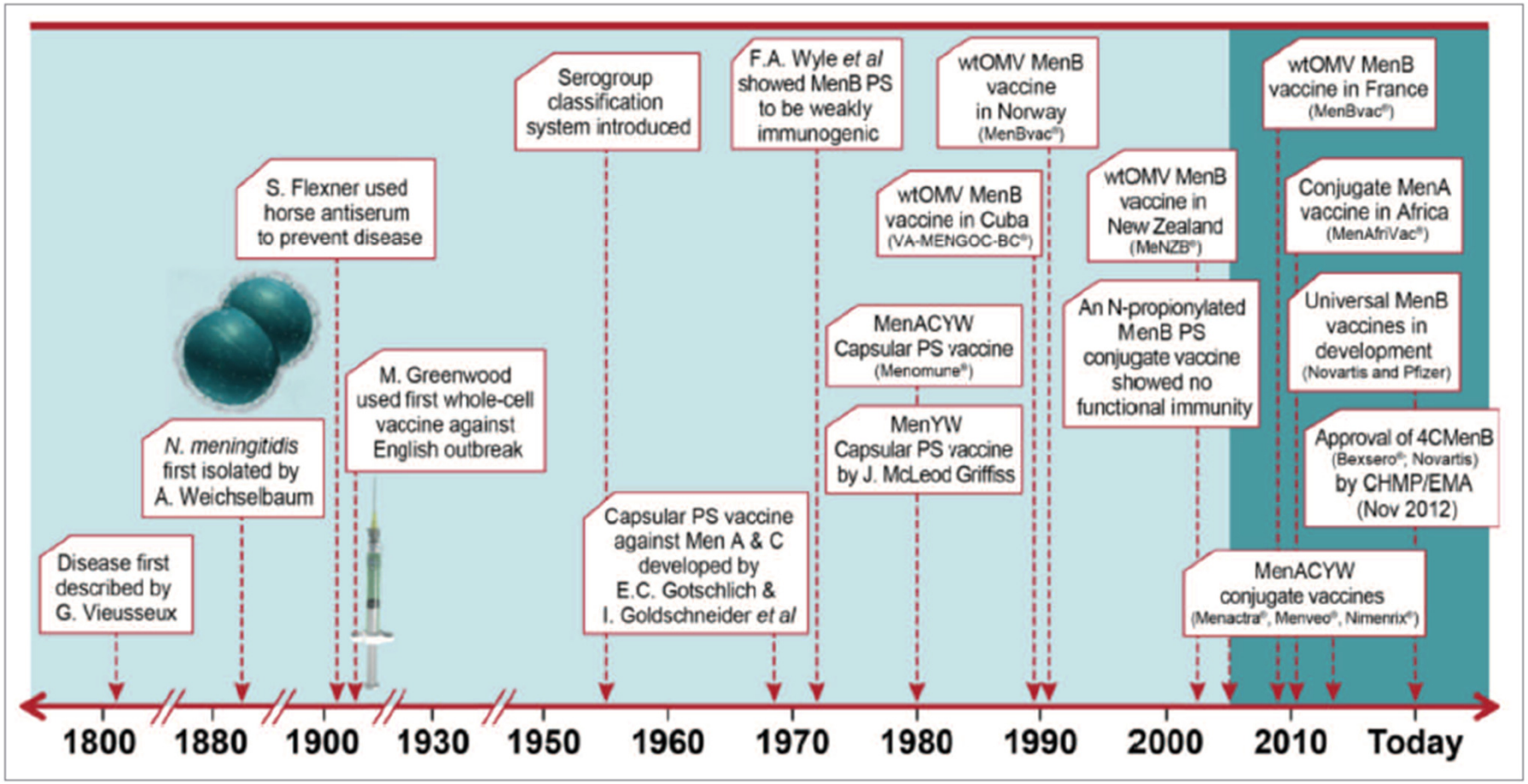
Cohen C, Singh E, Wu HM *et al*. *AIDS* 2010;24:1351-60; and updated data.

Ackn: AvG, NICD

MCD risk in patients with AIDS.
Harris CM et al
Open Forum Inf Diseases 2016

Incidence of MCD in AIDS patients 25 to 64 years olds was 3.5 cases per 100000 person years (95% confidence interval [CI], 2.1–5.6), compared with 0.3 cases per 100000 person years (95% CI, 0.3–0.3) for persons of the same age group not reported to have AIDS
(relative risk = 12.9; 95% CI, 7.9–20.9).

Meningoccocal vaccine development – time line



Holst et al. Human Vaccines & Immunotherapeutics 9:6, 1241–1253; June 2013

Table 2. Characteristics of Meningococcal Polysaccharide and Protein-Conjugate Vaccines

Property	Polysaccharide	Conjugate
T cell–dependent response	No	Yes
Immune memory	No	Yes
Persistence of protection	No	Yes[a]
Booster effect	No	Yes
Reduction of carriage	No	Yes
Herd immunity	No	Yes

Poland. CID 2010

Conjugate vaccines

	Serogroups	Manufacturer	Age indications
Monovalent			
Mengitec	MenC-CRM	Pfizer	≥ 2 Months
Menjugate	MenC-CRM	Novartis	≥ 2 Month
NeisVac-C	MenC-TT	Baxter	≥ 2 Months
MenAfrivac	Men A-TT	Serum Institute India  2010	1 – 29 years
Combination			
MenHibrix	Hib-MenCY-TT	GSK	6 wks – 18 mths
Menitorix	Hib-MenC-TT	GSK	6 wks – 18 mths Booster 1-2 yrs

Conjugate vaccines

Quadrivalent	Serogroups	Manufacturer	Age indications
Menveo	MenACWY-CRM	Novartis 2013	2-55 yrs (1 dose) 7-23 mths (2 doses) 2 Mths (4 doses)
Nimenrix	MenACWY-CRM	GSK Pfizer 2016	≥ 12 Month (1 dose)
NmVac4	*MenACWY-DT*	*JN Int Med Corp*	*≥ 9 Months?*
Menactra	MenACWY-DT	SP 2014	2-55 yrs (1 dose) 9-23 mths (2 doses)

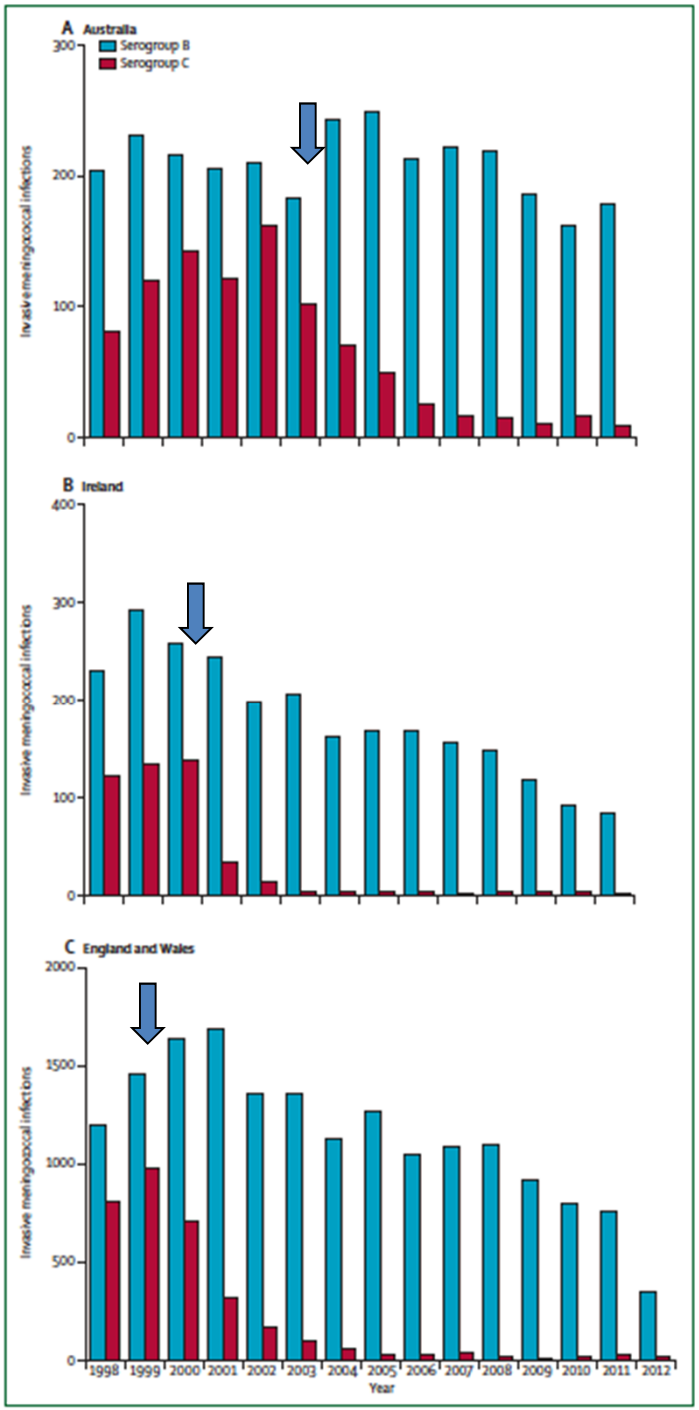
MenC Conjugate

Australia – MenC in 2003, with a catch-up campaign between 2003 and 2007 for all children aged 1 -19 years.
July 2013, NIP - Hib & MenC at 12 mths.

Ireland – MenC in 2000; infants were given three doses before 1 year of age, with a catch-up programme in adolescents.
2013, NIP – 3 doses: 3 months (MenC), 12–13 months (Hib & MenC), and 14–15 years (Men C)

England and Wales - MenC introduced in 1999, with a catch up campaign in children up to 19 years of age.
NIP - two dose schedule at 3 and 12 months of age.

Andrews & Pollard - LID2014;14: 426–34



Effect of a serogroup A meningococcal conjugate vaccine (PsA–TT) on serogroup A meningococcal meningitis and carriage in Chad: a community trial

D M Daugla, J P Gami, K Gamougam, N Naibei, L Mbainadji, M Narbé, J Toralta, B Kodbesse, C Ngadoua, M E Coldiron, F Fermon, A-L Page, M H Djingarey, S Hugonnet, O B Harrison, L S Rebbetts, Y Tekletsion, E R Watkins, D Hill, D A Caugant, D Chandramohan, M Hassan-King, O Manigart, M Nascimento, A Woukeu, C Trotter, J M Stuart, M C J Maiden, B M Greenwood

Summary

Background A serogroup A meningococcal polysaccharide–tetanus toxoid conjugate vaccine (PsA–TT, MenAfriVac) was licensed in India in 2009, and pre-qualified by WHO in 2010, on the basis of its safety and immunogenicity. This vaccine is now being deployed across the African meningitis belt. We studied the effect of PsA–TT on meningococcal meningitis and carriage in Chad during a serogroup A meningococcal meningitis epidemic.

Published Online
September 12, 2013
http://dx.doi.org/10.1016/S0140-6736(13)61612-8

See Online/Comment

Impact of MenA vaccine in Chad. *Dougla et al. Lancet 2013*

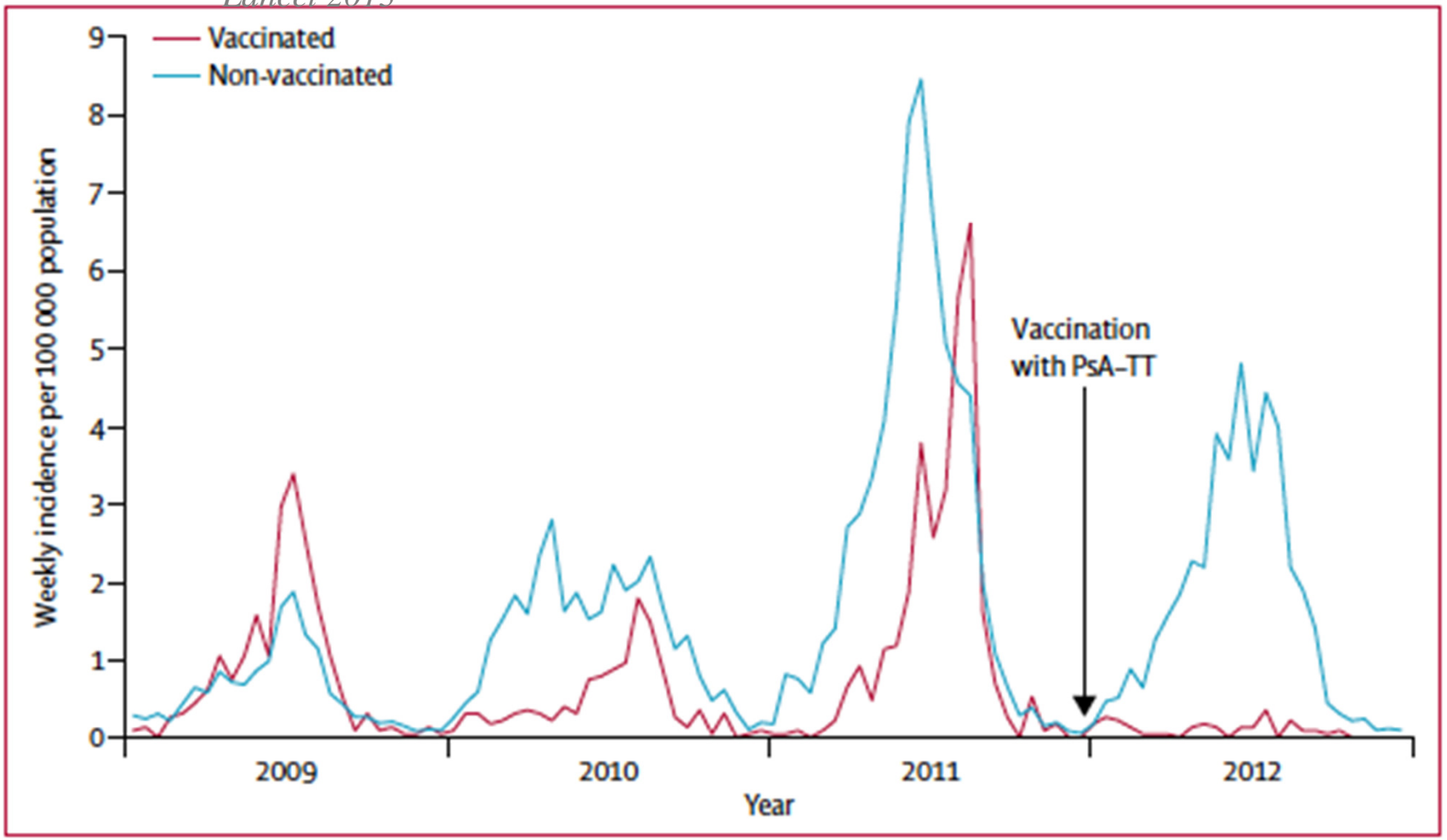


***Figure 3*: Incidence of reported cases of meningitis in Chad, 2009–12**

Vaccination with PsA–TT was undertaken in patients aged 1–29 years at the end of 2011 (arrow). PsA–TT=serogroup A meningococcal polysaccharide–tetanus toxoid conjugate vaccine.

Impact of MenAfriVac in nine countries of the African meningitis belt, 2010–15: an analysis of surveillance data

Caroline L Trotter, Clément Lingani, Katya Fernandez, Laura V Cooper, André Bita, Carol Tevi-Benissan, Olivier Ronveaux, Marie-Pierre Préziosi, James M Stuart

Summary

Background In preparation for the introduction of MenAfriVac, a meningococcal group A conjugate vaccine developed for the African meningitis belt, an enhanced meningitis surveillance network was established. We analysed surveillance data on suspected and confirmed cases of meningitis to quantify vaccine impact.

Lancet Infect Dis 2017; 17: 867–72

Published Online May 22, 2017

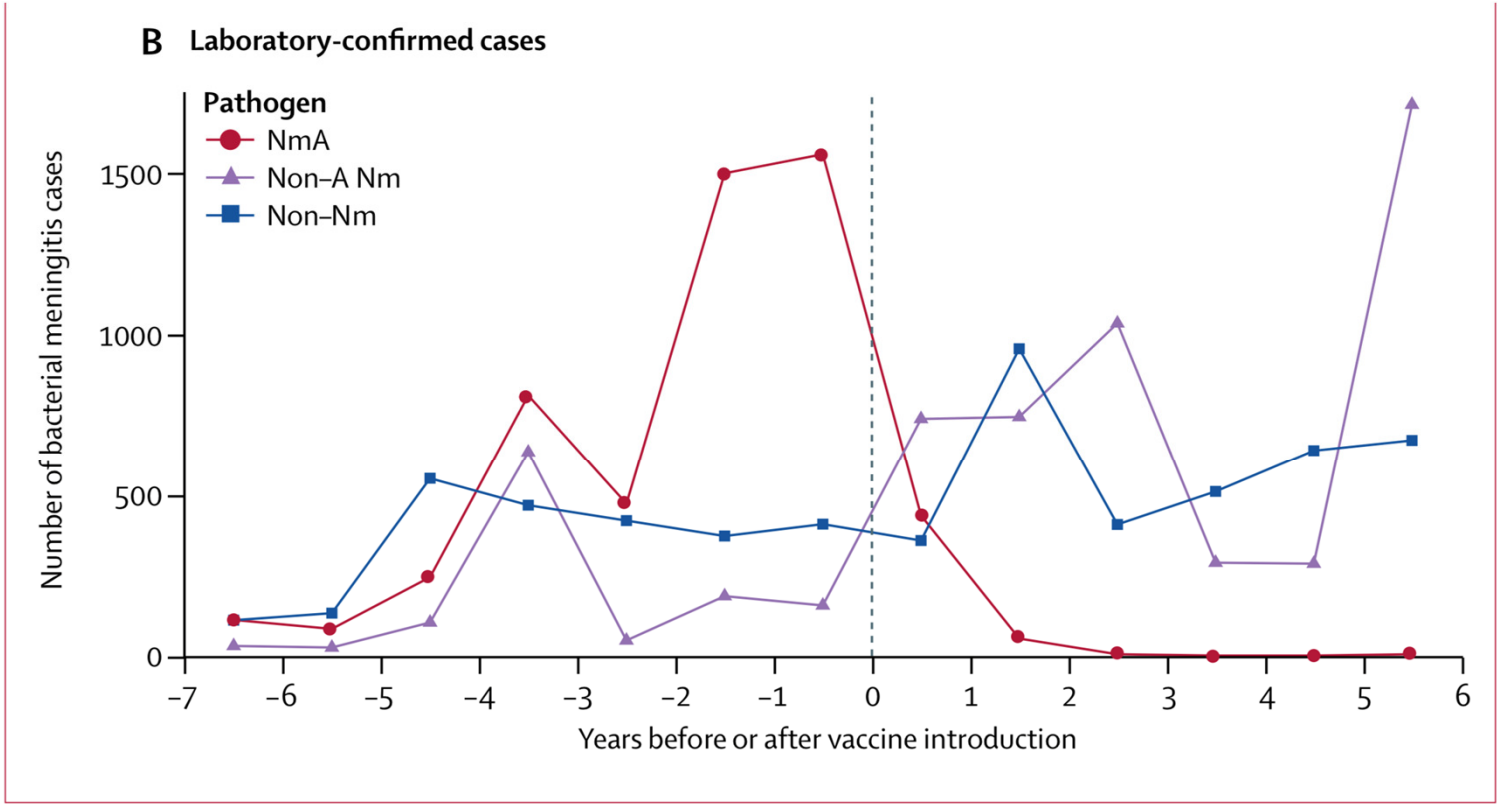
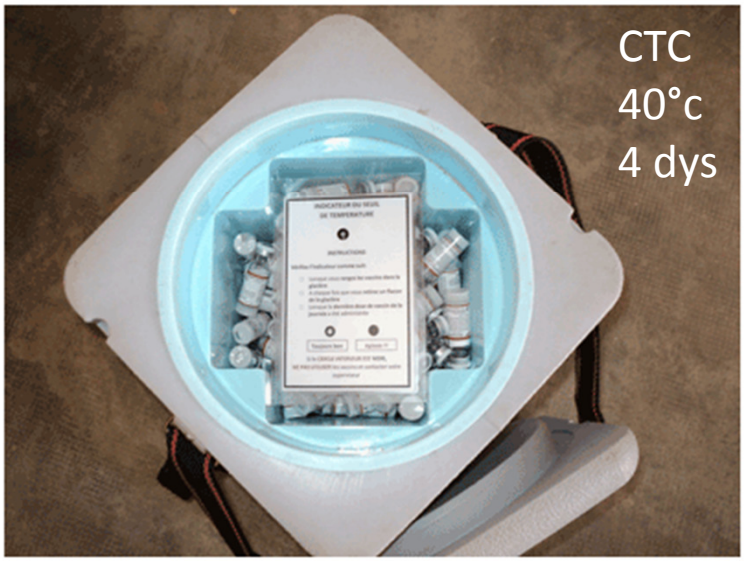


Figure: **Total annual suspected and confirmed cases of bacterial meningitis across all nine countries in relation to MenAfriVac introduction (dotted line)**

Meningitis Vaccine Project

Eliminating epidemic meningitis as a public health problem in sub-Saharan Africa



MenAfriVac® breaks the cold chain barrier!

19 February 2014—A study published online today in the journal *Vaccine* shows that removing the pioneering vaccine from constant refrigeration is not only safe but could extend vaccination coverage to the remotest regions in sub-Saharan Africa.

A second study published in the *Bulletin of the World Health Organization* shows that cutting out the cold chain could halve storage and vaccine transportation costs.

MenAfriVac®, which is manufactured by Serum Institute of India Ltd., is the first vaccine allowed to travel outside of the cold chain in Africa. As shown in the above photograph, there are no ice packs in the vaccine box, and a peak threshold indicator tells the vaccinators if the vaccine has reached its limit and needs to be discarded.

NEWS AND EVENTS

Study shows dramatic impact of MenAfriVac® in sub-Saharan Africa

Read the September 12, 2013, article in *The Lancet* »

Number of meningitis cases in Africa's meningitis belt at the lowest level in ten years

The decrease is thought to be due to the introduction of MenAfriVac®, the meningococcal A conjugate vaccine developed by the MVP.

Read the WHO report of June 6, 2013 »

Listen to Channel Africa Radio's interview with Dr. Marie-Pierre Préziosi »

Meningococcal disease in the African meningitis belt, 2012

On March 22, 2013, the World Health Organization published a summary of the meningitis situation in Africa in 2012.

Read the report »

MenAfriVac vaccination campaign in Chad

Read the MVP statement of January 10, 2013 »

Read the Chad Ministry of Health statement of January 21, 2013 (in French) »

Read the English translation »

100 millionth person receives MenAfriVac, the lifesaving vaccine developed by the MVP

The milestone took place early December in Nigeria.

Read the announcement »

Serogroup B vaccines

- Bexsero® (Novartis) & Trumenba® (Pfizer)
- USA – routinely used for 10-23 year olds. 2 dose regimen.
- Bexsero® was introduced into the routine UK schedule on 1st September 2015. The vaccine is given at 2 and 4 months, with a booster at 12 months.

Meningococcal vaccines registered in SA

- Currently there are 2 types of meningococcal vaccines available in South Africa
  - A polysaccharide vaccine (Menomune®, Sanofi Pasteur (MPSV4)
  - A protein-conjugate polysaccharide vaccine (Menactra®, Sanofi Pasteur (MCV4).
- These are both quadrivalent vaccines targeting the polysaccharide capsules of serogroups A, C, W and Y.

Southern African Journal of Infectious Diseases 2017; 32(3):82–86
https://doi.org/10.1080/23120053.2017.1359939

South Afr J Infect Dis
ISSN 2312-0053 EISSN 2313-1810

GUIDELINES

Recommendations for the use of meningococcal vaccines in South Africa

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[b]*Vaccines for Africa Initiative, Institute for Infectious Diseases and Molecular Medicine, University of Cape Town, Cape Town, South Africa*
[c]*Department of Paediatrics, University of KwaZulu-Natal, Durban, South Africa*
[d]*General Practitioner, South African Society of Travel Medicine, Cape Town, South Africa*
[e]*Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases, a division of the National Health Laboratory Services, Johannesburg, South Africa*
**Corresponding author, email: susan.meiring@nhls.ac.za*

Background: Although meningococcal disease (MD) incidence in South Africa is low, *Neisseria meningitidis* (NM) causes severe disease that is often life-threatening and can cause long-term disabilities. A quadrivalent protein-conjugated meningococcal vaccine (MCV4) is available, and provides protection against 75% of disease causing serogroups in South Africa.
Recommendations: We advise vaccination of persons at high risk of meningococcal disease including those with complement deficiency and asplenia; laboratory personnel from reference laboratories who work with NM; and travellers to Saudi Arabia.
The need for routine vaccine against meningococcal disease in South Africa is controversial given the current burden of disease. However, due to the high morbidity/mortality of MD we recommend that clinicians consider vaccination of healthy infants and children; HIV-infected persons with a CD4 count > 25%; students attending college /university /military academies; and miners.
Conclusion: Protein-conjugated meningococcal vaccine is preferable to the polysaccharide vaccine given the ability of the protein-conjugated meningococcal vaccine to induce immune memory, allow for booster responses and eliminate carriage of the organism in the person vaccinated.

Keywords: guidelines, meningitis, meningococcal vaccines , *Neisseria meningitidis*, South Africa, vaccine

MCV recommendations - 1

Group	Recommendation	Doses	Booster
Hajj pilgrims and travellers to Saudi	Required	Single primary dose	A booster dose every 3 years for MPSV4 or 5 years for MCV4 is required for repeated travel as per current Saudi regulations
Travellers to meningitis belt or other areas where disease is hyperendemic/epidemic	Recommended	Single primary dose	Booster dose every 5 years should be considered for repeated travel to highly endemic areas
Research/reference laboratory workers routinely exposed to N. meningitidis	Recommended	Single primary dose	Booster dose every 5 years if risk remains
Persons with medical conditions at high risk of acquiring infection: Complement component deficiencies and asplenic conditions	Recommended	Two-dose primary schedule 12 weeks apart	Booster dose every 5 years

MCV recommendations – 2
Should be considered

Population group	Primary dosing	Booster
Healthy children and infants	Children 9 months to 23 months: 2 doses 12 weeks apart Children ≥24 months: 1 dose	
Healthy adolescents or young adults entering university or college (particularly if staying in hostels)	Single dose prior to entry into university or college	
Military recruits on training or deployment	Single dose prior to commencing training or deployment	Booster dose required if risk remains high 5 years after primary dose
Miners	Single primary dose	
Attendees of mass gatherings	Single primary dose	
HIV infection	Two-dose primary schedule 12 weeks apart	Booster every 5 years
Other immunocompromising conditions	Two-dose primary schedule 12 weeks apart	Booster every 5 years

Menactra & GBS

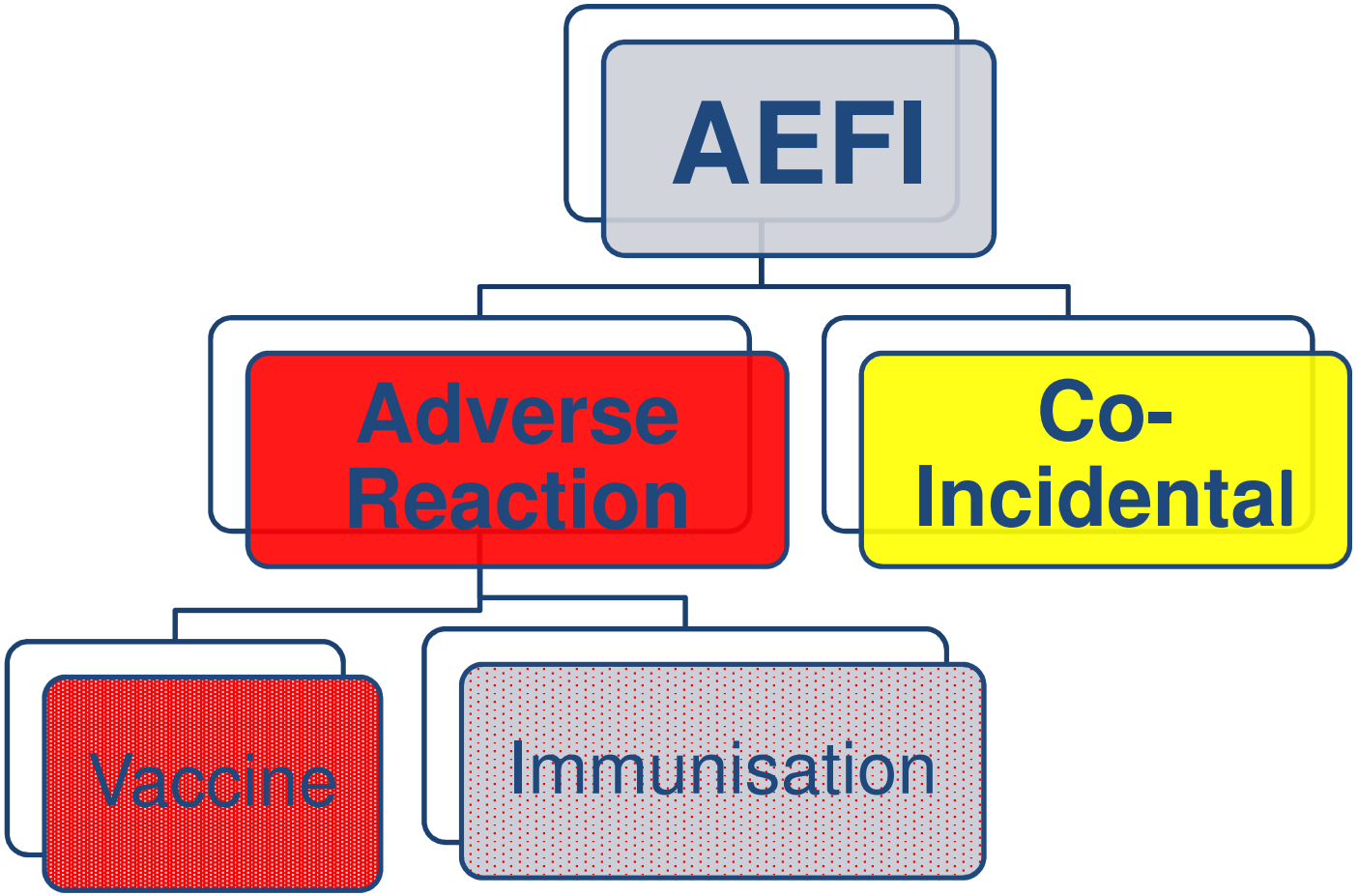
Does Menactra Meningococcal Conjugate Vaccine cause Guillain-Barré Syndrome (GBS)? NO

No. Two large studies were conducted to investigate whether GBS was caused by the vaccine or was coincidental with vaccination. These studies included a combined total of over 2 million vaccinated adolescents. The results of these studies showed that there was **no link between Menactra and GBS**.

- A 2012 study used health records of over 9.6 million preteens and teens to evaluate a possible link between Menactra and GBS. The study found that youth who received Menactra were not at increased risk of developing GBS.
- Another large 2012 study combined the above study with data from the Vaccine Safety Datalink to search for diagnoses of GBS in 11.2 million preteens and teens who received Menactra. This study also found no link between GBS and Menactra and observed 0 confirmed GBS cases.

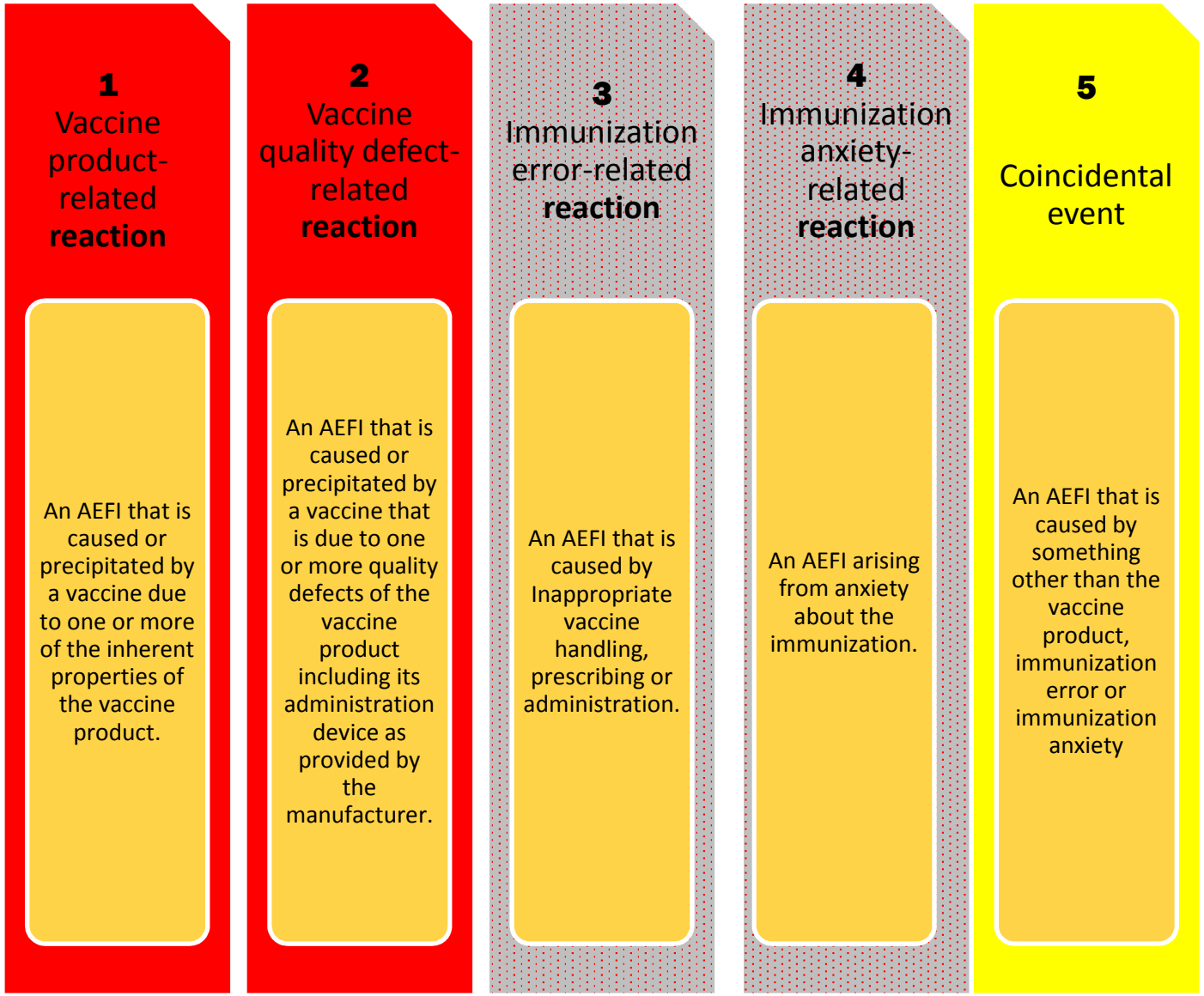
Note: A 2003 study concluded that people who received the 1976 swine influenza vaccine had a small increased risk for developing GBS.

https://www.cdc.gov/vaccinesafety/concerns/history/gbs-menactra-faqs.html

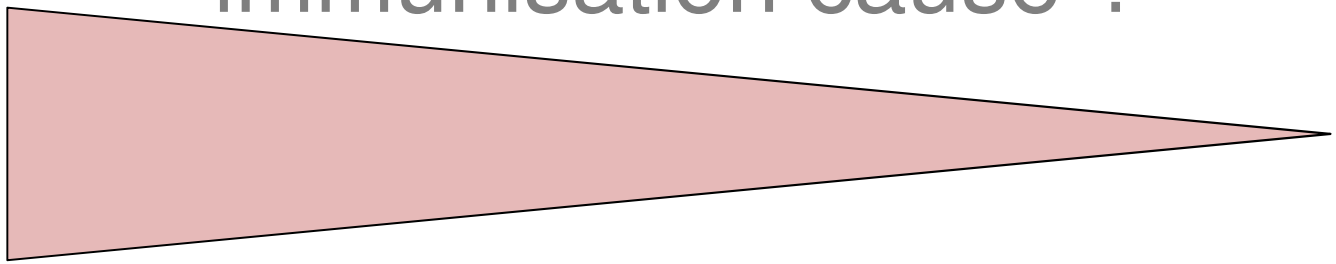


http://vaccine-safety-training.org

CIOMS/ WHO cause specific definition of AEFIs



What adverse effects do vaccines or immunisation cause ?



Side effect	Reaction	
Common > 1% and < 10%	Rare >0.01% and < 0.1%	Very rare < 0.001% and<0.0001
Expected	Unexpected	Unexpected
Examples		
Fever ISR # Rash	Febrile convulsion BCG adenitis ISR - Abscess Urticaria/Angioedema	Thrombocytopenia Hypotonic hyporesponsive episodes (HHE) Anaphylaxis

ISR - Injection Site Reaction

- The Global Advisory Committee on Vaccine Safety (GACVS) was established in 1999 to respond promptly, efficiently, and with scientific rigour to vaccine safety issues of potential global importance.

- The Committee provides independent, authoritative, scientific advice to WHO on vaccine safety issues of global or regional concern with the potential to affect in the short or long term national immunization programmes

http://www.who.int/vaccine_safety/committee/en/

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The popular Annual African Vaccinology Course (AAVC) convened by VACFA will take place in November 2018

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Who should attend?

- Immunisation program managers & officers
- Researchers & public health professionals working in the field of vaccines (immunology, immunisation activities such as advocacy, policy formulations, etc.)
- Postgraduate students & postdocs in the field of vaccinology/immunology

Applications are now open: www.vacfa.uct.ac.za

Topics to be covered during the 5-day course include:

Programmatic challenges on immunisation	Basic epidemiology & immunology	Surveillance, monitoring & reporting of AEFI	Underused, new & future vaccines, session on NITAGs	Media engagement on immunisation	Web-based training in vaccinology

Quick Links

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Vaccine Preventable Diseases (VPDs)

Who, When & Where

Resources & Links

FAQs

Immunisation statistics-

News

1 2

Monday, 18 June 2018

South Africa recommends the use of meningococcal vaccines

Among certain groups, there is a significant morbidity/mortality of meningococcal disease in South Africa. The authors recommend that clinicians consider vaccination of healthy infants and children; HIV-infected persons with a CD4 count > 25%; students attending college /university /military academies; and miners.

Read more

unicef for every child

Ethiopia becomes one of the 42 Countries to eliminate Maternal and Neonatal Tetanus

UNICEF and the Ethiopian Ministry of Health announced the country's achievement of maternal and neonatal tetanus elimination.

Read more