Meningokok Hastalıkları ve MenACWY- TT Aşısı

Prof. Dr. Zafer Kurugöl

61. Türkiye Milli Pediatri Kongresi
15-19 Kasım 2017, Antalya

Bakteriyel Menenjit Etkenleri

	Likely pathogens
<1 month	Group B streptococci, *Escherichia coli*, *Listeria monocytogenes* (neonatal pathogens)
1–3 months	
No immunisation or one dose of primary immunisation	Neonatal pathogens, *S pneumoniae*, *N meningitidis*, Hib
3–6 months	
No immunisation	*S pneumoniae*, *N meningitidis*, Hib
At least two doses of primary immunisation (with Hib-Omp vaccine)	*S pneumoniae*, *N meningitidis*
>7 months to 5 years	
No immunisation	*S pneumoniae*, *N meningitidis*, Hib
Primary immunisation completed	*S pneumoniae* (non-PCV serotypes), *N meningitidis*
6–21 years	*S pneumoniae*, *N meningitidis*

Hib aşısını ulusal aşı şemasına ekleyen ülkeler (2017)

Introduced* to date *(192 countries or 99%)*

Not Available, Not Introduced/No Plans *(2 countries or 1%)*

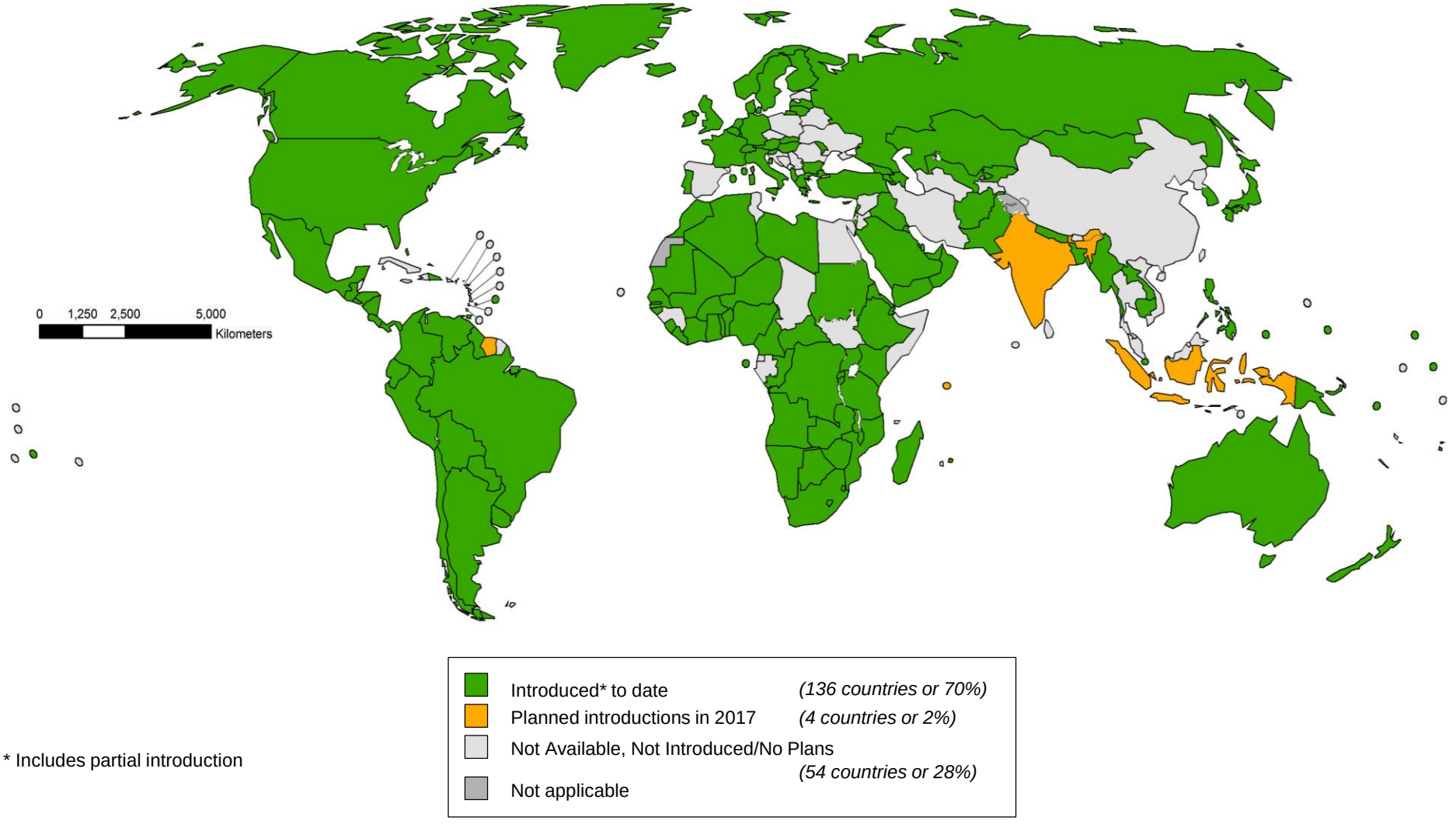
Not applicable

* Includes partial introduction

Data source: WHO/IVB Database, as of 09 August 2017
Map production Immunization Vaccines and Biologicals (IVB), World Health Organization

WHO

Konjuge Pnömokok aşısını aşı şemasına ekleyen ülkeler (2017)



* Includes partial introduction

Data source: WHO/IVB Database, as of 09 August 2017
Map production Immunization Vaccines and Biologicals (IVB), World Health Organization

WHO

Effect of vaccines on bacterial meningitis worldwide

Peter B McIntyre, Katherine L O'Brien, Brian Greenwood, Diederik van de Beek

Lancet 2012; 380: 1703–11

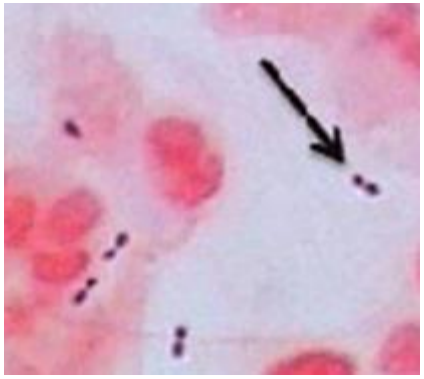
	Haemophilus influenzae type b[22]	*Streptococcus pneumoniae*[21]	*Neisseria meningitidis*[12,23]
Cases			
Highest incidence region (Africa)	46 (31–52)	38 (11–48)	>100 (endemic)* >1000 (epidemic)*
Lowest incidence region (Europe)	16 (12–22)	6 (5–9)	1–2 (endemic)† 2–10 (epidemic)†
Deaths			
Highest mortality region (Africa)*	31 (20–35)	28 (7–36)	..
Lowest mortality region (Europe)†	4 (3–6)	3 (1–7)	..
Morbidity			
Proportion of survivors with major long-term sequelae[1]	9·5% (7·1–15·3)	24·7% (16·2–35·3)	7·2% (4·3–11·2)

Data are n per 100 000 population per year (95% CI) unless otherwise specified. Mean proportion of survivors with major long-term sequelae for all organisms combined in the highest incidence regions is 25% (95% CI 19–32), and in the lowest incidence regions is 9% (7–12).[1] *African meningitis belt. †Low incidence regions for invasive meningococcal disease—Europe, USA, and Australia.

Table 2: Estimates of global disease burden for meningitis attributable to *Haemophilus influenzae* type b, *Streptococcus pneumoniae* (children younger than 5 years), and *Neisseria meningitidis* (all ages), by organism and region

Neisseria meningitidis

Gram-negatif
Aerobik
diplokok



Polisakkarid
kapsül

- Kapsüler antijenlere göre 12 serogrup
  - Klinik olarak 5 serogrup önemli (A, B, C, Y, W)
  - Serogrup X, Afrika'da küçük epidemiler
- Kapsüler antijenler uzun süreli immunolojik hafıza oluşturmazlar

Apicella MA. In: *Principles and Practice of Infectious Diseases*. 1995; Granoff DM, et al. In: *Vaccines*. 5th ed. 2008;
Kimmel SR. *Am Fam Physician.* 2005;72(10):2049.


Gizli bakteriyemi
Etkili immun yanıt
Bakteriyel faktörler
Konağın genetik yapısı
Konak immun yanıtı
Menenjit ± Meningokoksemi
Kan-beyin bariyerini geçiş
Meningokoksemi
Vasküler hasar, DIK
Doku hasarı, şok

Etiology of Childhood Bacteremia and Timely Antibiotics Administration in the Emergency Department

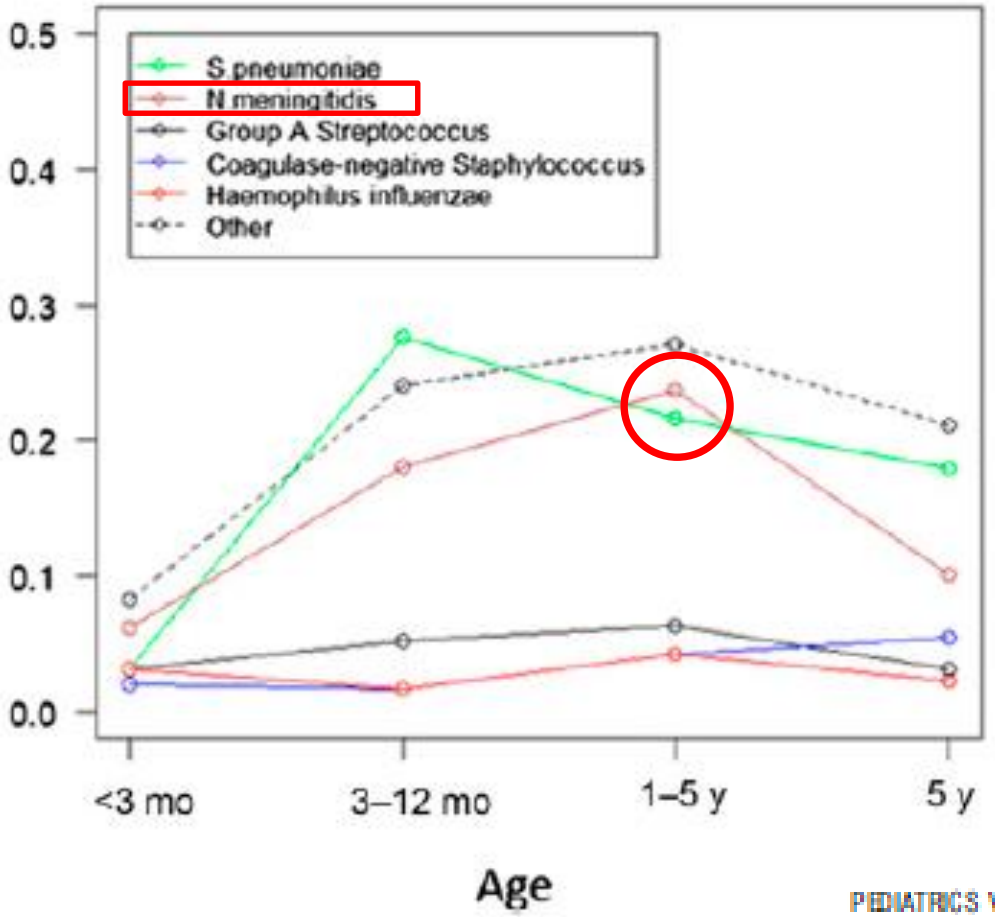
Adam D. Irwin, MRCPCH[a], Richard J. Drew, MD FRCPath[b], Philippa Marshall, MBChB[a], Kha Nguyen, MRCPCH[a], Emily Hoyle, MBChB[c], Kate A. Macfarlane, MBChB[a], Hoying F. Wong, MBChB[a], Ellen Mekonnen, MBChB[a], Matthew Hicks, MBChB[a], Tom Steele, MBChB[a], Christine Gerrard, BSc[b], Fiona Hardiman, BSc[b], Paul S. McNamara, PhD FRCPCH[a], Peter J. Diggle, PhD[c], Enitan D. Carrol, MD FRCPCH[a]

BACKGROUND: Bacteremia is nc
associated with significant m
initiate timely, appropriate a

METHODS: A retrospective time
ED between 2001 and 2011.
susceptibility were recorded.

RESULTS: A total of 575 clinic
meningitidis ($n = 96$), and *Sta*
1.42 per 1000 ED attendance
(6.6%–14.5%) in vaccine-prev
infections. The pneumococcal
pneumococcal bacteremia. Th
attendances ($P = .002$). Susce
care–associated bacteremia w
2.3–5.8). Median time to antil
27–97) minutes longer in Gra

CONCLUSIONS: Changes in the
treatment. Increasingly pediat
stay. Prompt, effective antimic
continued etiological surveilla



Review

Meningococcal pneumonia

Matthias Vossen [a], Dieter Mitteregger [b], Christoph Steininger [a,*]

[a] Department of Medicine I, Div. of Infectious Diseases and Tropical Medicine, Medical University of Vienna, Vienna, Austria
[b] Department of Laboratory Medicine, Div. of Clinical Microbiology, Medical University of Vienna, Vienna, Austria

ARTICLE INFO

Article history:
Received 31 March 2016
Received in revised form 7 July 2016
Accepted 11 July 2016
Available online 18 July 2016

Keywords:
Neisseria meningitidis
Pneumonia
Invasive meningococcal disease

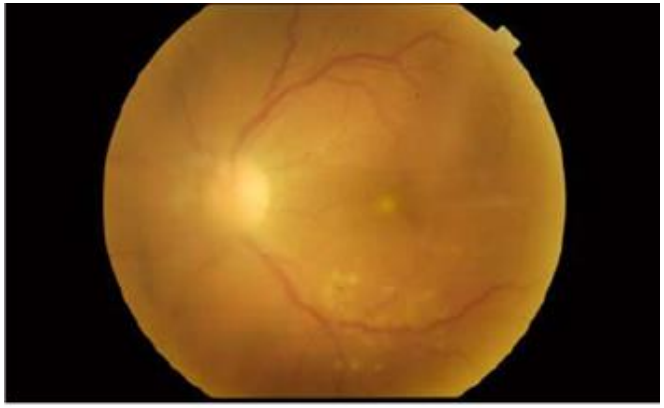
ABSTRACT

Neisseria meningitidis remains the most important cause of bacterial meningitis worldwide, particularly in children and young adults. The second most common and a potentially severe end-organ manifestation of invasive meningococcal disease (excluding systemic sepsis) is meningococcal pneumonia. It occurs in between 5% and 15% of all patients with invasive meningococcal disease and is thus the second most common non-systemic end-organ manifestation. To establish the diagnosis requires a high level of clinical awareness – the incidence is therefore very likely underreported and underestimated. This review of 344 meningococcal pneumonia cases reported in the Americas, Europe, Australia, and Asia between 1906 and 2015 presents risk factors, pathogenesis, clinical manifestations, diagnostic approaches, treatment, and prognosis of meningococcal pneumonia.

- Vakaların %5-15 pnömoni
- Özellikle >65 yaş, çocuklarda da görülebilir
- En sık Y, W
- Radyoloji diğer bakteriyel etkenlerle benzer

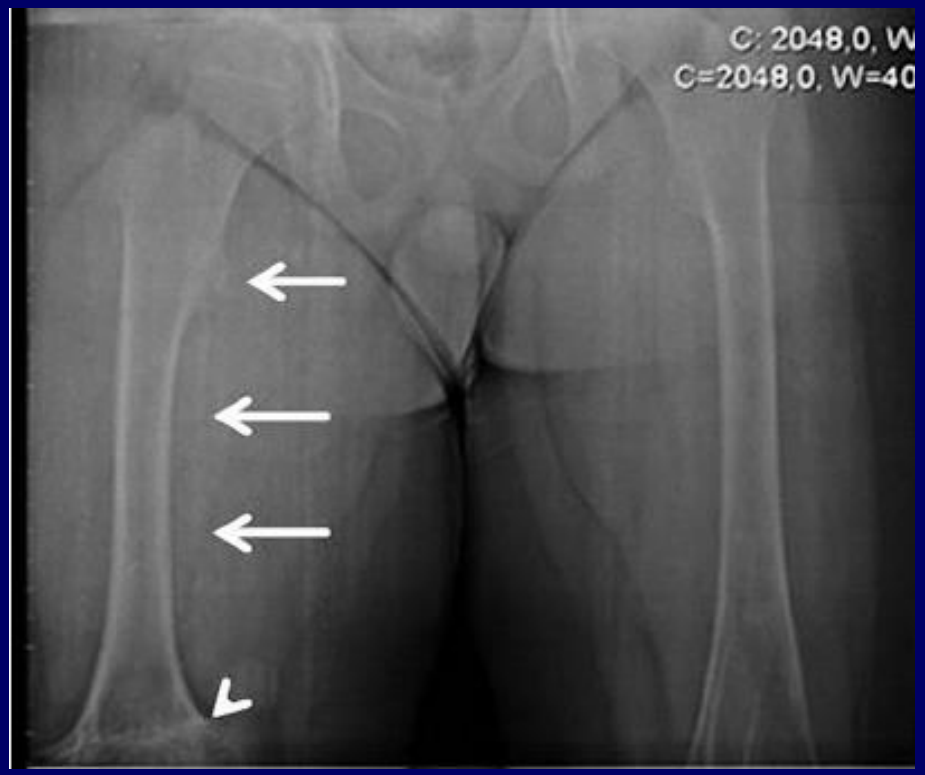
Vaccine 34 (2016) 4364–4370

Meningokok hastalığı
Klinik bulgular



- Artirit
- Otitis media
- Epiglottit
- Perikardit
- Konjuktivit
- Endoftalmit
- Uretrit
- Postenfeksiyöz inflamatuvar sendrom
- Kronik meningokoksemi

Late Sequel of Meningococcemia: Skeletal Dysplasia



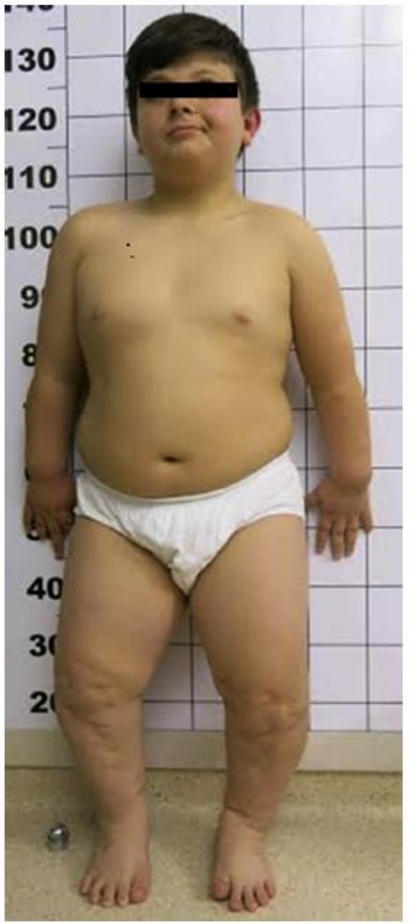


Figure 1. Limb length discrepancy and angulation of legs.

Karabulut GS, et al. J Pediatr 2016; 173:264-264.e2.

İnvaziv meningokok hastalığı (IMH)

1.200.000 vaka
135.000 ölüm

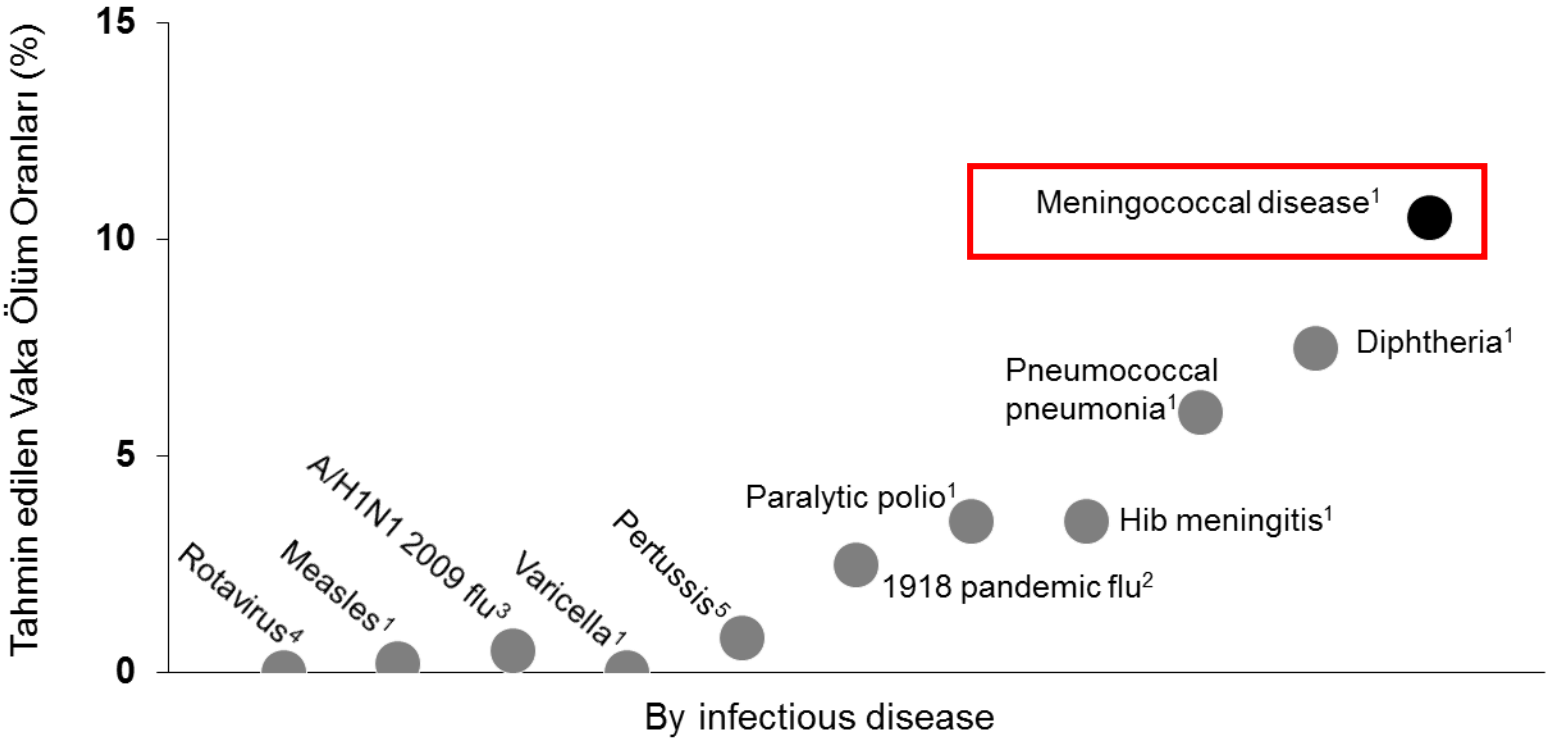
- Hızlı progresyon gösteren (
- Teda
  nede
- En y
  enfe

re

- Meningokokal menenjitte fatalite oranı %10-20,
- meningokoksemi vakalarında %40

Nelson Textbook of Pediatrics, 2011 Jafri RZ, et al. Popul Health Metr. 2013;11(1):17.

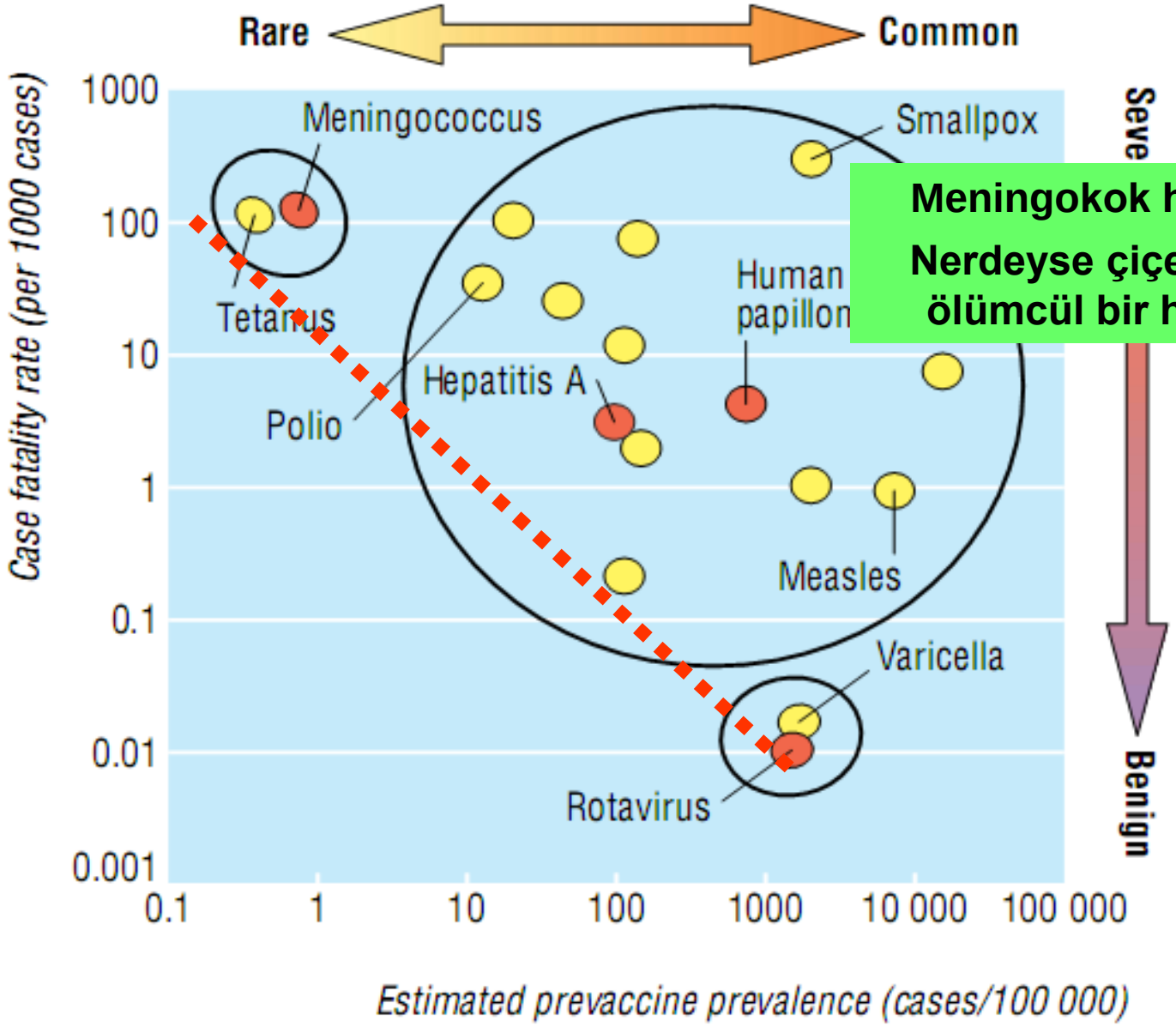
Vaka/Ölüm Oranları



Notes: Meningococcal disease and Hib meningitis: despite appropriate antimicrobial therapy; paralytic polio: in children; 1918 pandemic flu: in young adults; varicella: in children and adolescents; A/H1N1 2009 flu: worldwide; measles: US, 1985–1992; rotavirus: US general population; pertussis: infants <6 months of age, US, 2001–2003.

Hib=*Haemophilus influenzae* type b.

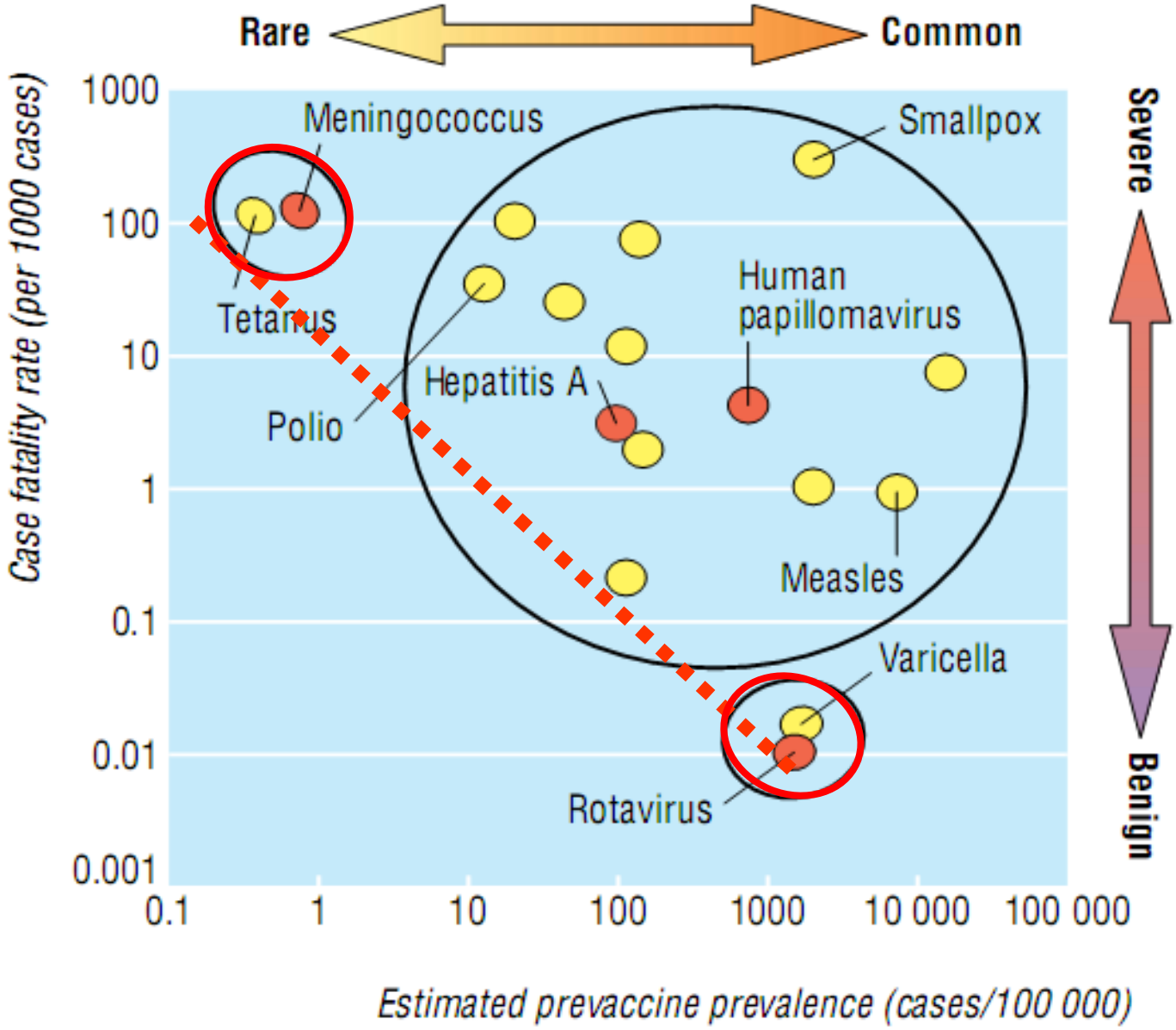
1. Centers for Disease Control and Prevention (CDC). *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 12th ed. Atkinson W, et al, eds. Washington, DC: Public Health Foundation; 2012. http://www.cdc.gov/vaccines/pubs/pinkbook/index.html#chapters; 2. Taubenberger JK, et al. *Emerg Infect Dis.* 2006;12:15-22; 3. Pandemic H1N1 2009 Overview. CIDRAP website. http://www.cidrap.umn.edu/cidrap/content/influenza/swineflu/biofacts/h1n1_panview.html; 4. Gerba CP, et al. *Wat Res*. 1996:30;2929-2940; 5. Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep*. 2005;54:1283-1286.



Meningokok hastalığı

Nerdeyse çiçek kadar ölümcül bir hastalık

Temte JL BMJ 2006



Temte JL BMJ 2006

SEKELLER

Long-term sequelae (any)	%10-20
Hearing impairment	
Hearing loss (any)	8 (7%)
Severe hearing loss	4 (3.5%)
Hearing aid	2 (1.7%)
Cochlear implant	1 (0.9%)
Neurologic, behavioral, developmental and motor impairment	
Learning-academic difficulties (any)	26 (22.6%)
Behavioral and emotional problems	17 (14.8%)
Chronic headaches	16 (14%)
Neur..	4 (12.2%)

Çalışma yaptırıyorum aşı takvimine alacağız

Hürriyet Haber 03.08.2005 - 00:00 | Son Güncelleme : 03.08.2005 - 00:01

Makbule Başboğa'nın kollarının ve bacaklarının kesilmesine yol açan menenjit aşısının bulunmayışıyla ilgili olarak Hürriyet'in sorularını yanıtlayan Sağlık Bakanı Recep Akdağ, şunları söyledi:`Bu aşı plan dahilinde çocukluk çağı rutin aşılarının içine girecek. Biz

İnvaziv meningokok hastalığı (IMH)

- **Semptomlar başlangıçta (ilk 12 saatte) nonspesifiktir →**

0–12 saat
Nonspesifik

Ateş, baş ağrısı, bulantı, kusma, ishal, nezle, kırıklık, iştah azalması, irritabilite

Branco RG, et al. *J Pediatr (Rio J)*. 2007;83(2 suppl):S46; Thompson MJ, et al. *Lancet*. 2006;367(9508):397-403.

İnvaziv meningokok hastalığı (IMH)

- **Semptomlar başlangıçta (ilk 12 saatte) nonspesifiktir → yanlış tanı (ÜSYE, gastroenterit)**

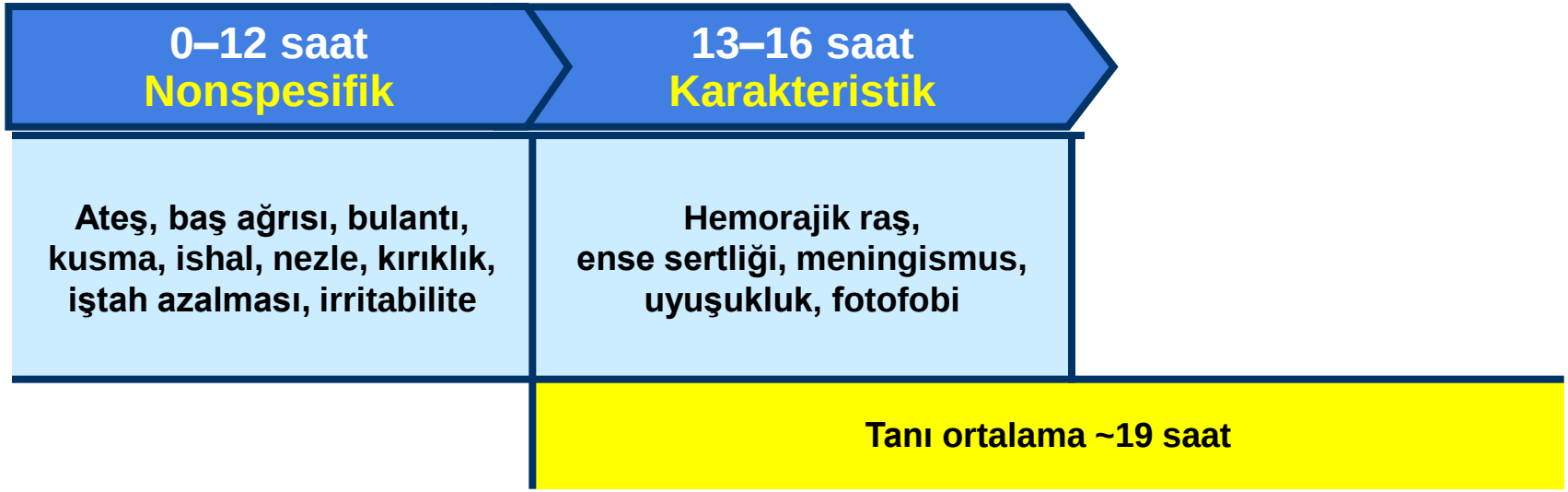
0–12 saat
Nonspesifik

Ateş, baş ağrısı, bulantı, kusma, ishal, nezle, kırıklık, iştah azalması, irritabilite

Branco RG, et al. *J Pediatr (Rio J)*. 2007;83(2 suppl):S46; Thompson MJ, et al. *Lancet*. 2006;367(9508):397-403.

İnvaziv meningokok hastalığı (IMH)

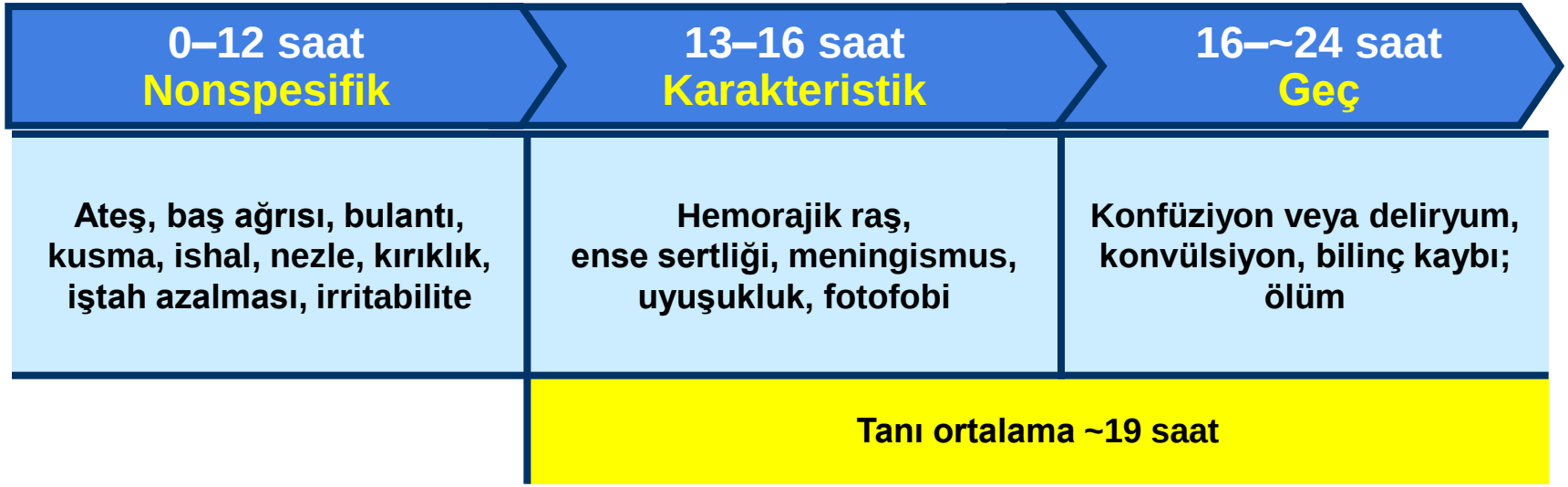
- **Semptomlar başlangıçta (ilk 12 saatte) nonspesifiktir → yanlış tanı (ÜSYE, gastroenterit)**



Branco RG, et al. *J Pediatr (Rio J)*. 2007;83(2 suppl):S46; Thompson MJ, et al. *Lancet*. 2006;367(9508):397-403.

İnvaziv meningokok hastalığı (IMH)

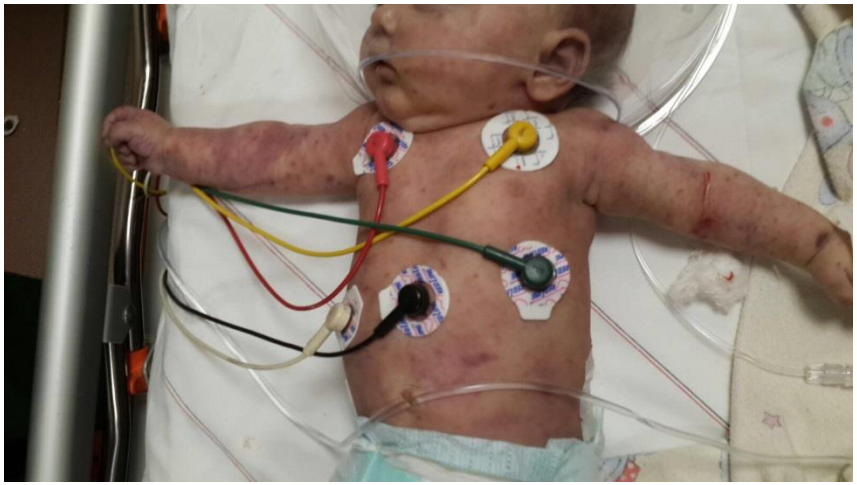
- **Semptomlar başlangıçta (ilk 12 saatte) nonspesifiktir → yanlış tanı (ÜSYE, gastroenterit)**
- **Hızlı progresyon gösterir, 24 saat içinde ölüm**



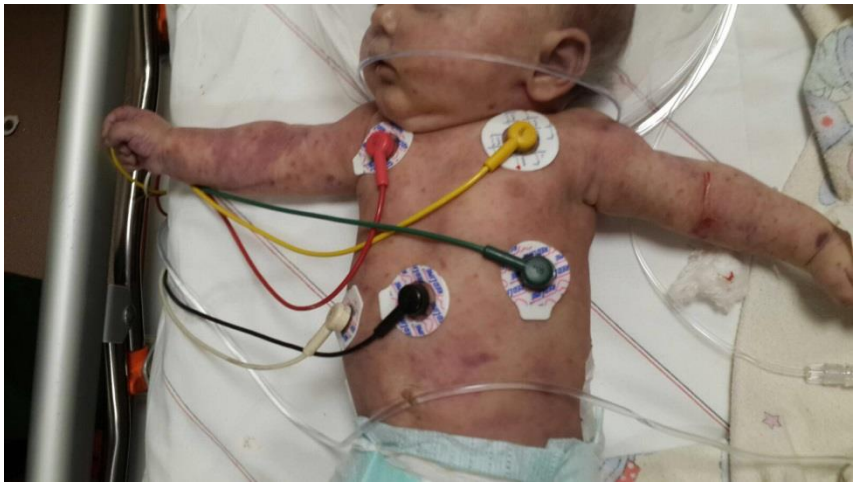
Branco RG, et al. *J Pediatr (Rio J)*. 2007;83(2 suppl):S46; Thompson MJ, et al. *Lancet*. 2006;367(9508):397-403.

- Önceden sağlıklı bebek
- Saat 10.00 ⇒ Ateş, huzursuzluk
- Aile hekimi ⇒ ÜSYE
- Oral antibiyotik (am-Klavunat)
- Saat 15.00 ⇒ Konvülsiyon, vücutta döküntü (kol ve gövdede birkaç adet)

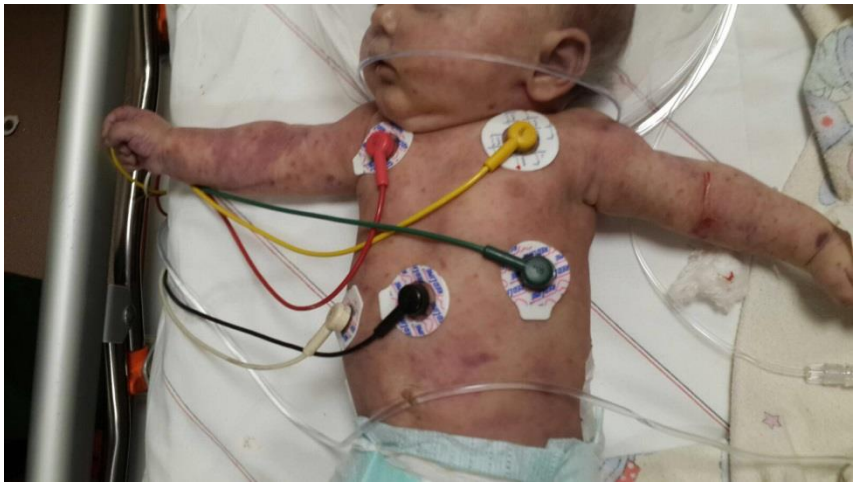
- Önceden sağlıklı bebek
- Saat 10.00 ⇒ Ateş, huzursuzluk
- Aile hekimi ⇒ ÜSYE
- Oral antibiyotik (am-Klavunat)
- Saat 15.00 ⇒ Konvülsiyon, vücutta döküntü (kol ve gövdede birkaç adet)
- Saat 16.00 ⇒ Ege Üniversitesi Çocuk Acil başvurusu



- Önceden sağlıklı bebek
- Saat 10.00 ⇒ Ateş, huzursuzluk
- Aile hekimi ⇒ ÜSYE
- Oral antibiyotik (am-Klavunat)
- Saat 15.00 ⇒ Konvülsiyon, vücutta döküntü (kol ve gövdede birkaç adet)
- Saat 16.00 ⇒ Ege Üniversitesi Çocuk Acil başvurusu
- Saat 17.00 ⇒ Exitus



- Önceden sağlıklı bebek
- Saat 10.00 ⇒ Ateş, huzursuzluk
- Aile hekimi ⇒ ÜSYE
- Oral antibiyotik (am-Klavunat)
- Saat 15.00 ⇒ Konvülsiyon, vücutta döküntü (kol ve gövdede birkaç adet)
- Saat 16.00 ⇒ Ege Üniversitesi Çocuk Acil başvurusu
- Saat 17.00 ⇒ Exitus
- Kan Kültürü ⇒ N. Meningitidis
- PCR ⇒ Seroprup W



Infection (2012) 40:717–718
DOI 10.1007/s15010-012-0286-x

IMAGES IN INFECTION

Purpura fulminans in a child due to *Neisseria meningitidis*

H. Özdemir · T. Kendirli · E. Çiftçi · E. İnce

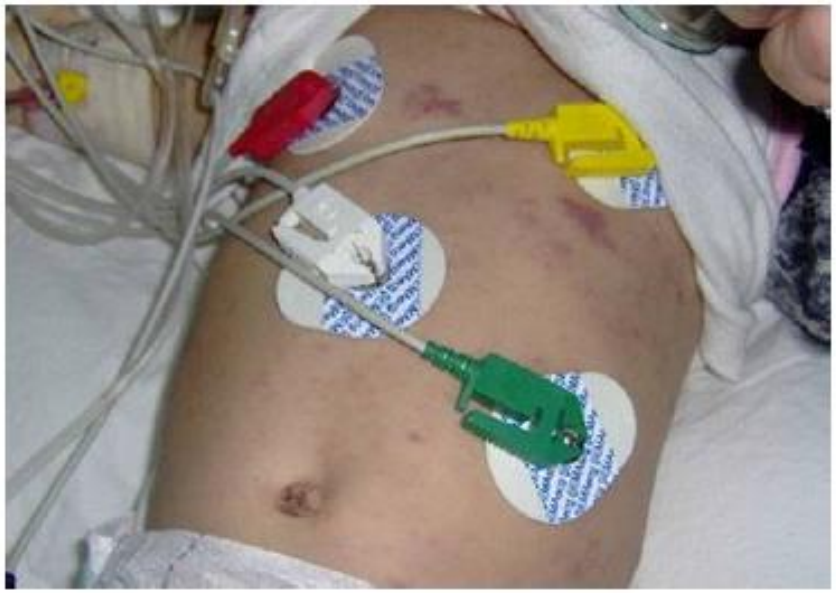


Fig. 1 Petechiae on the chest and quickly replaced bullous and purpuric lesions

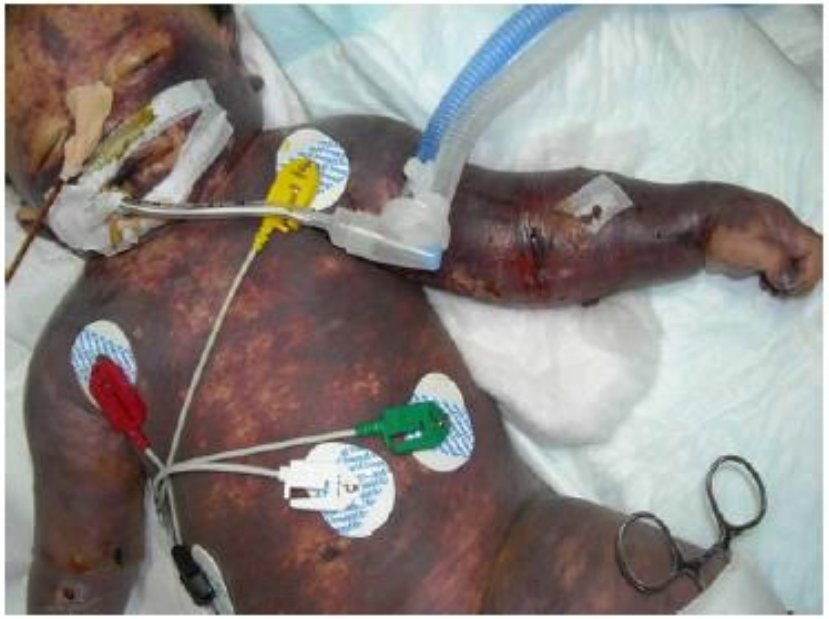


Fig. 2 Purpura fulminans (PF) and necrosis all over the body

4. saatte

was positive for *Neisseria meningitidis*. Despite the appropriate medical and supportive treatment, disseminated vascular coagulation (DIC) and multi-organ failure developed and the patient died during the 58th h of hospitalization.

24. saatte

Kanuni SS Has Başvuruda

Okmeydanı Hastanesi birkaç saat sonra

İngiltere

- **2015 Temmuz-2016 Ocak**
- **15-19 yaş grubunda GIS bulguları ile başvuran 103 vaka**
- **%64 olguda yalnızca karın ağrısı**
- **%23 olguda gastroenterit (%11 sadece ishal)**
- **8 olguda apandisit, 8 olguda peritonit**
- **%19 olguda abdominal cerrahi**
- **İlk 24 saat içinde ölümler**

Campbell H, et al. Euro Surveill 2016;21(12).

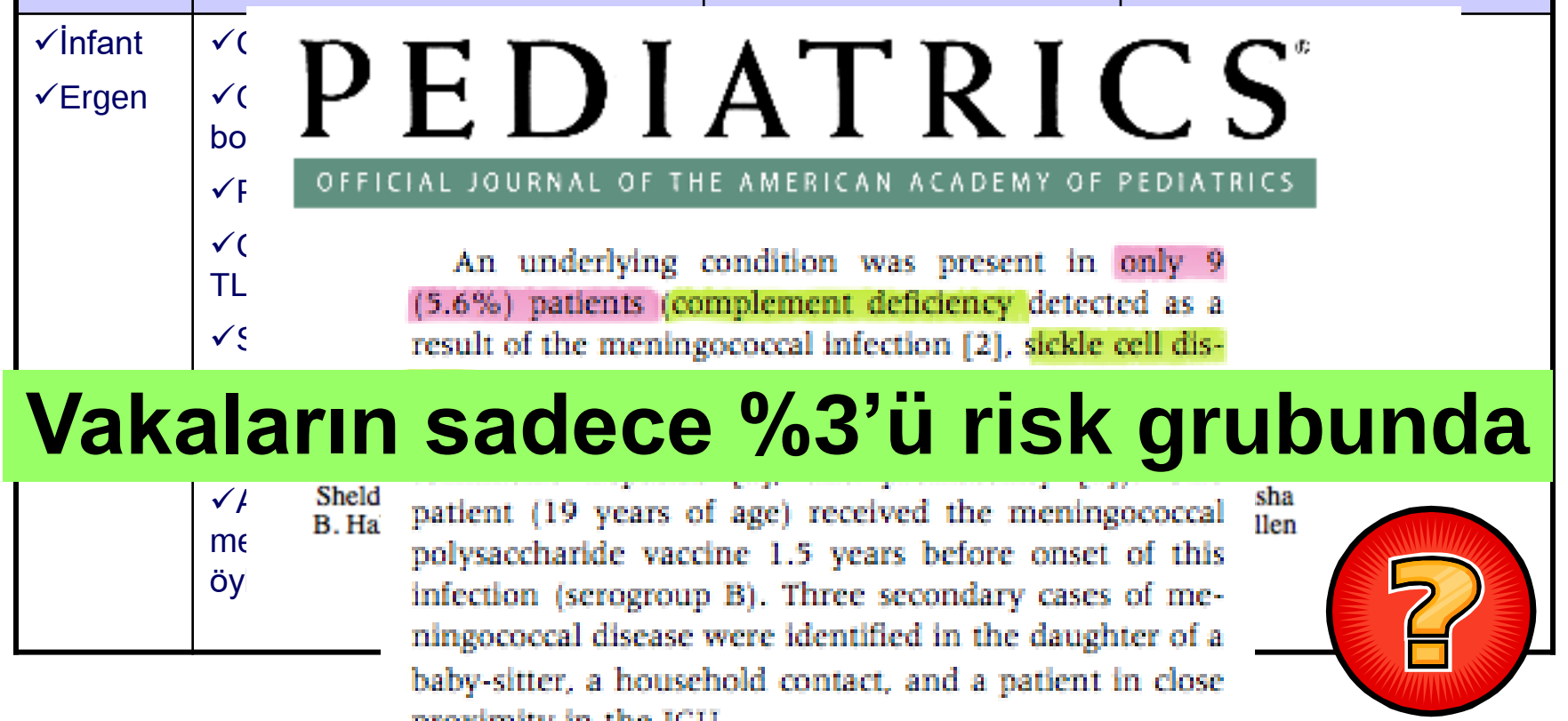
İngiltere

- 2015 Temmuz-2016 Ocak
- 15-19 yaş grubunda GIS bulguları ile başvuran 103 vaka
- %64 olguda yalnızca karın ağrısı
- %23 olguda gastroenterit (%11 sadece ishal)
- İlk 24 saat içinde ölümler
- Yüksek fatalite ile seyreden
- Hipervirulan ST-11 serogrup W suşu

Campbell H, et al. Euro Surveill 2016;21(12).

İnvaziv hastalık risk faktörleri

Yaş	Konağa ait	Sosyal faktörler	Nazofaringeal irritasyon
✓İnfant ✓Ergen	✓(✓(bo ✓F ✓(TL ✓S ✓A me öy		



PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

An underlying condition was present in only 9 (5.6%) patients (complement deficiency detected as a result of the meningococcal infection [2], sickle cell dis-

Sheld
B. Ha

patient (19 years of age) received the meningococcal polysaccharide vaccine 1.5 years before onset of this infection (serogroup B). Three secondary cases of meningococcal disease were identified in the daughter of a baby-sitter, a household contact, and a patient in close proximity in the ICU.

sha
llen

Vakaların sadece %3'ü risk grubunda

Sheldon L, et al. Pediatrics 2006; 118: e979.

Previous pathology in cases of invasive meningococcal disease in children under 5 years old

Raquel Abad [a], Rosa Cano [b], Israel John Thuissard [c], Julio A. Vázquez [a,□,✉,✉]

- **İspanya**
- **5 yaşından küçük 1255 IMH vakası**
  - **1209 hastada (%96.5) altta yatan hastalık bulunmadığı,**
  - **Sadece 46 (%3.5) hastada altta yatan hastalık saptanmış.**

Gac Sanit. 2015;29:474 - Vol. 29 Núm.6

Previous pathology in cases of invasive meningococcal disease in children under 5 years old

Raquel Abad [a], Rosa Cano [b], Israel John Thuissard [c], Julio A. Vázquez [a,□,✉,✉]

- **46 hastada altta yatan hastalık saptanmış.**
  - Hematolojik malignitesi hasta : 0
  - SSS patolojileri, kafa fraktürü: 3 hasta
  - Minör konjenital anomaliler: 34 hasta

SADECE RİSK GRUBUNUN AŞILANMASI DURUMUNDA 1255 VAKANIN YALNIZCA BİRİNDE KORUNMA SAĞLANACAKTIR.

Gac Sanit. 2015;29:474 - Vol. 29 Núm.6

İnvaziv hastalık risk faktörleri

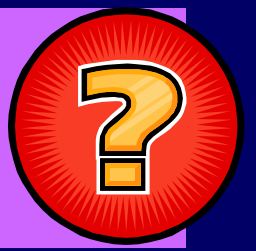


Table 1. Statistically significant risk factors for invasive meningococcal disease (univariate analysis).

Variables	Cases (%)	Controls (%)	p-value*
Immigrant	18/44 (40.9%)	20/84 (23.8%)	0.044
Monitoring child's health by the same pediatrician	29/42 (69%)	72/84 (85.7%)	0.027
Father smoker	30/42 (71.4%)	36/82 (43.9%)	0.004
Number of cigarrets per day (fathers)			
(≥20)	26/42 (61.9%)	30/82 (36.6%)	0.004**
(1–19)	4/42 (9.5%)	6/82 (7.3%)	
Density: number of people/ house dimensions (100 m^2) median value (IQR)	5.3 (4.0–6.7)	4.2 (3.2–5.6)	0.019***
Density: ≥ 4.4 (number of people per 100 m^2 house)	25/37 (67.6%)	33/73 (45.2%)	0.026
Contact with cases of IMD	4/41(9.8%)	0/84 (0%)	0.010
History of viral respiratory infection	22/43 (51.2%)	27/84 (32.1%)	0.037
Sore throat	8/43 (18.6%)	4/84 (4.8%)	0.021
Church attendance	12/43 (27.9%)	40/82 (48.8%)	0.024
Relocation or vacation during the previous month	10/43 (23.3%)	6/83 (7.2%)	0.010

*Chi-square test or Fisher's exact test

** Chi-square test for trend

***Mann-Whitney test.

Hadjichristodoulou C, et al. PLoS One. 2016;11(6):e0158524.

INFECTIOUS DISEASES,
2017; VOL. 49,
NO. 6, 433–444

http://dx.doi.org/10.1080/23744235.2017.1285046

REVIEW ARTICLE

Risk factors for community-acquired bacterial meningitis

Lene Fogt Lundbo & Thomas Benfield

Table 1. Summary of risk of bacterial meningitis in all age groups.

Pathogen	Age groups with highest rates of colonization	Ages groups with highest rates of invasive disease	Site of entry	Most important risk factors
Streptococcus pneumoniae	The youngest children	The elderly and young children	Nasopharynx, through skull fracture or from contiguous or distant foci of infection	Crowding, smoking, splenectomy, HIV infection, B-cell dysfunction, complement deficiencies, hematological cancer, cochlear implants
Neisseria meningitidis	Older children, adolescents and young adults	Infants, adolescents/young adults and the elderly >65	Nasopharynx or blood. Possibly via n. Olfactorius	Crowding, smoking, late complement deficiency, complement inhibitor treatment, asplenia, HIV infection
Haemophilus influenzae	Unvaccinated individuals	Adults; infants and children if not vaccinated	Nasopharynx, contiguous spread from local infection	Crowding, smoking, HIV infection, splenectomy, diminished humoral immunity

İnvaziv hastalık risk faktörleri

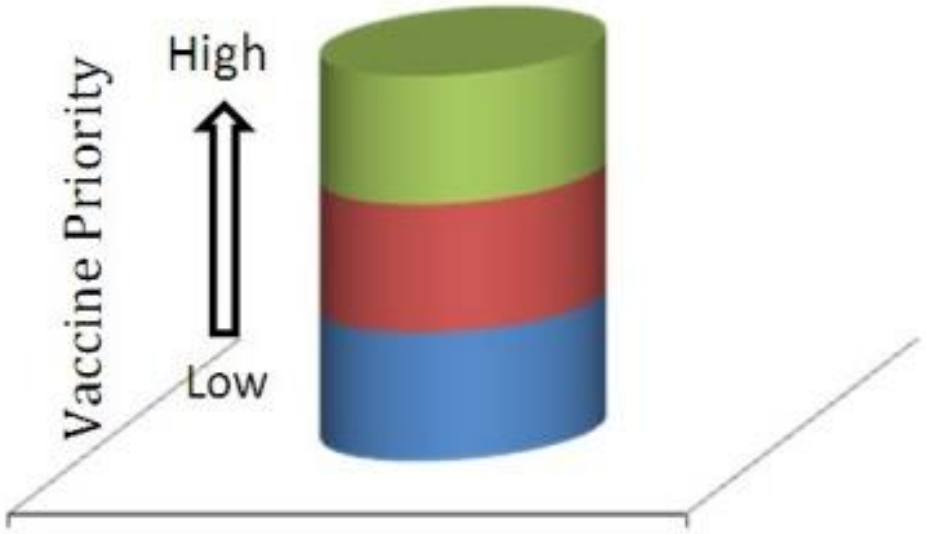
Yaş	Konağa ait	Sosyal faktörler	Nazofaringeal irritasyon
✓İnfant ✓Ergen	✓C5-C9 kompleman defekti ✓Opsonizasyon ve fagositoz bozuklukları ✓Properdin eksikliği ✓Genetik polimofizm (MBL, TLR4 gen) ✓Splenoktomi veya fonk aspleni ✓Hipogamaglobulinemi ✓HIV ✓Ailede daha önce geçirilmiş meningokokal enfeksiyon öyküsü ✓**Astım ya da akciğer enfeksiyonu nedeniyle hospitalizasyon öyküsü** ✓**Eculizumab kullanımı** ✓**Prematüre doğum**	✓ **Hac ziyaretinde** bulunma ✓ Toplu yaşam (yurt, askeri birlik) ✓ Fakirlik ✓ Küçük-kalabalık yerlerde yaşam ✓ Sağlık çalışı olma ✓ Endemik bölgeye seyahat ✓ Aşırı alkol tüketimi	✓**Sigara** ✓**Solunum yolu enfeksiyonları**

Olea A et al. Emerg Infect Dis. 2017 Jul;23(7):1070-1078.

IMH- Epidemiyoloji

- **İnvaziv meningokok hastalığı epidemiyolojisi (insidansı, yaş dağılımı, serogrup dağılımı) ülkeden ülkeye değiştiği gibi zaman içinde de önemli değişiklikler gösterir.**

IMH- Epidemiyoloji



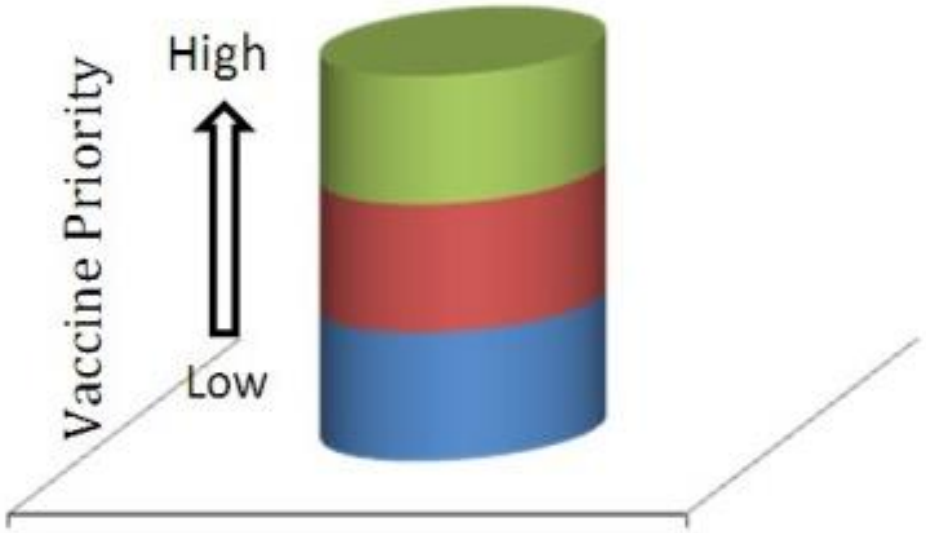
Yüksek endemisite: 100.000 de ≥ 10 olgu

Orta endemisite: 100.000 de 2-10 olgu

Düşük endemisite: 100 000 de < 2 olgu

A categorization of countries according to IMD attack rates.

IMH- Epidemiyoloji



Countries with high endemic rates and/or >= 1 epidemic over the past 20 years

Countries with moderate endemic rates

Countries with low endemic rate

Yüksek endemisite: 100.000 de ≥ 10 olgu

Orta endemisite: 100.000 de 2-10 olgu

Düşük endemisite: 100 000 de < 2 olgu

A categorization of countries according to IMD attack rates.

Jafri et al. Population Health Metrics 2013, 11:17; http://www.pophealthmetrics.com/content/11/1/17

Table 2. Organizations with population size ≥5,000 persons

1 case	• Serogrouping of isolate or clinical specimen performed • Isolate typed or stored for future molecular typing, or sent to CDC, but not discarded • Case investigation • Chemoprophylaxis of close contacts
2 cases in 6 months	Same response as after 1 case with the following additions:
	• If all cases have serogroup B disease and available information supports use of MenB vaccine, consult CDC regarding the use of MenB vaccine using a CDC-sponsored expanded access IND

CDC > Meningococcal Home

Meningococcal Outbreaks

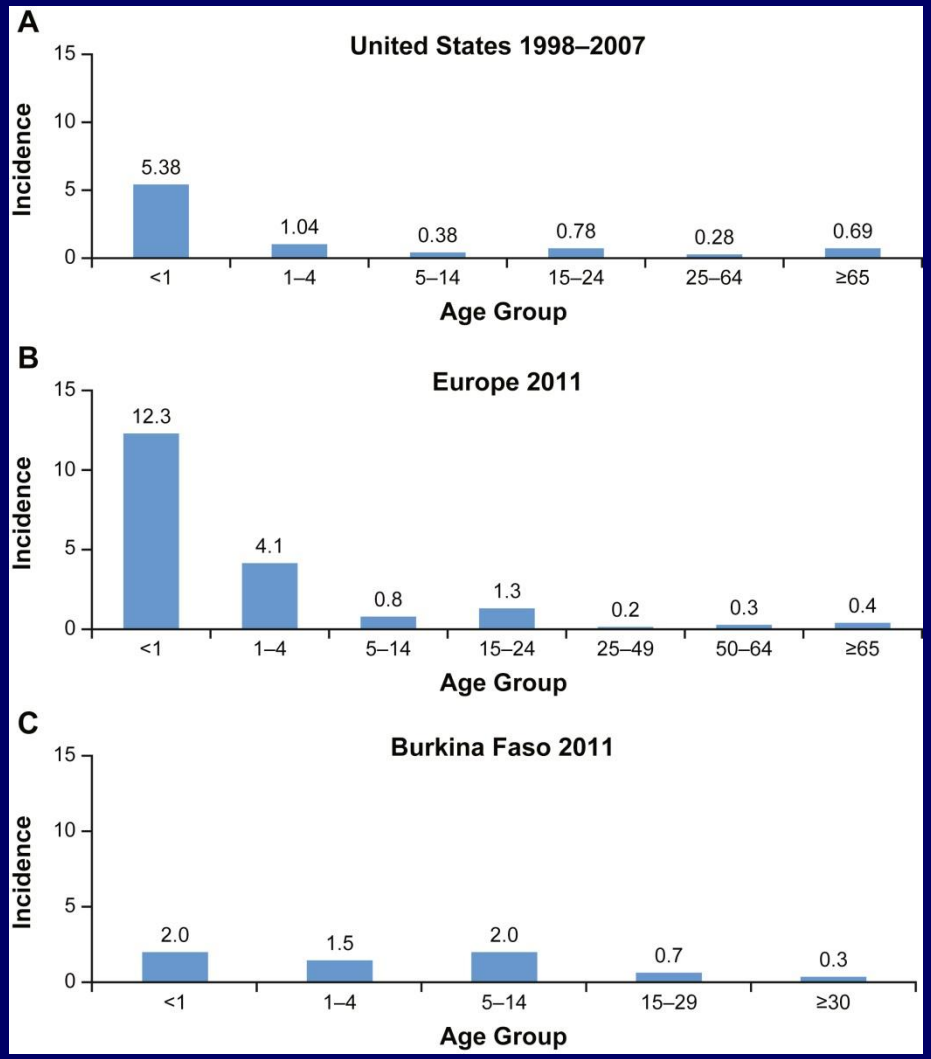
Outbreak Definition

An outbreak occurs when multiple cases of the same serogroup (types) happen in a population over a short time period. Outbreaks can occur in communities, schools, colleges, prisons, and other populations. Depending on the population size and specific circumstances, health officials may declare an outbreak after just two cases.

An outbreak is defined as a chain of transmission including 2 or more cases linked in time and space.

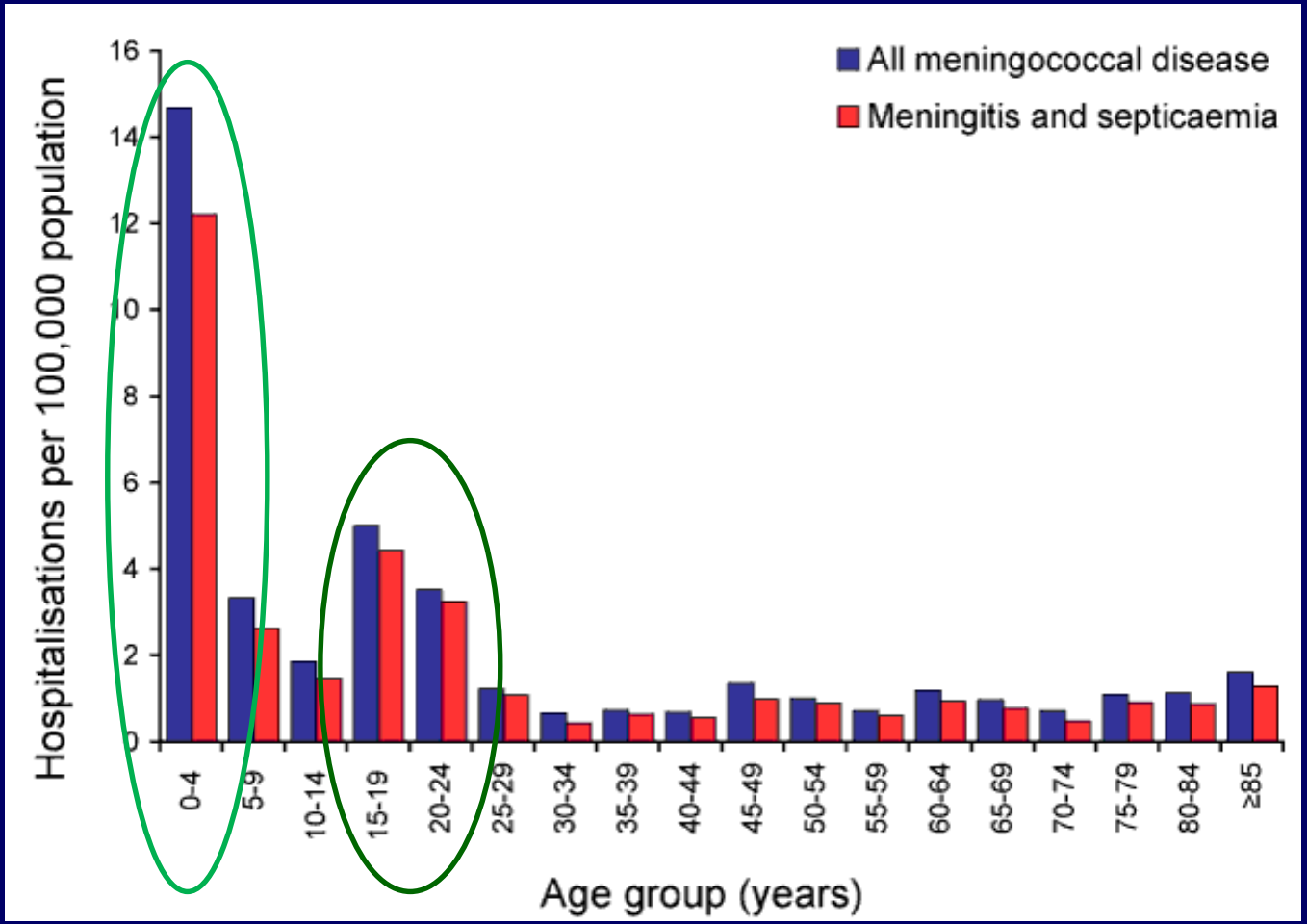
http://www.cdc.gov/meningococcal/downloads/interim-guidance.pdf

IMH yaş dağılımı



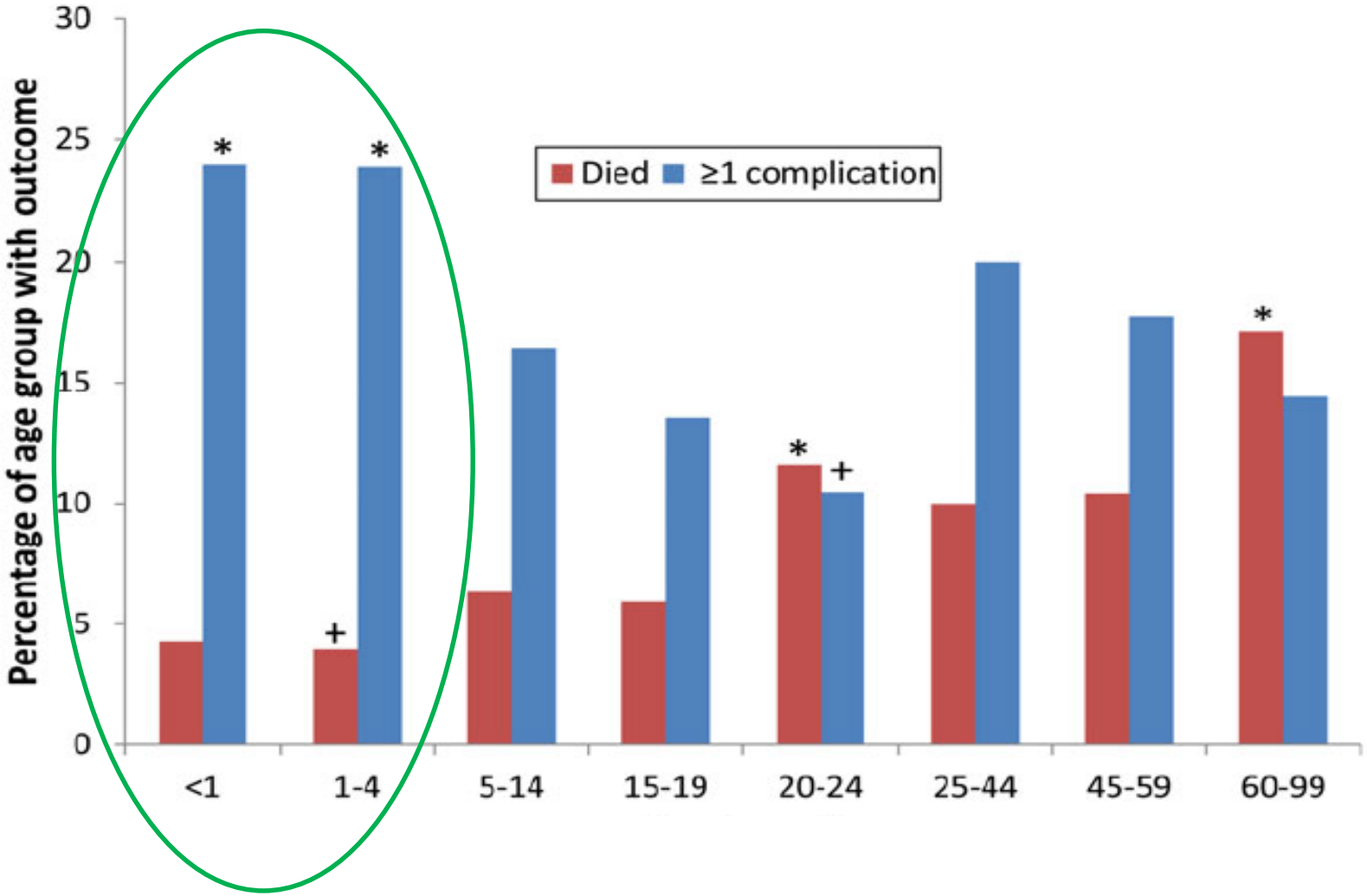
Pelton S. J Adolesc Health 2016;59(2 Suppl):S3-S11.

IMH yaş dağılımı, ABD



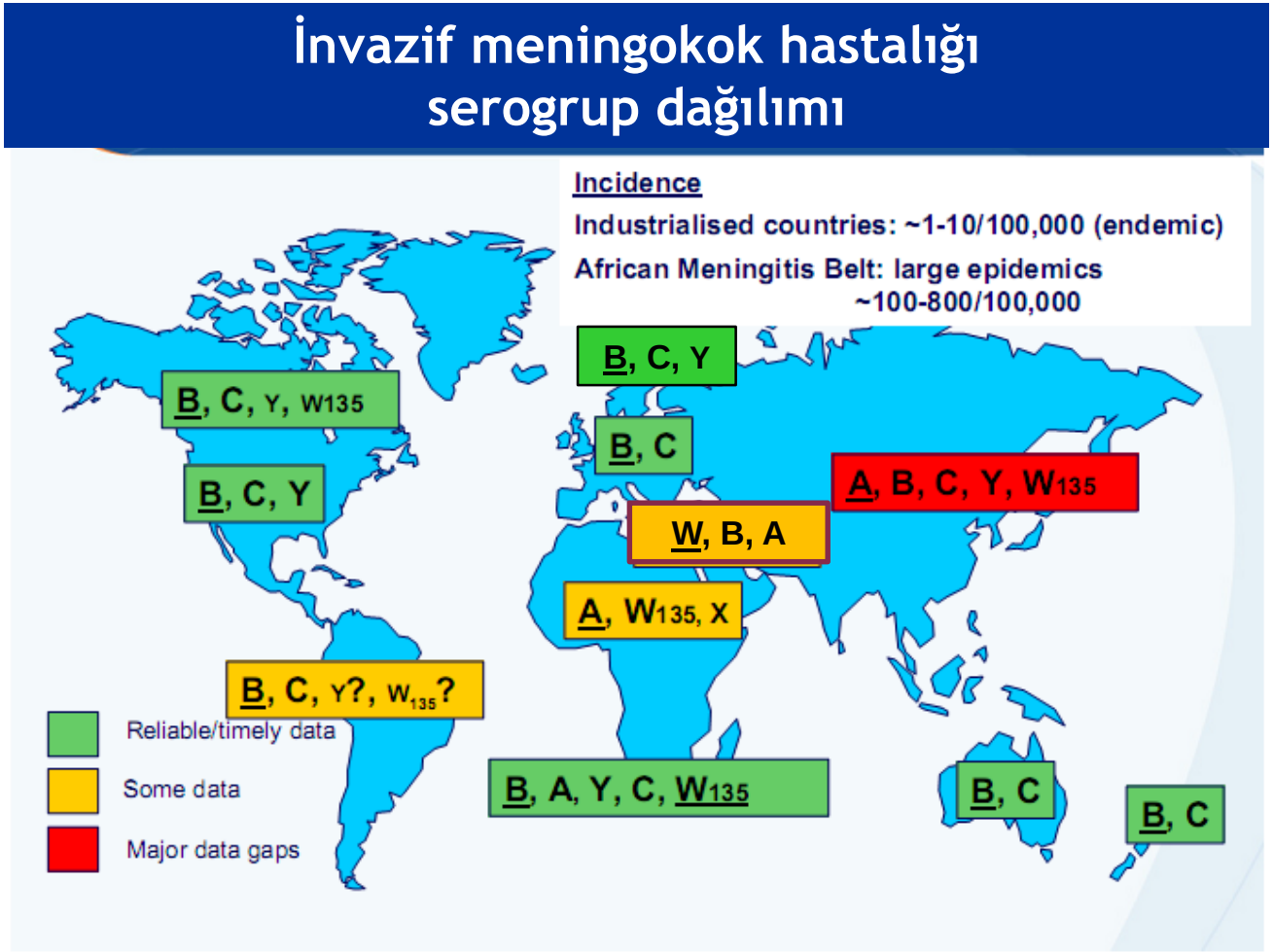
Source: Unpublished data, Active Bacterial Core surveillance (ABCs) system.

IMH Ölüm, Komplikasyon



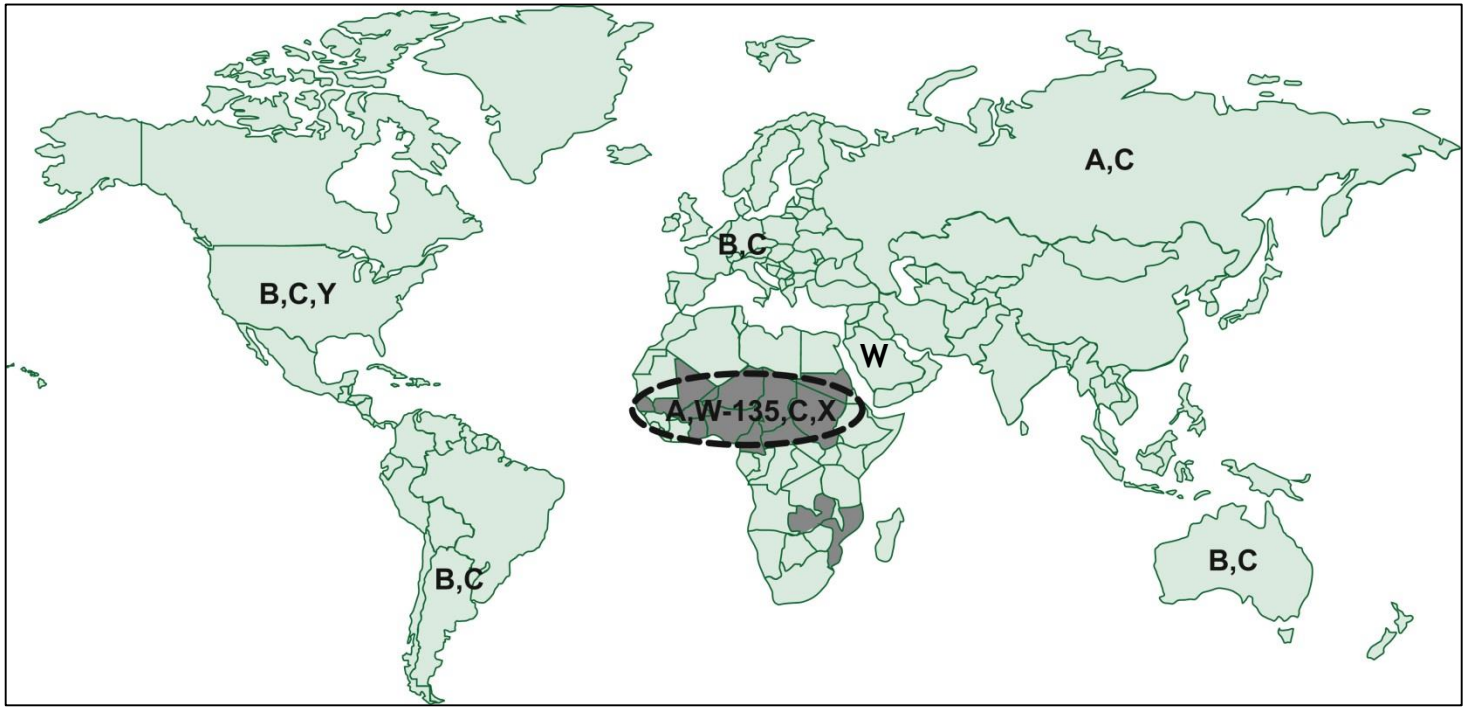
Sadarangani M, et al. CID 2015:60. e 27

IMH serogrup dağılımı



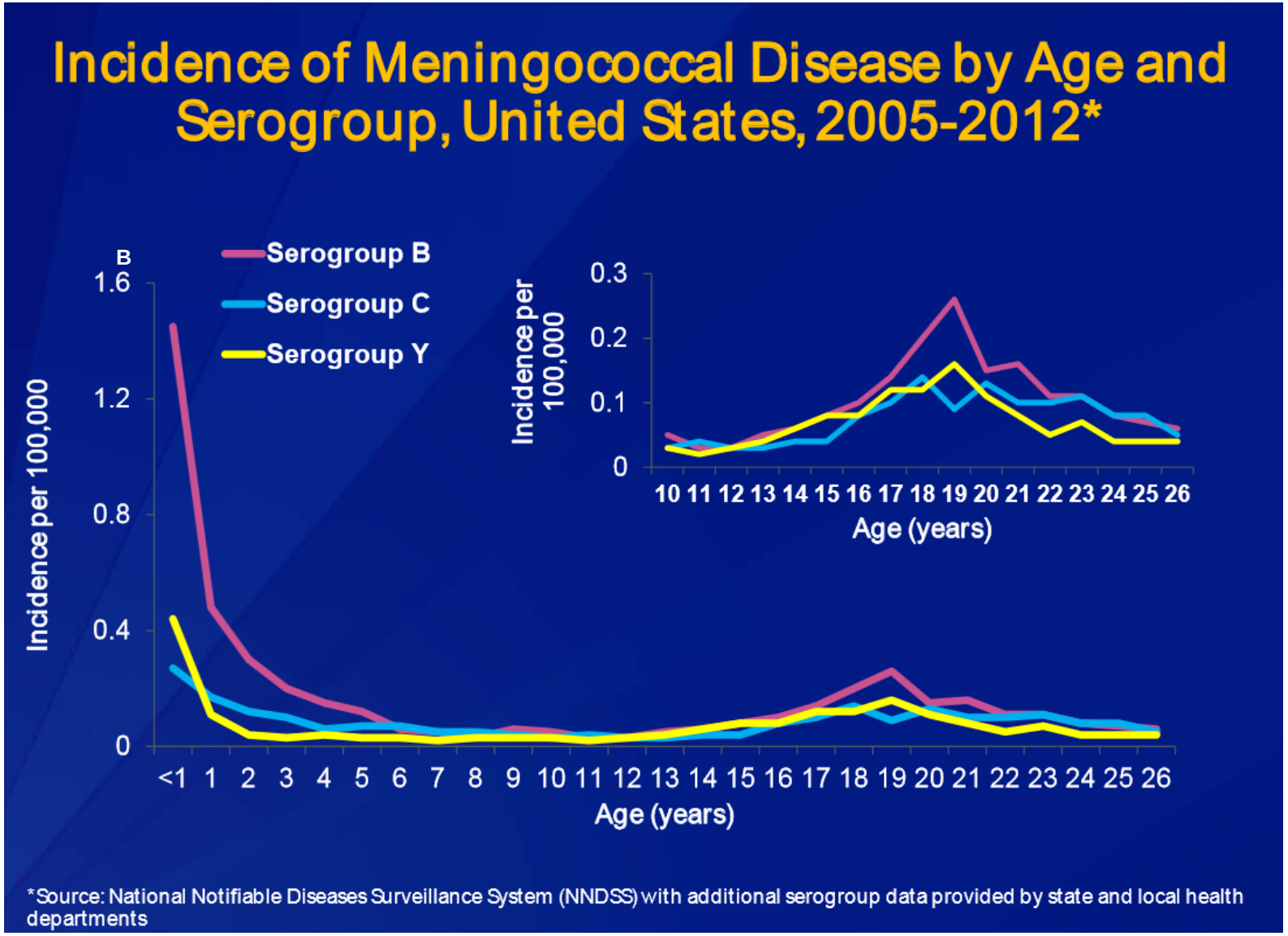
IMH serogrup dağılımı

İnvazif meningokok hastalığı serogrup dağılımı

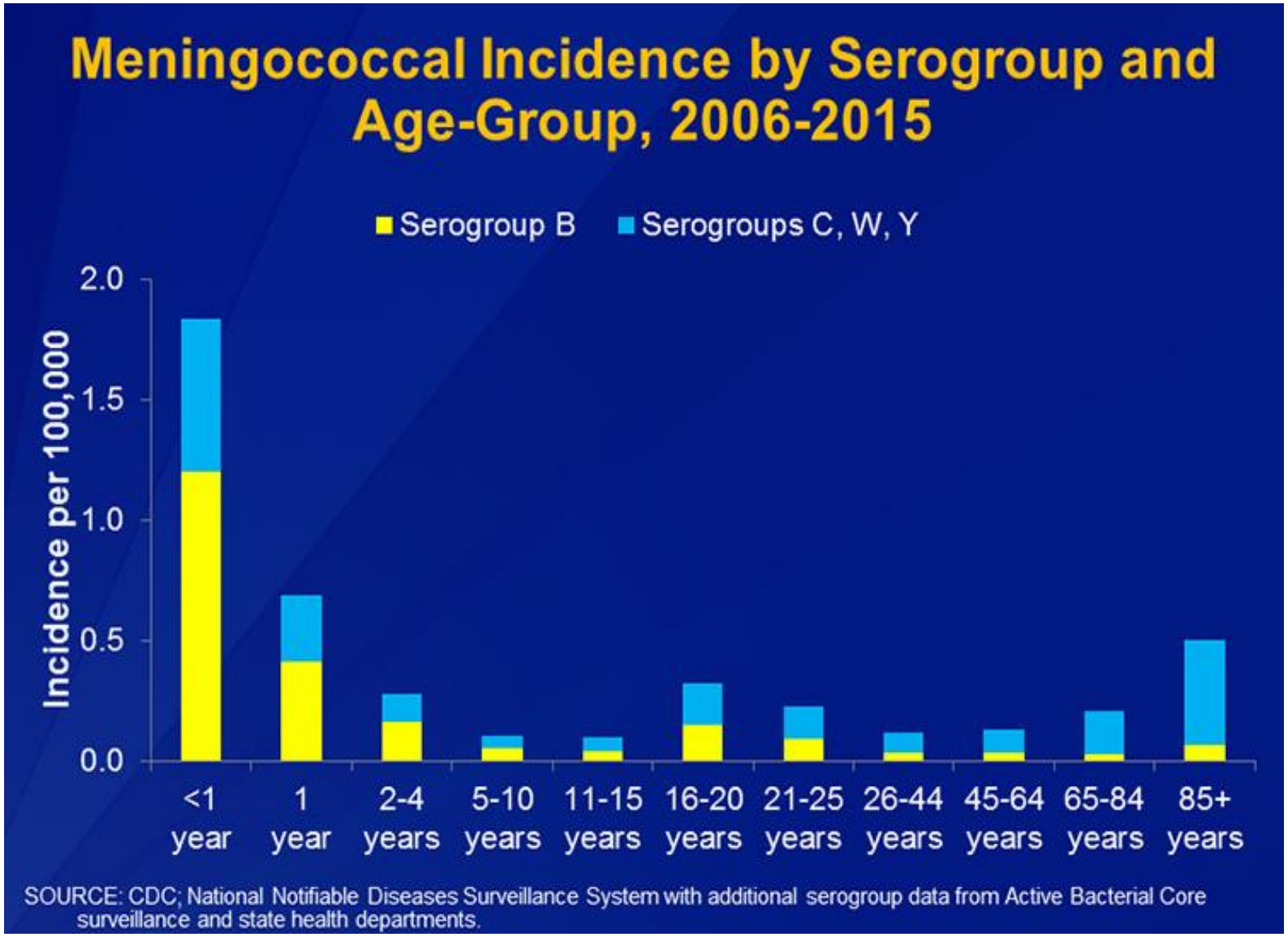


Pelton S. J Adolesc Health 2016; 59(2 Suppl) :S3-S11.

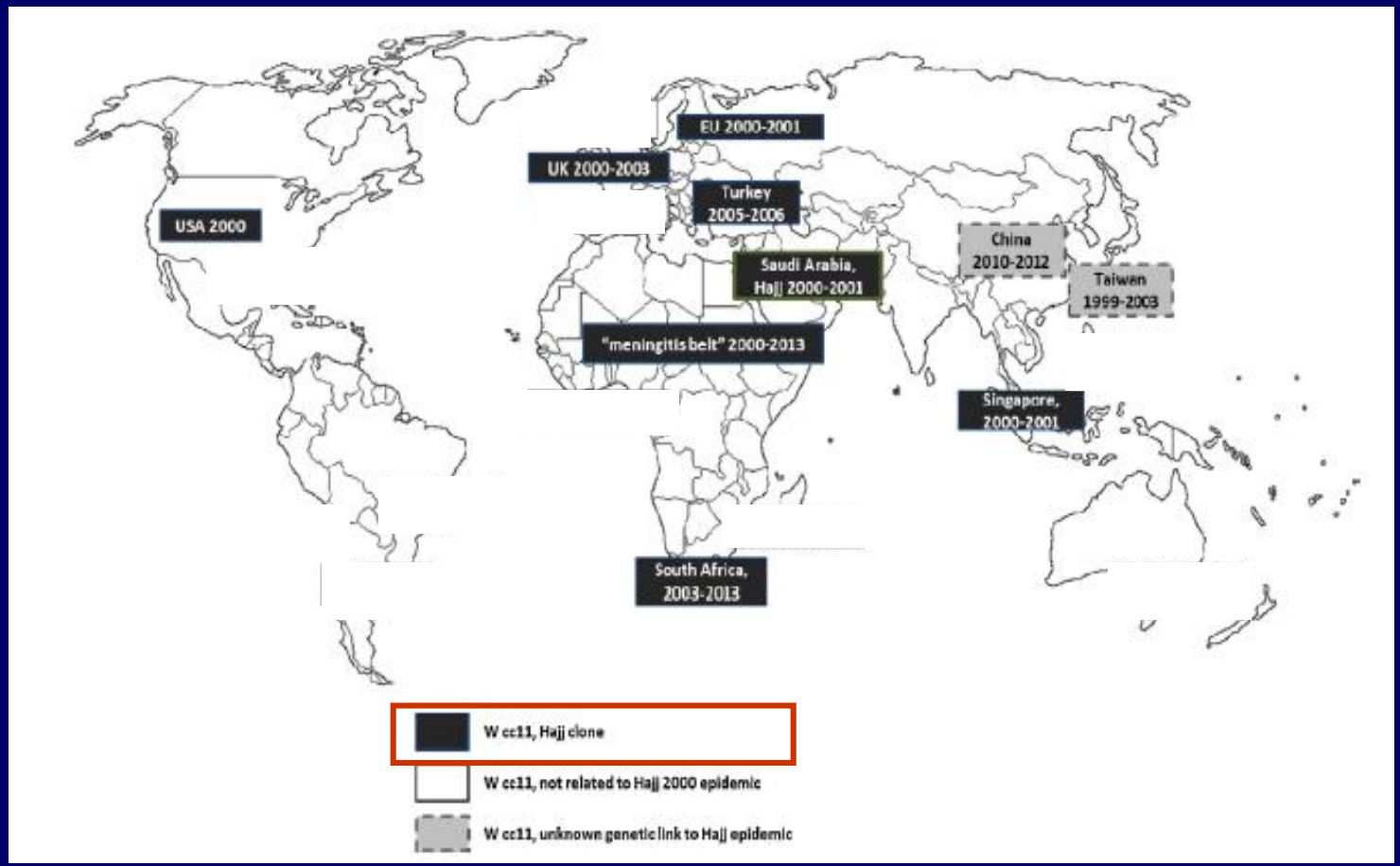
Serogrup dağılımı (ABD)



Serogrup dağılımı (ABD)



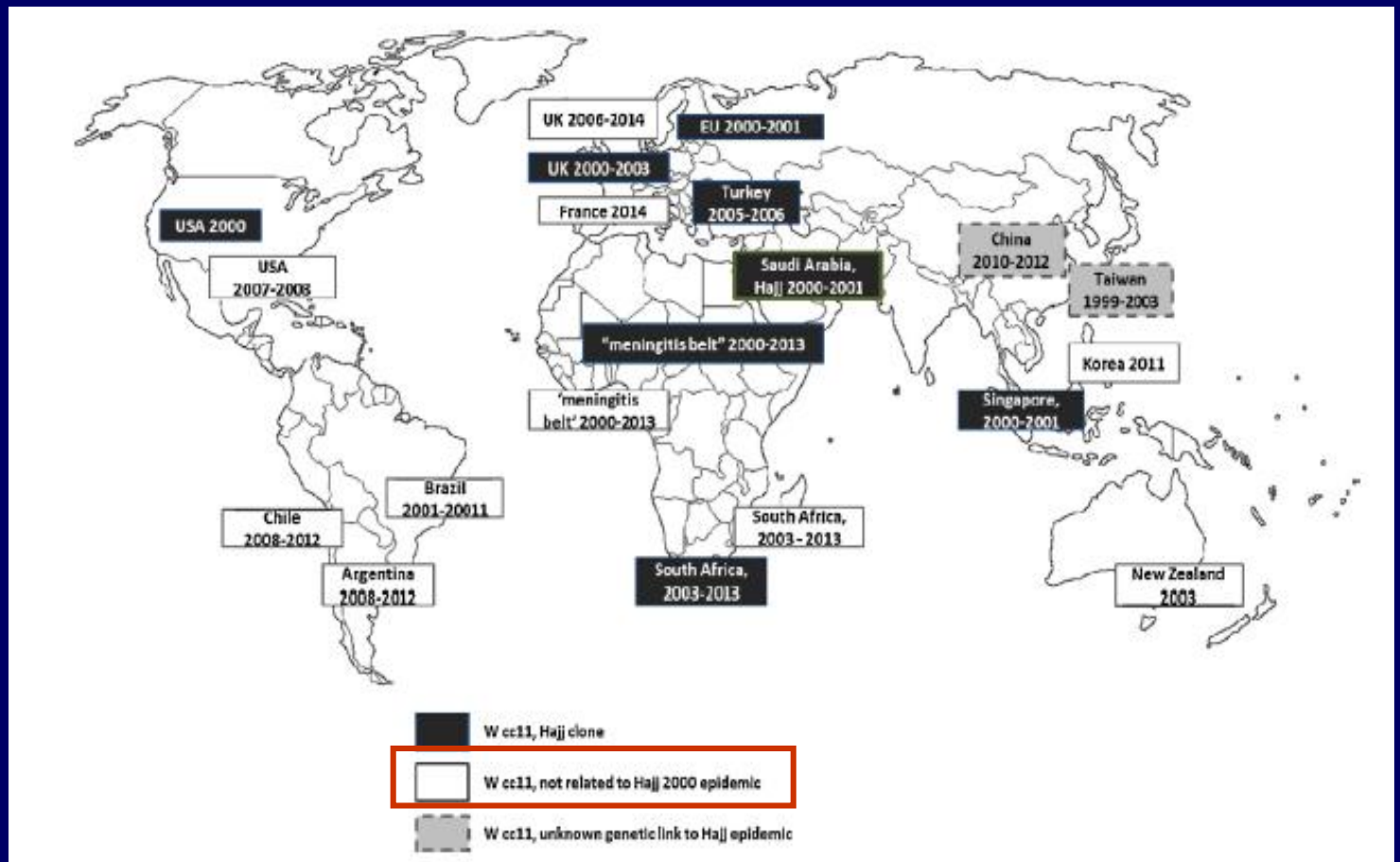
W salgınları



Vaccine 34 (2016) 1515–1523

Global epidemiology of capsular group W meningococcal disease (1970–2015): Multifocal emergence and persistence of hypervirulent sequence type (ST)-11 clonal complex

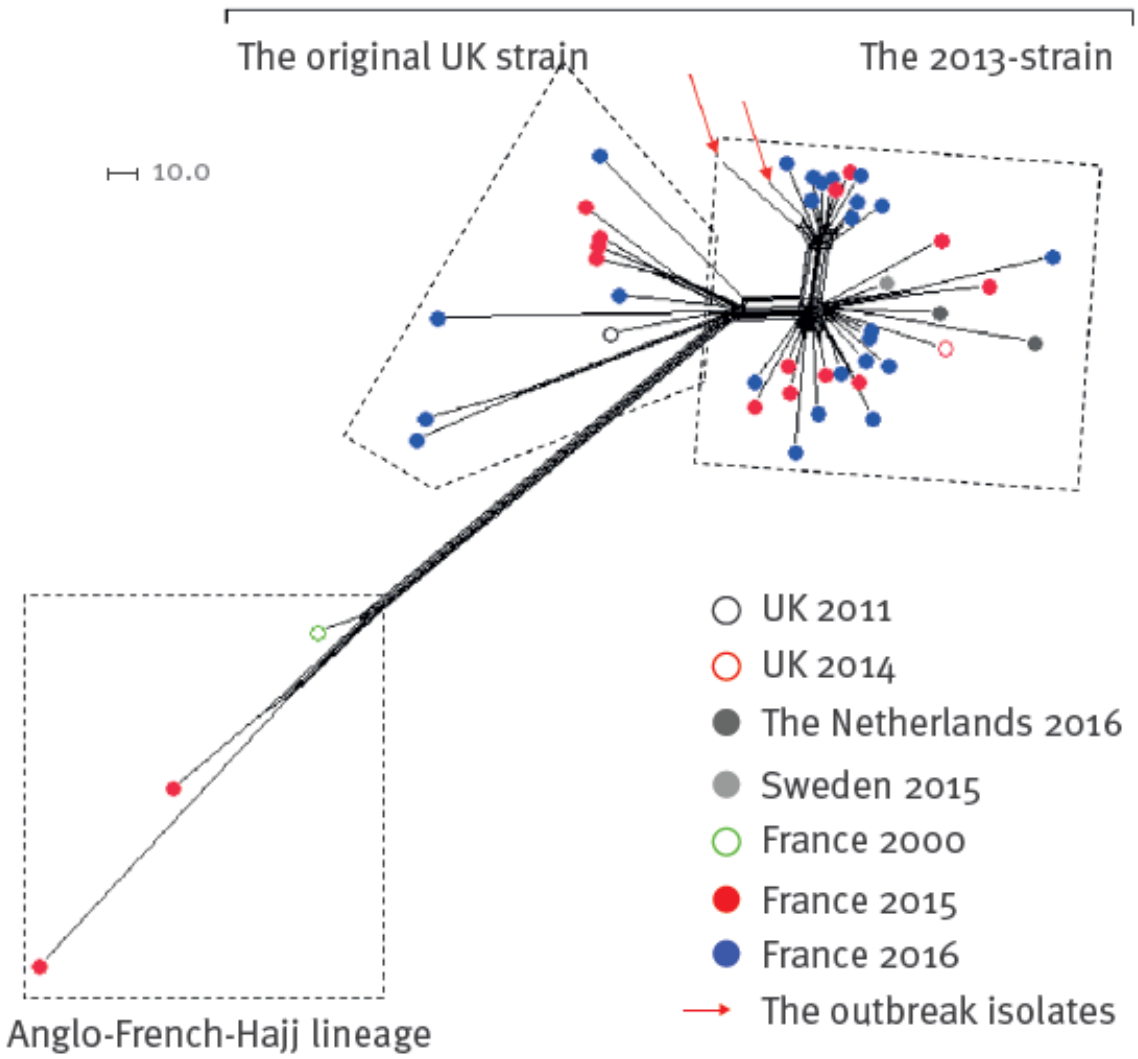
Mustapha M. Mustapha, Jane W. Marsh, Lee H. Harrison*



Vaccine 34 (2016) 1515–1523

FIGURE

Phylogenetic network of group W/clonal complex (cc)11 isolates, France, 2015–2016 (n = 47)



RAPID COMMUI

Presenta
case fata
disease
January

high
ccal
to

H Campbell [1], SR P
1. Immunisation D
2. Meningococcal
3. St. George's Uni

Correspondence: S

Citation style for this ar
Campbell H, Parikh SR,
W meningococcal diseas
ES.2016.21.12.30175

associated with group
g/10.2807/1560-7917.

hed on 24 March 2016

RAPID COMMUNICATIONS

A cluster of invasive meningococcal disease (IMD) caused by *Neisseria meningitidis* serogroup W among university students, France, February to May 2017

C Bassi [1], M Taha [2], C Merle [3], E Hong [2], D Lévy-Bruhl [4], A Barret [4 5], I Mounchetrou Njoya [1 5]

1. Santé publique France, French National Public Health Agency, Regional Unit (Cire) Ile-de-France, Paris, France
2. National Reference Centre for Meningococci and Haemophilus influenzae, Institut Pasteur, Paris, France
3. Regional Health Agency in the Ile-de-France region (Agence régionale de santé d'Ile-de-France), Paris, France
4. Santé publique France, French National Public Health Agency, Saint-Maurice, France
5. These authors contributed equally to this work.

Correspondence: Clément Bassi (clement.bassi@ars.sante.fr)

Citation style for this article:
Bassi C, Taha M, Merle C, Hong E, Lévy-Bruhl D, Barret A, Mounchetrou Njoya I. A cluster of invasive meningococcal disease (IMD) caused by Neisseria meningitidis serogroup W among university students, France, February to May 2017. Euro Surveill. 2017;22(28):pii=30574. DOI: http://dx.doi.org/10.2807/1560-7917.ES.2017.22.28.30574

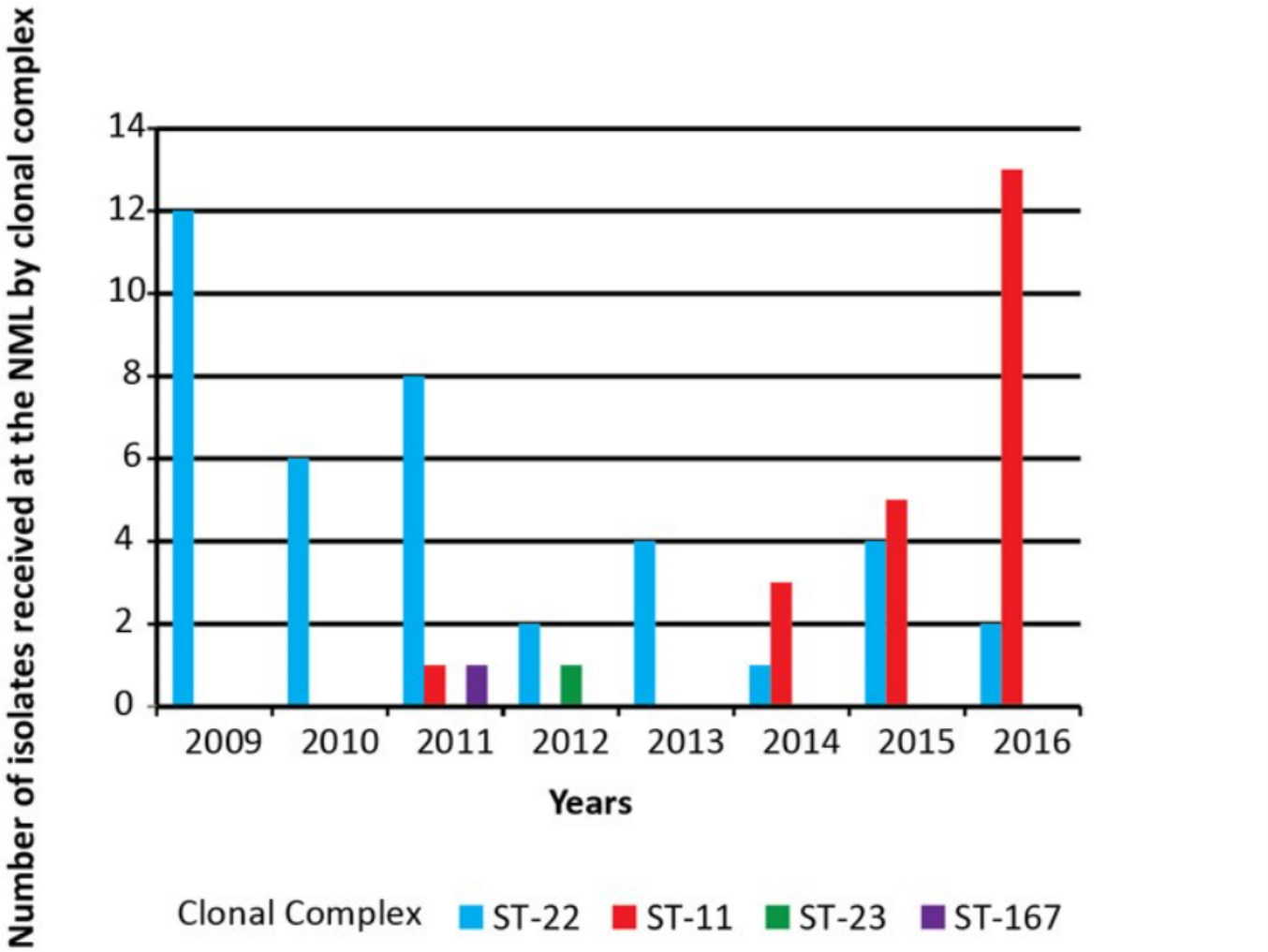
HOLLANDA

- 2015 yılına kadar yılda 4-5 olgu
  2016 ve 2017 yıllarında 50 olgu
- %93 olgu yeni Serogrup W- cc11 (UK-2013 strain)
- Septisemi ve pnömoni en sık başvuru şekli
- 1 yaş altı olgu az, daha çok genç erişkin ve yaşlılarda

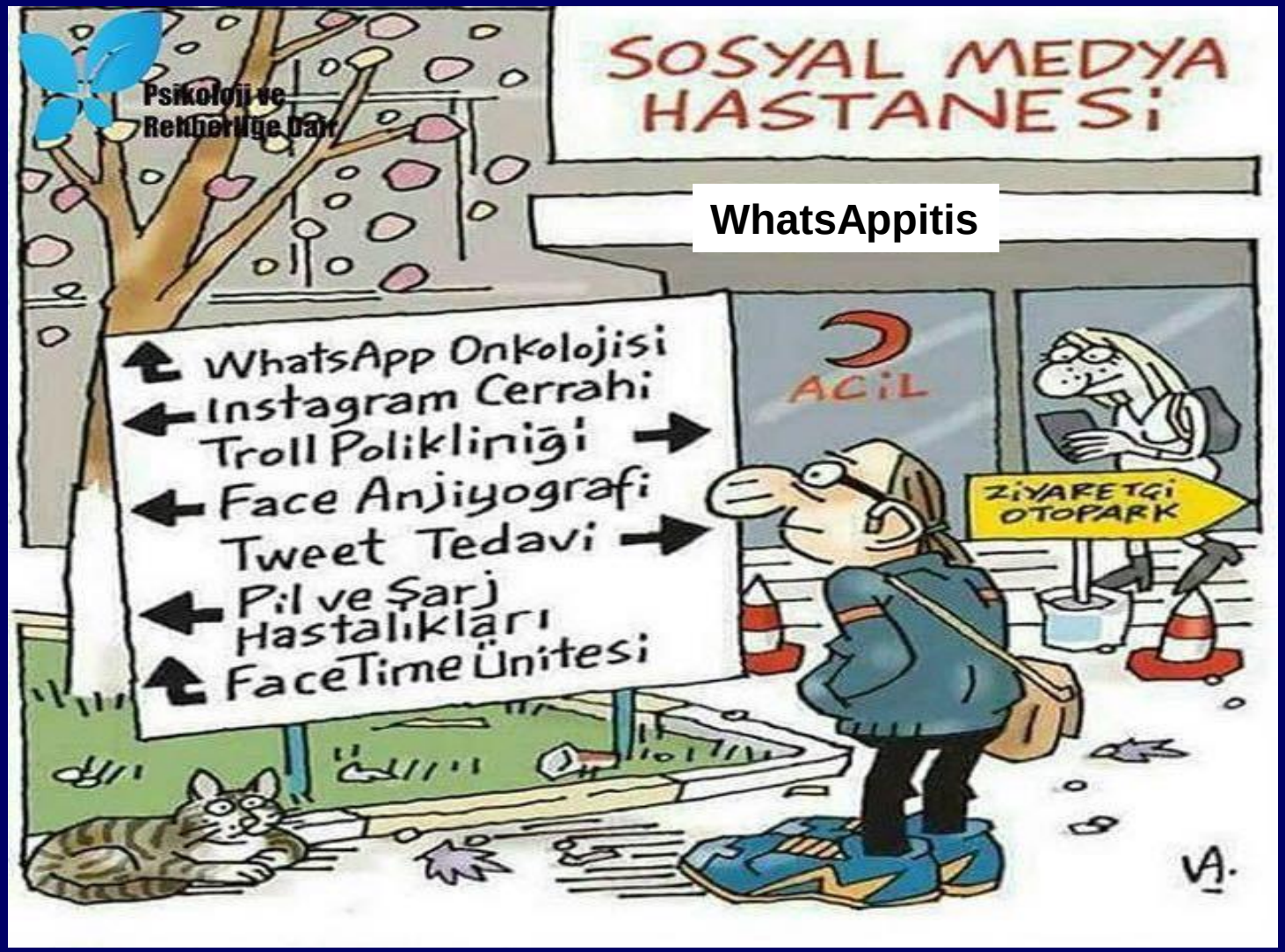
İSPANYA

- 2016-2017'de tüm yaş gruplarında
- W sıklığı 2 kat artmış
- Yeni olguların tamamı cc11 (UK-2013 strain)

Figure 1: Clonal analysis of invasive *Neisseria meningitidis* serogroup W (MenW) in Canada, 2009-2016

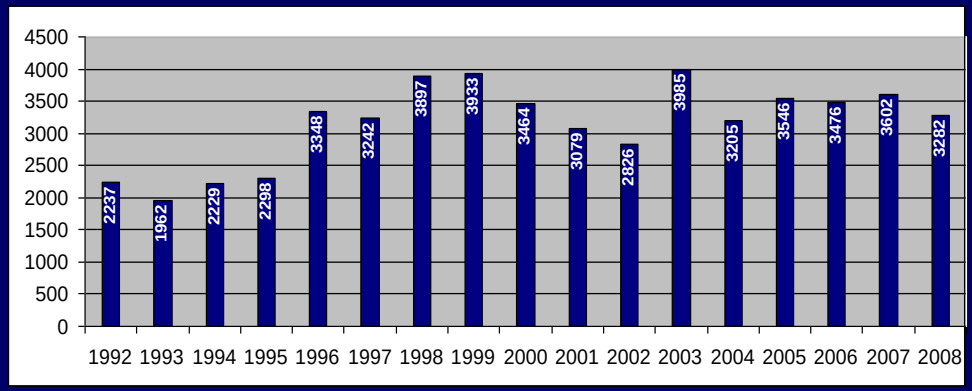


Türkiye’de IMH epidemiyolojisi



Türkiye’de IMH epidemiyolojisi

Türkiye'de IMH epidemiyolojisi



TÜİK verilerine göre yıllık meningokokal enfeksiyon kaynaklı ölümler, 1992-2008

Tablo 8.5 Bildirilen Bebek Ölüm Nedenleri, Türkiye, Sağlık Bakanlığı

Neden	2007	2008	Toplam	%'si
Prematüre Doğum	4964	3988	8952	%31
Doğum Anomalisi	2752	2164	4916	%17
Sepsis	1282	1568	2850	%10
Kalp Hastalığı	1461	917	2378	%8
Perinatal Asfiksi	929	903	1832	%6
Akut Solunum Yolu Enfeksiyonu	651	316	967	%3
Doğum Travması	251	97	348	%1
İshal	126	83	209	%1
Kaza	80	94	174	%1
Intravasküler Hemoraj	30	78	108	<%1
Menenjit	50	48	98	<%1
Malignansi	72	18	90	<%1
Yenidoğan tetanosu	0	7	7	<%1
Özel Durumlar	1102	672	1774	%6
Diğer	1425	2753	4178	%15
Toplam	15175	13706	28881	%100.0

Kaynak: Sağlık Bakanlığı, Bebek Ölümleri – 2009

Meningokok hastalığı kaynaklı ölümler (1992-2009)

- **TC Sağlık Bakanlığı → 49-151**
- **Türkiye İstatistik Kurumu (TÜİK) → 1982-3985**

Türkiye'de IMH epidemiyolojisi

World Health Organization

Countries with moderate endemic rates (2 - 10 cases/100,000 population year)

Country	Year	Incidence/ 100, 000 population	Predominant serogroup	Source	Comments
Switzerland	1999-2004	1.16-2.36	C	[24]	A conjugate vaccine for group C introduced in 2005
Turkey	1997-2005	0.3-2.2	*	[28]	

DSÖ'ne göre Türkiye ORTA endemisite kategorisinde bir ülkedir.

* WHO position paper November 2011-11-28

Türkiye menenjit sürveyansı

A Prospective Study of Etiology of Childhood Acute Bacterial Meningitis, Turkey

Mehmet Ceyhan,* Inci Yildirim,* Paul Balmer,† Ray Borrow,† Bunyamin Dikici,‡ Mehmet Turgut,§ Nese Kurt,§ Aysel Aydogan,¶ Cigdem Ecevit,¶ Yasar Anlar,# Ozlem Gulumser,# Gonul Tanir,** Nuran Salman,†† Nezahat Gurler,†† Nevin Hatipoglu,†† Mustafa Hacimustafaoglu,‡‡ Solmaz Celebi,‡‡ Yavuz Coskun,§§ Emre Alhan,¶¶ Umit Celik,¶¶ Yildiz Camcioglu,†† Gulten Secmeer,* Deniz Gur,## and Steve Gray†

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 14, No. 7, July 2008

Türkiye menenjit sürveyansı

RESEARCH PAPER

Human Vaccines & Immunotherapeutics 10:09, 1–7; October 1, 2014; © 2014 Taylor & Francis Group, LLC

Meningitis Caused By Neisseria Meningitidis, Hemophilus Influenzae Type B and Streptococcus Pneumoniae During 2005–2012 in Turkey

A Multicenter Prospective Surveillance Study

Mehmet Ceyhan[1,†], Nezahat Gürler[2,†], Yasemin Ozsurekci[1,†,*], Melike Keser[3,†], Ahmet Emre Aycan[1,†], Venhar Gurbuz[1,†], Nuran Salman[4,†], Yildiz Camcioglu[5,†], Ener Cagri Dinleyici[6,†], Sengul Ozkan[7,†], Gulnar Sensoy[8], Nursen Belet[8,†], Emre Alhan[9], Mustafa Hacimustafaoglu[10,†], Solmaz Celebi[10,†], Hakan Uzun[11,†], Ahmet Faik Oner[12,†], Zafer Kurugol[13,†], Mehmet Ali Tas[14,†], Denizmen Aygun[15,†], Eda Karadag Oncel[1,†], Melda Celik[1,†], Olcay Yasa[16,†], Fatih Akin[17,†], and Yavuz Coşkun[18,†]

Türkiye menenjit sürveyansı

HUMAN VACCINES & IMMUNOTHERAPEUTICS
2016, VOL. 0, NO. 0, 1–6
http://dx.doi.org/10.1080/21645515.2016.1209278

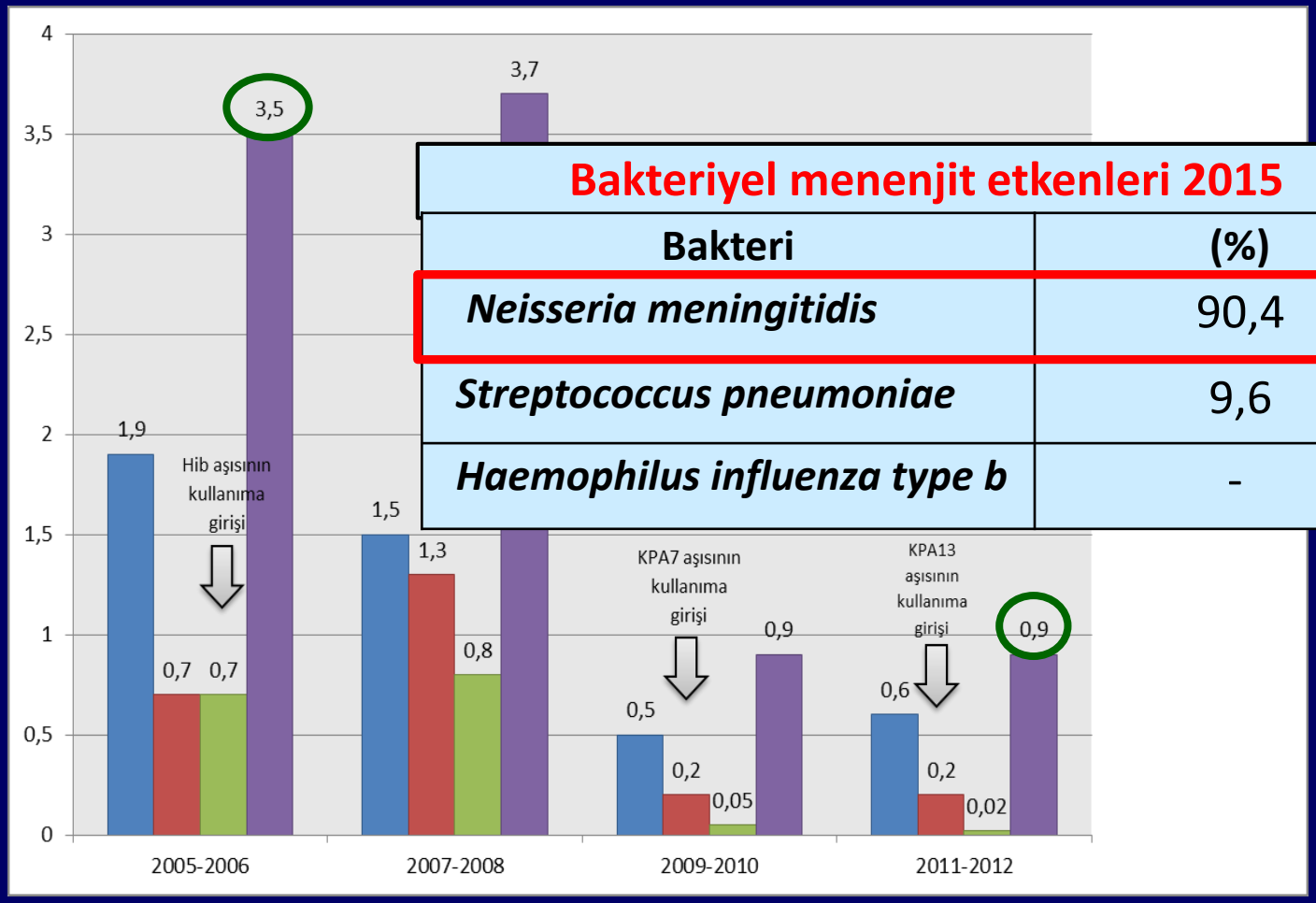
Taylor & Francis
Taylor & Francis Group

RESEARCH PAPER

Bacterial agents causing meningitis during 2013–2014 in Turkey: A multi-center hospital-based prospective surveillance study

Mehmet Ceyhan[a,#], Yasemin Ozsurekci[a,#], Nezahat Gürler[b,#], Eda Karadag Oncel[a,#], Yıldız Camcioglu[c,#], Nuran Salman[d,#], Melda Celik[e,#], Melike Keser Emiroglu[f,#], Fatih Akin[g,#], Hasan Tezer[h,#], Aslinur Ozkaya Parlakay[i,#], Nilden Tuygun[j,#], Diyar Tamburaci[k,#], Ener Cagri Dinleyici[l,#], Adem Karbuz[m,#], Ünal Uluca[n,#], Emre Alhan[o,#], Ümmühan Çay[o,#], Zafer Kurugol[p,#], Nevin Hatipoğlu[q,#], Rengin Şiraneci[q,#], Tolga İnce[r,#], Gülnar Sensoy[s,#], Nursen Belet[s,#], Enes Coskun[t,#], Fatih Yilmaz[t,#], Mustafa Hacimustafaoglu[u,#], Solmaz Celebi[u,#], Ümit Celik[v,#], Metehan Ozen[w,#], Aybüke Akaslan[w,#], İlker Devrim[x,#], Necdet Kuyucu[y,#], Fatmanur Öz[z,#], Sefika Elmas Bozdemir[aa,#], and Ahu Kara[x,#]

Türkiye menenjit sürveyansı

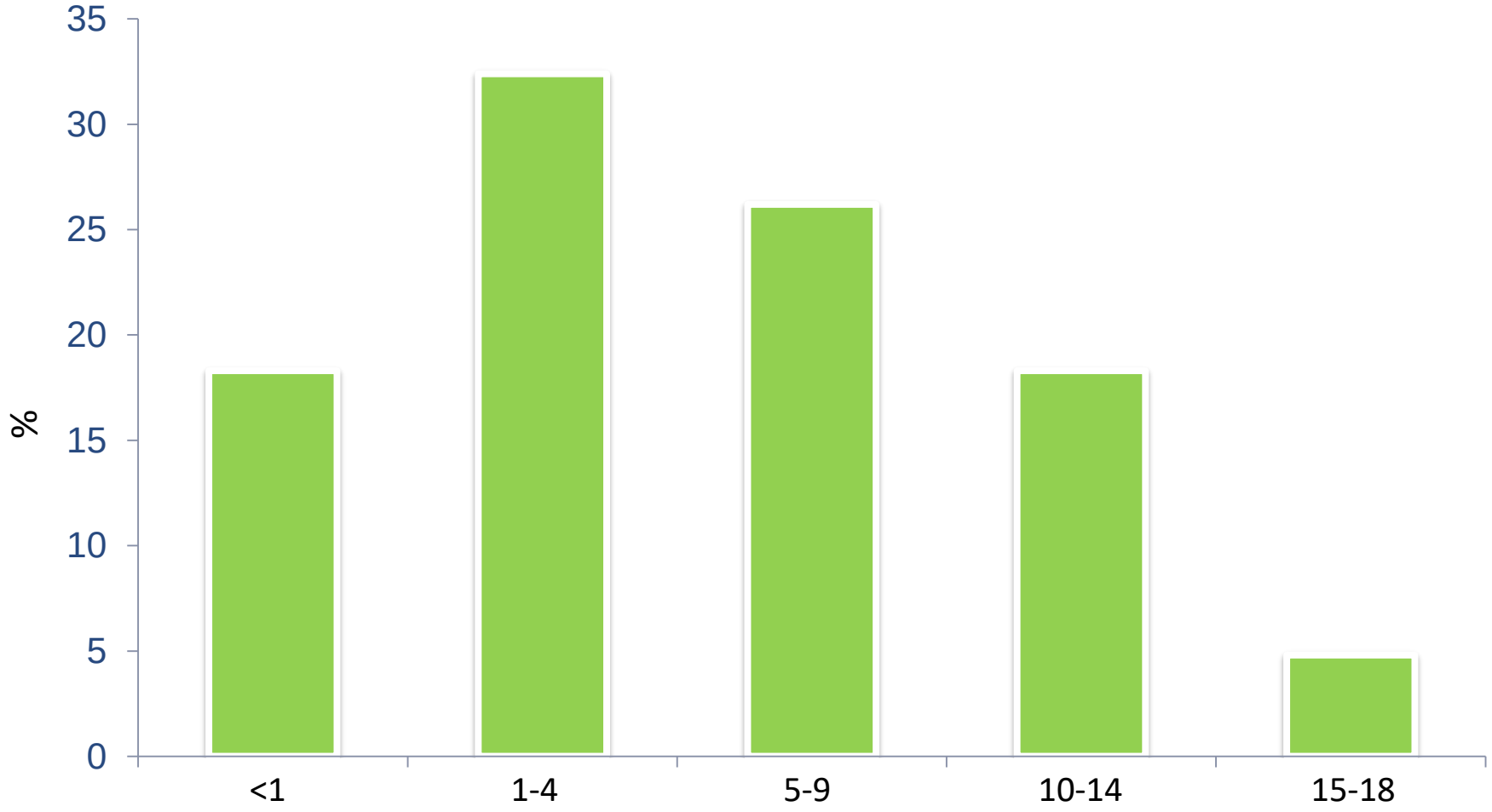


Bakteriyel menenjit etkenleri 2015

Bakteri	(%)
Neisseria meningitidis	90,4
Streptococcus pneumoniae	9,6
Haemophilus influenza type b	-

Ceyhan M, et al. Hum Vaccin Immunother 2014; 10:9, 2706-12.

İMH vakalarının yaşa göre dağılımı Türkiye (2005-2012)



Ceyhan *et al.,* Human Vaccines & Immunotherapeutics 10:9, 2706-12; September 2014

İMH vakalarının yaş dağılımı - Türkiye

Ref. No.	N	Olgu klinik dağılımı		Olgu yaş dağılımı		Mortalite	Bölgesi
		Meningokoksemi (%)	Menenjit (%)	0-5 yaş	6-17 yaş		
Akyıldız	65	% 46,1	%30,7	% 81	% 19	%18,44	Istanbul
	83	%73,49	%26,51	% 66	% 44	%15,60	Erzurum
Elmastaş	41	%21,9	%48,8	% 66	% 44	Bilinmiyor	İzmir
Ersoy	85	%30,59	%20	Bilinmiyor	Bilinmiyor	%18,82	İzmir
Özdal	143	-	-	%71		%17	Diyarbakır
Kepenekli	7	%42	% 57	% 90	% 10	Bilinmiyor	Ankara
Kulcu	16	%87,50	%12,5	% 93	% 7	%43,75	Istanbul
Tüysüz	140	%78	%22	% 60	% 40	%8,62	Istanbul

Meningokok olgularının ortalama %74'ü 0-5 yaş arasındadır.

Adölesan piki görülmez.

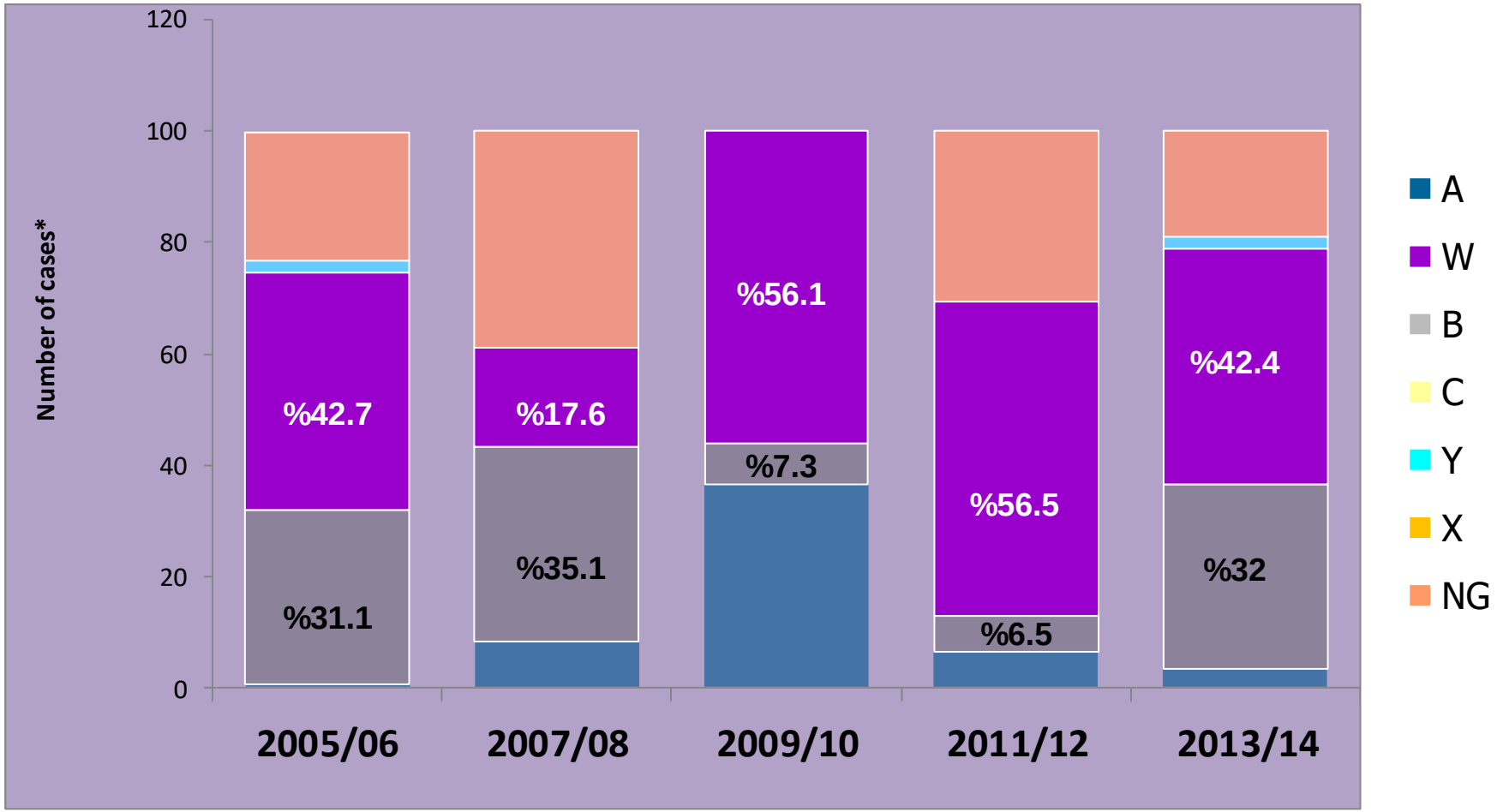
Bakır M, et al. Expert Rev Vaccines. 2015 Aug;14:1089-97.

Meningokok Serogrup Dağılımı (Türkiye, 1974-2014)

Yazar	Yıllar	Bölge	Serogrup Dağılımı, N (%)							
			A	B	C	W	Y	X	NG	Toplam
Berkman	1974-1979	Ankara	33 (%29)	53 (%46)	29 (%25)	0 (%0)	0 (%0)	0 (%0)	0 (%0)	115
Berkman	1980-1984	Ankara	8 (%32)	13 (%52)	4 (%16)	0 (%0)	0 (%0)	0 (%0)	0 (%0)	25
Tuncer	1987	Ankara	-	4 (%5)	36 (%95)	0 (%0)	0 (%0)	0 (%0)	0 (%0)	
Elmastaş	1990-1994	İzmir	1 (%2)	4 (%10)	36 (%88)	0 (%0)	0 (%0)	0 (%0)	0 (%0)	41
Ceyhan	2005-2006	Türkiye	%0.7	%31.1	0	%42.7	%2.2	0	%23.2	243
Toprak	2006-2009	Türkiye	1 (%2)	29 (%62)	2 (%4)	1 (%2)	0	1 (%2)	13 (%19)	47
Ceyhan	2005-2014	Türkiye	28 (%8.4)	87 (%26.1)	0	127 (%38.1)	3 (%0.9)	0	88 (%26.4)	333

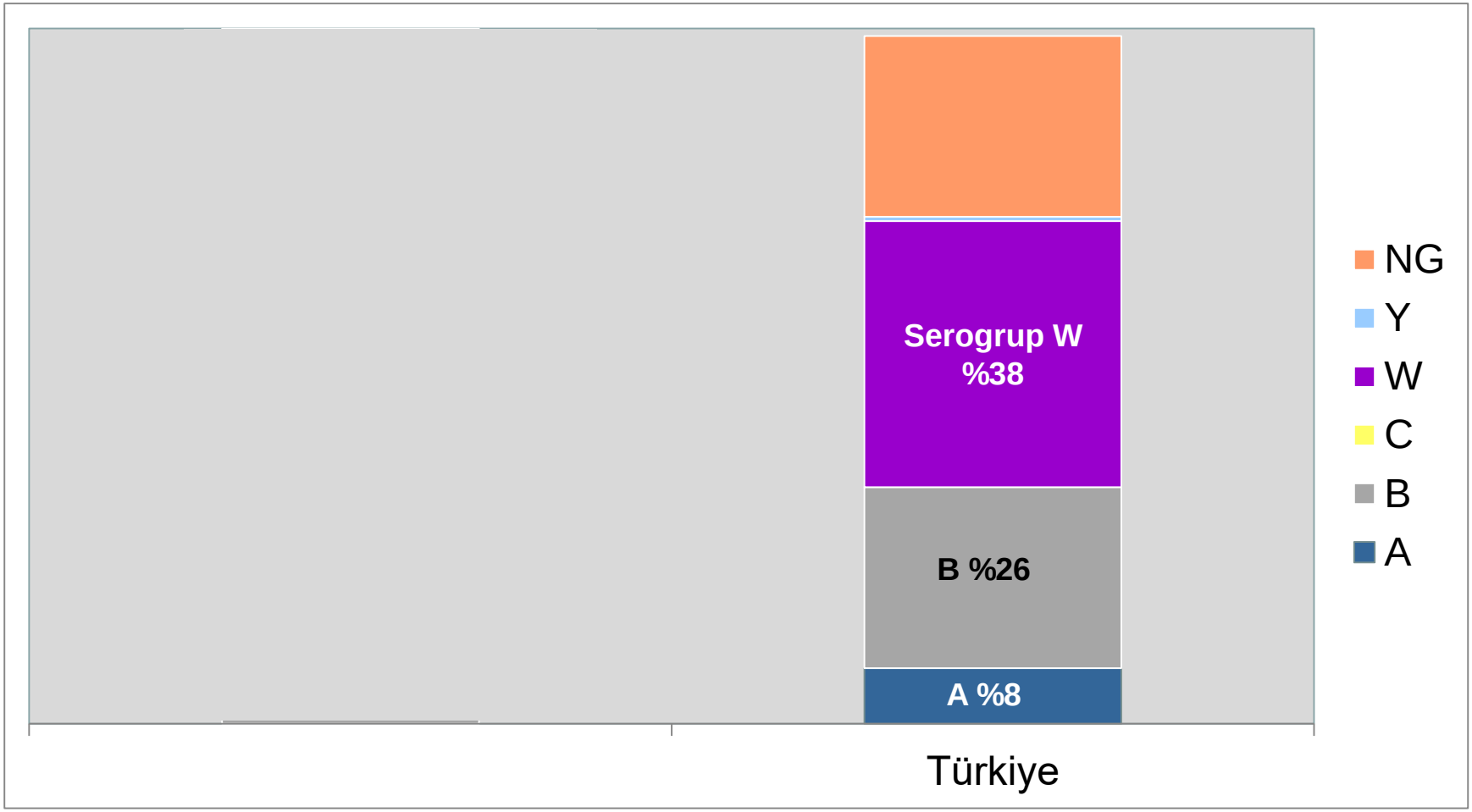
Berkman E, Ozben G. Mikrobiyoloji Bülteni 1982;16:101-106.
Elmastas H, ark. T Klin Pediatri 1992;1:58-61;
Ceyhan M, et al. Emerging Infectious Diseases 2008; 14: 1089-1096.
Toprak D, et al. PIDJ 2014; 33:1087-9.
Ceyhan M, et al. Hum Vaccin Immunother 2014; 10:9, 2706-12.
Bakır M, Altınel S. Expert Rev Vaccines. 2015 Aug;14(8):1089-97.

Meningokok Serogrup Dağılımı (Türkiye, 2005-2014)

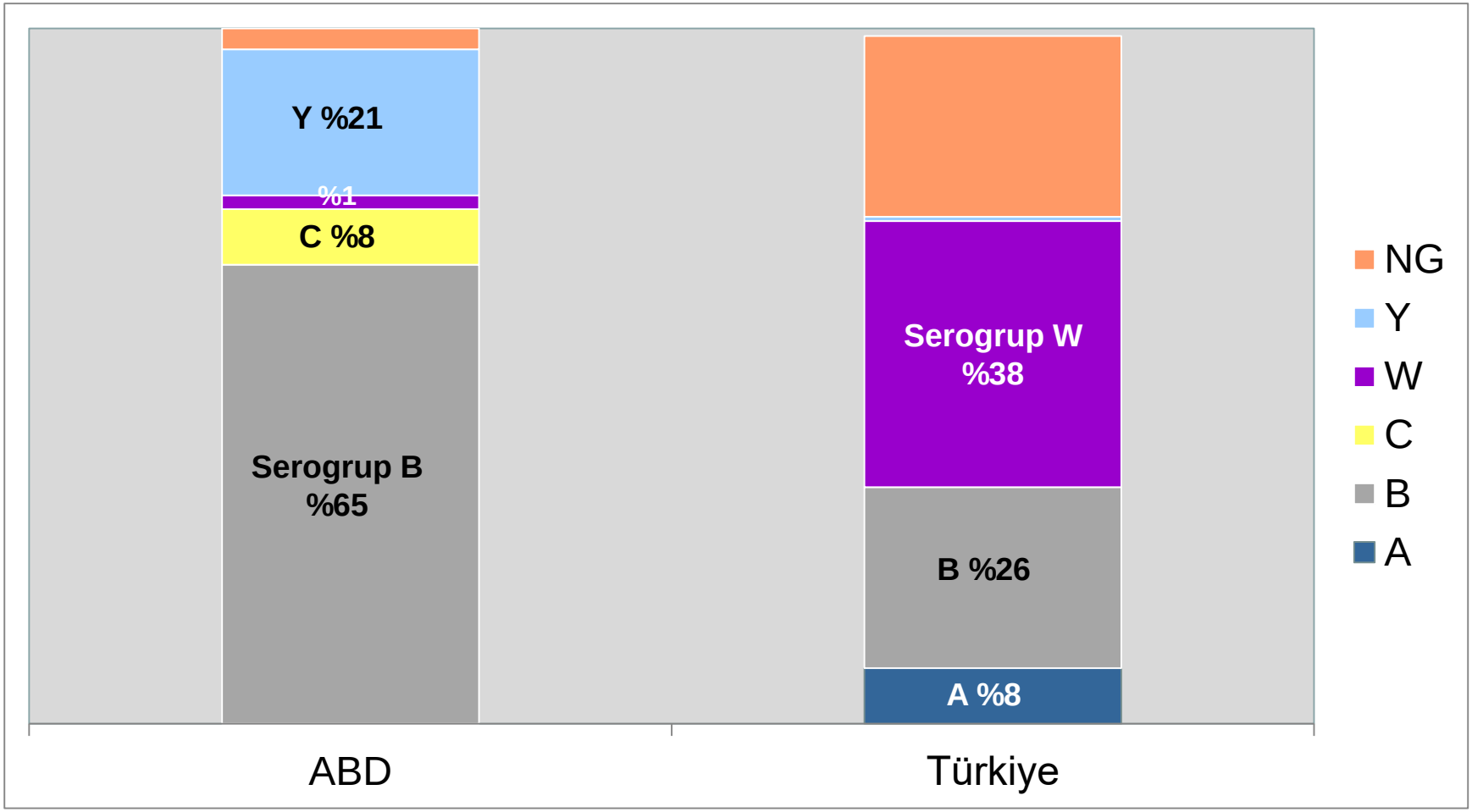


Ceyhan M, et al. Hum Vaccin Immunother 2014;10:2706-12; Ceyhan M,et al. Hum Vaccin Immunother 2016;12(11):2940-5

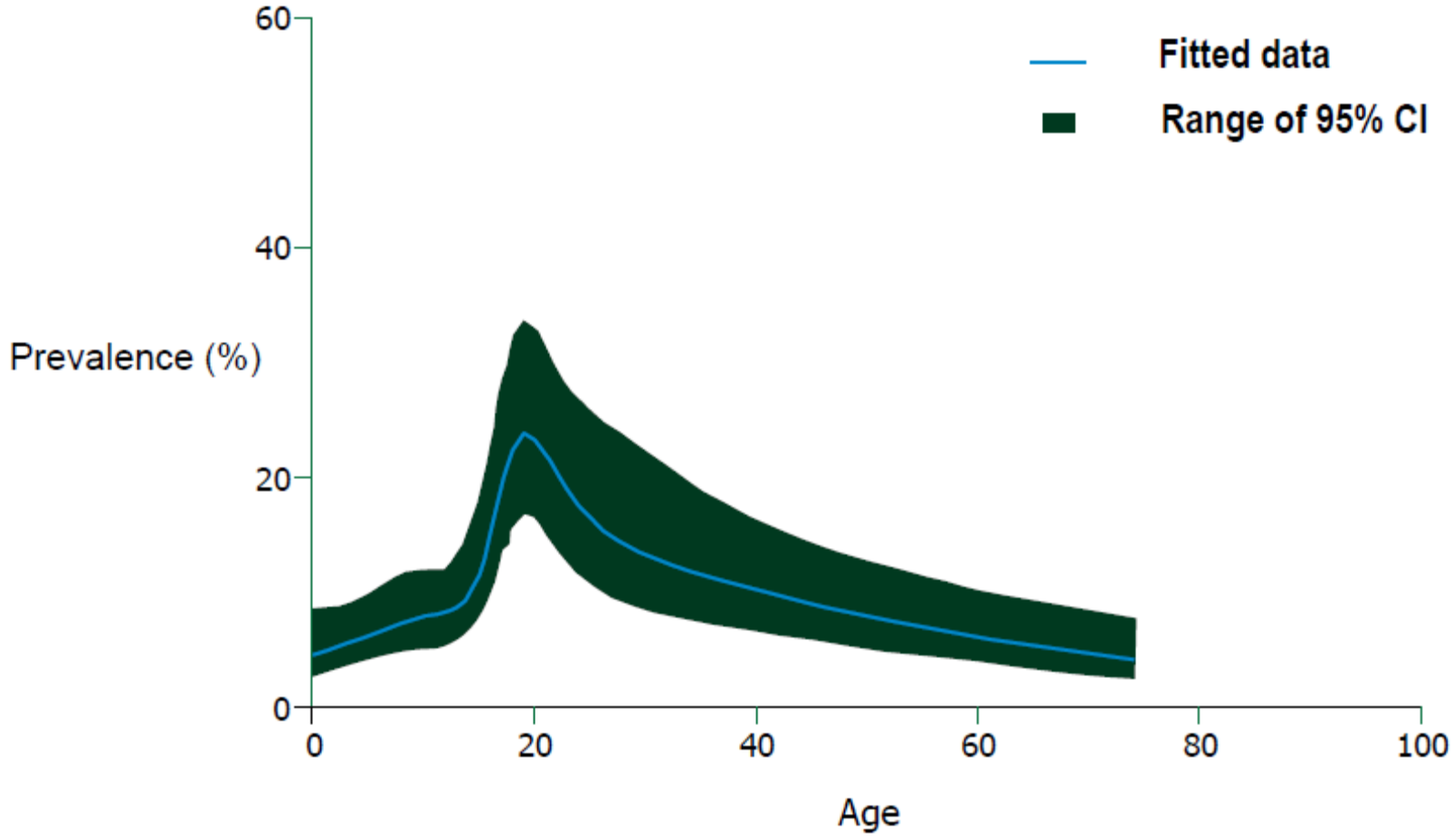
Meningokok Serogrupları (Türkiye, 2005-2014)



Meningokok Serogrupları (Türkiye, 2005-2014)

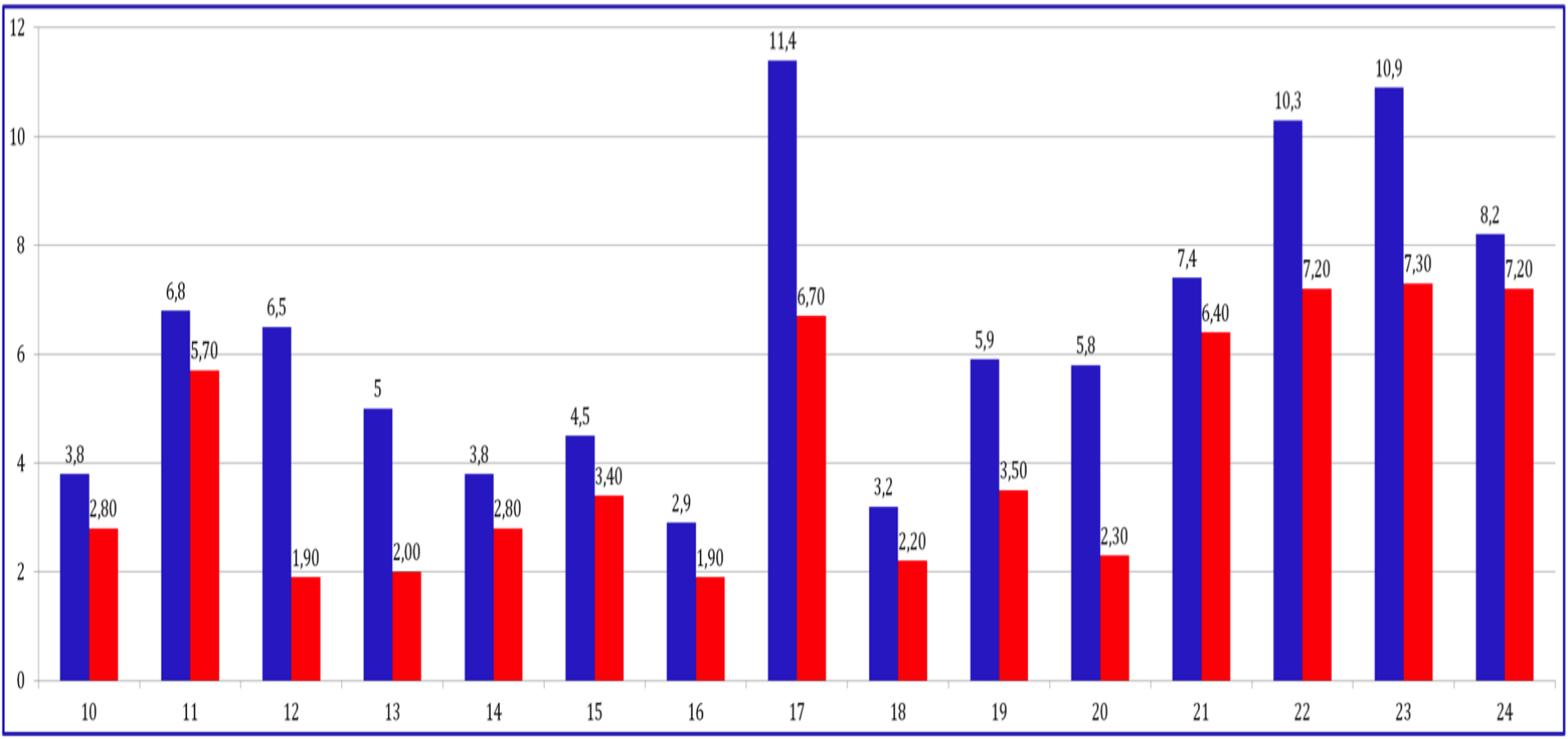


MENİNGOKOK TAŞIYICILIK
28 ÜLKEDEN 89 ÇALIŞMA



Christensen H et al. Lancet Infect Dis. 2010;10:853.

MENİNGOKOK TAŞIYICILIK
TÜRKİYE

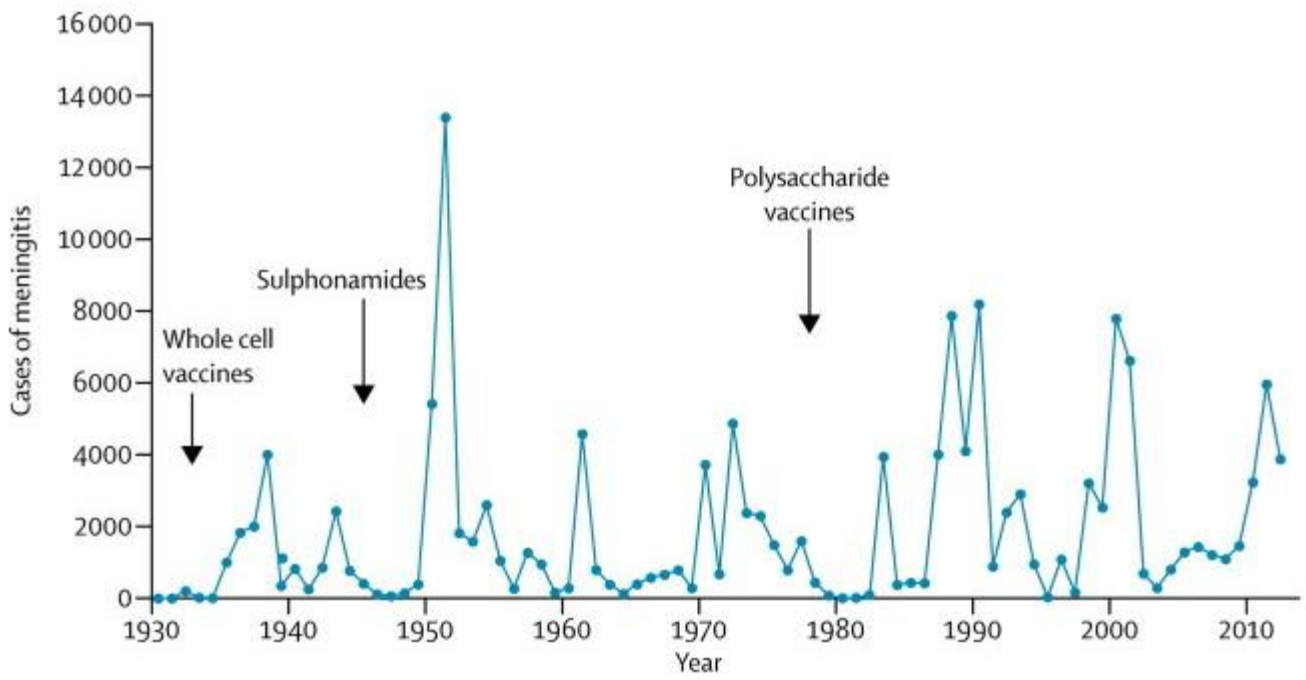


SEROGRUP W (%65.6)

Tekin T, et al. Hum Vaccin Immunother. 2017;13(5):1182-9.

IMH Hastalığı Korunma

IMH Hastalığı Korunma



(updated 27 February 2015)

Table 2: Summary of WHO Position Papers - Recommended Routine Immunizations for Children

Antigen		Doses in	Interval Between Doses	Considerations (see footnotes for details)
Recommendations for all chil				
BCG [1]				ıs HIV
Hepatitis B [2]	Option 1			e and low birth weight ıistration and combination
	Option 2			groups
Polio [3]	OPV + IPV			ı dose sion and importation risk
	IPV / OPV Sequential			ter needed for early schedule dose given <8 weeks)
	IPV			interrupted schedule tion vaccine
DTP [4]				
Haemophilus influenzae type b [5]	Option 1			se if >12 months of age nmended for children > 5 yrs interrupted schedule ıistration and combination
	Option 2			
Pneumococcal (Conjugate) [6]	Option 1			ıptions efore 6 months of age ıistration preterm neonates booster
	Option 2			
Rotavirus [7]	Rotarix			ıptions nmended if > 24 months old
	Rota Teq			
Measles [8]				tion vaccine; HIV early on; Pregnancy
Rubella [9]				and sustain 80% coverage ion vaccine and Co- ation; Pregnancy
HPV [10]				13 year old girls y ≥ 15 years 3 doses immunocompromised

Refer to http://www.who.int/immunization

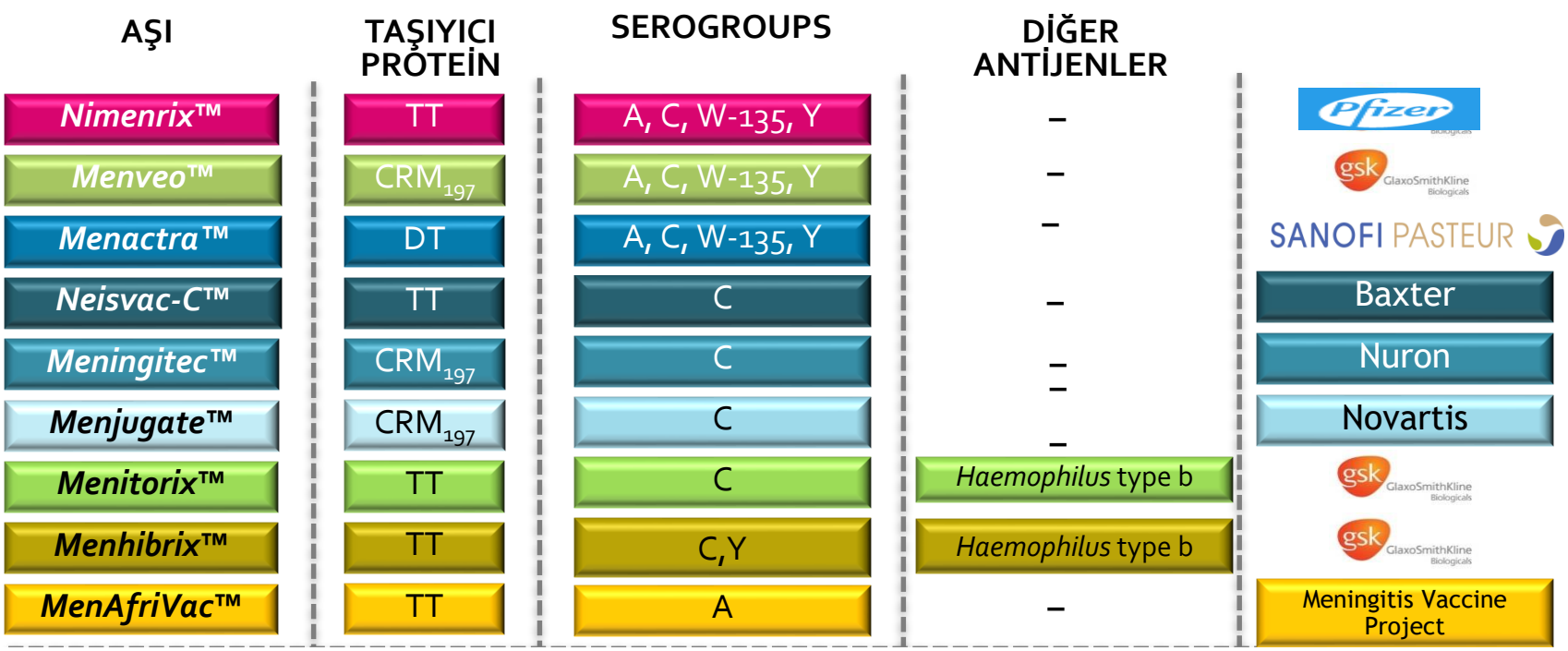
This table summarizes the WHO vaccination

National schedules should be based on loca

[16] Meningococcal

- Position paper reference: Weekly Epid. Record (2011, 86: 521-540) [pdf 1.1Mb] and Update for MenA conjugate Weekly Epid Record (2015, 90: 57-68) [pdf 852KB]
- Conjugate vaccines are preferred over polysaccharide vaccines due to their potential for herd protection and their increased immunogenicity, particularly in children <2 years of age.
- Both conjugate and polysaccharide vaccines are efficacious and safe when used in pregnant women.
- MenA conjugate vaccine (5µg) a 1-dose schedule is recommended at 9-18 months of age based on local programmatic and epidemiologic considerations. The vaccine should be administered by deep intramuscular injection, preferably in the anterolateral aspect of the thigh. There is no reason to expect interference when co-administered with other vaccines. The need for a booster dose has not been established.
- If in a specific context there is a compelling reason to vaccinate infants younger than 9 months, a 2-dose schedule should be used starting at 3 months of age, with an interval of at least 8 weeks between doses.
- For monovalent MenC conjugate vaccine one single intramuscular dose is recommended for children aged >12 months, teenagers and adults. Children 2-11 months require 2 doses administered at an interval of a least 2 months and a booster about 1 year after. If the primary series is interrupted, vaccination should be resumed without repeating the previous dose.
- Quadrivalent conjugate vaccines (A,C,W135,Y-D and A,C,W135,Y-CRM) should be administered as one single intramuscular dose to individuals > 2 years. A,C,W135,Y-D is also licensed for children 9-23 months of age, and given as a 2-dose series, 3 months apart beginning at age 9 months. If the primary series is interrupted, vaccination should be resumed without repeating the previous dose.
- Meningococcal polysaccharide vaccines are less, or not, immunogenic in children under 2 years of age.
- Meningococcal polysaccharide vaccines can be used for those > 2 years of age to control outbreaks in countries where limited economic resources or insufficient supply restrict the use of meningococcal conjugate vaccines. Polysaccharide vaccines should be administered to individuals > 2 years old as one single dose. One booster 3-5 years after the primary dose may be given to persons considered to be a continued high risk of exposure, including some health workers. See position paper for details.

Meningokok Aşıları



Meningokok Aşıları

Hangi aşı

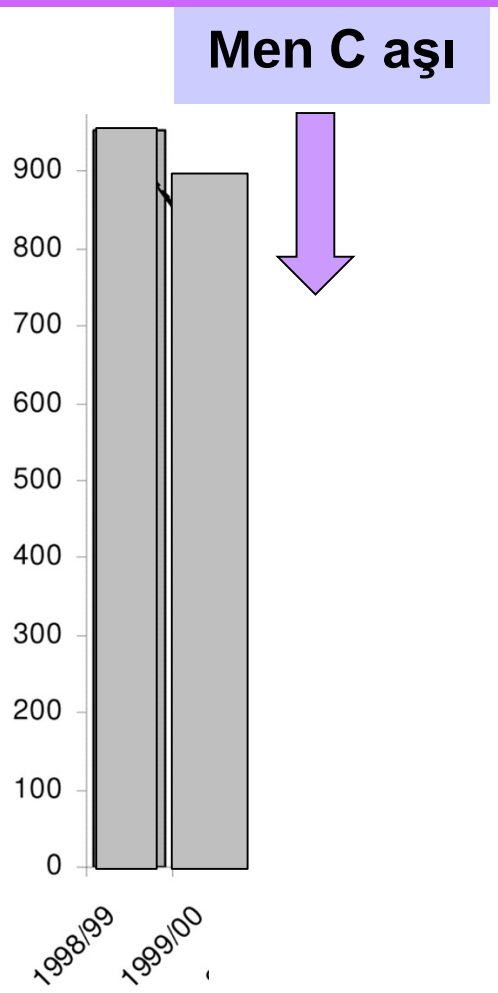
AŞI	TAŞIYICI PROTEİN	SEROGROUPS	DİĞER ANTİJENLER	
Nimenrix™	TT	A, C, W-135, Y	–	Pfizer
Menveo™	CRM_{197}	A, C, W-135, Y	–	GlaxoSmithKline Biologicals
Menactra™	DT	A, C, W-135, Y	–	SANOFI PASTEUR
Neisvac-C™	TT	C	–	Baxter
Meningitec™	CRM_{197}	C	–	Nuron
Menjugate™	CRM_{197}	C	–	Novartis
Menitorix™	TT	C	*Haemophilus* type b	GlaxoSmithKline Biologicals
Menhibrix™	TT	C,Y	*Haemophilus* type b	GlaxoSmithKline Biologicals
MenAfriVac™	TT	A	–	Meningitis Vaccine Project
Bexsero™	–	B	–	GlaxoSmithKline Biologicals
Trumenba®	–	B	–	Pfizer

Bu sorusunun cevabı o ülkede

<u>güncel olarak hangi serogrup (serogruplar)</u>

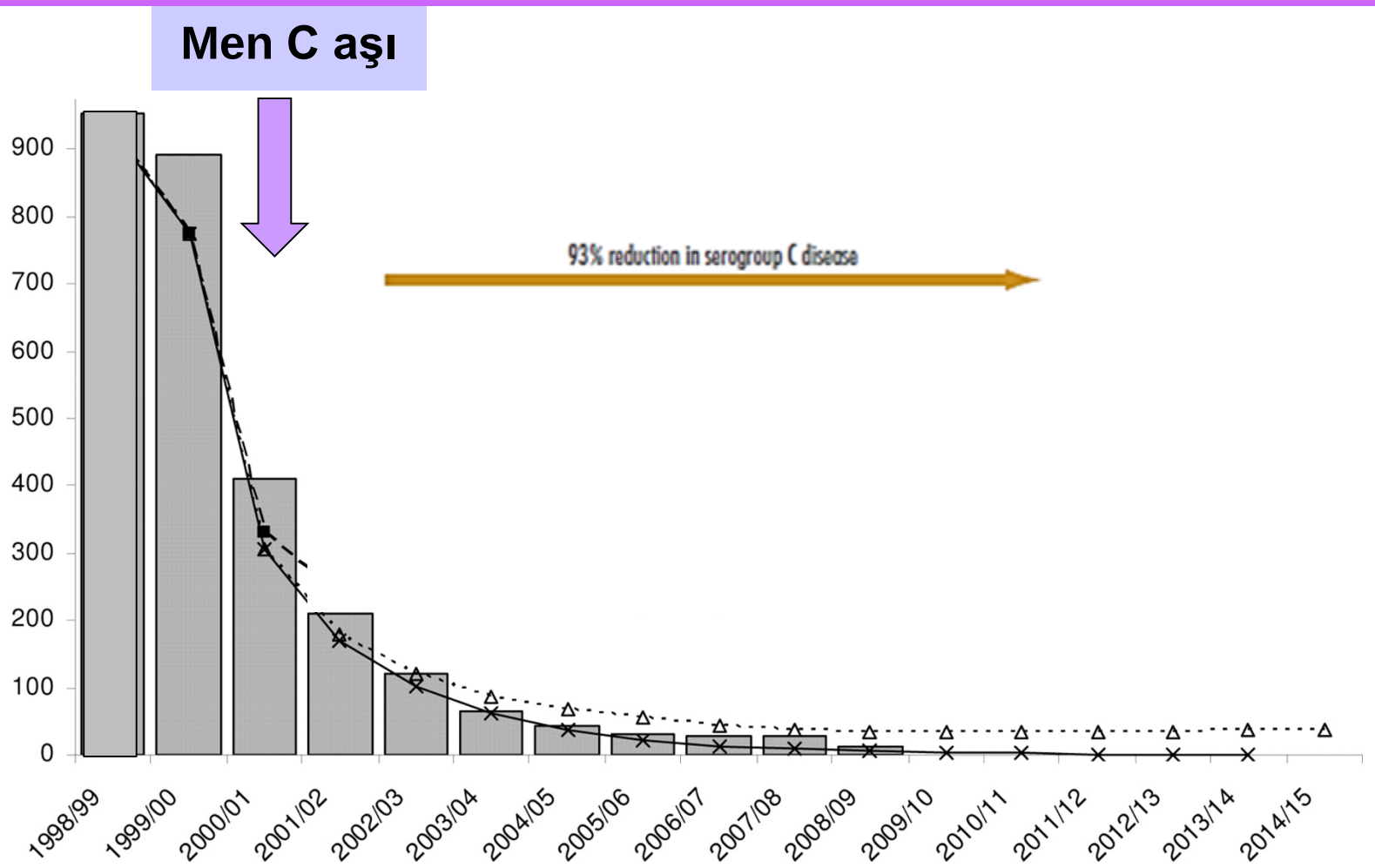
<u>hakimse</u> onu (onları) içeren aşı

MenC aşısı- İNGİLTERE



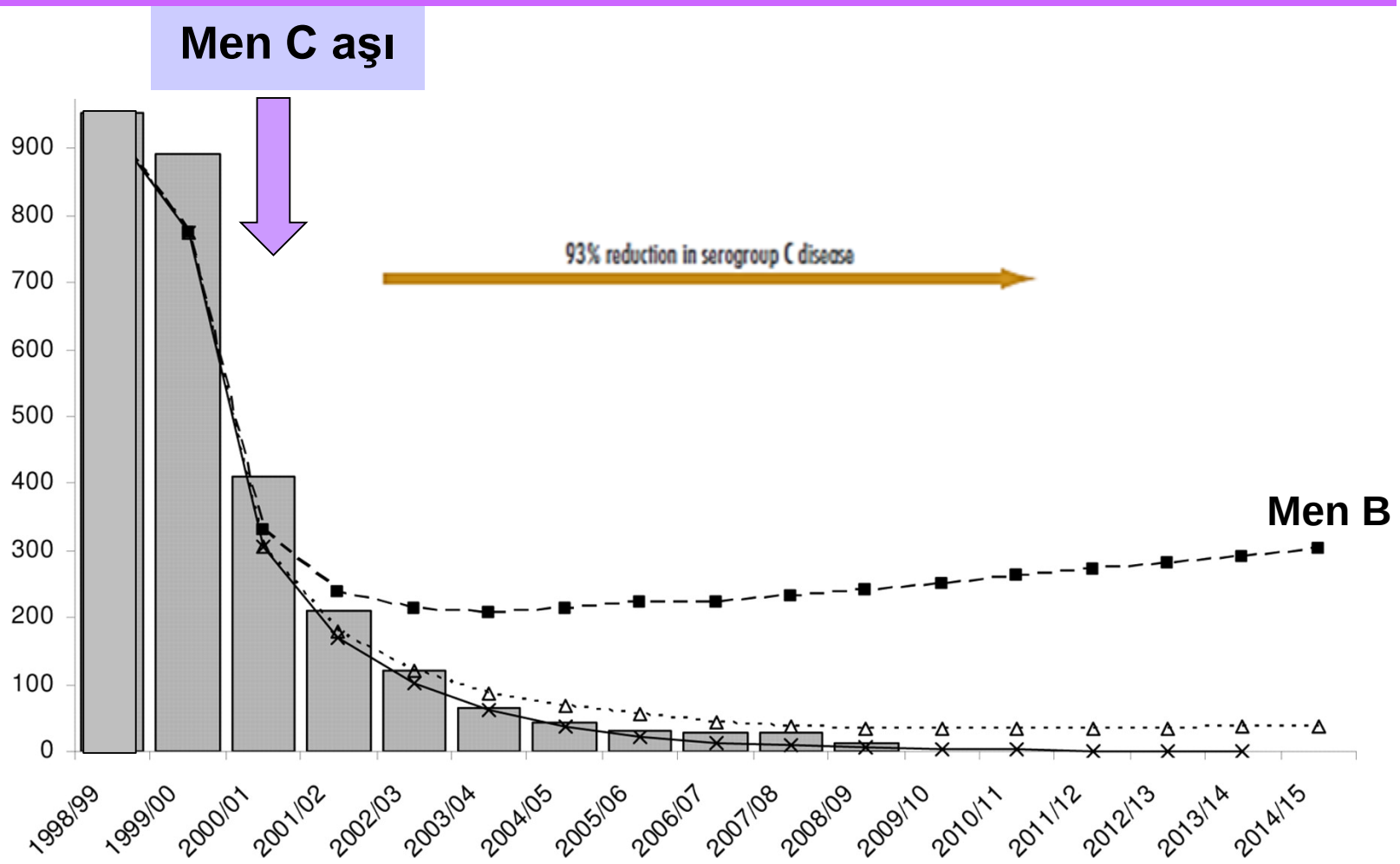
Argante L, et al. BMC Med 2016; 14(1): 98.

MenC aşısı- İNGİLTERE



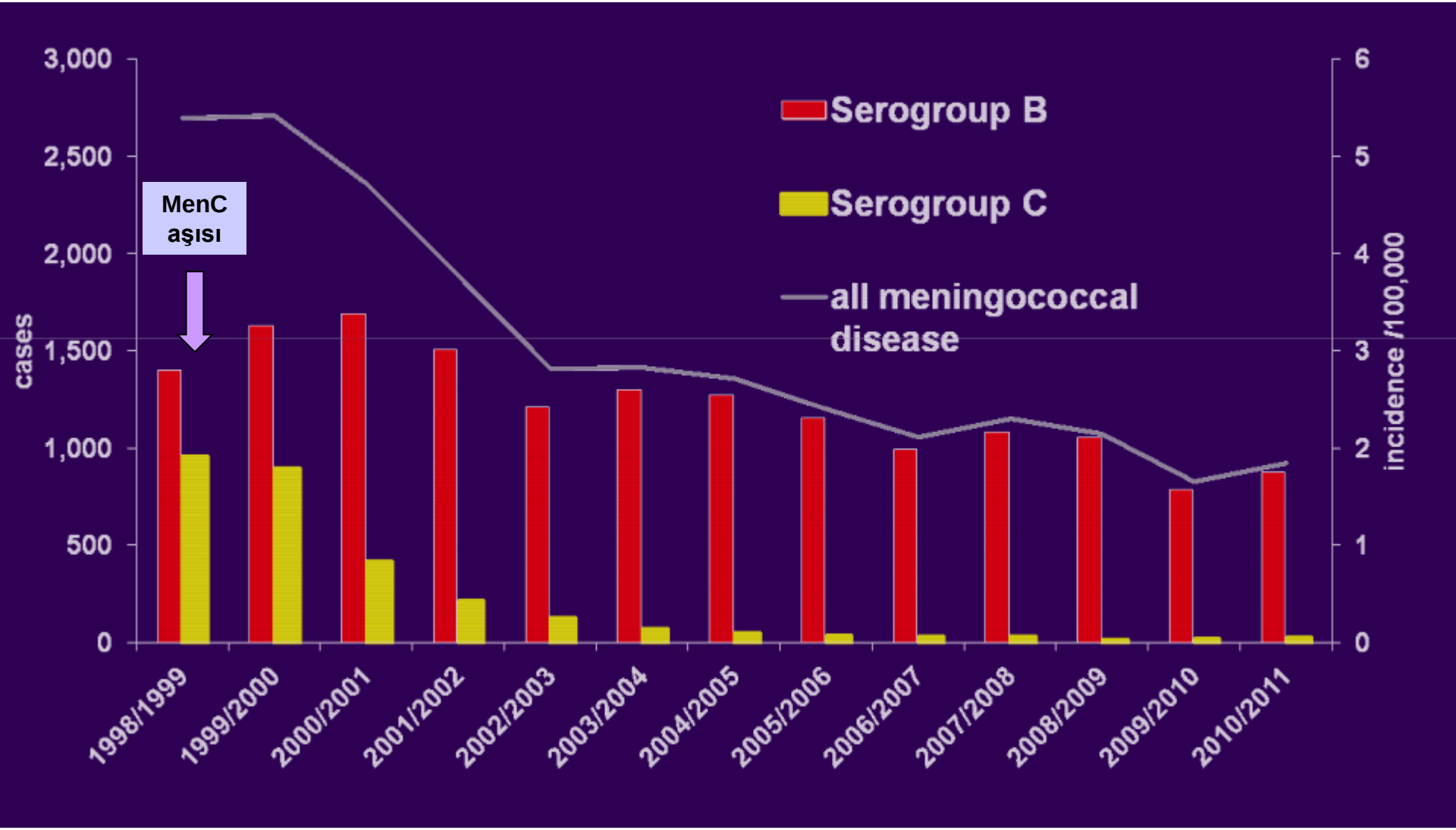
Argante L, et al. BMC Med 2016; 14(1): 98.

MenC aşısı- İNGİLTERE

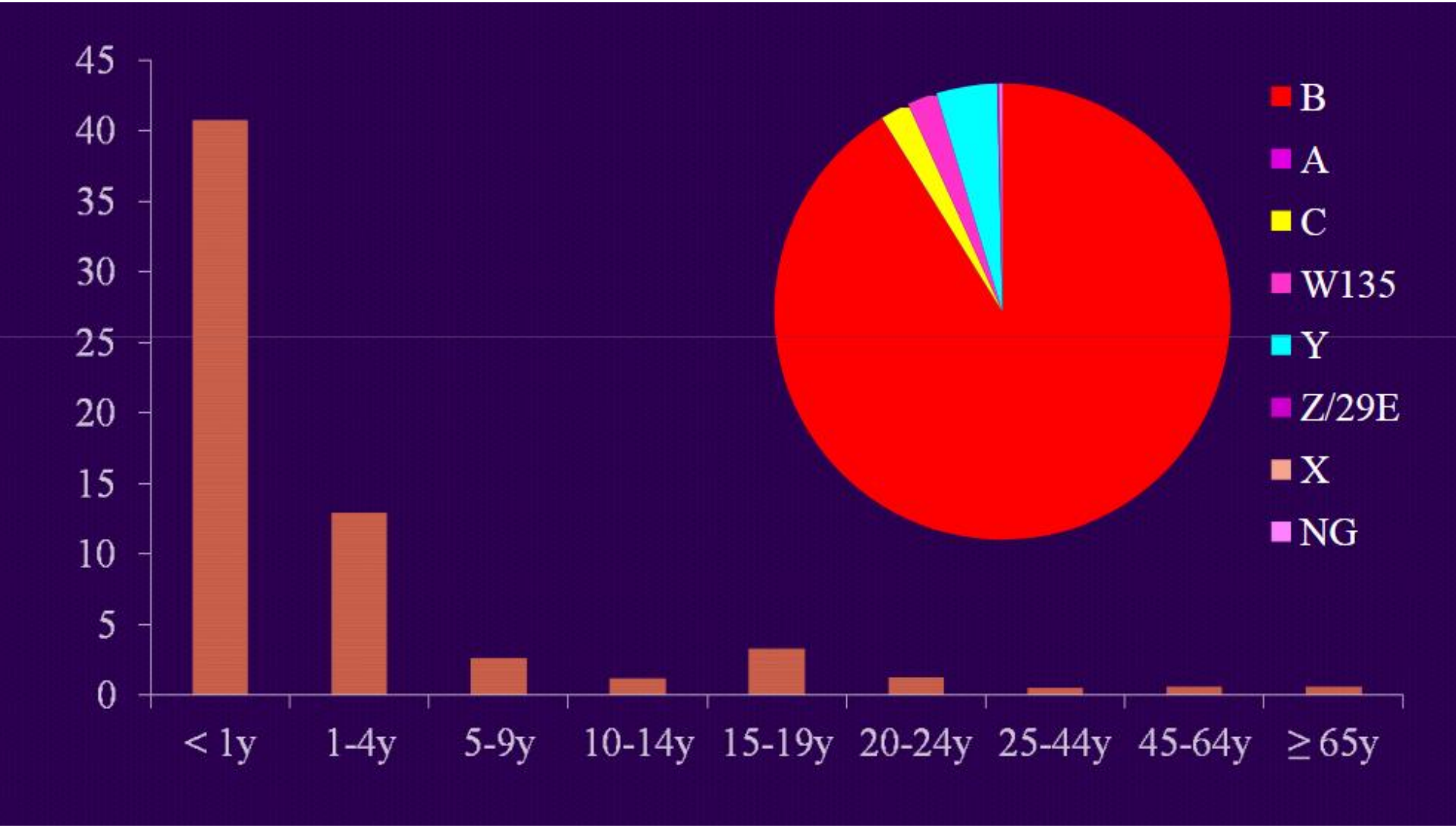


Argante L, et al. BMC Med 2016; 14(1): 98.

İNGİLTERE
IMH serogrup dağılımı



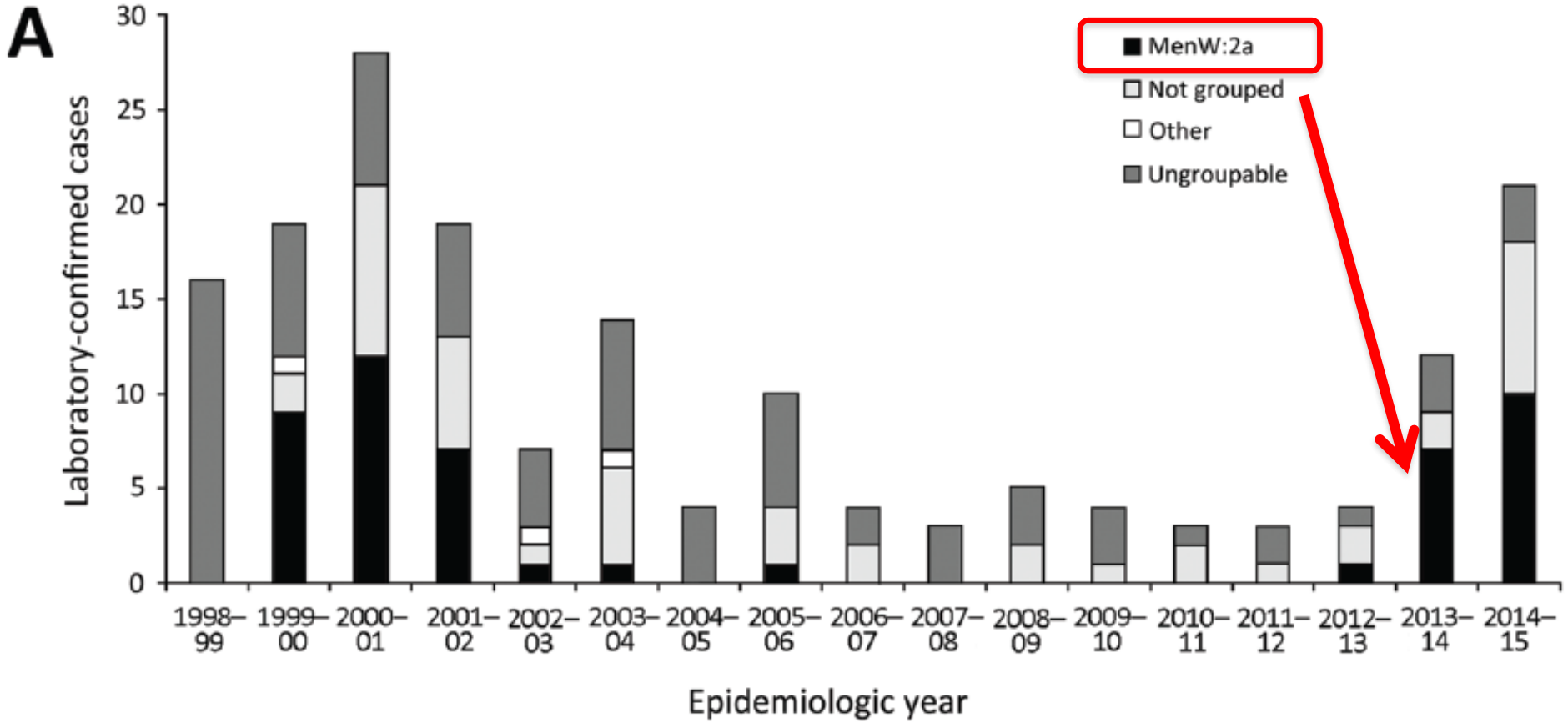
İNGİLTERE
IMH serogrup dağılımı



UK 2015 Immunisation Schedule

AGE	Immunisation (Vaccine Given)
2 months	• **DTaP/IPV(polio)/Hib** (diphtheria, tetanus, pertussis (whooping cough), polio, and *Haemophilus influenzae* type b) - 5-in-one injection (Pediacel® or Infanrix IPV Hib®); plus: • **PCV** (pneumococcal conjugate vaccine) - in a separate injection (Prevenar 13®). • **Rotavirus** (Rotarix®) - oral route (drops). • **Meningitis B** (Bexsero®).
3 months	• **DTaP/IPV(polio)/Hib** 5-in-one injection, 2nd dose (Pediacel® or Infanrix IPV Hib®); plus: • **Rotavirus** (Rotarix®) - oral route (drops).
4 months	• **DTaP/IPV(polio)/Hib** 5-in-one injection, 3rd dose (Pediacel® or Infanrix IPV Hib®); plus: • **PCV** 2nd dose (Prevenar 13®) - in a separate injection. • **Meningitis B** 2nd dose (Bexsero®).
Between 12 and 13 months	• **Hib/MenC** (combined as one injection) - 4th dose of Hib and 1st dose of MenC (Menitorix®); plus: • **MMR** (measles, mumps and rubella) - combined as one injection (Priorix® or M-M-RVAXPRO®); plus: • **PCV** 3rd dose (Prevenar 13®) - in a separate injection. • **Meningitis B** 3rd dose (Bexsero®).

Meningococcal Group W Disease in Infants and Potential Prevention by Vaccination



Parikh SR, et al, Emerg Infect Dis. 2016;22(8):1505-7.

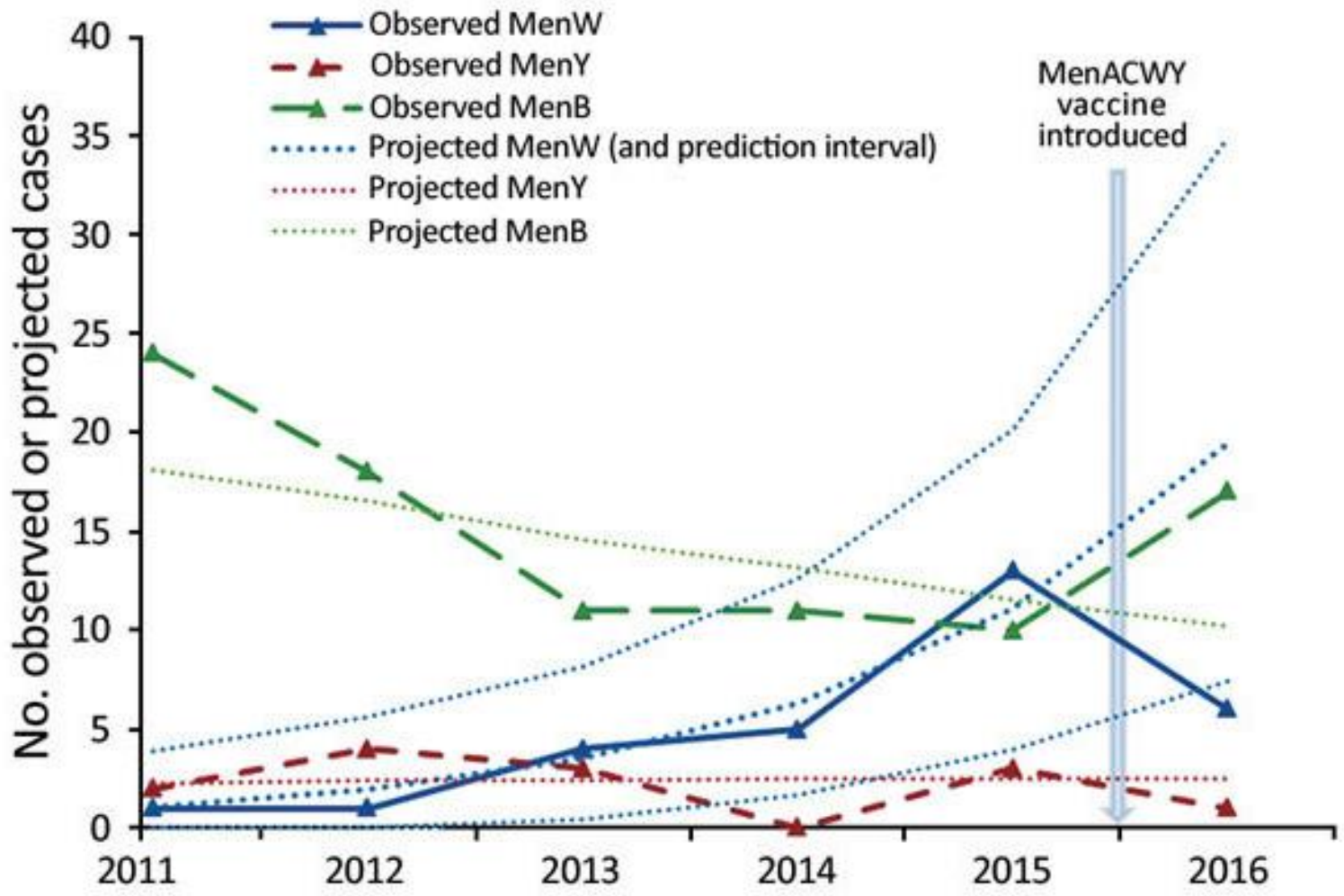
RAPID COMMUNICATIONS

Presentation with gastrointestinal symptoms and high case fatality associated with group W meningococcal disease (MenW) in teenagers, England, July 2015 to January 2016

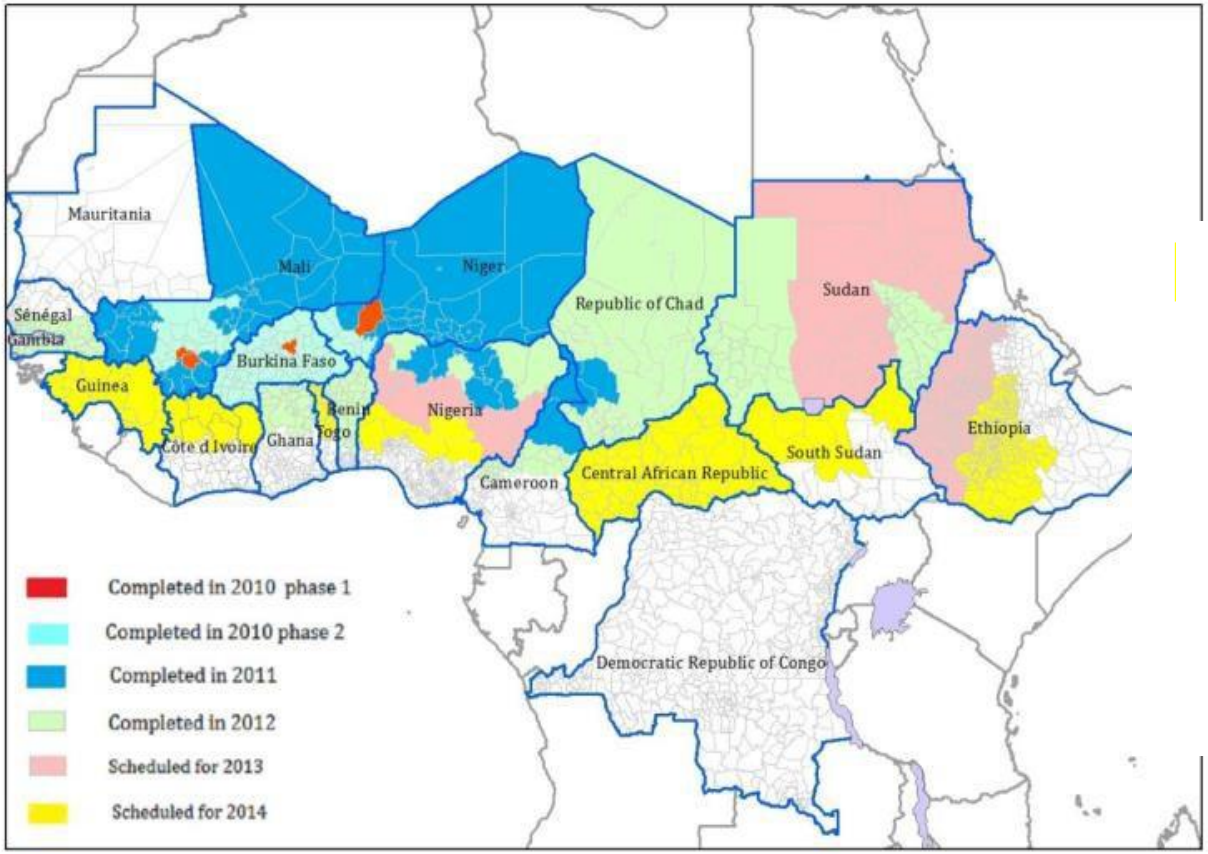
- **2015 Temmuz-2016 Ocak**
- **15-19 yaş grubunda serogrup W salgını**
- **Hipervirulan ST-11 suşu**
- **103 vaka**
- **GIS bulguları ile başvuru**
- **İlk 24 saat içinde ölümler**
- **Yüksek fatalite oranları**

UK 2016 Immunisation Schedule

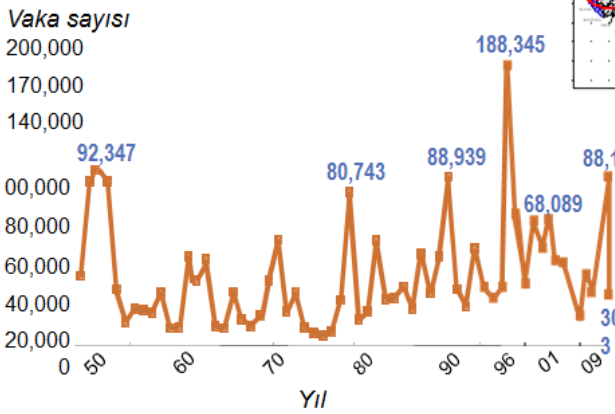
AGE	Immunisation (Vaccine Given)



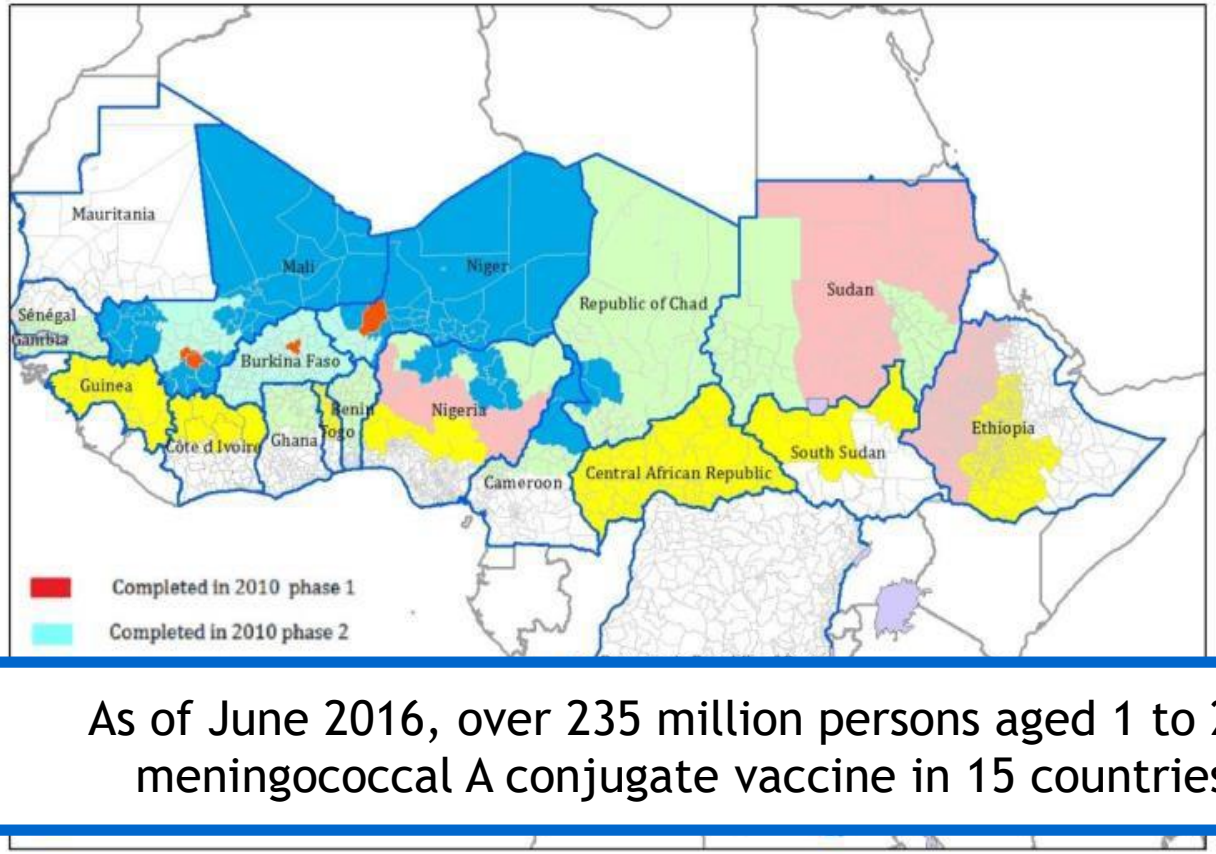
Afrika menenjit kuşağı

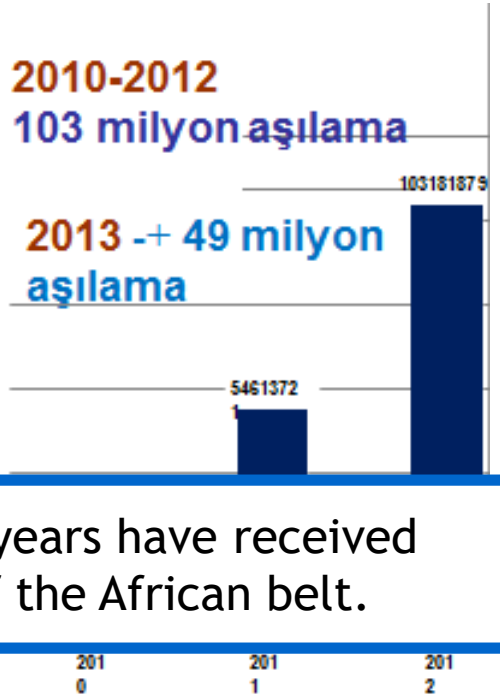


Yıllara göre vaka sayıları



Men A Konjuge aşısı (MenAfriVac)
(Kitlesel aşılama, 1-29 yaş)

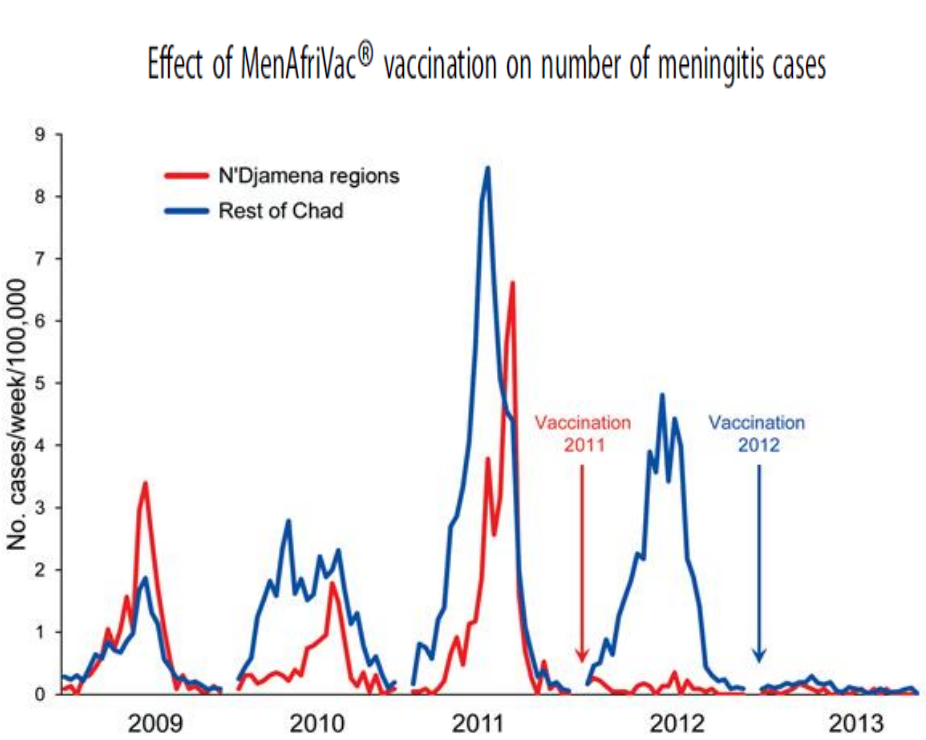




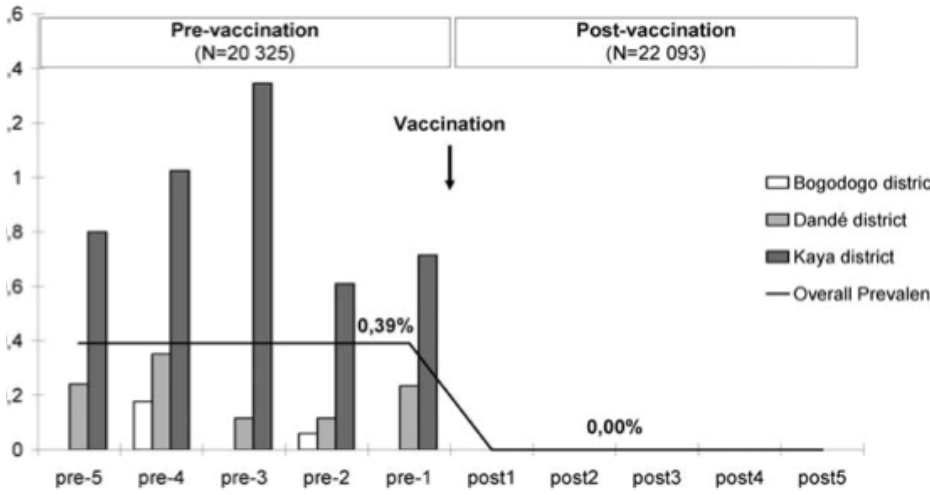
As of June 2016, over 235 million persons aged 1 to 29 years have received meningococcal A conjugate vaccine in 15 countries of the African belt.

WHO - Serum Institute of India işbirliği ile PsA-TT aşısı

MenAfriVac etkinliği



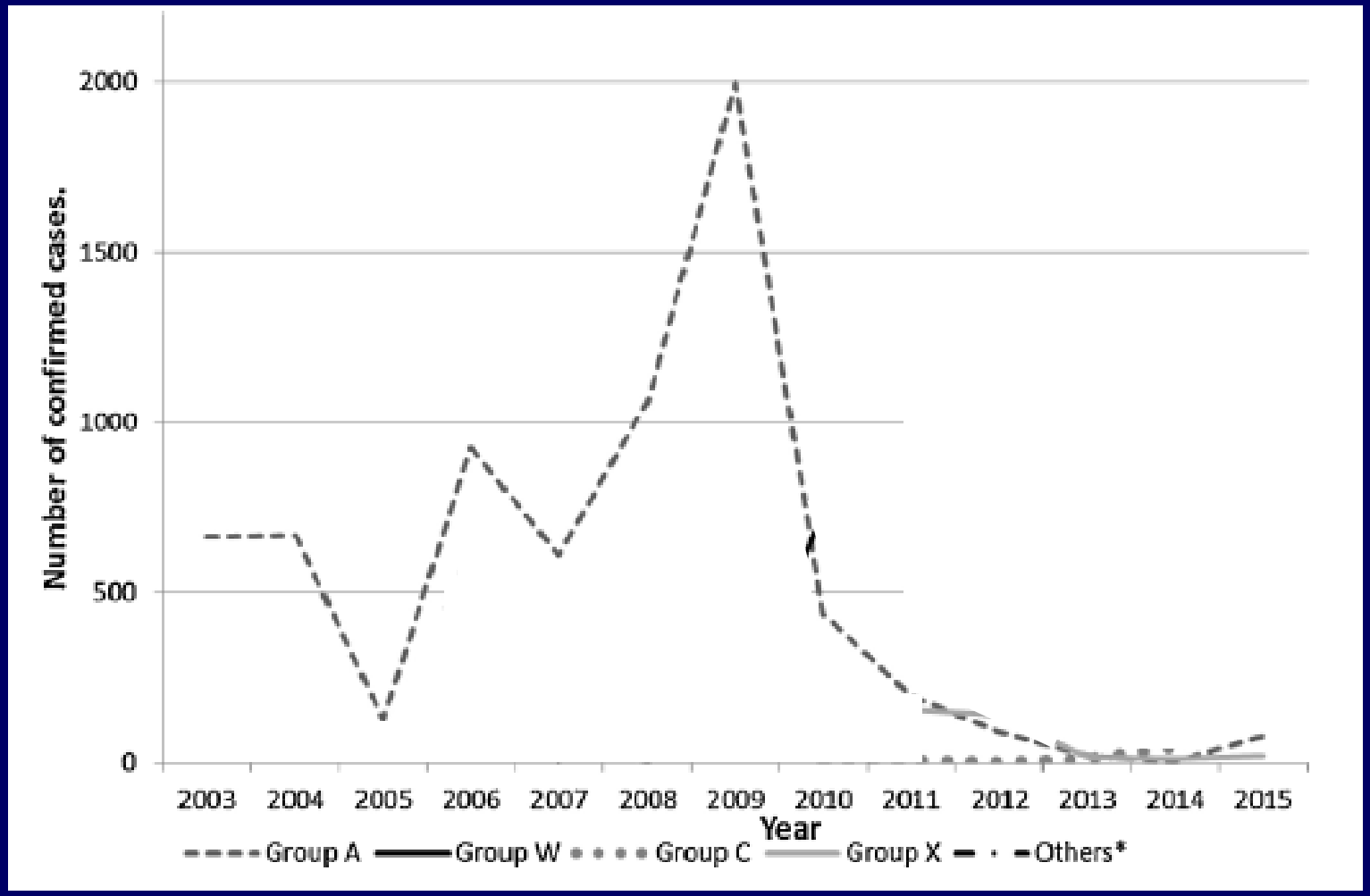
Carriage of serogroup A Neisseria meningitidis at 5 timepoints before (pre-5 to pre-1) and 5 timepoints after (post1 to post5) MenAfriVac vaccination.



MenAfrivac, serogroup A'ya bağlı invaziv meningokok hastalığının ve taşıyıcılığın önlenmesinde çok etkili bulunmuştur.

Daugla DM, et al. Lancet 2014 ;383(9911):40-47.

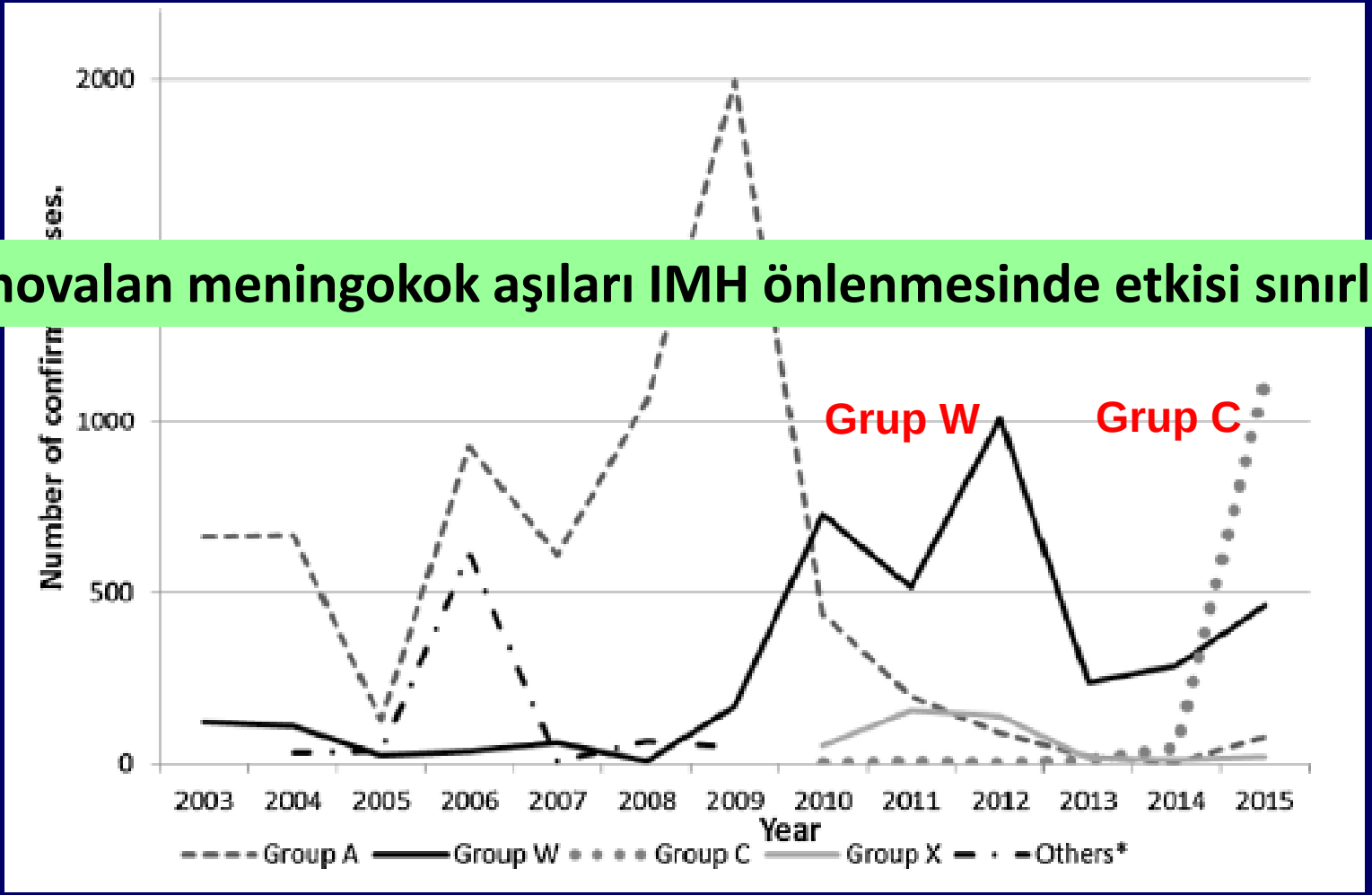
Afrika menenjit kuşağı
IMH vakalarının dağılımı (2003-2015)



WHO surveillance bulletins. http://wwwmeningvaxorg/epidemic-updatesphp (2016)

Afrika menenjit kuşağı
IMH vakalarının dağılımı (2003-2015)

Monovalan meningokok aşıları IMH önlenmesinde etkisi sınırlıdır.



Distribution of capsular groups among confirmed invasive meningococcal disease cases, African meningitis belt, 2003–2015.

Konjuge MenACWY aşıları

	MenACWY-TT	MenACWY-CRM	MenACWY-DT
Türkiye	• 12 aylıktan itibaren her yaşta tek doz	• 2 ay-55 yaş • 2-9 ay: risk grubuna • 9 aydan itibaren sağlıklı bireylere	• 9 ay-55 yaş • 9-23 ay: iki doz (3 ay ara ile) • 2-55 yaş: tek doz
EMA	• 6.haftadan itibaren uygulanır. • 6 ila 12 haftalık bebeklere üç (2+1) doz • 12 ay ve üzeri tek doz	• 2 yaş ve üzeri tek doz	• EMA onayı yok
FDA		• 2 ay-55 yaş	• 9 ay-55 yaş

Konjuge MenACWY-TT aşısı (Nimenrix)

- Serogrup A,C,W,Y içeren dört bileşenli konjuge meningokok aşısı
- Taşıyıcı protein: Tetanoz toksoidi (TT)
- Adjuvan ve thimerosal içermez
- İntramuskuler olarak uygulanır.

Neisseria meningitidis serogrup A polisakkariti[1]	5 µg
Neisseria meningitidis serogrup C polisakkariti[1]	5 µg
Neisseria meningitidis serogrup W_{135} polisakkariti[1]	5 µg
Neisseria meningitidis serogrup Y polisakkariti[1]	5 µg
[1]tetanoz toksoid taşıyıcı proteine konjuge	44 µg

MenACWY-TT aşısı (Nimenrix)

•EMEA tarafından Nisan 2012' de onaylanmıştır.

• 12 aydan büyük çocuk ve erişkinlerde tek doz intramuskuler olarak uygulanması önerilmektedir.

•2016 yılında EMEA 6. haftadan itibaren (2+1 şeması ile) uygulama onayı vermiştir (Avrupa'da)

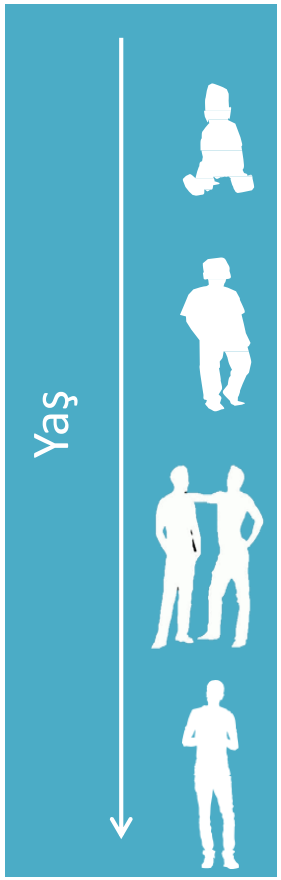
•Türkiye'de halen 12.ay sonrası kullanım onaylıdır.

MenACWY-TT aşısı

- İmmünojenite ve güvenirlilik çalışmaları
- Birlikte uygulama çalışmaları
- Antikor persistansı çalışmaları

MenACWY-TT aşısı immunojenite çalışmaları

Nimenrix ile ilgili >8000 kişide Faz II ve Faz III çalışma yürütülmüştür.



1052 bebek (6-12 hafta ilk doz için)

3079 toddlers (12-23 ay)

909 çocuk (2-5 yaş arası)

990 büyük çocuk (6-10 yaş arası)

2317 adölesan (11-17 yaş arası)

2326 erişkin (18-55 yaş arası)

374 deneyimli erişkin (56 yaş üstü)

(***ABD, Meksika, Panama,Lübnan, Suudi Arabistan ,Avusturya, Çek Cumhuriyeti, Danimarka, Finlandiya, Yunanistan, Almanya, İsveç, Fransa, Hindistan, Tayvan, Tayland, Filipinler***)

EMA. Nimenrix SmPC 02/2017.

İmmünojenite çalışmaları

hSBA (İnsan komplemanı serum bakterisidal antikor) analizleri	rSBA (Tavşan komplemanı serum bakterisidal antikor) analizleri
≥1:4 değerindeki hSBA titreleri, koruma eşik değeri olarak kabul edilir	≥1:8 değerindeki rSBA titreleri, koruma eşik değeri olarak kabul edilir.

İnsan veya yavru tavşan komplemanı kullanılan SBA analizleri, DSÖ[3] ve ruhsatlandırma kurumları tarafından kabul edilmektedir[4]

WHO, Weekly epidemiological record, No. 47, 2011

MenACWY-TT Klinik Çalışmaları

12 AY BEBEKLERDE
TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR

Vaccine 34 (2016) 3363–3370

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Safety and immunogenicity of a CRM or TT conjugated meningococcal vaccine in healthy toddlers

Gianni Bona[a], Paolo Castiglia[b], Giorgio Zoppi[c], Maurizio de Martino[d], Annaelisa Tasciotti[e], Diego D'Agostino[f], Linda Han[g], Igor Smolenov[f,*]

MenACWY-TT Klinik Çalışmaları

12-23 AY VE 3-5 YAŞ ARASI ÇOCUKLARDA TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR

Vaccine 28 (2010) 744–753

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

A dose-range study assessing immunogenicity and safety of one dose of a new candidate meningococcal serogroups A, C, W-135, Y tetanus toxoid conjugate (MenACWY-TT) vaccine administered in the second year of life and in young children

M. Knuf[a], D. Kieninger-Baum[a], P. Habermehl[a], P. Muttonen[b], H. Maurer[c], P. Vink[d], J. Poolman[d], D. Boutriau[d,*]

MenACWY-TT Klinik Çalışmaları

2-10 YAŞ ARASI ÇOCUKLARDA TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR

Eur J Pediatr (2013) 172:601–612
DOI 10.1007/s00431-012-1924-0

ORIGINAL ARTICLE

Immunogenicity and safety of the quadrivalent meningococcal serogroups A, C, W-135 and Y tetanus toxoid conjugate vaccine (MenACWY-TT) in 2–10-year-old children: results of an open, randomised, controlled study

Markus Knuf · Olivier Romain · Klaus Kindler · Uta Walther · Phu-My Tran · Heidemarie Pankow-Culot · Thomas Fischbach · Dorothee Kieninger-Baum · Véronique Bianco · Yaela Baine · Jacqueline Miller

MenACWY-TT Klinik Çalışmaları

10-25 YAŞ ARASI ADÖLESAN VE GENÇ ERİŞKİNLERDE TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR

ORIGINAL STUDIES

Immunogenicity and Safety of an Investigational Quadrivalent Meningococcal ACWY Tetanus Toxoid Conjugate Vaccine in Healthy Adolescents and Young Adults 10 to 25 Years of Age

Roger Baxter, MD, Yaela Baine, PhD,† Kathleen Ensor, BA, RN,* Veronique Bianco, MS,‡ Leonard R. Friedland, MD,† and Jacqueline M. Miller, MD†*

MenACWY-TT Klinik Çalışmaları

11-55 YAŞ ARASI ADÖLESAN VE ERİŞKİNLERDE TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR

Borja-Tabora *et al. BMC Infectious Diseases* 2013, **13**:116
http://www.biomedcentral.com/1471-2334/13/116

BMC Infectious Diseases

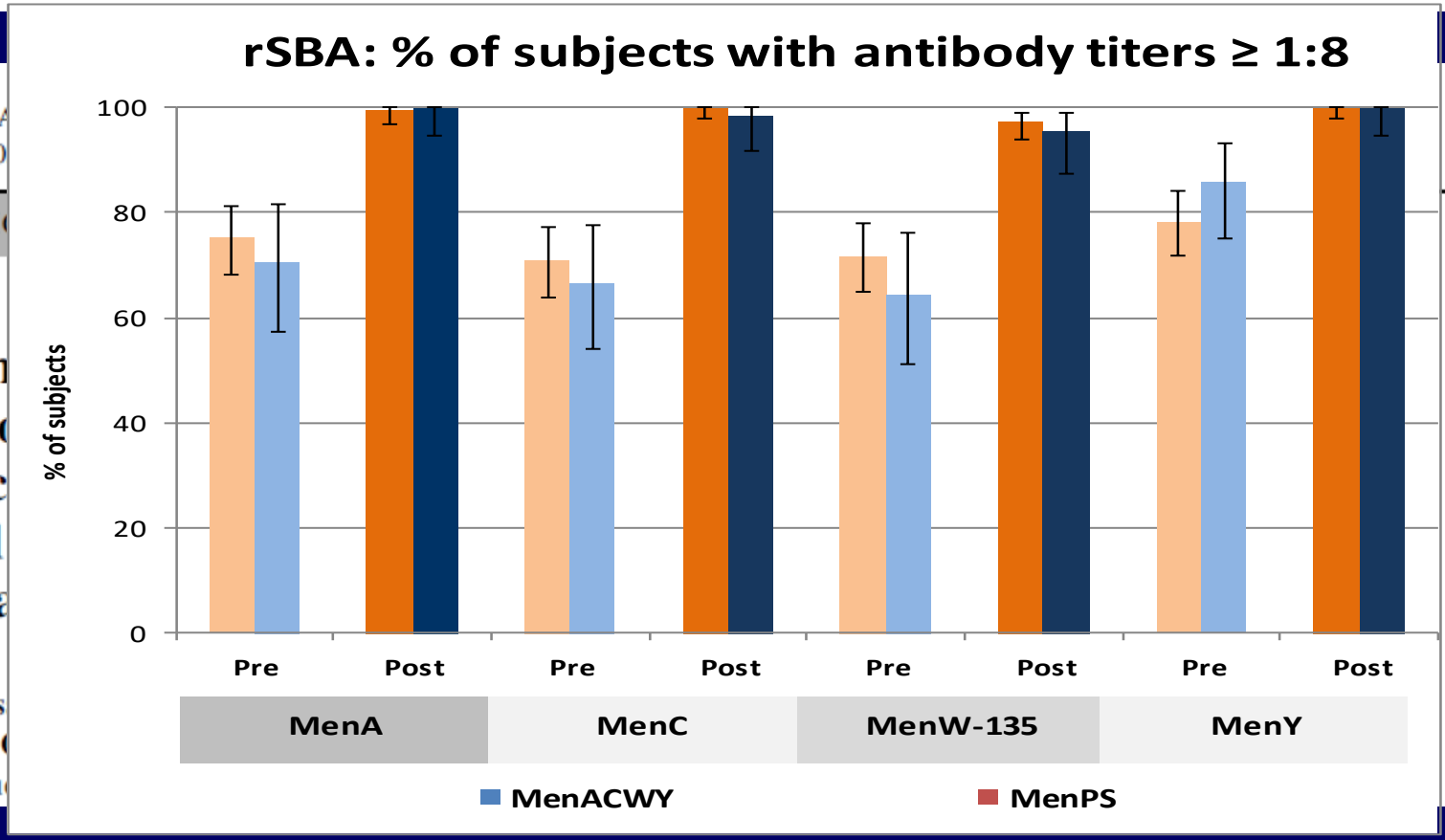
RESEARCH ARTICLE Open Access

Immune response, antibody persistence, and safety of a single dose of the quadrivalent meningococcal serogroups A, C, W-135, and Y tetanus toxoid conjugate vaccine in adolescents and adults: results of an open, randomised, controlled study

Charissa Borja-Tabora[1], Cecilia Montalban[2], Ziad A Memish[3*], Marie Van der Wielen[4], Veronique Bianco[4], Dominique Boutriau[4] and Jacqueline Miller[5]

MenACWY-TT Klinik Çalışmaları

56-103 YAŞ DENEYİMLİ ERİŞKİNLERDE
TEK DOZ MENACWY-TT İMMUNOJENİK VE GÜVENİLİR



MenACWY-TT Klinik Çalışmaları

2 AYLIK BEBEKLERDE 2+1 ŞEMASI İLE UYGULANAN MENACWY-TT AŞISI İMMUNOJENİK VE GÜVENİLİR

Abstract

Background:
This was the first study evaluating the immunogenicity and safety of the quadrivalent meningococcal tetanus toxoid conjugate vaccine (MenACWY-TT) coadministered with routine childhood vaccines in young infants.

Methods:
In this open, randomized, controlled, phase III study (NCT01144663), 2095 infants (ages 6–12 weeks) were randomized (1:1:1:1) into 4 groups to receive MenACWY-TT at 2, 3, 4 and 12 months of age, or MenACWY-TT, MenC-cross-reactive material (CRM197) or MenC-TT at 2, 4 and 12 months of age. All participants received PHiD-CV and DTPa-HBV-IPV/Hib at 2, 3, 4 and 12 months of age. Immune responses were measured by serum bactericidal activity assays using rabbit (rSBA) and human (hSBA) complement. Solicited and unsolicited symptoms were recorded during 8 and 31 days post-vaccination, respectively, and serious adverse events throughout the study.

Results:
Noninferiority of immune responses to MenC induced by 2 or 3 doses of MenACWY-TT versus 2 doses of MenC-TT or MenC-CRM197 was demonstrated. Predefined criteria for the immunogenicity of MenACWY-TT to MenA, MenW and MenY were met. One month after 2 or 3 primary MenACWY-TT doses, ≥93.1% and ≥88.5% of infants had rSBA and hSBA titers ≥1:8 for all serogroups. The robust increases in rSBA and hSBA titers observed for all vaccine serogroups postbooster vaccination suggested that MenACWY-TT induced immune memory. MenACWY-TT coadministered with childhood vaccines had a clinically acceptable safety profile.

Conclusions:
This study supports the coadministration of MenACWY-TT with routine childhood vaccines as 2 or 3 primary doses during infancy followed by a booster dose in the second year of life.

MenACWY-TT İstenmeyen Etkiler

SİSTEMİK İSTENMEYEN ETKİLER

- **12-23 ay: irritabilite, halsizlik, ateş, iştahsızlık**
- **2-5 yaş yaş: halsizlik, irritabilite, ateş, iştahsızlık**
- **6-10 yaş: halsizlik, baş ağrısı, GIS bulguları, ateş**
- **11-17 yaş: halsizlik, baş ağrısı, GIS bulguları, ateş**
- **18-55 yaş: baş ağrısı,halsizlik, GIS bulguları, ateş**
- **>55 yaş: çok nadiren baş ağrısı**

PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2012; **21**: 1350–1358
Published online 16 July 2012 in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/pds.3321

ORIGINAL REPORT

Risk o

gate

1354

Table 2. Prevalen

Vaccinations before GBS onset date	
MCV4	9 (12.5)
MPSV4	2 (2.0)
Tdap	10 (10.1)
Tetanus	0 (0.0)
Td	3 (3.0)
Influenza	9 (9.1)
HepB	3 (3.0)
HPV[§]	5 (10.9)
Vaccinations within 42 days of GBS onset date	
MCV4	0 (0.0)
MPSV4	1 (1.0)
Tdap	0 (0.0)
Tetanus	0 (0.0)
Td	0 (0.0)
Influenza	2 (2.0)
HepB	1 (1.0)
HPV[§]	2 (4.3)

67,471)*

dministration
MCV4, *n* (%)[‡]

MCV4
MPSV4
Tdap
Td
Tetanus
Influenza
HepB
HPV

85 (0.2)[§]
,991 (22.8)
1,535 (3.9)
93 (0.2)
1,817 (4.6)
2,708 (6.9)
,430 (11.3)

[6] *Department*
[7] *Optum Insig*
[8] *Highmark I*
[9] *Duke Clinic*
[10] *Aetna, Blue*
[11] *Kaiser Per*
[12] *World Hea*

PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2012; **21**: 1350–1358
Published online 16 July 2012 in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/pds.3321

ORIGINAL REPORT

Risk
vacci

ugate

Priscilla
Donnie F
Judith M
Peter M.

chrane[3],
[3],
L. Syat[1],

[1] *Departme*
[2] *Outcome*
[3] *Departme*
[4] *Harvard*
[5] *HealthCo*
[6] *Departme*
[7] *Optum In*
[8] *Highmark*
[9] *Duke Clin*
[10] *Aetna, B*
[11] *Kaiser P*
[12] *World H*

A, USA

Vaccinations before GBS onset date	
MCV4	9 (12.5)
MPSV4	2 (2.0)
Tdap	10 (10.1)
Tetanus	0 (0.0)
Td	3 (3.0)
Influenza	9 (9.1)
HepB	3 (3.0)
HPV[§]	5 (10.9)
Vaccinations within 42 days of GBS onset date	
MCV4	0 (0.0)
MPSV4	1 (1.0)
Tdap	0.0)
Tetanus	0 (0.0)
Td	0 (0.0)
Influenza	2 (2.0)
HepB	1 (1.0)
HPV[§]	2 (4.3)

MCV4 vaccination was not associated with increased GBS risk.

MenACWY-TT aşısı

- İmmünojenite ve güvenirlilik çalışmaları
- **Birlikte uygulama çalışmaları**

MenACWY-TT Birlikte Uygulama Çalışmaları

Vaccine 29 (2011) 4274–4284

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Tetravalent meningococcal serogroups A, C, W-135 and Y conjugate vaccine is well tolerated and immunogenic when co-administered with measles–mumps–rubella–varicella vaccine during the second year of life: An open, randomized controlled trial

Timo Vesikari[a,*], Aino Karvonen[a], Veronique Bianco[b], Marie Van der Wielen[b], Jacqueline Miller[c]

[a] Vaccine Research Center, University of Tampere Medical School, Tampere, Finland
[b] GlaxoSmithKline Biologicals, Belgium
[c] GlaxoSmithKline Biologicals, United States

ARTICLE INFO

Article history:
Received 19 November 2010
Received in revised form 1 March 2011
Accepted 12 March 2011
Available online 6 April 2011

Keywords:
Tetravalent meningococcal vaccine
Conjugate vaccine
Bactericidal activity
Measles–mumps–rubella–varicella vaccine

ABSTRACT

Co-administration of meningococcal ACWY-tetanus toxoid conjugate vaccine (ACWY-TT) with MMRV vaccine was investigated in 1000 12–23-month old children randomized (3:3:1:1) to receive co-administered ACWY-TT + MMRV, or a single dose of ACWY-TT, MMRV or MenC-CRM_{197}. Non-inferiority of ACWY-TT to MenC-CRM_{197} and non-inferiority of ACWY-TT + MMRV to ACWY-TT and MMRV alone, and the immunogenicity of serogroups AWY were demonstrated according to pre-defined criteria. Fever reactions in ACWY + MMRV and MMRV groups were comparable. ACWY-TT can be co-administered with MMRV without affecting immunogenicity or safety profiles of either vaccine.

This study has been registered at www.clinicaltrials.gov NCT00474266.

MenACWY-TT Birlikte Uygulama Çalışmaları

- **KKK - suçiçeği aşısı,**
- **Difteri-tetanoz-asellüler boğmaca-IPA-HBV-Hib,**
- **Hepatit A-B aşısı,**
- **10-bileşenli konjuge pnömokok aşısı,**
- **13-bileşenli konjuge pnömokok aşısı,**
- **HPV aşısı,**
- **Tdab,**
- **Mevsimsel grip aşısı** ile birlikte uygulanabilir.

MenACWY-TT aşısı

- Noninferiorite çalışmaları, menACWY-TT aşısının diğer çocukluk dönemi aşılarıyla veya mevsimsel grip aşısı ile birlikte uygulandığında immunojenesitesinin veya birlikte uygulandığı aşının immunojenesitesinin değişmediğini göstermiştir.

MenACWY-TT aşısı

- **MenACWY-TT tek başına veya rutindeki diğer aşılarla birlikte uygulandığında, tüm yaş gruplarında iyi tolere edilir. Grade 3 lokal veya sistemik istenmeyen etkilerin insidansı (ilk 4 günde) ve ciddi yan etki insidansı (6 aylık izlem periyodunda) düşüktür (<%4.5).**

Croxtall JD, Dhillon S. Drugs 2012;72(18):2407-30.

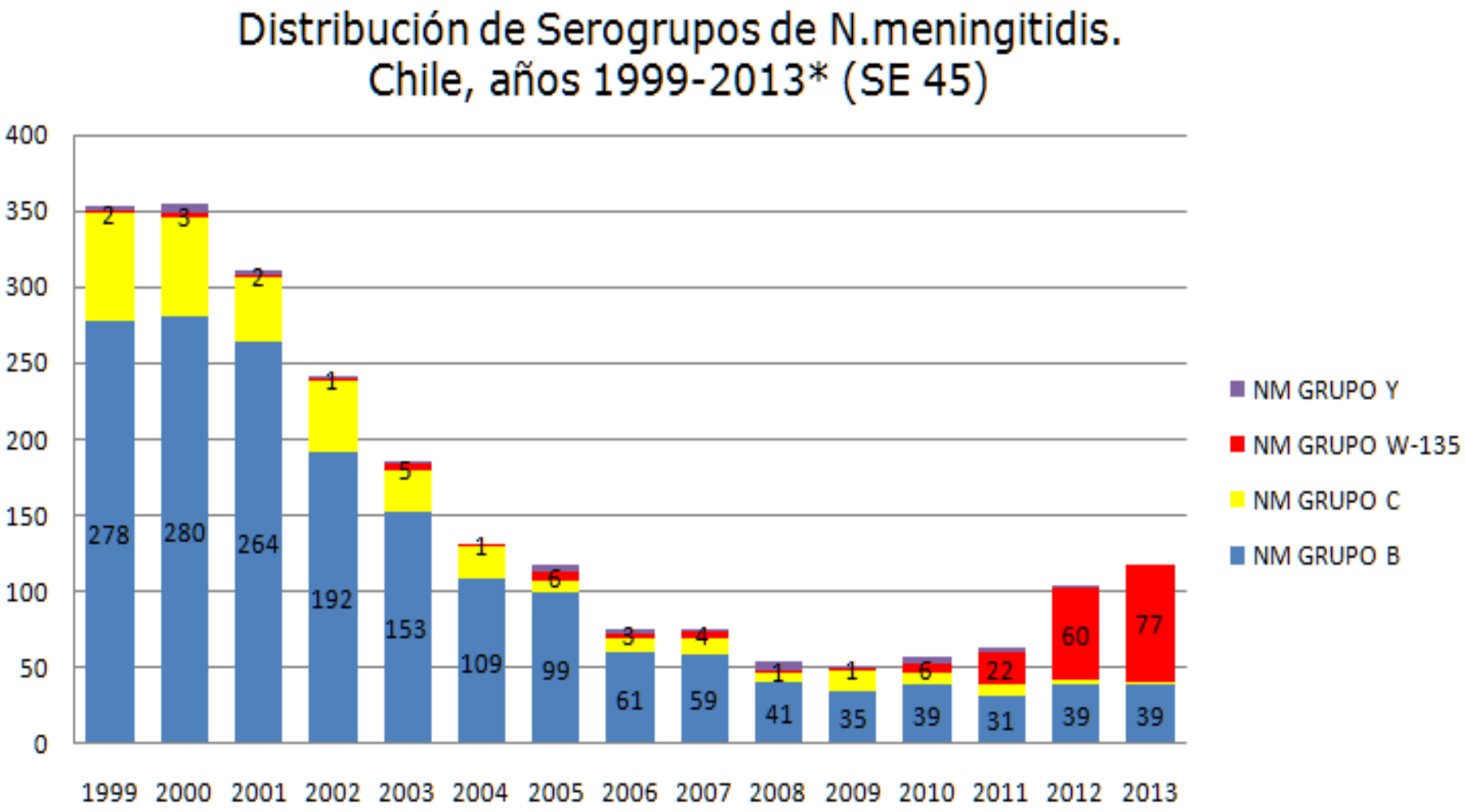
Nimenrix 71 ülkede ruhsatlıdır

Avrupa Birliği Ülkeleri
ALMANYA
BELÇİKA
BULGARİSTAN
HIRVATİSTAN
KIBRIS
ÇEK CUMHURİYETİ
DANİMARKA
ESTONYA
FİNLANDİYA
FRANSA
ALMANYA
YUNANİSTAN
MACARİSTAN
İRLANDA
İTALYA
LETONYA
LİTVANYA
LÜKSEMBURG
MALTA
HOLLANDA
POLONYA
PORTEKİZ
ROMANYA
SLOVAKYA
SLOVENYA
İSPANYA
İSVEÇ

Diğer Ülkeler
SUUDİ ARABİSTAN
BRAZİLYA
İSRAİL
BİRLEŞİK KRALLIK
TÜRKİYE
BOSNA HERSEK
BANGLADEŞ
KAMERUN
NİJER
MALİ
KUVEYT
KANADA
TAYLAND
LÜBNAN
GİNE
GABON
FAS
SENEGAL
TUNUS
KATAR
PANAMA
UGANDA
NİGERYA
AVUSTRALYA
ŞİLİ
FİLİPİNLER
BRUNEİ

FİLİPİNLER
BRUNEİ
KENYA
KONGO
BAHREYN
FİLDİŞİ SAHİLİ
GANA
ETİYOPYA
HONG KONG
KOLOMBİYA
MALEZYA
KONGO
BİRLEŞİK ARAP EMİRLİKLERİ
SİNGAPUR
YENİ ZELLANDA
TANZANYA
UKRAYNA
KAZAKİSTAN

Şili'de meningokok hastalığı
Serogrup W salgını



The Global Meningococcal Initiative: global epidemiology, the impact of vaccines on meningococcal disease and the importance of herd protection

http://dx.doi.org/10.1080/14760584.2017.1258308

Ray Borrow, Pedro Alarcón, Josefina Carlos, Dominique A. Caugant, Hannah Christensen, Roberto Debbag, Philippe De Wals, Gabriela Echániz-Aviles, Jamie Findlow, Chris Head, Daphne Holt, Hajime Kamiya, Samir K Saha, Sergey Sidorenko, Muhamed-Kheir Taha, Caroline Trotter, Julio A. Vázquez Moreno, Anne von Gottberg & Marco A. P. Sáfadion behalf of the Global Meningococcal Initiative

3.3.2. MenW control

Vaccination strategies for controlling MenW and other *N. meningitidis* strains using multivalent conjugate vaccines are being rolled out in a number of countries. An immunization campaign began in 2012 in Chile with the quadrivalent conjugate vaccine (MenACWY; Menveo®; Table 1), initially targeting children aged from 9 months to <5 years. The incidence of MD in this age group before and after introduction of quadrivalent *N. meningitidis* (MenACWY) vaccination is shown in Figure 4. Since 2012, approximately 1 million children have been vaccinated, and vaccine uptake of 95% has been attained in these age groups (data from ISPCH Laboratorio de Agentes de Meningitis Bacteriana). In addition, since 2012, a temporary vaccination strategy was established in which children aged from 9 months to 5 years were vaccinated, and infants from 9 months old were given a second dose to increase protection. The vaccines Menactra® (Table 1) and Menveo® have been used as part of this temporary vaccination strategy. On 1 January 2014, vaccination became part of the national immunization schedule and was mandatory for all children aged ≥1 year, with a one-dose schedule of Nimenrix® (Table 1) implemented.

The Global Meningococcal Initiative: global epidemiology, the impact of vaccines on meningococcal disease and the importance of herd protection

http://dx.doi.org/10.1080/14760584.2017.1258308

Ray Borrow, Pedro Alarcón, Josefina Carlos, Dominique A. Caugant, Hannah Christensen, Roberto Debbag, Philippe De Wals, Gabriela Echániz-Aviles, Jamie Findlow, Chris Head, Daphne Holt, Hajime Kamiya, Samir K Saha, Sergey Sidorenko, Muhamed-Kheir Taha, Caroline Trotter, Julio A. Vázquez Moreno, Anne von Gottberg & Marco A. P. Sáfadion behalf of the Global Meningococcal Initiative

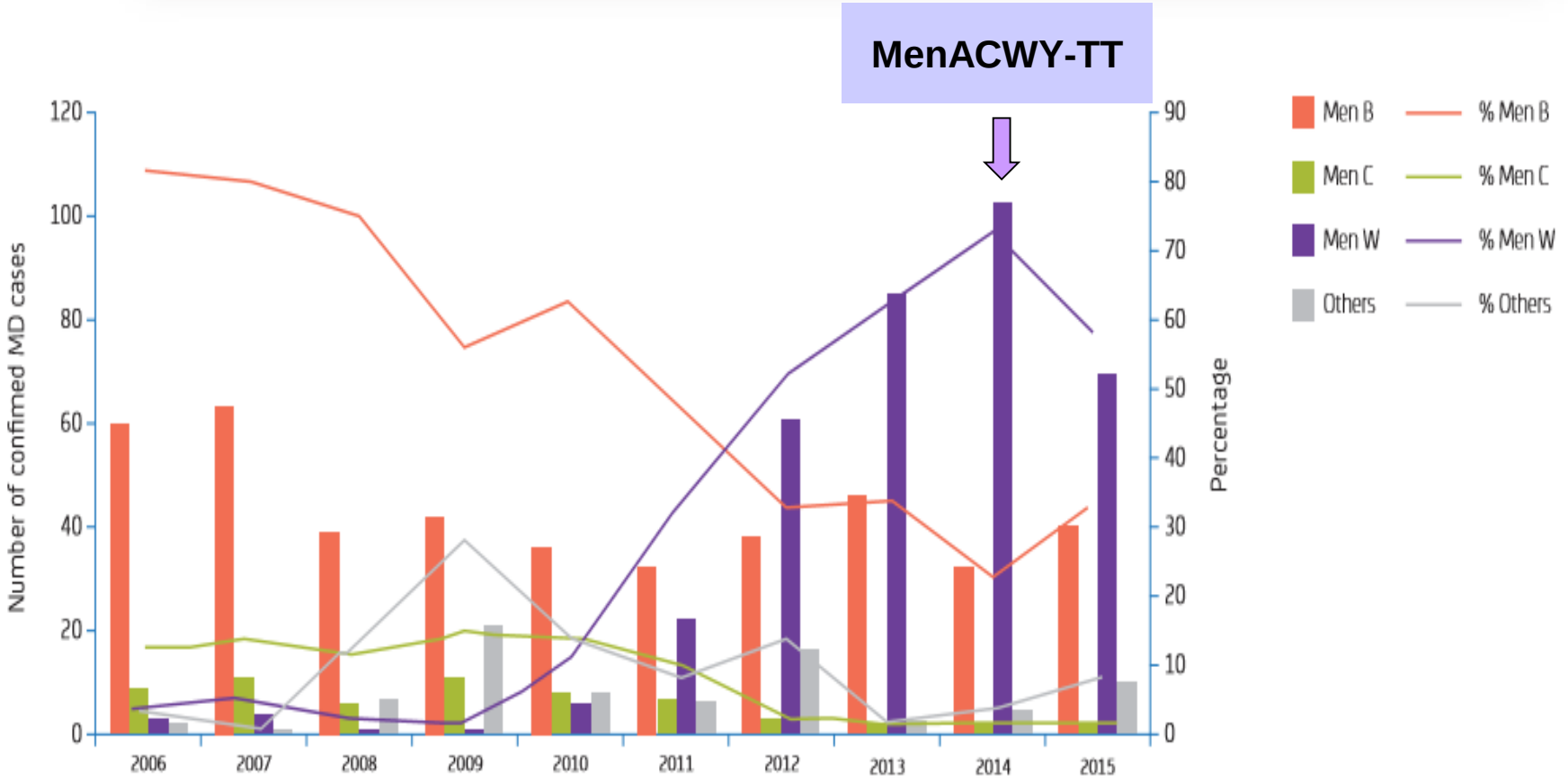


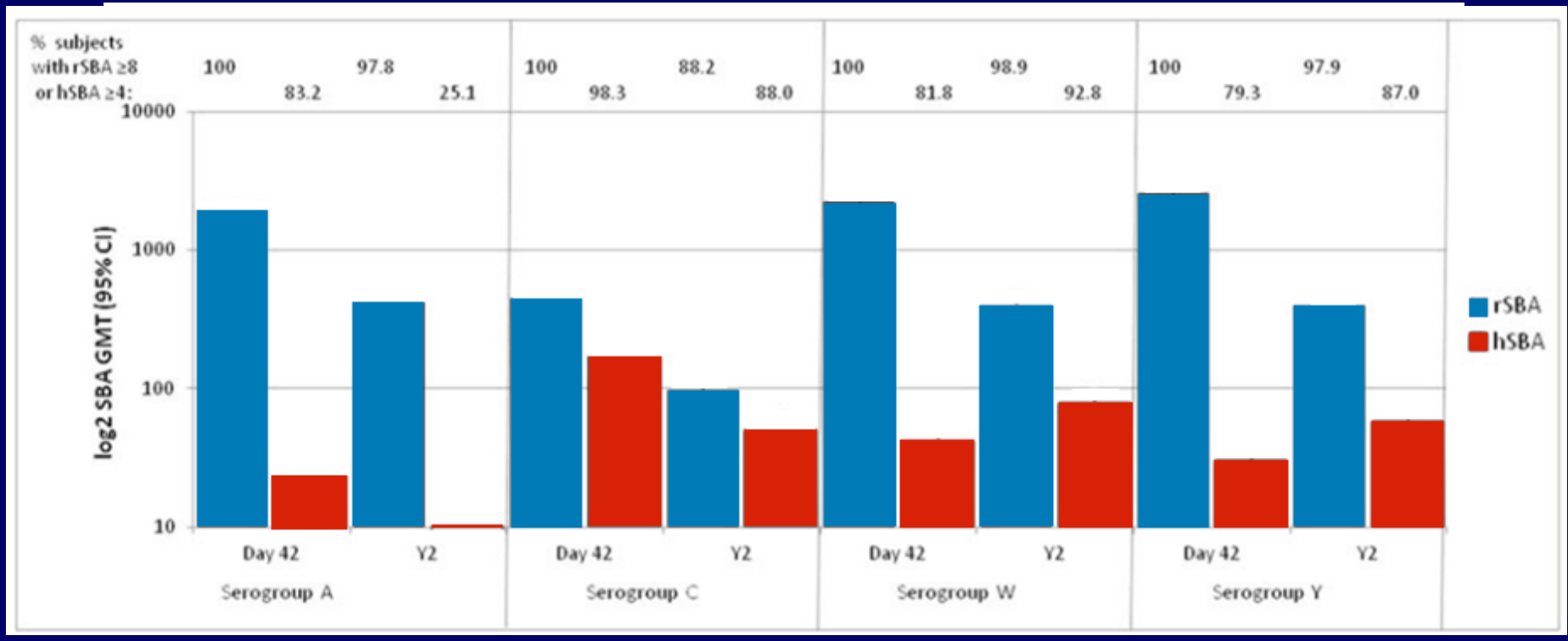
Figure 4. Incidence of MD in Chile in children between 9 months and <5 years of age before and after introduction of quadrivalent *Neisseria meningitidis* (MenACWY) vaccination in 2012 (unpublished data from Instituto de Salud Pública de Chile, Laboratorio de Agentes de Meningitis Bacteriana, Santiago, Chile).

MD: meningococcal disease; Men: *Neisseria meningitidis* serogroup.

MenACWY-TT aşısı

- İmmünojenite ve güvenirlilik çalışmaları
- Birlikte uygulama çalışmaları
- **Antikor persistansı**

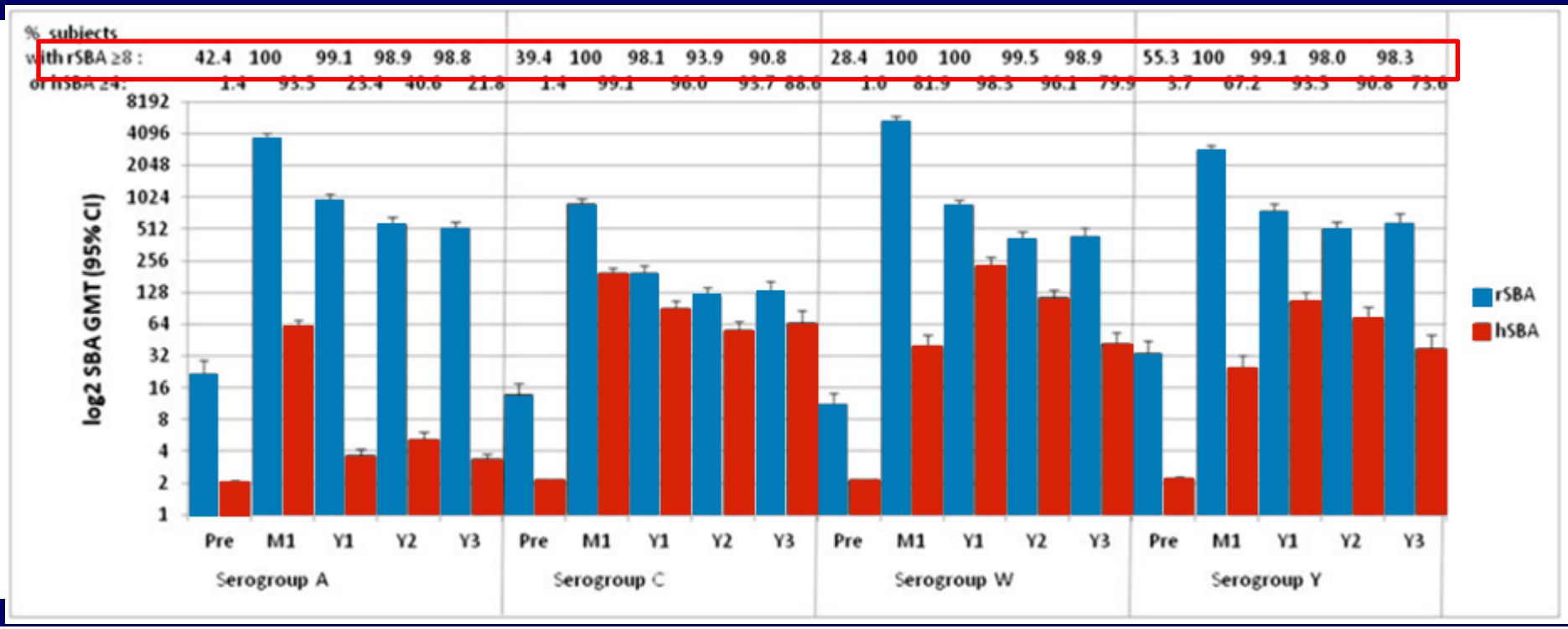
MenACWY-TT Antikor Persistansı (24. ay)



Percentage of toddlers with rSBA or hSBA titres ≥8 or ≥4, respectively, and rSBA GMTs at pre-vaccination and 1 month, 1,2 and 3 y post-vaccination with ACWYTT

12. ayda tek doz MenACWY-TT uygulanan 2-10 yaş grubu çocuklarda aşılamadan 24 ay sonra yeterli aşı yanıtının devam ettiği gösterilmiştir.

MenACWY-TT Antikor Persistansı (36. ay)



Percentage of toddlers with rSBA or hSBA titres ≥8 or ≥4, respectively, and rSBA GMTs at pre-vaccination and 1 month, 1,2 and 3 y post-vaccination with ACWYTT

12. ayda tek doz MenACWY-TT uygulanan 1-10 yaş grubu çocuklarda aşılamadan 36 ay sonra yeterli aşı yanıtının devam ettiği gösterilmiştir.

MenACWY-TT Antikor Persistansı (60. ay)

We studied the persistence of serum bactericidal antibody using rabbit and human complement (rSBA/hSBA, cut-offs 1:8) 5 y after a single dose of meningococcal serogroups A, C, W, Y tetanus toxoid conjugate vaccine (MenACWY-TT) compared with age-appropriate control vaccines in toddlers and children (NCT00427908). Children were previously randomized (3:1) to receive either MenACWY-TT or control vaccine (MenC-CRM_{197} in 1-<2 y olds; MenACWY-polysaccharide vaccine [Men-PS] in 2-<11 y olds). Subjects with rSBA-MenC titers <1:8 at any time point were revaccinated with MenC conjugate vaccine and discontinued from the study. A repeated measurement statistical model assessed potential selection effects due to drop-outs. At year 5 in MenACWY-TT-vaccinated-toddlers for serogroups A, C, W, and Y respectively, percentages with rSBA titers ≥1:8 were 73.5%, 77.6%, 34.7%, and 42.9%, hSBA ≥1:8 were 35.6%, 91.7%, 82.6% and 80.0%. For MenC-CRM_{197} recipients, 63.6% had persisting rSBA-MenC titers ≥1:8 and 90.9% had hSBA-MenC ≥1:8 (not significantly different versus MenACWY-TT for either assay: exploratory analyses). In 2-<11 y olds rSBA titers ≥1:8 in MenACWY-TT-vaccinees were 90.8%, 90.8%, 78.6%, and 78.6% and 15.4%, 100%, 0.0%, 7.7% in Men-PS-vaccinees (significantly different for serogroups A, W and Y, exploratory analyses). Serogroups A, W and Y rSBA GMTs were ≥ 26-fold higher in MenACWY-TT-vaccinees. As expected, GMTs modeled at year 5 to assess the impact of subject drop out (mainly for revaccination), appeared lower for serogroup C. No vaccine-related SAEs were reported. Antibody persistence was observed for all serogroups up to 5 y after MenACWY-TT vaccination.

Tek doz MenACWY-TT uygulanan 12 ay - 10 yaş çocuklarda, aşılamadan 5 yıl sonra tüm aşı serogruplarına antikor yanıtının devam ettiği gösterilmiştir.

MenACWY-TT Antikor Persistansı (10-25 yaş)

The Pediatric Infectious Disease Journal
Issue: Volume 34(11), November 2015, p 1236–1243

VACCINE REPORTS

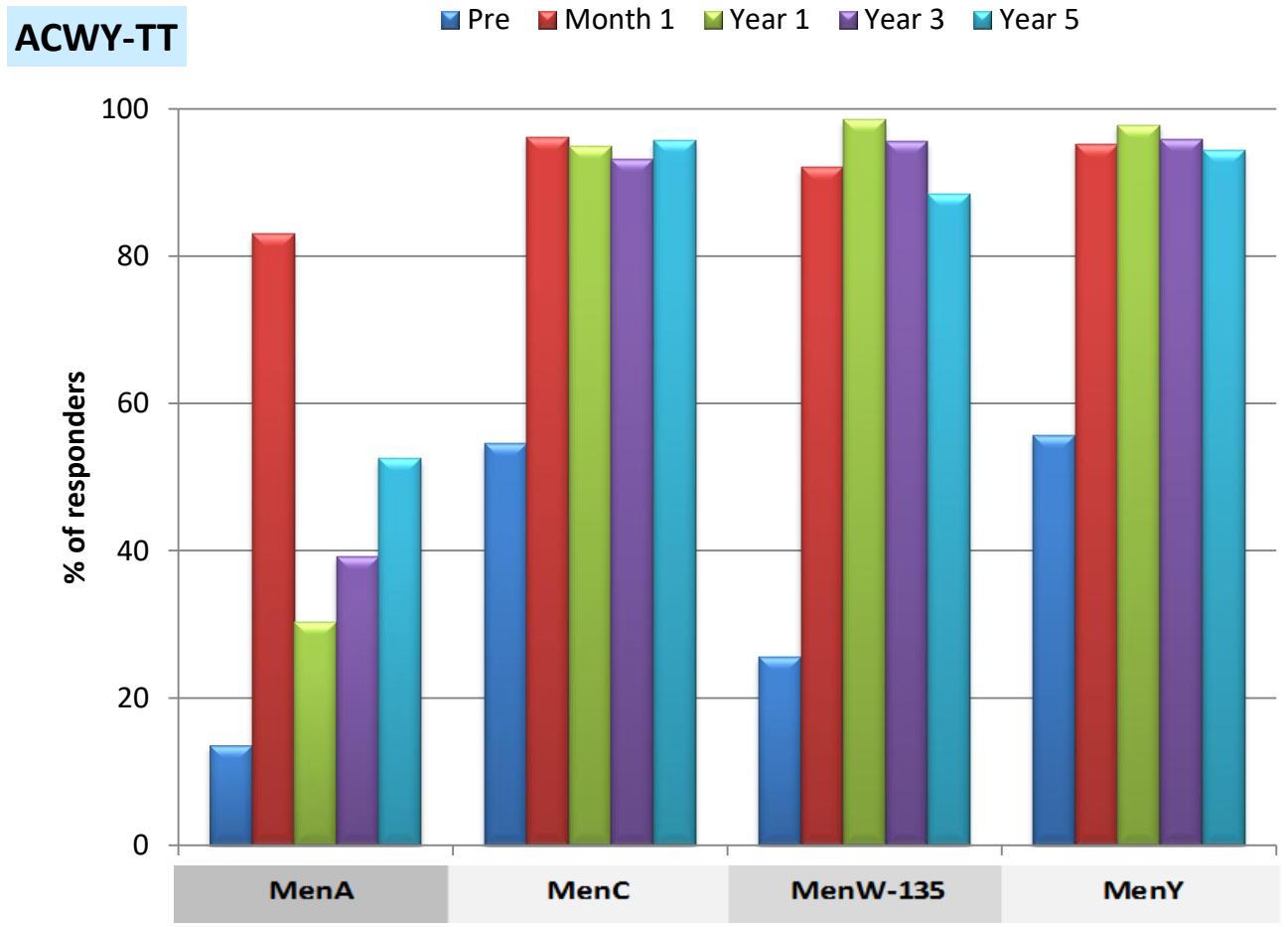
Five-year Antibody Persistence and Booster Response to a Single Dose of Meningococcal A, C, W and Y Tetanus Toxoid Conjugate Vaccine in Adolescents and Young Adults

An Open, Randomized Trial

Roger Baxter, MD, Yaela Baine, PhD,† Devayani Kolhe, MSc,‡ Carmen I. Baccarini, MD,†*
Jacqueline M. Miller, MD,† and Marie Van der Wielen, MD§

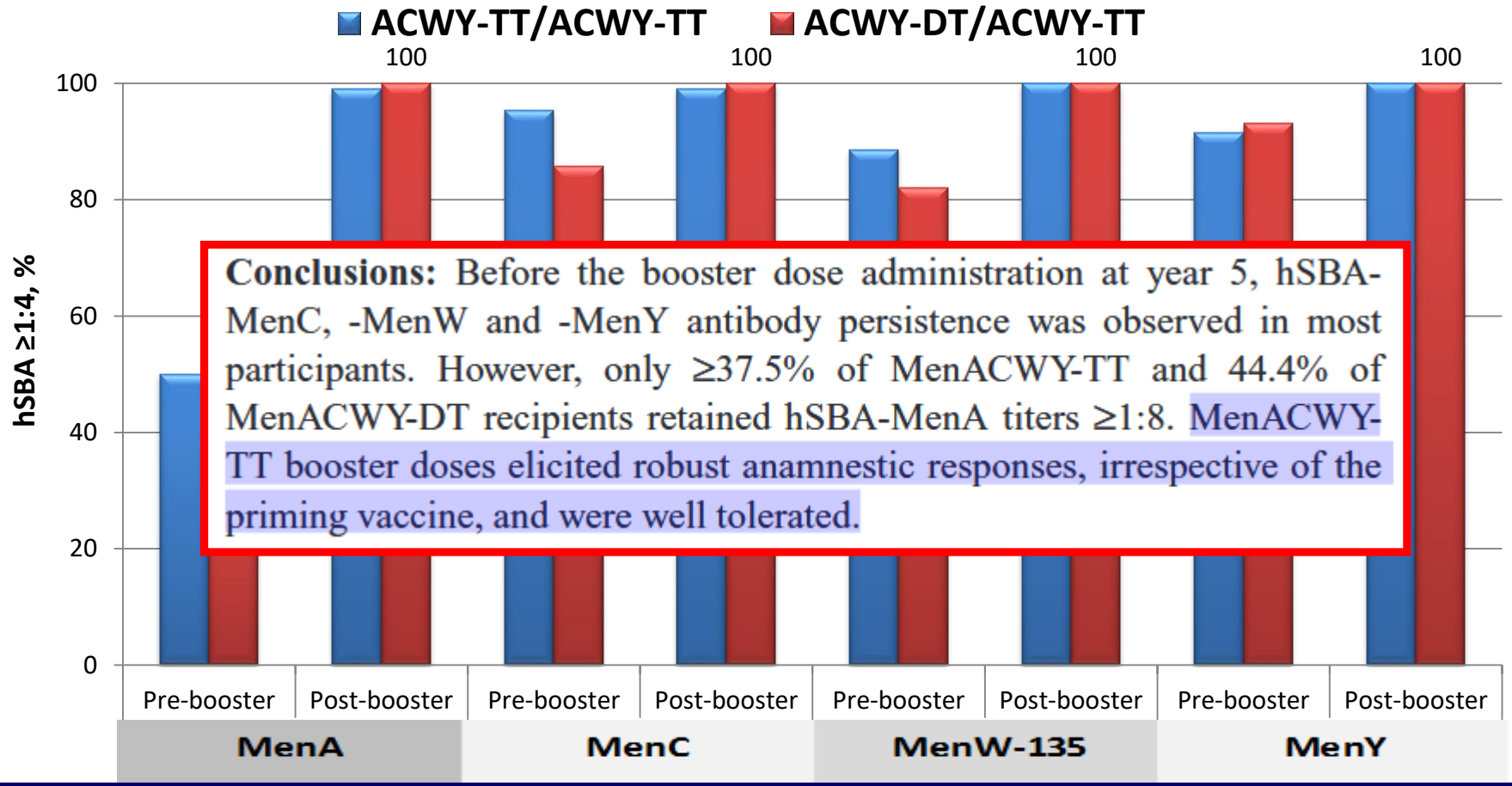
MenACWY-TT Antikor Persistansı

Percentage of participants with hSBA antibody titers ≥1:4



Rapel yanıtı

Percentage of participants with hSBA antibody titers ≥1:4 before and one month after administration of a booster dose of MenACWY-TT



Conclusions: Before the booster dose administration at year 5, hSBA-MenC, -MenW and -MenY antibody persistence was observed in most participants. However, only ≥37.5% of MenACWY-TT and 44.4% of MenACWY-DT recipients retained hSBA-MenA titers ≥1:8. MenACWY-TT booster doses elicited robust anamnestic responses, irrespective of the priming vaccine, and were well tolerated.

Tek doz yeterli mi?

Küçük çocuklarda; tek doz MenACWY-TT uygulamasından 5 yıl sonra tüm serogruplara yüksek antikor titresi devam etmektedir

This study found that antibody persistence 5 years after MenACWY-TT vaccination in infancy did not differ substantially between children who received 1 or 2 doses

We observed no other potentially significant differences with respect to antibody persistence of serogroups A, C and Y. Overall, 5 years after primary vaccination with MenACWY-TT, there was no clear evidence of benefit of receiving 2 versus 1 dose of vaccine in infancy.

The Pediatric Infectious Disease Journal • Volume 35, Number 6, June 2016

Tek doz yeterli mi?

Küçük çocuklarda; tek doz ya da iki doz MenACWY-TT uygulamasından 5 yıl sonra rapel yapıldığında güçlü anemnestik yanıt

VACCINE REPORTS

	ACWY-1		ACWY-2	
Antibody	N	% (95% CI)	N	% (95% CI)
MenA	31	**100 [88.8–100]**	35	**100 [90.0–100]**
MenC	30	**93.3 [77.9–99.2]**	34	**91.2 [76.3–98.1]**
MenW	31	**100 [88.8–100]**	35	**100 [90.0–100]**
MenY	26	**100 [86.8–100]**	31	**100 [88.8–100]**

MenACWY-TT elicited robust anamnestic responses

The Pediatric Infectious Disease Journal • Volume 35, Number 6, June 2016

ÖZET

- **MenACWY-TT aşısı, 12. aydan itibaren tek doz uygulandığında, tüm yaş gruplarında, aşının içerdiği 4 meningokok serogrupa karşı güçlü, uzun süreli ve güvenli bir koruma sağlar.**

SABRINIZ İÇİN TEŞEKKÜR EDERİM

Aşılama: Hasta Davranışı ve Sağlık Personeli Önerisinin Önemi

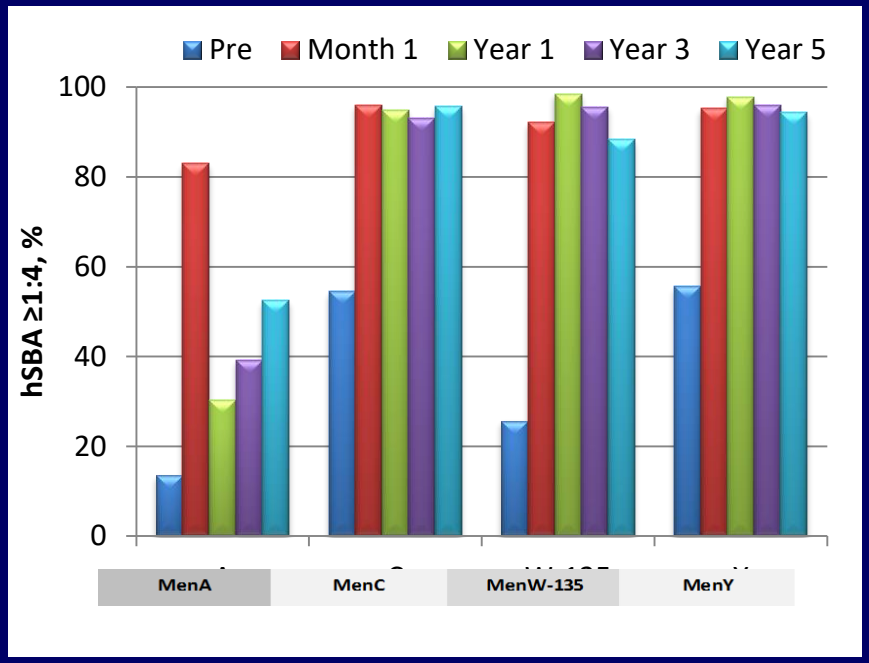
Hasta Davranışı	Doktor Önerisi	Aşılanan %
Pozitif	Evet	84
Negatif	Evet	63
Pozitif	Hayır	7

Adapted from *MMWR* 1988;37:657.

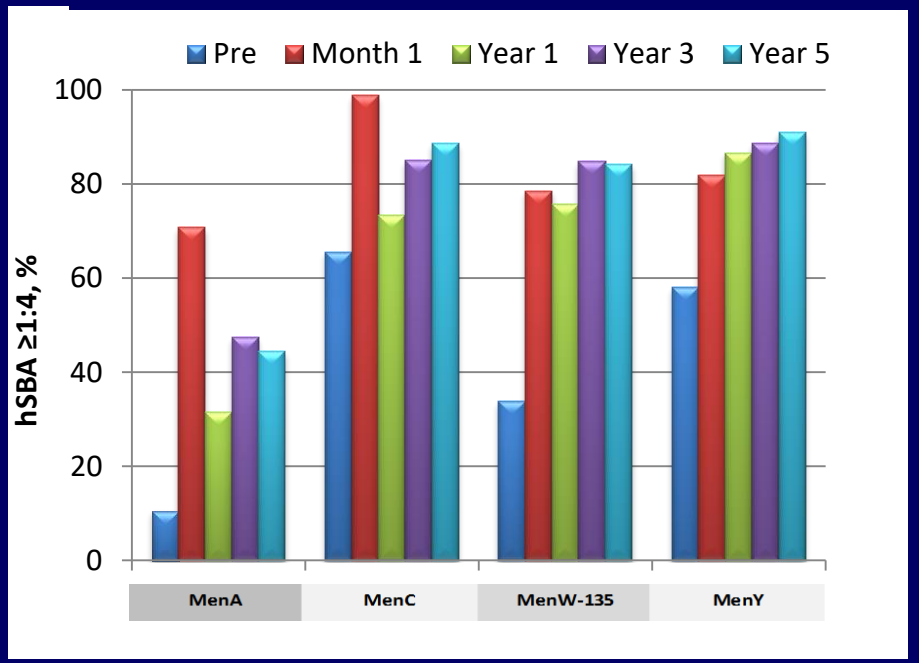
MenACWY-TT Antikor Persistansı

Percentage of participants with hSBA antibody titers ≥1:4

ACWY-TT

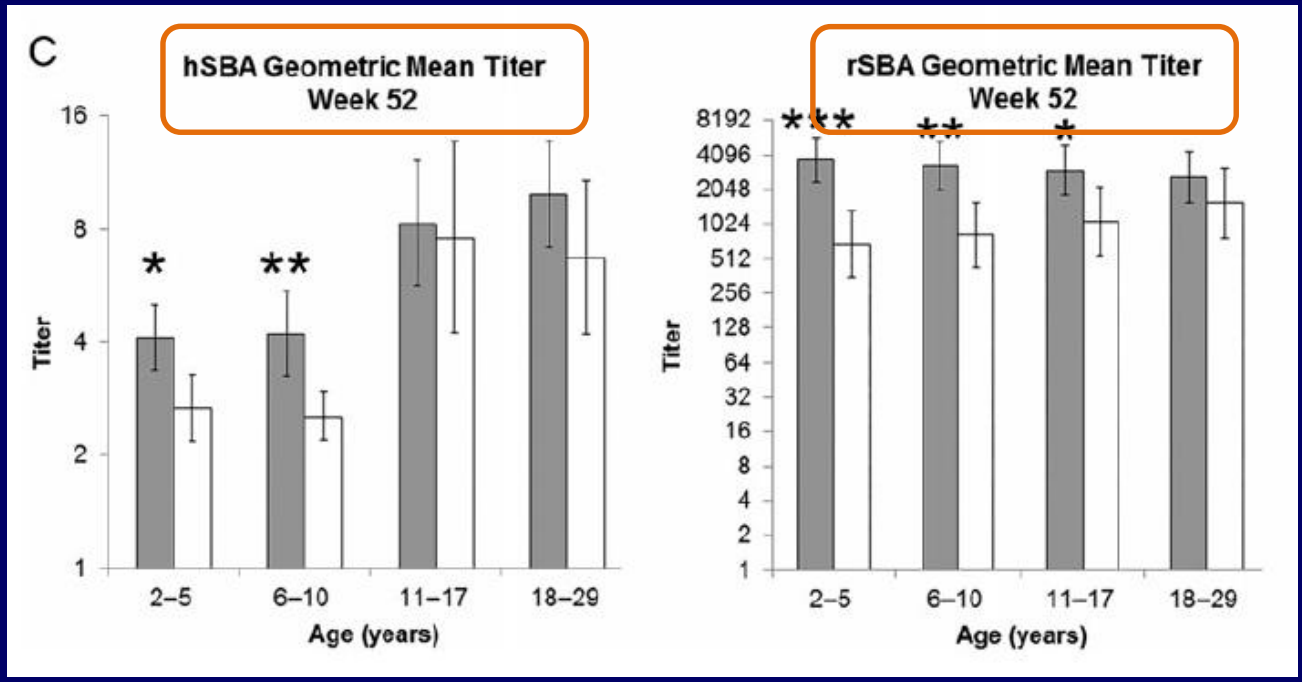


ACWY-DT



Human Complement Bactericidal Responses to a Group A Meningococcal Conjugate Vaccine in Africans and Comparison to Responses Measured by 2 Other Group A Immunoassays

Gregory A. Price,[1] Aimee M. Hollander,[1,a] Brian D. Plikaytis,[2,b] Brian T. Mocca,[1] George Carlone,[2,b] Helen Findlow,[3] Ray Borrow,[3] Samba O. Sow,[4] Aldiouma Diallo,[5] Olubukola T. Idoko,[6] Godwin C. Enwere,[7] Cheryl Elie,[2] Marie-Pierre Preziosi,[7,8] Prasad S. Kulkarni,[9] and Margaret C. Bash[1]



Regardless of the discrepancies between hSBA and rSBA titers and anti-PsA IgG as presented here, the PsA-TT vaccine has had a dramatic effect in the field. To date, no individuals immunized with PsA-TT have become ill due to MenA

Clin Infect Dis. 2015 ; Su