



Public Health
England

Recent epidemiology of meningococcal disease and impact of immunisation programmes in the UK

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Petition signed by more than 800,000 people calling for the meningitis B vaccine to be given to all children under 11.



More than £10,000 has been raised for the family who have been told their 10-month-old daughter will have all her limbs amputated



Evolving UK meningococcal immunisation programme

**Nov
1999**

UK first country to introduce MCC at 2, 3, 4 months of age with catch-up campaign

**Sept
2006**

MCC programme changed to 3, 4 & 12 months of age

**June
2013**

MCC programme changed to 3 & 12 months & 13/14 years of age

Sept 2015

MCC changed to ACYW at 13/14 years of age & catch-up started for all 13 to 18 year olds

UK first country to introduce 4CMenB, 2, 4 & 12 months of age

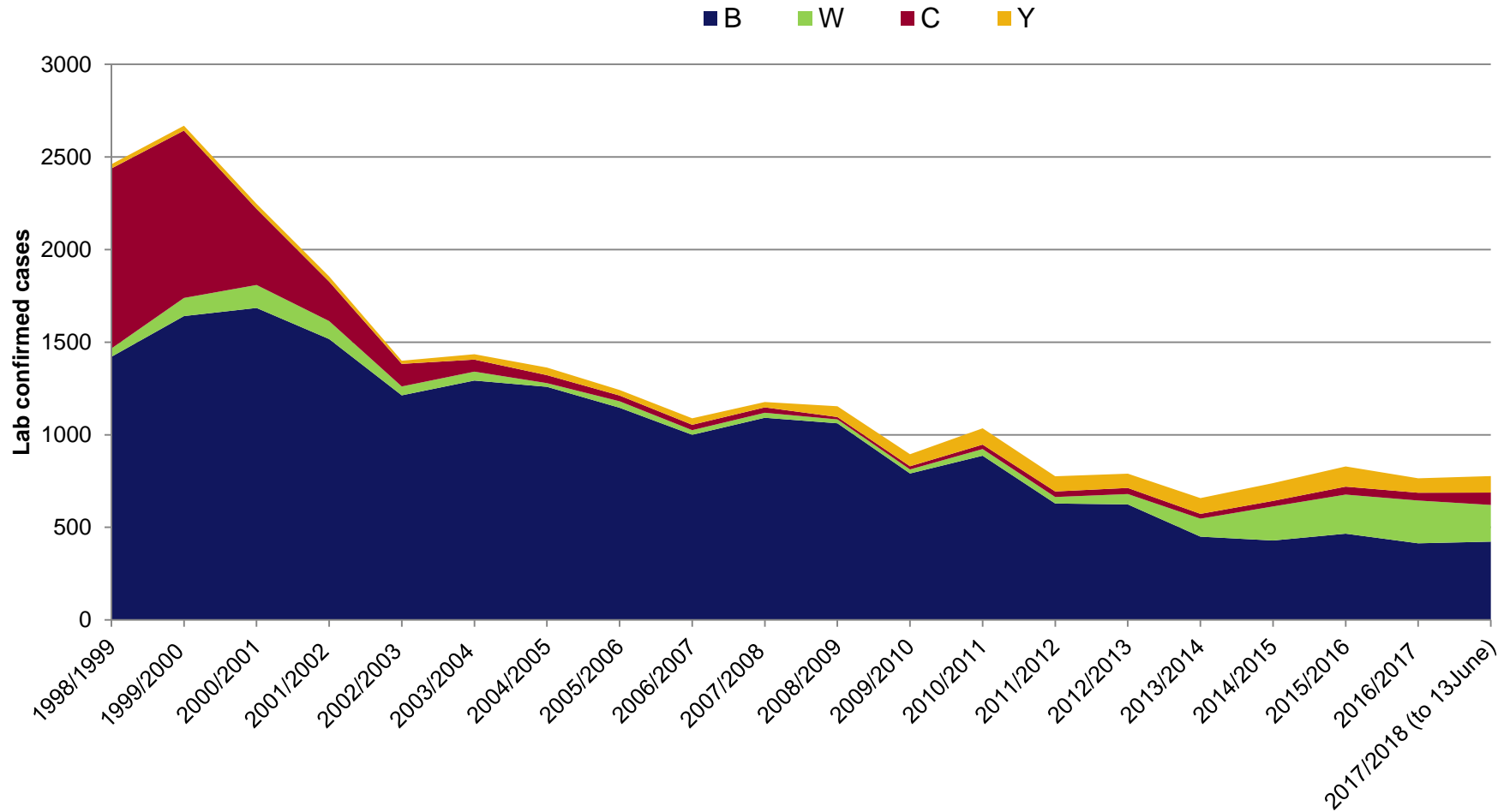
**July
2016**

3 month of age MCC removed



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Invasive meningococcal disease laboratory-confirmed cases England and Wales 1998/9 to 2017/18 (June 13th)





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UK MenB programme

Negotiations to procure at cost-effective price were concluded in late March 2015

MenB vaccine given with routine immunisation appointments from 1st September 2015

Routine cohort: infants born on or after the **1 July 2015**

Schedule: 2, 4 and 12 months (2+1)

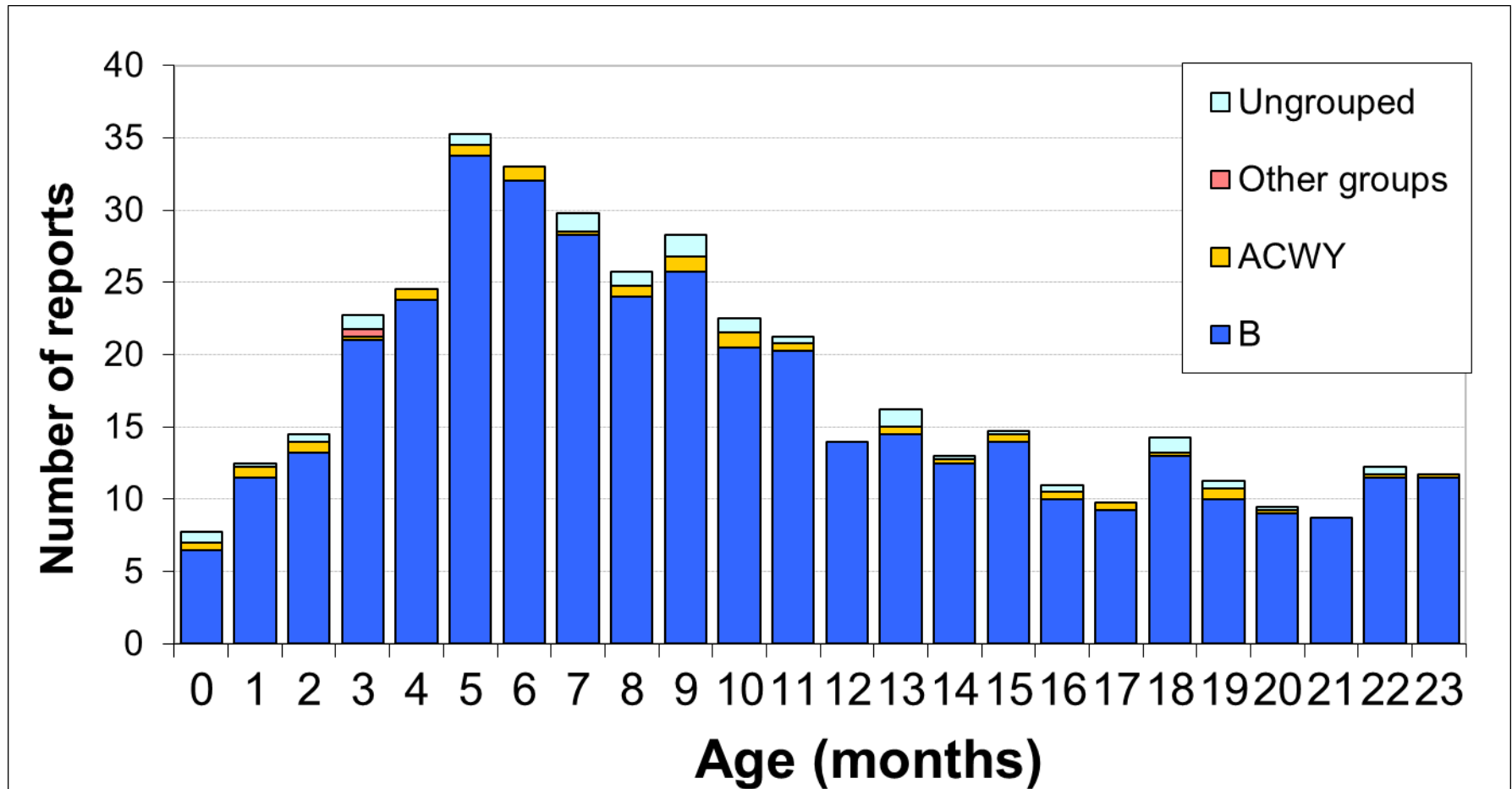
Catch-up cohort: infants born from **1 May to 30 June 2015**

Schedule: 3, 4 and 12 months (2+1)

Schedule: 4 and 12 months (1+1)



Invasive Meningococcal Disease in <2 year-olds England & Wales (2006/07-2010/11)




Effectiveness and impact of a reduced infant schedule of 4CMenB vaccine against group B meningococcal disease in England: a national observational cohort study

Sydel R Parikh, Nick J Andrews, Kazim Beebeejaun, Helen Campbell, Sonia Ribeiro, Charlotte Ward, Joanne M White, Ray Borrow, Mary E Ramsay, Shamez N Ladhani

Doses	Cases vaccinated / total	Average matched coverage	VE* (95 %CI)
2+0	9/13 (69%)	92.9%	82.9% (24.1% to 95.2%)

Assuming 88% of MenB strains covered by 4CMenB, then VE against vaccine-preventable strains **~94%**





Vaccine eligible cohort update

Data until 31st December 2017

- A total of 202 laboratory confirmed cases of IMD in infants were borne from May 1st 2015.
- MenB accounted for 135 (67%) of cases:

B	W	C	Y	NG
135	41	12	8	6
67%	20%	6%	4%	3%

- 25 infants were too young to receive 4CMenB (less than 2 months of age).
- Thus 177 infants/children were vaccine eligible:

B	W	C	Y	NG
116	40	11	6	4
66%	23%	6%	3%	2%



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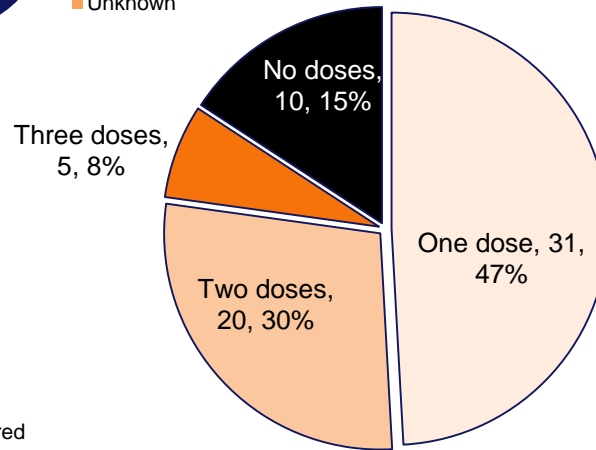
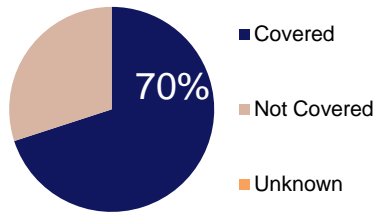
Results: Up to 31st December 2017 (28 months of surveillance) for vaccine eligible children

- Of the MenB cases, 21 (18%), 48 (43%), 36 (31%), and 11 (9%) had received zero, one, two or three doses of vaccine, respectively.
- Cultures were received from 66 (57%) of the MenB cases and thus available for MATS analysis.
- A total of 50 MenB cases (43%) were confirmed by PCR only.

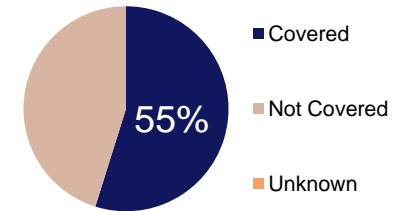


Culture confirmed MenB cases (n=66) - Potential 4CMenB coverage by number of doses

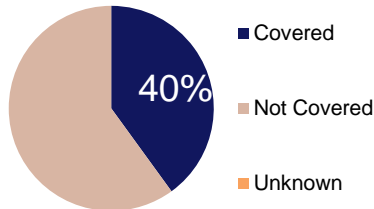
No doses



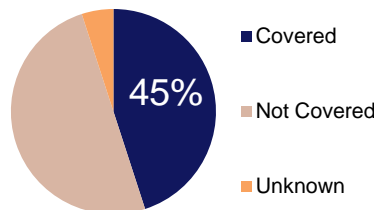
One dose



Three doses



Two doses

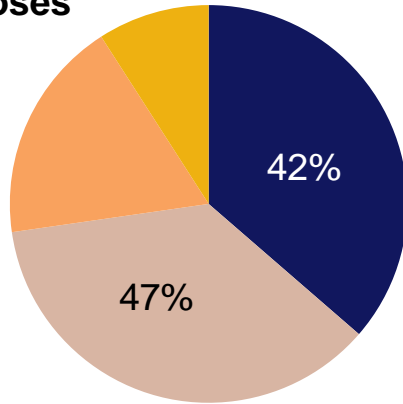




Non-culture MenB cases (n=50)

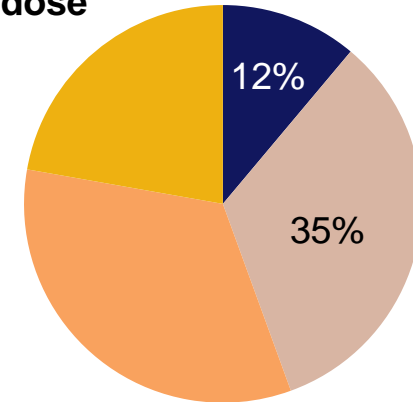
Potential coverage by PorA and/or fHbp

No doses

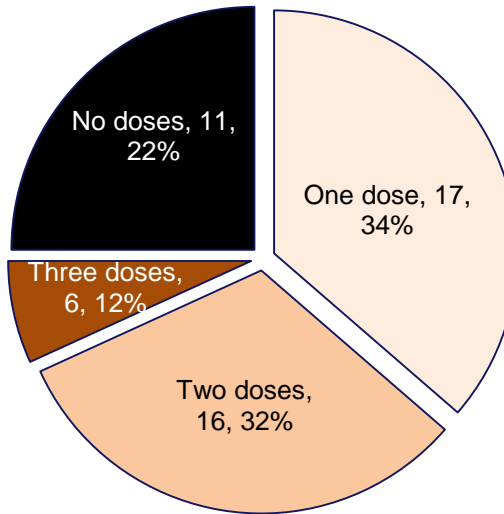
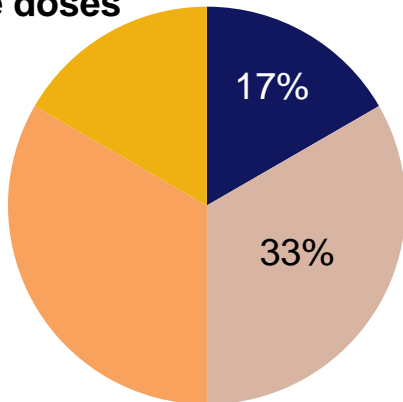


- PorA P1.4 and/or fHbp 1.1 or 1.4
- Other PorA and other fHbp variant 1
- Other PorA and fHbp variant 2 or 3
- No product

One dose

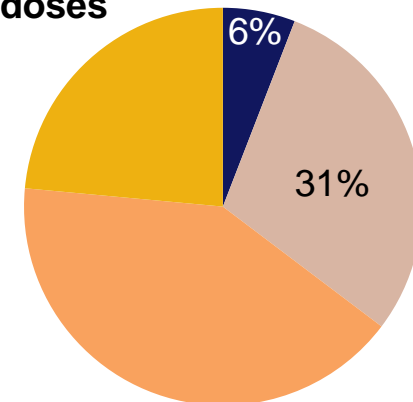


Three doses



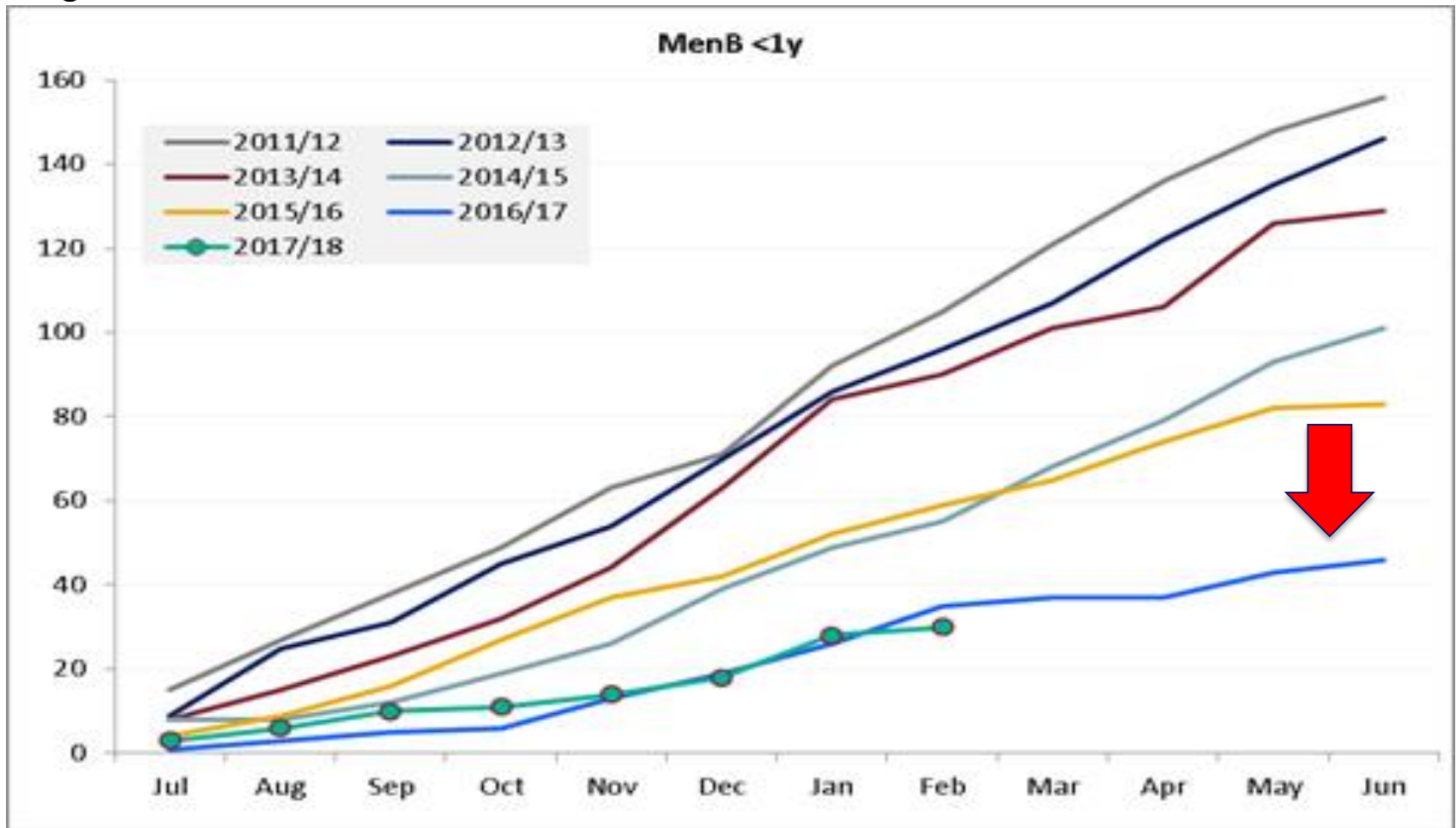
- One dose
- Two doses
- Three doses
- No doses

Two doses



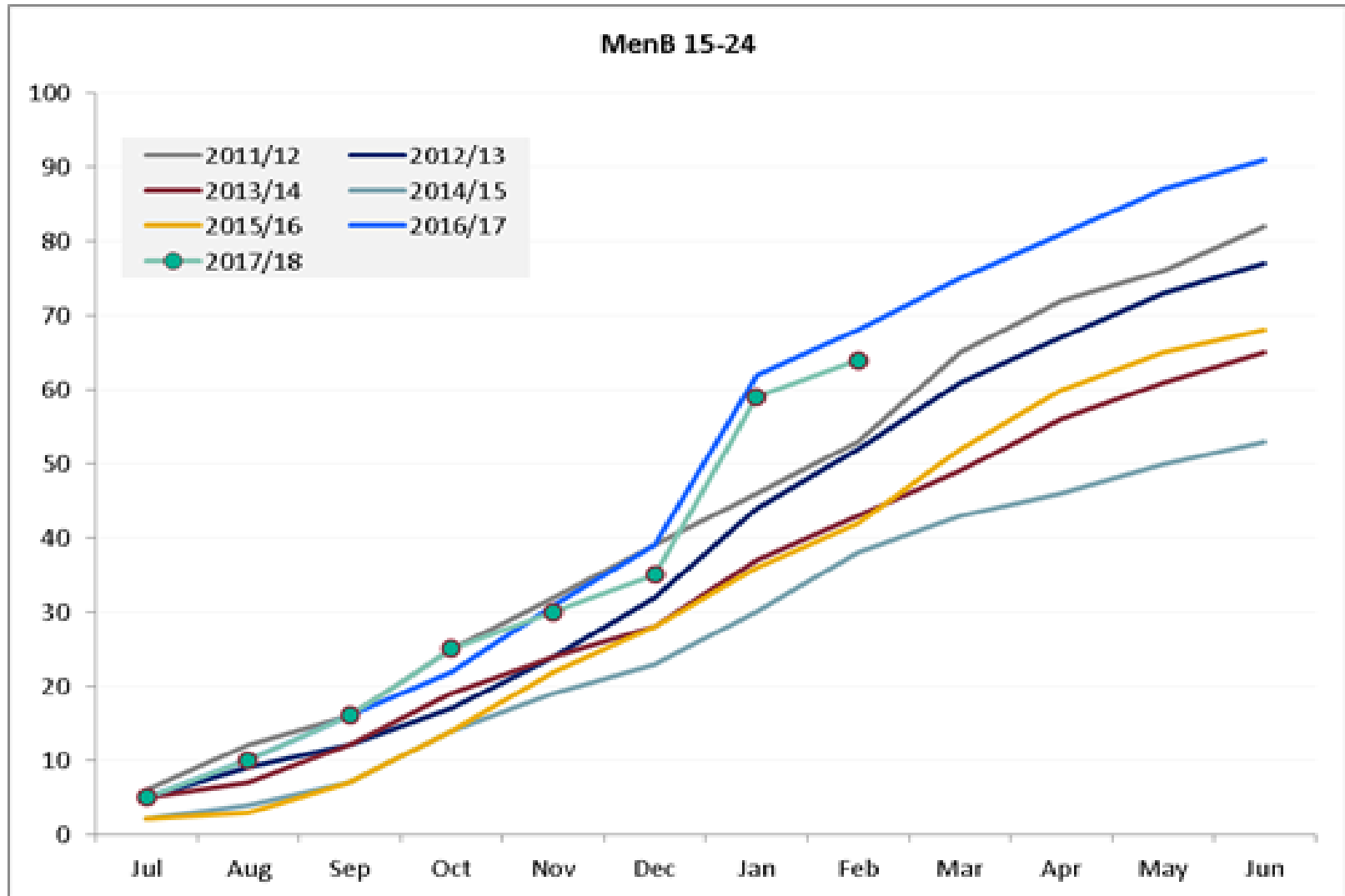


Cases in <1 year-olds





Cases in <15 to 24 year-olds





Vaccine Safety

- So far, 3 million doses given to children so far
- Concerns before vaccine introduction
 - ? Kawasaki Disease – very rare in <6m, no evidence of increase
 - ? Seizures – no evidence of increase in any kind of seizure
 - ? Less likely to have subsequent vaccination – no evidence (97-98% return for their subsequent vaccines)
- Primary Care consultations for fever
 - 1.5-fold increase in infants attending GP for fever post-vaccination with 4CMenB
- Secondary care consultations for fever
 - 3-4 fold increase in infants attending the ED for fever post-vaccination with 4CMenB
- Hospitalisations for fever
 - Around half the infants attending the ED have septic screens +/- antibiotics
 - ? Did the parents give prophylactic paracetamol as recommended?

Effectiveness of Meningococcal B Vaccine against Endemic Hypervirulent *Neisseria meningitidis* W Strain, England

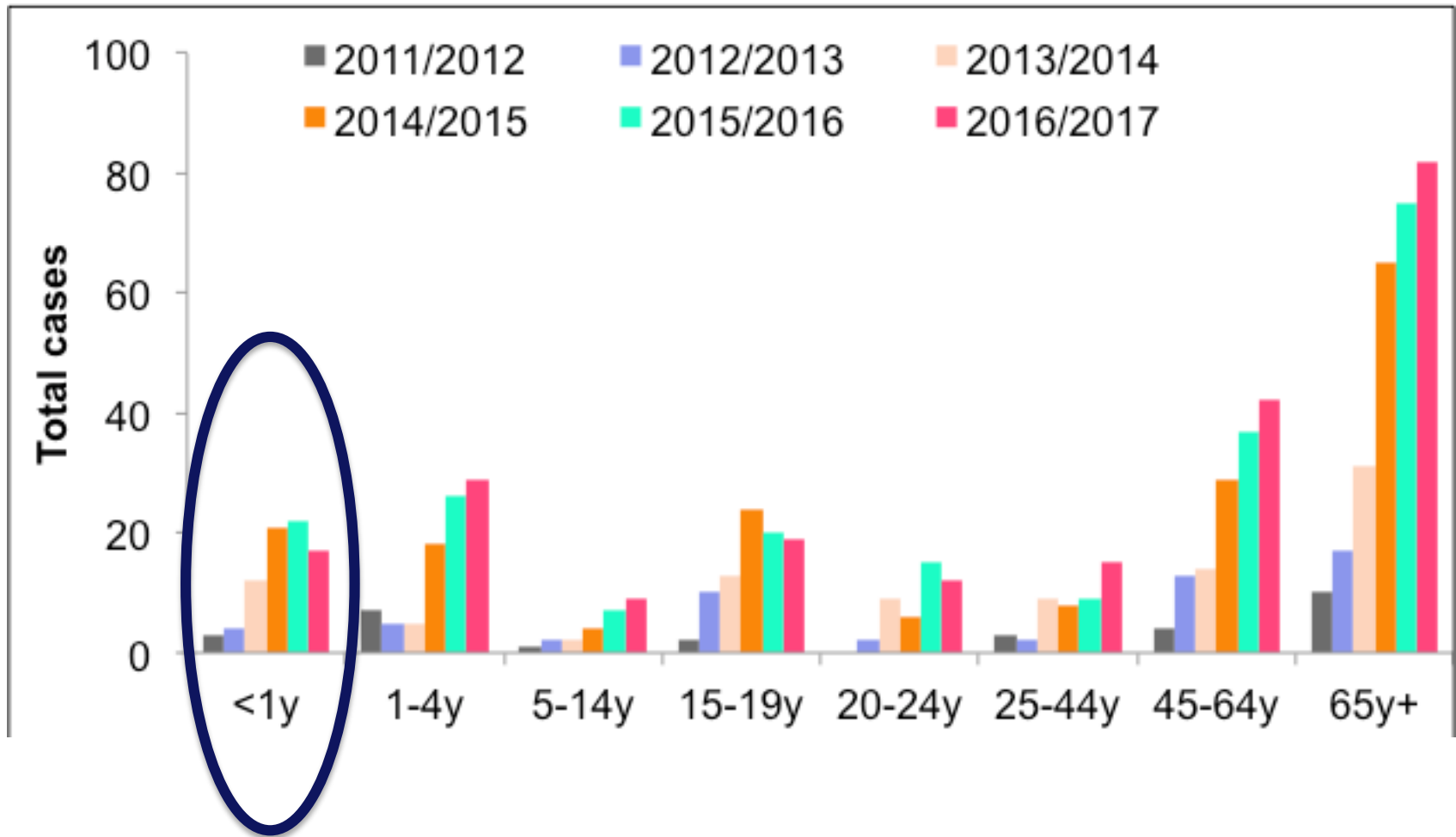
Shamez N. Ladhani, Marzia Monica Giuliani,
Alessia Biolchi, Mariagrazia Pizza,
Kazim Beebeejaun, Jay Lucidarme,
Jamie Findlow, Mary E. Ramsay, Ray Borrow

Lab number	Site	Type	Pre-	Pool1	Pool2	Pool3	Pool4
M							st 4th
M							128
M							64
M							>64
M12-240016	Blood	W:2aP1.5,2 cc11	<2	32	32	64	128
M11-240798	Blood	W:NT:P1.5,2 cc11	<2	>64	>64	>64	>64
M12-240754	Blood	W:NTP1.5,2 cc11	<2	64	64	>64	>64

Suggests that children immunised with 4CMenB may have some protection against MenW cc11



Any Impact on W ? (up to 2016/17)





Capsular group W in vaccine eligible cohort

No doses, 6 cases (3 culture & 3 PCR only)

One dose, 16 cases (13 culture & 3 PCR only)

Two doses, 17 cases (11 culture & 6 PCR only)

Three doses, 1 case (PCR only):

onset 7 months post booster

PorA P1.5,2

fHbp variant 1, allele 377, peptide 318

W cc11 normally fHbp variant 2, allele 22, peptide 22

W cc11 isolates possess NadA variant 2/3

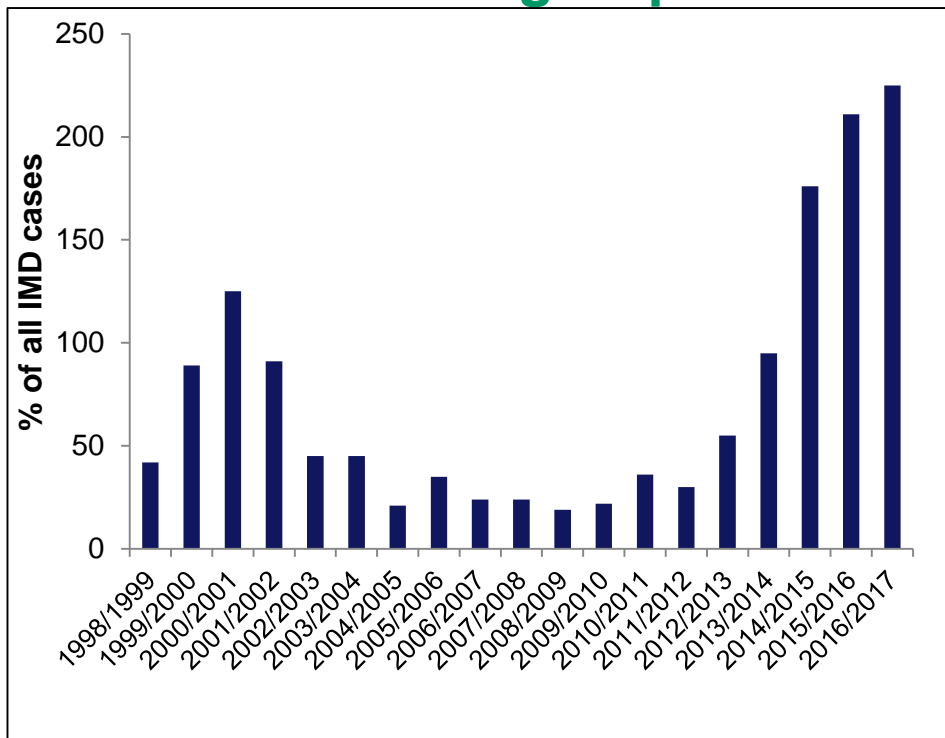


A DEADLY STRAIN OF MENINGITIS W IS ON THE RISE—BUT WHAT IS IT?

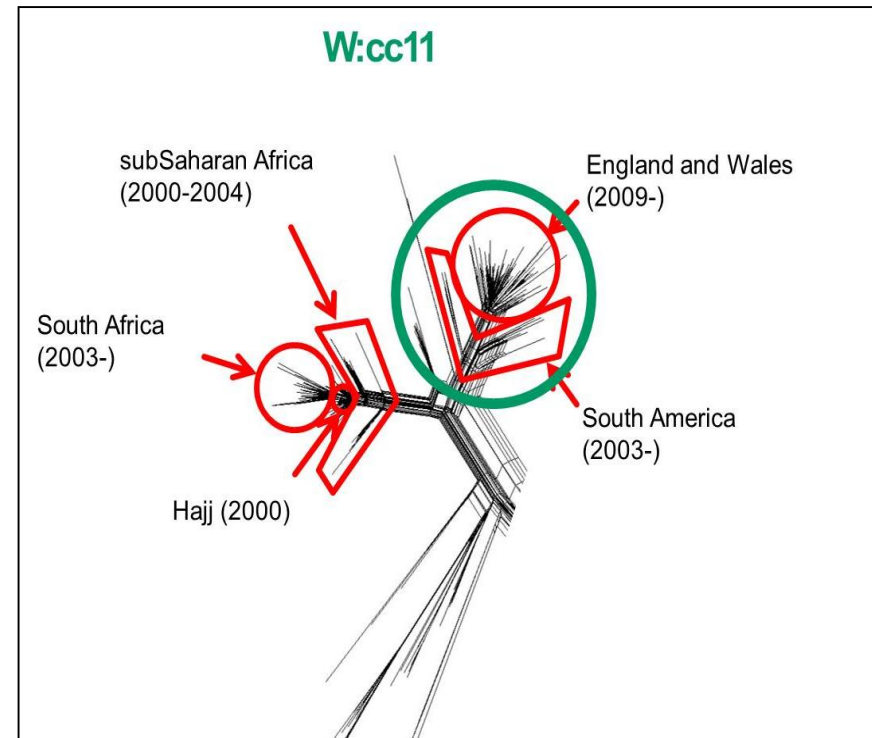
Cases of the aggressive meningitis W strain have increased nearly tenfold since 2009.

BY LUCY CLARKE-BILLINGS ON 8/17/16 AT 3:35 PM

England & Wales lab confirmed cases of serogroup W



W cc11 split tree analysis





MenACWY vaccination programme roll-out

Birth cohort	2014/15 year - age	Academic year				
		2014/15	2015/16	2016/17	2017/18	2018/19
01/09/2003-31/08/2004	Y6 – 10/11				Y9 ACWY	Y9 ACWY
01/09/2002-31/08/2003	Y7 - 11/12			Y9 ACWY		
01/09/2001-31/08/2002	Y8 - 12/13		Y9 ACWY	Y10 ACWY		
01/09/2000-31/08/2001	Y9 - 13/14		Y10 ACWY	Y11 ACWY		
01/09/1999-31/08/2000	Y10 - 14/15	Y10 MenC	Y11 ACWY			
01/09/1998-31/08/1999	Y11 - 15/16			Y13 ACWY		
01/09/1997-31/08/1998	Y12 - 16/17		Y13 ACWY			
01/09/1996-31/08/1997	Y13 – 17/18	Y13 ACWY				

Key

Routine schedule MenC

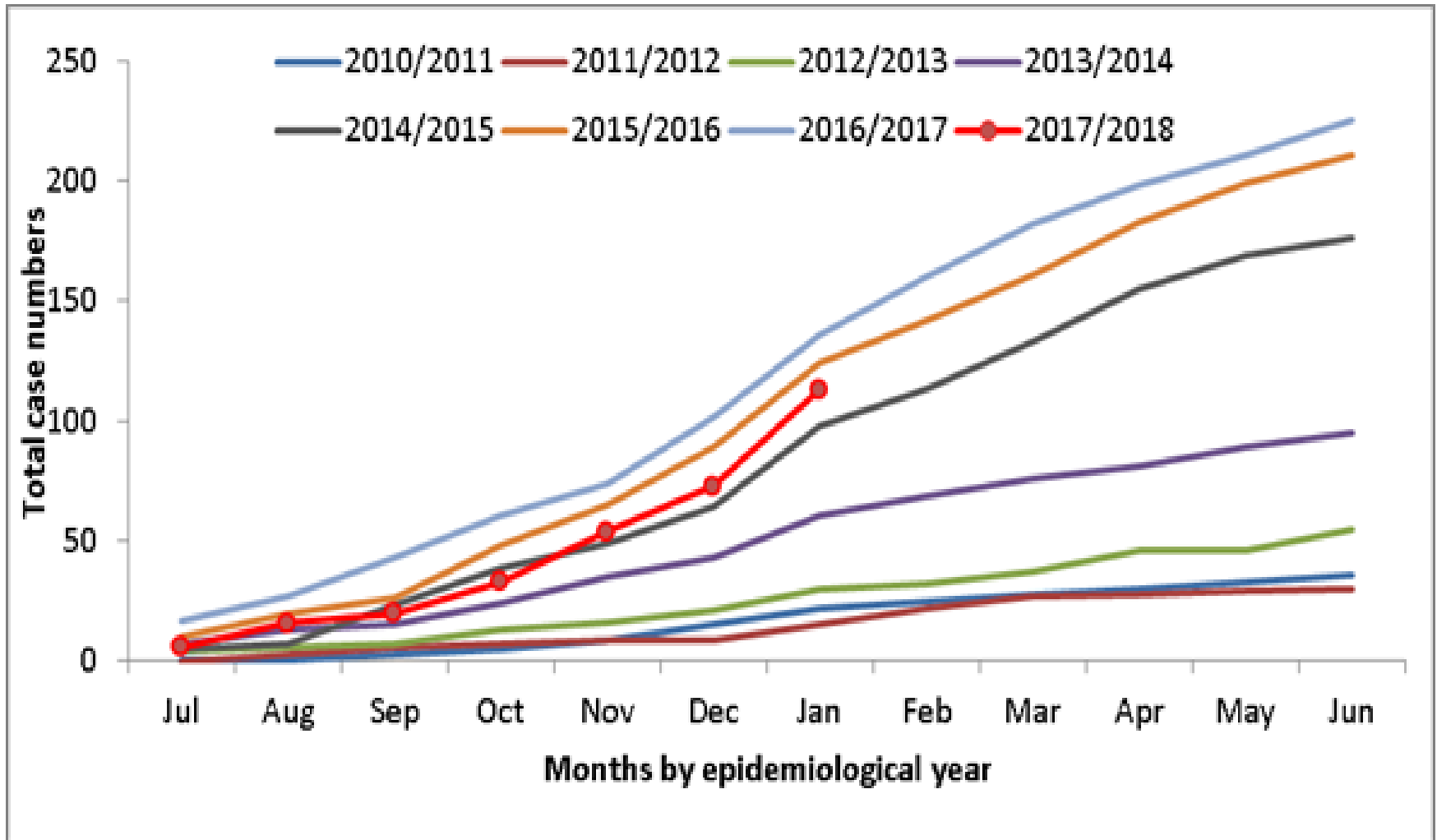
Routine schedule ACWY

School based catch-up ACWY

Primary care catch-up cohorts

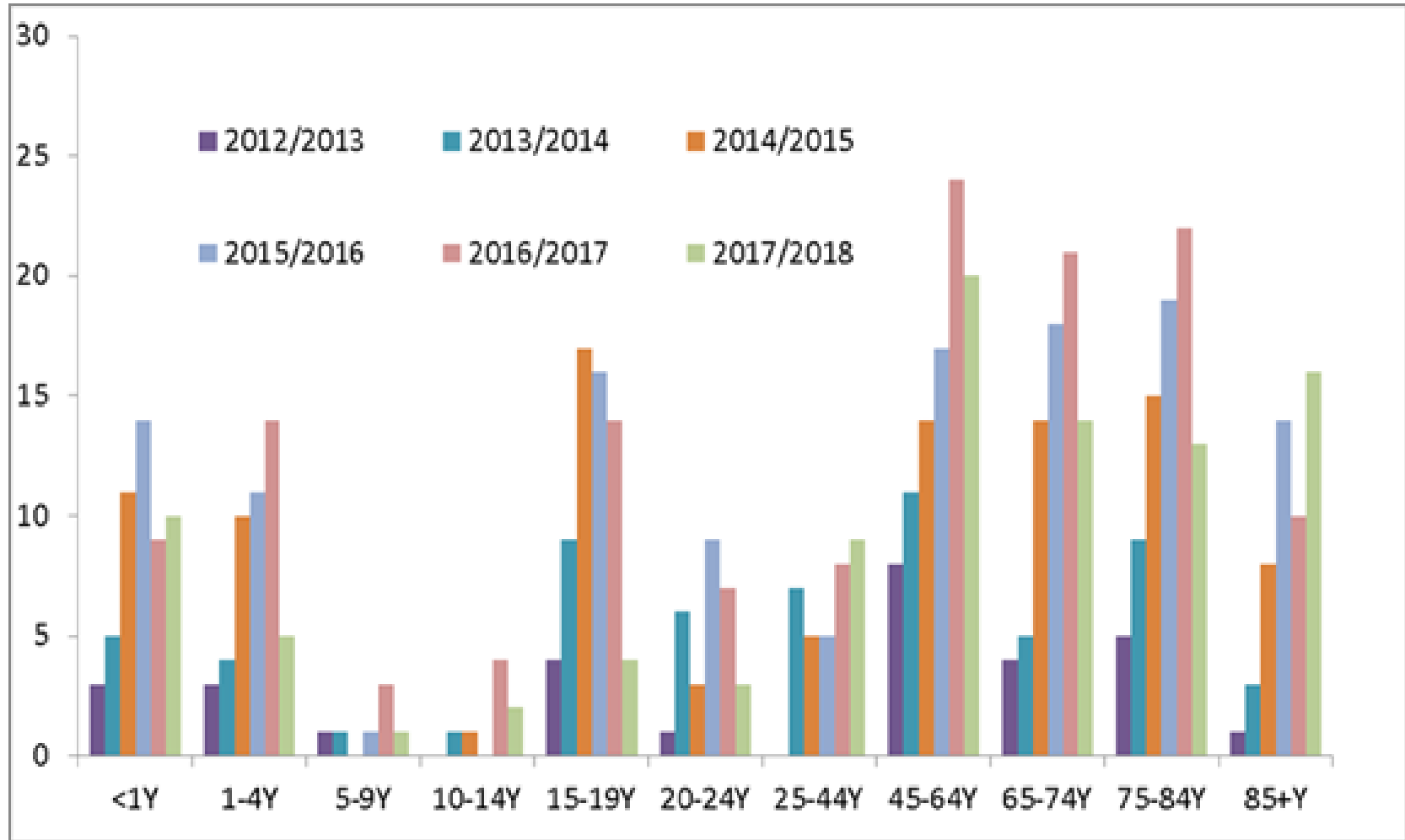


Cumulative totals of lab confirmed MenW disease, England





Age distribution of MenW cases by epidemiological year (July- Jan only)





Decision to Stop 3 month MenC dose

- MenC disease is extremely rare in the UK
- Most children currently receive MenC vaccine due to rapid waning of immunity
- Recent evidence suggests that the current MenC programme leads to 4 additional cases in infants and <1 additional case in toddlers annually
- Removing the 3-month MenC dose may lead to 4 additional cases in infants (<1 year-olds)
- Removing MenC at 3 months of age
- Giving additional vaccines at 3m [? PCV13]

PHE REPORT TO JCVI

Removing the 3-month MenC dose may lead to 4 additional cases in infants and <1 additional case in toddlers annually



MenC cases < 1 year, England

- Overall, cases of IMD in <1 years of age have fallen since the MenB programme was introduced.
- There were 119 cases in 2014/15 compared to only 90 in 2017/18 (July to May inclusive).
- This reduction has been driven by the impact of MenB vaccination, as MenB case numbers in infants fell by 39 (42% fall).
- Over the same time period, MenW and MenY cases in infants have remained fairly stable over the last 4 years.
- In contrast, MenC infant cases have increased from 1 to 12.



MenC cases < 1 year, England

- 7/12 (58.3%) occurred in one region 10.9 per 100,000
- The two recent MenC infant deaths & one known severe infant case with life-changing outcomes were also reported from this region.
- As there have been no epidemiological links identified between the infant cases, this would suggest increased circulation of MenC within the community of that region.
- The adolescent MenCAWY programme is expected to control circulation of MenC by reducing rates of carriage in young adults.
- As no substantial difference in the meningococcal immunisation programmes, vaccine coverage rates or performance in the region suggests that the excess cases are a very unfortunate but random event.



Summary

- MenB cases continue to decline from 349 in 2015/6 to 277 in 2016/17.
- 4CMenB continues to have a significant impact on MenB disease in infants and toddlers.
- Surveillance on-going ... > 3 million doses ...No safety concerns so far.
- MenW cases across all age groups have declined for the first time in 2017/18.
- In infants, there is some evidence of 4CMenB impact on MenW disease, but very few cases.
- Cases of serogroup C are being closely monitored.



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Acknowledgements

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(<http://www.meningitis.org/research/genome>).