Invasive Meningococcal Disease, 2011–2020, and Impact of the COVID-19 Pandemic, England

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Invasive meningococcal disease incidence in England declined from 1.93/100,000 persons (1,016 cases) in 2010–11 to 0.95/100,000 (530 cases) in 2018–19 and 0.74/100,000 in 2019–20 (419 cases). During national lockdown for the coronavirus disease pandemic (April–August 2020), incidence was 75% lower than during April–August 2019.

Neisseria meningitidis is a major global cause of bacterial meningitis and septicemia (*1*). Six serogroups (A, B, C, W, X, Y) are responsible for most invasive meningococcal disease (IMD) cases (*1*). In the United Kingdom, implementation of serogroup C (MenC) meningococcal conjugate vaccine in 1999 led to sustained declines in MenC disease (*2*). In August 2015, an emergency adolescent MenACWY immunization program for persons 13–18 years of age and new university students was implemented to control a national outbreak of a hypervirulent MenW strain belonging to sequence type 11 clonal complex (MenW:cc11) (*3*). In September 2015, the United Kingdom became the first country to add a protein-based meningococcal B vaccine, 4CMenB, into the national infant immunization program (*4*). Both programs have reduced IMD caused by the respective vaccine serogroups (*5*).

Since December 2019, the novel coronavirus (COVID-19) pandemic has led to major changes in the epidemiology of bacterial and viral infections worldwide (Brueggemann AB et al., unpub. data, https://www.medrxiv.org/content/10.1101/2020.11.18.20225029v1). We report IMD incidence in England during 2011–2020, including the impact of a national lockdown to control the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Public Health England (PHE) conducts national surveillance of IMD (*6*) and SARS-CoV-2 (*7*) in England. IMD incidence was highest, 1.93 cases/100,000 population (1,016 total cases), during the 2010–11 academic year (September–August) and declined to 1.15 cases /100,000 population for 2013–14 (617 cases) before increasing to 1.51 cases /100,000 population (825 cases) in 2015–16 (Figure). Adolescent MenACWY and infant 4CMenB immunization programs in 2015 led to additional annual declines in IMD incidence, to 0.95 cases /100,000 population (530 cases) in 2018–19 (incidence rate ratio [IRR] 0.63 [95% CI 0.56–0.70] for 2018–19 vs. 2015–16). Incidence further declined during the 2019–20 pandemic year (419 cases; 0.74 cases /100,000 population; IRR 0.49 [95% CI 0.44–0.56] for 2019–20 vs. 2015–16). IMD cases declined for all serogroups from 2015–16 to 2019–20: MenB by 38% (from 452 to 279 cases), MenC by 41% (41 to 24 cases), MenW by 68% (218 to 70 cases) and MenY by 66% (108 to 37 cases) (Appendix Figure 1, https://wwwnc.cdc.gov/EID/article/27/9/20-4866-App1.pdf).

IMD cases declined after the national COVID-19 lockdown on March 23, 2020, and remained low during April–August 2020 (Appendix Figure 2). During 2018–19, PHE received 12,628 clinical samples from patients with suspected IMD; of these, 462 (4%) tested positive for *N. meningitidis*. These totals were 9,968 specimens, 401 (4%) positive, during 2019–20 (21% fewer cases). During April–August 2020, a total of 50 (1.8%) of 2,808 samples tested positive for *N. meningitidis*, compared

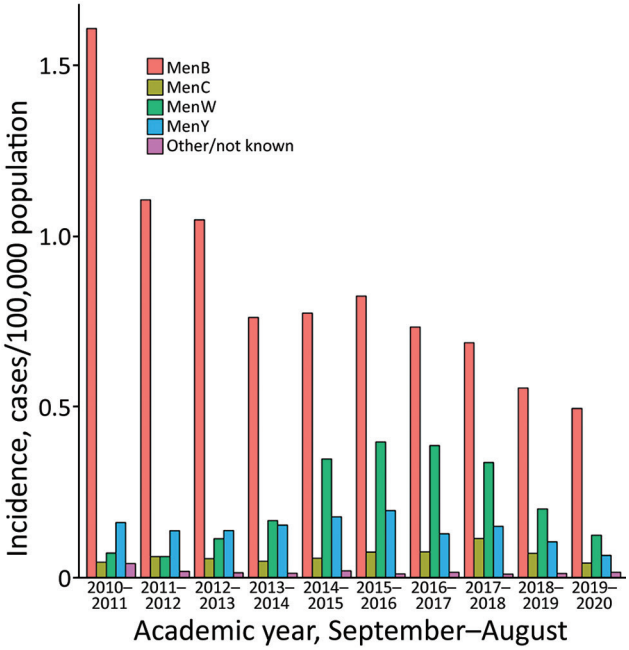

Figure. Cases of invasive meningococcal disease, by academic year, England, 2015–2020. Men, meningococcal conjugate vaccine (by serogroup).

Table. Confirmed cases of meningococcal disease during April–August 2019 and April–August 2020, England*

Category	April–Aug 2019, no. (%)	April–Aug 2020, no. (%)	RR (95% CI)
Group			
Total (N)	179	45	0.25 (0.18–0.35)
MenB	104 (58)	33 (73)	0.32 (0.21–0.47)
MenC	14 (8)	5 (11)	0.36 (0.13–0.99)
MenW	42 (23)	5 (11)	0.12 (0.05–0.30)
MenY	16 (9)	0	0
Other	3 (2)	2 (4)	0.67 (0.11–3.97)
Age group, y			
Total	179	45	0.25 (0.18–0.35)
<5	39 (22)	17 (38)	0.44 (0.25–0.78)
5–14	20 (11)	4 (9)	0.2 (0.07–0.58)
15–24	24 (13)	4 (9)	0.17 (0.06–0.48)
25–64	53 (30)	14 (31)	0.26 (0.15–0.47)
≥65	43 (24)	6 (13)	0.14 (0.06–0.32)

*The numbers of typeable strains during the specified time frame by age group are shown. RR, relative risk.

with 134 (2.7%) of 5,025 samples during the same period in 2019 (p = 0.016). Combining culture-confirmed and PCR-confirmed cases, IMD incidence was 75% lower (IRR 0.25, 95% CI 0.18–0.35) during April–August 2020 than during April–August 2019 (Table). In contrast, IMD incidence during September 2019–March 2020 (the 7 months before national lockdown) was similar to that for September 2018–March 2019 (IRR 1.06, 95% CI 0.91–1.23). Declines were observed for all age groups and serogroups (Appendix Table). During lockdown, compared with the same period during the previous year, MenB was overrepresented (33/45 [73%] vs. 104/179 [58%] cases), whereasMenW (5/45 [11%] vs. 42/179 [23%] cases) and MenY (0/45 [0%] vs. 16/179 [9%] cases) were underrepresented (Appendix Table, Figure 1).

A total of 45 IMD cases were diagnosed during April–August 2020. The median age of patients was 67 (interquartile range 20–85) years. Linkage with national SARS-CoV-2 data identified 2 patients with IMD who were also positive for SARS-CoV-2 by reverse transcription PCR; both were <90 days of age with late-onset MenB meningitis, and 1 died. Meningitis (with or without septicemia) was proportionally more frequent during the lockdown months compared with the same period in 2019 (27/45 [60%] v. 71/179 [39.7%] cases; p = 0.014). Three (6.7%) of the 45 patients died within 28 days of diagnosis: the infant with co-infection, an adult with MenB meningitis, and an older adult with MenB septicemia.

Limitations of our study include limited clinical data collected for undiagnosed IMD cases. Cases and case-fatality rates during the lockdown period might also be underestimated if some patients died of IMD at home because they did not seek medical help earlier as a result of the stay at home messaging during lockdown.

In summary, IMD incidence in England has been declining since the early 2000s (*8*) because of the MenC immunization program and natural trends in MenB disease and further declined because of 2 new meningococcal immunization programs. National lockdown in March 2020 led to a 75% reduction in cases compared with the same period in the previous year, with MenB cases overrepresented. Declines in IMD cases after national lockdown were also reported in France (*9*), which is reassuring because viral infections are known to precede IMD; therefore, SARS-CoV-2 could potentially have increased the risk of secondary bacterial infections. Our findings do not support wider vaccination against IMD during the COVID-19 pandemic.

About the Author

Dr. Subbarao is a microbiology and infectious diseases registrar for Public Health England in London. Her main interests are vaccine-preventable diseases, antimicrobial stewardship, and *M. tuberculosis*.

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SARS-CoV-2 Infection among Pregnant and Postpartum Women, Kenya, 2020–2021

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We determined incidence of severe acute respiratory syndrome coronavirus 2 and influenza virus infections among pregnant and postpartum women and their infants in Kenya during 2020–2021. Incidence of severe acute respiratory syndrome coronavirus 2 was highest among pregnant women, followed by postpartum women and infants. No influenza virus infections were identified.

[1]These authors contributed equally to this article.

Information about the incidence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection among hospitalized pregnant women is available (*1*), but information about incidence among pregnant women in the community is not. We therefore quantified the incidence of symptomatic laboratory-confirmed SARS-CoV-2 and influenza infections among pregnant and postpartum women and their infants in Kenya during 2020–2021. The study was reviewed and approved by the Kenya Medical Research Institute Scientific and Ethics Review Unit (KEMRI SSC. 2880) and the Centers for Disease Control and Prevention (CDC) Institutional Review Board (CDC protocol 6709; 45 C.F.R. part 46; 21 C.F.R. part 56). All participants provided written consent.

We adapted an ongoing prospective multiyear influenza mother/baby cohort to include SARS-CoV-2 testing (*2*). Pregnant women at <31 weeks of gestation who were seeking prenatal care in Siaya County, Kenya, were approached for enrollment. Those who provided informed consent completed a survey about their demographics and antenatal history and were tested for HIV infection. Women were then phoned or visited at home once weekly until delivery and through their postpartum period, together with their infants, for 6 months to

Table. Characteristics of pregnant and postpartum women and their infants with laboratory-confirmed severe acute respiratory syndrome coronavirus 2 infection, Kenya, May 2020–February 2021*

Characteristic	Values
Women, n = 16	
Days from onset to swabbing, mean (SD)	2.6 (1.9)
Care-seeking from onset, d	
≤2	11 (68.8)
>2	5 (31.3)
Self-reported symptoms	
Fever in past 48 h	2 (12.5)
Measured fever ≥38.0°C	2 (12.5)
Cough	16 (100)
Shortness of breath	1 (6.3)
Runny nose	10 (62.5)
Headache	10 (62.5)
Muscle/ joint pain	2 (12.5)
Antimicrobial medication	16 (100)
Infants, n = 2	
Days from onset to swabbing, mean (SD)	2.5 (2.1)
Care-seeking from onset, d	
≤2	1 (50.0)
>2	1 (50.0)
Clinical signs reported by mother	
Fever in previous 48 h	1 (50.0)
Measured fever ≥38.0°C	1 (50.0)
Cough	2 (100)
Runny nose	1 (50.0)
Diarrhea	1 (50.0)
Antimicrobial medication	2 (100)

*Values are no. (%) unless otherwise indicated.

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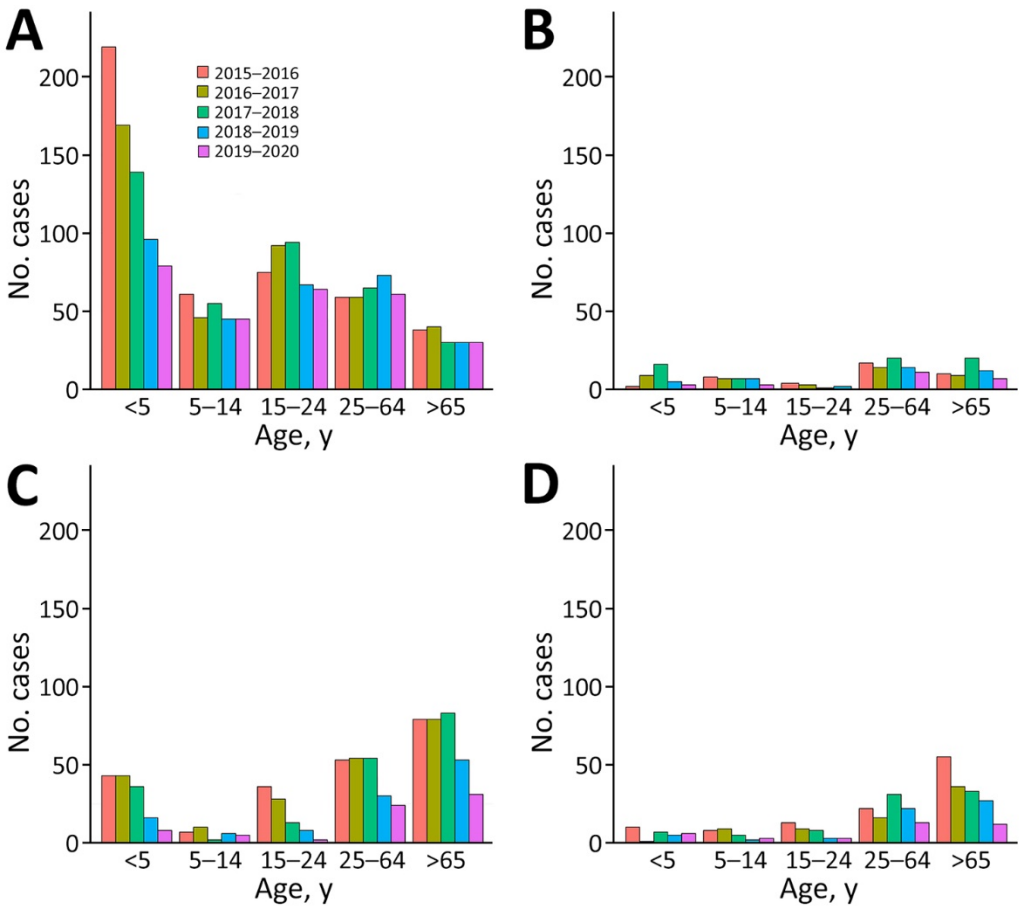
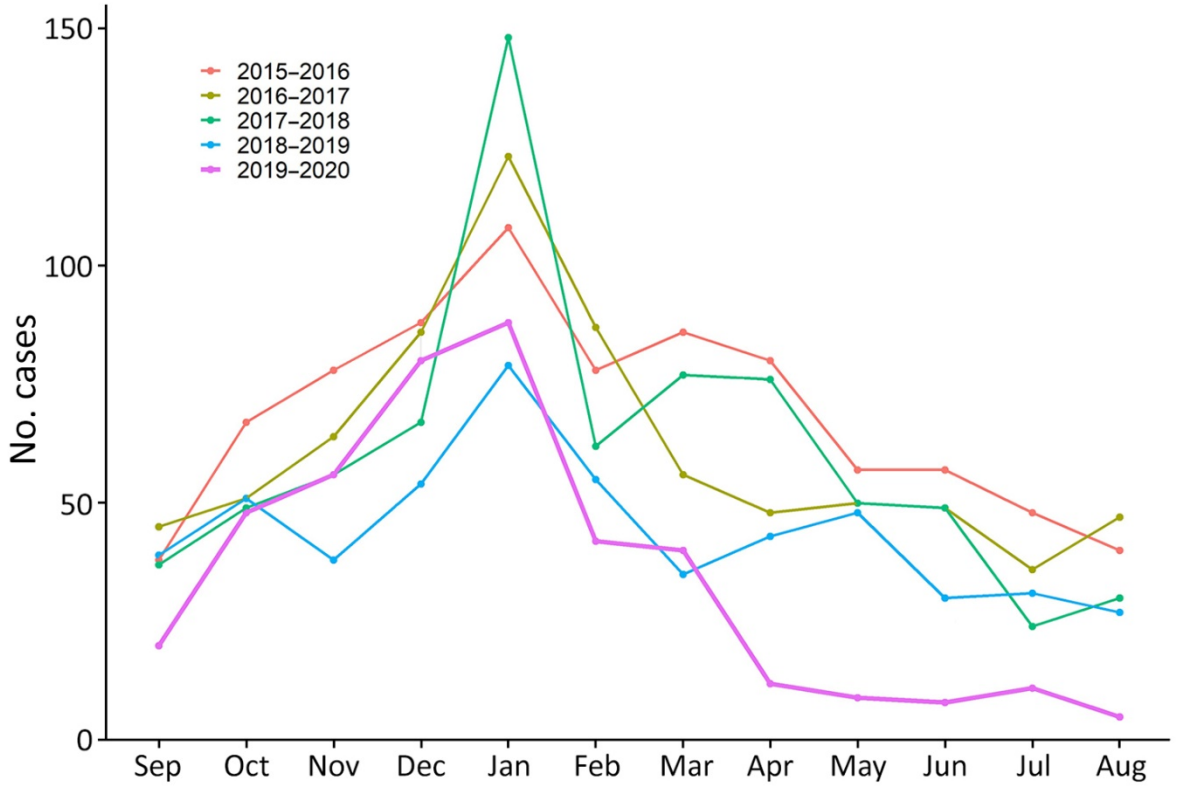
Appendix

Appendix Table. Demographic, clinical, and microbiological information comparing cases of meningococcal disease during April–August 2019 and 2020 using χ^2 test of independence

Characteristic	April–Aug 2019 n (%)	April–Aug 2020 n (%)	χ^2 test of independence p value
Total	179 (100%)	45 (100%)	
Sex			0.301
Female	92 (51%)	27 (60%)	
Male	87 (49%)	18 (40%)	
Age group, y			0.175
<5	39 (22%)	17(38%)	
5–14	20 (11%)	4 (9%)	
15–24	24 (13%)	4 (9%)	
25–64	53 (30%)	14 (31%)	
≥65	43 (24%)	6 (13%)	
Serogroup			0.046
MenB	104 (58%)	33 (73%)	
MenC	14 (8%)	5 (11%)	
MenW	42 (23%)	5 (11%)	
MenY	16 (9%)	0 (0%)	
Other/not known	3 (2%)	2 (4%)	
Clincial presentation			0.097
Meningitis	27 (15%)	13 (29%)	
Septicemia	87 (49%)	15 (33%)	
Meningitis and septicemia	44 (25%)	14 (31%)	
Pneumonia	5 (3%)	0 (0%)	
Other source	16 (9%)	3 (7%)	
Identification			0.028
Culture positive	76 (42%)	12 (27%)	
PCR positive	61 (34%)	25(56%)	
Culture/PCR positive	42 (23%)	8 (18%)	
Death within 28 d	13 (7%)	3 (7%)	0.89



Appendix Figure 1. Annual number of cases of invasive meningococcal disease, England, 2015–2020: A) MenB; B) MenC; C) MenW; D) MenY.



Appendix Figure 2. Total numbers of cases of invasive meningococcal disease, England, 2015–2020.