PEDIATRIC VACCINES & INFECTIOUS DISEASES

SEPTEMBER 2018

Jump-start immunizations in the NICU

Talking with vaccine-hesitant parents takes training and finesse

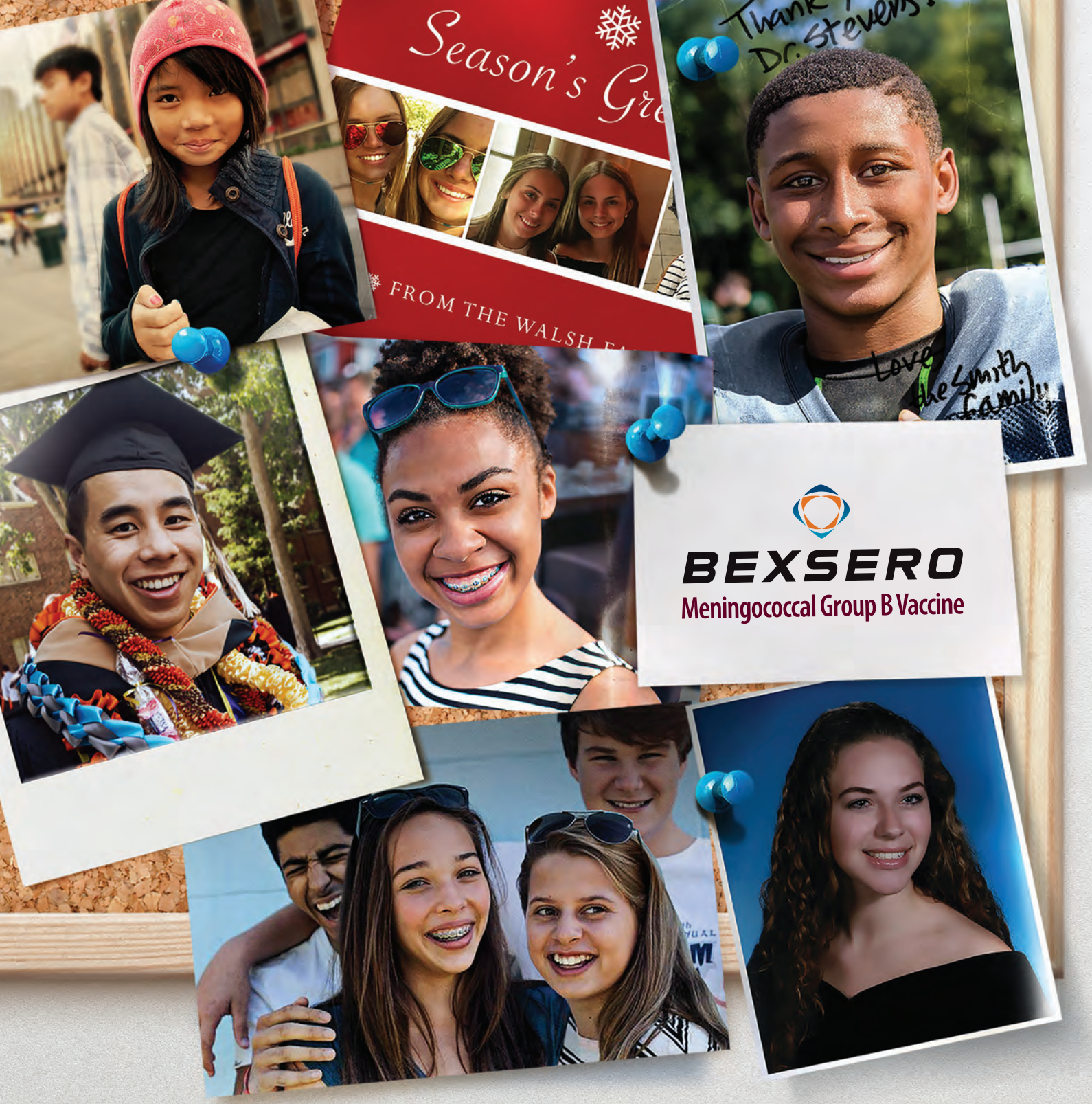
Try a flu shot program to raise compliance

Measles exacts a high toll among Europe's youngest citizens

Commentary by Kristina A. Bryant, MD

A SUPPLEMENT TO

Pediatric News®



The persons depicted are models used for illustrative purposes only.

FAST-MOVING LIVES DEMAND THE FASTEST SERIES COMPLETION

ONLY BEXSERO CAN HELP PROTECT YOUR PATIENTS FROM MenB IN AS FAST AS 1 MONTH WITH 2 DOSES[1,2]

4 COMPONENTS

that may be present on the surface of MenB are distinctly targeted by BEXSERO.[1]

2 DOSES

of BEXSERO are administered, each as a 0.5-mL prefilled syringe.[1]

AS FAST AS 1 MONTH

The dosing schedule for BEXSERO allows your patients to complete the series within the span of 1 typical summer break.[1]

Talk with your adolescent patients about vaccinating against MenB

Visit **www.ChooseBEXSERO.com**

Indication for BEXSERO

BEXSERO is a vaccine indicated for active immunization to prevent invasive disease caused by *Neisseria meningitidis* serogroup B. BEXSERO is approved for use in individuals 10 through 25 years of age.

Approval of BEXSERO is based on demonstration of immune response, as measured by serum bactericidal activity against three serogroup B strains representative of prevalent strains in the United States. The effectiveness of BEXSERO against diverse serogroup B strains has not been confirmed.

Important Safety Information for BEXSERO

- BEXSERO is contraindicated in cases of hypersensitivity, including severe allergic reaction, to any component of the vaccine, or after a previous dose of BEXSERO
- Appropriate observation and medical treatment should always be readily available in case of an anaphylactic event following the administration of the vaccine
- The tip caps of the prefilled syringes contain natural rubber latex, which may cause allergic reactions in latex-sensitive individuals
- Syncope (fainting) can occur in association with administration of BEXSERO. Ensure procedures are in place to avoid injury from falling associated with syncope
- The most common solicited adverse reactions observed in clinical trials were pain at the injection site (≥83%), myalgia (≥48%), erythema (≥45%), fatigue (≥35%), headache (≥33%), induration (≥28%), nausea (≥18%), and arthralgia (≥13%)
- Vaccination with BEXSERO may not provide protection against all meningococcal serogroup B strains
- Some individuals with altered immunocompetence may have reduced immune responses to BEXSERO
- Vaccination with BEXSERO may not result in protection in all vaccine recipients

Please see accompanying brief summary of full Prescribing Information for BEXSERO.

References: 1. Prescribing Information for BEXSERO. **2.** Prescribing Information for TRUMENBA..

BRIEF SUMMARY

BEXSERO (Meningococcal Group B Vaccine)
Suspension for intramuscular injection

The following is a brief summary only; see full prescribing information for complete product information.

1 INDICATIONS AND USAGE

BEXSERO is a vaccine indicated for active immunization to prevent invasive disease caused by *Neisseria meningitidis* serogroup B. BEXSERO is approved for use in individuals 10 through 25 years of age.

Approval of BEXSERO is based on demonstration of immune response, as measured by serum bactericidal activity against three serogroup B strains representative of prevalent strains in the United States. The effectiveness of BEXSERO against diverse serogroup B strains has not been confirmed.

4 CONTRAINDICATIONS

Hypersensitivity, including severe allergic reaction, to any component of the vaccine, or after a previous dose of BEXSERO. *[see Description (11) of full prescribing information].*

5 WARNINGS AND PRECAUTIONS

5.1 Preventing and Managing Allergic Reactions

Appropriate observation and medical treatment should always be readily available in case of an anaphylactic event following the administration of the vaccine.

5.2 Syncope

Syncope (fainting) can occur in association with administration of BEXSERO. Ensure procedures are in place to avoid injury from falling associated with syncope.

5.3 Latex

The tip caps of the pre-filled syringes contain natural rubber latex which may cause allergic reactions in latex sensitive individuals.

5.4 Limitation of Vaccine Effectiveness

BEXSERO may not protect all vaccine recipients. BEXSERO may not provide protection against all meningococcal serogroup B strains *[see Clinical Pharmacology (12.1) of full prescribing information].*

5.5 Altered Immunocompetence

Some Individuals with altered immunocompetence may have reduced immune responses to BEXSERO.

Complement Deficiency

Persons with certain complement deficiencies and persons receiving treatment that inhibits terminal complement activation (for example, eculizumab) are at increased risk for invasive disease caused by *N. meningitidis* serogroup B even if they develop antibodies following vaccination with BEXSERO. *[See Clinical Pharmacology (12.1).]*

6 ADVERSE REACTIONS

The most common solicited adverse reactions observed in clinical trials were pain at the injection site (≥83%), myalgia (≥48%), erythema (≥45%), fatigue (≥35%), headache (≥33%), induration (≥28%), nausea (≥18%), and arthralgia (≥13%).

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in clinical trials of a vaccine cannot be directly compared with rates in the clinical trials of another vaccine and may not reflect the rates observed in practice.

In 4 clinical trials, 3058 individuals aged 10 through 25 years of age received at least one dose of BEXSERO, 1436 participants received only BEXSERO, 2089 received only placebo or a control vaccine, and 1622 participants received a mixed regimen (placebo or control vaccine and BEXSERO).

In a randomized controlled study[1] conducted in US and Poland, 120 participants aged 10 through 25 years of age received at least one dose of BEXSERO, including 112 participants who received 2 doses of BEXSERO 2 months apart; 97 participants received saline placebo followed by MENVEO [Meningococcal (Groups A, C, Y, and W-135) Oligosaccharide Diphtheria CRM_{197} Conjugate Vaccine]. Across groups, median age was 13 years, males comprised 49% and 60% were White; 34% were Hispanic, 4% were Black,<1% were Asian, and 2% were other.

In a second randomized controlled study[2] conducted in Chile, all subjects (N=1,622) aged 11 through 17 years of age received at least 1 dose of BEXSERO. This study included a subset of 810 subjects who received 2 doses of BEXSERO 1 or 2 months apart. A control group of 128 subjects received at least 1 dose of placebo containing aluminum hydroxide. A subgroup of 128 subjects received 2 doses of BEXSERO 6 months apart. In this study, median age was 14 years, males comprised 44%, and 99% were Hispanic.

In a third randomized controlled study[3] conducted in the United Kingdom (UK), 974 university students aged 18 through 24 years of age received at least 1 dose of BEXSERO, including 932 subjects who received 2 doses of BEXSERO 1 month apart. Comparator groups received 1 dose of MENVEO followed by 1 dose of placebo containing aluminum hydroxide (n=956) or 2 doses of IXIARO (Japanese Encephalitis Vaccine, Inactivated, Adsorbed) (n=947). Across groups, median age was 20 years, males comprised 46%, and 88% were White, 5% were Asian, 2% were Black, <1% were Hispanic, and 4% were other.

In an uncontrolled study[4] conducted in Canada and Australia, 342 participants aged 11 through 17 years of age received at least 1 dose of BEXSERO, including 338 participants who received 2 doses of BEXSERO 1 month apart. The median age was 13 years, males comprised 55%, and 80% were White, 10% were Asian, 4% were Native American/Alaskan, and 4% were other.

Local and systemic reactogenicity data were solicited from all participants in the studies conducted in Chile, US/Poland, Canada/Australia, and in a subset of participants in the UK study. Reports of unsolicited adverse events occurring within the first 7 days after each vaccination were collected in all studies. In the US/Poland study, reports of unsolicited adverse events were collected up to one month after the second vaccination.

Reports of all serious adverse events, medically attended adverse events and adverse events leading to premature withdrawal were collected throughout the study period for the studies conducted in Chile (12 months), UK (12 months), US/Poland (8 months), and Canada/Australia (2 months).

Solicited Adverse Reactions

The reported rates of local and systemic reactions among participants 10 through 25 years of age following each dose of BEXSERO administered 2 months apart or control in the US/Polish study[1] are presented in Table 1 and Table 2.

Table 1: Percentage of U.S. and Polish Participants Aged 10 through 25 Years Reporting Local Solicited Adverse Reactions[a] within 7 Days after BEXSERO or Control, by Dose

Local Adverse Reaction		Dose 1 BEXSERO n = 110-114	Dose 1 Placebo (Saline) n = 94-96	Dose 2[b] BEXSERO n = 107-109	Dose 2[b] MENVEO n = 90-92
Pain	Any	90	27	83	43
	Mild	27	20	18	26
	Moderate	44	5	37	9
	Severe	20	2	29	8
Erythema	Any	50	13	45	26
	1-25 mm	41	11	36	13
	>25-50 mm	6	1	5	6
	>50-100 mm	3	0	5	4
	>100 mm	0	0	0	2
Induration	Any	32	10	28	23
	1-25 mm	24	9	22	16
	>25-50 mm	7	0	4	0
	>50-100 mm	1	1	2	4
	>100 mm	0	0	0	2

Clinicaltrials.gov Identifier NCT01272180.

[a] Erythema and induration: Any (≥1 mm). Pain: Mild (transient with no limitation in normal daily activity); Moderate (some limitation in normal daily activity); Severe (unable to perform normal daily activity).

[b] Administered 2 months after Dose 1.

Table 2. Percentage of U.S. and Polish Participants Aged 10 through 25 Years Reporting Systemic Adverse Reactions[a] within 7 Days after BEXSERO or Control, by Dose

Systemic Adverse Reaction		Dose 1 BEXSERO n = 110-114	Dose 1 Placebo (Saline) n = 94-96	Dose 2[b] BEXSERO n = 107-109	Dose 2[b] MENVEO n = 90-92
Fatigue	Any	37	22	35	20
	Mild	19	17	18	11
	Moderate	14	5	10	7
	Severe	4	0	6	2
Nausea	Any	19	4	18	4
	Mild	12	3	10	3
	Moderate	4	1	5	1
	Severe	4	0	4	0
Myalgia	Any	49	26	48	25
	Mild	21	20	16	14
	Moderate	16	5	19	7
	Severe	12	1	13	4
Arthralgia	Any	13	4	16	4
	Mild	9	3	8	2
	Moderate	3	1	6	2
	Severe	2	0	2	0
Headache	Any	33	20	34	23
	Mild	19	15	21	8
	Moderate	9	4	6	12
	Severe	4	1	6	3

(continued on next page)

Table 2. Percentage of U.S. and Polish Participants Aged 10 through 25 Years Reporting Systemic Adverse Reactions[a] within 7 Days after BEXSERO or Control, by Dose *(cont'd)*

Systemic Adverse Reaction		Dose 1 BEXSERO n = 110-114	Dose 1 Placebo (Saline) n = 94-96	Dose 2[b] BEXSERO n = 107-109	Dose 2[b] MENVEO n = 90-92
Fever	≥38°C	1	1	5	0
	38.0-38.9°C	1	1	4	0
	39.0-39.9°C	0	0	1	0
	≥40°C	0	0	0	0

Clinicaltrials.gov Identifier NCT01272180.

[a] Systemic reactions: Mild (transient with no limitation in normal daily activity); Moderate (some limitation in normal daily activity); Severe (unable to perform normal daily activity).

[b] Administered 2 months after Dose 1.

Solicited adverse reaction rates were similar among participants 11 through 24 years of age who received BEXSERO in the other three clinical studies,[2,3,4] except for severe myalgia which was reported by 3-7% of subjects. Severe pain was reported by 8% of university students in the UK[3].

Non-serious Adverse Events

In the 3 controlled studies[1,2,3] (BEXSERO n=2221, control n=2204), non-serious unsolicited adverse events that occurred within 7 days of any dose were reported by 439 (20%) receiving BEXSERO and 197 (9%) control recipients. Unsolicited adverse events that were reported among at least 2% of participants and were more frequently reported in participants receiving BEXSERO than in control recipients were injection site pain, headache, and injection site induration unresolved within 7 days, and nasopharyngitis.

Serious Adverse Events

Overall, in clinical studies, among 3,058 participants aged 10 through 25 years of age who received at least 1 dose of BEXSERO, 66 (2.1%) participants reported serious adverse events at any time during the study. In the 3 controlled studies[1,2,3] (BEXSERO n=2716, Control n=2078), serious adverse events within 30 days after any dose were reported in 23 (0.8%) participants receiving BEXSERO and 10 (0.5%) control recipients.

6.2 Additional Pre-licensure Safety Experience

In response to outbreaks of serogroup B meningococcal disease at 2 universities in the US, BEXSERO was administered as a 2-dose series at least 1 month apart. Information on serious adverse events was collected for a period of 30 days after each dose from 15,351 individuals aged 16 through 65 years of age who received at least 1 dose. Overall 50 individuals (0.3%) reported serious adverse events, including one event considered related to vaccination, a case of anaphylaxis within 30 minutes following vaccination.

6.3 Postmarketing Experience

Adverse event reports received for BEXSERO marketed outside the US are listed below. Because these events are reported voluntarily from a population of uncertain size, it is not always possible to estimate reliably their frequency, or to establish a causal relationship to vaccination. This list includes serious events or events which have suspected causal association to BEXSERO.

General Disorders and Administration Site Conditions:	Injection site reactions (including extensive swelling of the vaccinated limb, blisters at or around the injection site, and injection site nodule which may persist for more than 1 month).
Immune System Disorders:	Allergic reactions (including anaphylactic reactions), rash, eye swelling.
Nervous System Disorders:	Syncope, vasovagal responses to injection.

7 DRUG INTERACTIONS

Sufficient data are not available to establish the safety and immunogenicity of concomitant administration of BEXSERO with recommended adolescent vaccines.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category B:

Reproduction studies have been performed in rabbits at doses up to 15 times the human dose on a body weight basis and have revealed no evidence of impaired fertility in females or harm to the fetus due to BEXSERO. There are, however, no adequate and well controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, BEXSERO should be used during pregnancy only if clearly needed.

Pregnancy Registry for BEXSERO

GlaxoSmithKline maintains a surveillance registry to collect data on pregnancy outcomes and newborn health status outcomes following exposure to BEXSERO during pregnancy. Women who receive BEXSERO during pregnancy should be encouraged to contact GlaxoSmithKline directly or their healthcare provider should contact GlaxoSmithKline by calling 1-877-413-4759.

8.3 Nursing Mothers

It is not known whether BEXSERO is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when BEXSERO is administered to a nursing woman.

8.4 Pediatric Use

Safety and effectiveness of BEXSERO have not been established in children younger than 10 years of age.

8.5 Geriatric Use

Safety and effectiveness of BEXSERO have not been established in adults older than 65 years of age.

15 REFERENCES

1. NCT01272180 (V102_03)
2. NCT00661713 (V72P10)
3. NCT01214850 (V72_29)
4. NCT01423084 (V72_41)
5. Wang X, et al. *Vaccine.* 2011; 29:4739-4744.
6. Hosking J, et al. *Clin Vaccine Immunol.* 2007;14:1393-1399.

17 PATIENT COUNSELING INFORMATION

S*ee FDA-Approved Patient Labeling.*

Manufactured by GSK Vaccines, Srl
Bellaria-Rosia 53018, Sovicille (SI), Italy
US License No. 1617

Distributed by **GlaxoSmithKline**
Research Triangle Park, NC 27709

BXS:3BRS

Printed in USA. 1006502R0 July 2018

Addressing the know-do gap for vaccines

BY KRISTINA A. BRYANT, MD

A friend and mentor of mine is an expert in implementation science. She often reminds me that the very best ideas might fail – or just fail to live up to their potential – in the absence of a robust implementation plan.

As I reviewed the articles for this supplement, I was struck that vaccines might be characterized as our "very best ideas." They are safe. They are effective. Vaccine recommendations are supported by high-quality evidence sometimes collected over many years. We are motivated to protect our patients from vaccine-preventable diseases. Parents want their children to be healthy. Yet, as illustrated by a number of articles featured here, we don't always succeed in delivering vaccines to the children who need them. Too few adolescents are getting human papillomavirus vaccine. Neonatal ICU patients are remaining at risk for vaccine-preventable diseases longer than necessary. Every year, children die from influenza infections that could have been prevented or at least mitigated by immunization. So what's the problem?

The term "know-do gap" seems relevant here. This is the gap between what we know is best practice and what we actually do in practice. There is sound science in the world of vaccine delivery, but we don't always optimize effective strategies in our daily work. The first step is to know what immunization rates are in our practices and if they are lower than we want to them be, identify the barriers that exist. Then we can implement the most appropriate intervention, be it review of immunization status at every health care visit, electronic reminders, standing orders, motivational interviewing, or another one of the practices listed in these pages.

Dr. Bryant is a pediatrician specializing in infectious diseases at the University of Louisville (Ky.) and Norton Children's Hospital in Louisville. She is also the president-elect of the Pediatric Infectious Diseases Society. She has received research funding from Pfizer.

One theme linking many of the articles featured here is that providers need more education about vaccines in general and counseling vaccine-hesitant parents. The Centers for Disease Control and Prevention, the American Academy of Pediatrics, and the American Academy of Family Physicians collectively developed a set of tools for providers. Check out Provider Resources for Vaccine Conversations with Parents on the CDC website.

Another excellent resource is the The Vaccine Handbook App, a mobile App for iOS devices that contains the 2018 (7th) edition of The Vaccine Handbook: A Practical Guide for Clinicians. Written by Gary S. Marshall, MD, one of my colleagues at the University of Louisville (Ky.), this is a readable, comprehensive source of up-to-date information about vaccine science and vaccine recommendations. It also contains a very useful section on addressing concerns about vaccine. The Pediatric Infectious Diseases Society received an unrestricted educational grant from Sanofi Pasteur to made the app available free of charge. The app may be found by searching the App Store for "The Vaccine Handbook App" or visiting pids.org.

Do you have a vaccine delivery success story to share, maybe a creative solution to one of the challenges we all face as vaccine providers? Email me at k0brya01@louisville.edu and I'll try to feature a collection of these in an upcoming issue of Pediatric News.

Editor **Catherine Cooper Nellist**

Design Supervisor **Elizabeth Byrne Lobdell**

Production Specialist **Maria Aquino**

Group Publisher **Sally Cioci**
scioci@frontlinemedcom.com

President/CEO **Alan J. Imhoff**

Cover photograph:
evgenyatamanenko/Thinkstock

Pediatric Vaccines and Infectious Diseases is a supplement to Pediatric News, an independent newspaper that provides the practicing pediatrician with timely and relevant news and commentary about clinical developments in the field and about the impact of health care policy on the specialty and the physician's practice.

The ideas and opinions expressed in Pediatric Vaccines and Infectious Diseases do not necessarily reflect those of the Publisher.

MDedge

Missed opportunities abound to give HPV vaccine to adolescent girls

BY CATHERINE COOPER NELLIST
FROM THE JOURNAL OF THE PEDIATRIC INFECTIOUS DISEASES SOCIETY

Opportunities to give the human papillomavirus (HPV) vaccine were missed, especially during well-adolescent and vaccine-related visits, in a study of more than 14,000 fully insured teen girls, reported Claudia M. Espinosa, MD, of the division of pediatric infectious diseases, University of Louisville (Ky.), and her associates.

In a study of 14,588 girls in a fully insured commercial or Medicaid plan who turned 11 years old between Jan. 1, 2010, and Sept. 31, 2015, it was documented whether the girls received an HPV vaccine when they were given another adolescent vaccine – one or more doses of the Tdap vaccine and/or one or more doses of the 4-valent meningococcal conjugate vaccine (MenACWY vaccine).

Only 42% of eligible girls started the HPV vaccine series; 68% of girls who started the HPV vaccine series in their 11th year completed three doses during the 2-year measurement period, compared with 52% of those who started in their 12th year (Pediatr Infect Dis J. 2017 Sep 23. doi: 10.1093/jpids/pix067).

Girls who started HPV vaccination were more likely than those who didn't to receive the MenACWY (86% vs. 64%, respectively; *P* less than .0001) and Tdap (86% vs. 73%, respectively; *P* less than .0001) vaccines.

"A missed opportunity was defined as the absence of an HPV vaccine dose administered during any visit with a Tdap or MenACWY vaccine claim, any well-adolescent visit, or any encounter with a primary care provider, regardless of visit type," Dr. Espinosa and her associates said.

Of 10,987 visits when a Tdap or MenACWY vaccine dose was given, HPV vaccine was given at the same visit in only 37% of cases. An HPV vaccine was administered at only 26% of 12,621 of well-adolescent visits, and 42% of 14,195 other visits with primary care providers.

"The data also suggest that pediatricians and nonpediatricians alike are missing opportunities to administer the HPV vaccine when other adolescent vaccines are given," Dr. Espinosa and her associates noted.

"Future research should focus on communication strategies that might facilitate the conceptual 'bundling' of HPV vaccine with other adolescent vaccines in the provider's office," the investigators said.

cnellist@mdedge.com

LUISCAR/THINKSTOCK

COMMENTARY **BY DR. BRYANT**

▶ Data from Epinosa et al. confirm what one could intuit from national HPV immunization rates. According to the 2016 National Immunization Survey–Teen, 60% of adolescents aged 13-17 years received one or more doses of HPV vaccine and only 43% are up to date on all recommended doses. Collectively, we are missing opportunities to protect teens against HPV.

All politics is local and the same is likely true for immunization rates. Do you know how many of the teens in your practice initiate HPV vaccine and how many are fully immunized? Knowing your baseline is the first step to improving immunization rates. Simple intervention can make a difference. Denver Health boosted HPV coverage of one or more dose(s) in both boys and girls to more than 89% using a standard process that included assessing immunization records and offering vaccines at every visit, standing orders for routine immunization, and education for providers to present meningococcal, Tdap, and HPV as a standard bundle of adolescent immunizations. Additionally, providers received report cards with adolescent immunization rates.

The Centers for Disease Control and Prevention provides practical tips on how to bundle adolescent vaccines. It can be as simple as beginning the conversation by saying "Now that your child is 11, he/she needs three vaccines to help protect against meningitis, HPV cancers, and whooping cough. We'll give these shots during today's visit. Do you have any questions about these vaccines?" Additional tools and resources for talking to parents about HPV vaccine are available at www.cdc.gov/hpv.

Jump-start immunizations in the NICU

BY BRUCE JANCIN
REPORTING FROM ESPID 2018

MALMO, SWEDEN – The neonatal intensive care unit often represents a lost opportunity to bring an infant fully up to date for recommended age-appropriate immunizations – but it needn't be that way, Raymond C. Stetson, MD, declared at the annual meeting of the European Society for Paediatric Infectious Diseases.

He cited as a case in point the dramatic turnaround accomplished at the 26-bed NICU at the Mayo Clinic in Rochester, Minn., where he is a neonatal medicine fellow. When he and his coinvestigators conducted an electronic health record audit, they determined that only 56% of the 754 NICU patients cared for from 2015 through mid-2017 were fully up to date for the Advisory Committee on Immunization Practices–recommended vaccinations, excluding rotavirus vaccination, at the time of discharge or transfer. After developing and implementing an action plan, however, the on-time immunization rate jumped to 94% in the 155 patients discharged during the first 6 months of the new program.

BRUCE JANCIN/MDEDGE NEWS

Dr. Raymond C. Stetson recommends three quality improvement measures.

"We were able to find that, within our unit, a small number of quality improvement measures enabled us to drastically increase our vaccination rate in this population. I think this shows that other units ought to be auditing their immunization rates, and if they find similar root causes of low rates our experience could be generalized to those units as well," Dr. Stetson said.

It's well established that premature infants are at increased risk for underimmunization. Dr. Stetson and his coinvestigators deemed the baseline 56% on-time immunization rate in their NICU patients to be unacceptable, because underimmunized infants are more vulnerable to vaccine-preventable illnesses after discharge. So using the quality improvement methodology known as DMAIC – for Define, Measure, Analyze, Improve, Control – the investigators surveyed Mayo NICU physicians and nurses and identified

CONTINUED ON FOLLOWING PAGE

COMMENTARY **BY DR. BRYANT**

▶ With only a few exceptions, the American Academy of Pediatrics recommends that preterm and low-birth-weight infants be immunized with routinely recommended childhood vaccines at the same chronologic age as term and normal-birth-weight infants. The same goes for preterm infants who are medically stable but still in the neonatal ICU at 2 months of age. These infants can and should receive all inactivated vaccines, and only the rotavirus vaccine is deferred until the time of discharge, per current AAP recommendations. Yet many infants are not immunized as recommended.

A 2012 publication reported that only 51% of infants discharged on or after 60 days of age from six Kaiser Permanente NICUs were up to date on recommended immunizations (J Perinatol. 2012 May;32[5]:363-7). Ann Marie Navar-Boggan, MD, PhD, and her coauthors performed a retrospective cohort study and therefore could only speculate on the barriers to on-time immunization. They identified a need to explore both provider and parental attitudes toward immunization of NICU infants and called for "evaluation of immunization status of infants at discharge as a potential target for quality assessment and ongoing improvement."

In this study, Dr. Stetson and his colleagues did just that and found that both provider and parental hesitancy played a role in immunization lag at discharge, but rates could be improved with relatively simple interventions that included automated immunization reminders and provider education.

I wonder how many units currently monitor immunization rates as a quality measure? I think it is time for all of us to take up Dr. Stetson's challenge and audit immunization rates.

This group at Mayo Clinic, Rochester, Minn., did not look at rotavirus vaccination rates, but we know that infants not immunized until discharge may age out of eligibility for vaccine. Some NICUs have chosen to give the vaccine to age-eligible inpatients and have not identified significant nosocomial spread or vaccine-type rotavirus disease in unimmunized infants. These new data should help to inform future recommendations.

Talking with vaccine-hesitant parents takes training and finesse

BY DAMIAN MCNAMARA
AT AAP 2017


WAVEBREAKMEDIA/THINKSTOCK

CHICAGO – Addressing vaccine-hesitant parents can cause physicians considerable stress. However, they can feel more confident by adopting one of two communication strategies after gauging the strength of antivaccine beliefs, results of a pilot study suggest.

"We found that physicians frequently feel anxious and uncomfortable when confronted with parents who are strongly vaccine hesitant. They frequently lack confidence in dispelling the various safety concerns raised by parents and find themselves frequently combating an internal desire to just avoid the conflict," said Paul J. Carson, MD, an expert in infectious diseases in the department of public health at North Dakota State University in Fargo.

"After we got to know these pediatric providers, we realized the incredible stress they encounter when trying to approach these conversations," lead researcher Lauren Lee Dybsand, MPH, said in an interview at the annual meeting of the American Academy of Pediatrics.

The AAP suggests pediatricians adopt the "CASE method," which stands for Corroborate parents' concern, talk About me, describe the Science, and Explain/advise why they should vaccinate. The academy also recommends motivational interviewing as an additional tool to achieve vaccine acceptance. Ms. Dybsand, Dr. Carson, and their colleagues examined these two different approaches after training five pediatric providers. They also assessed physician perceptions about confidence and satisfaction regarding each method.

The pediatric providers were trained

CONTINUED ON FOLLOWING PAGE

CONTINUED FROM PREVIOUS PAGE

three root causes of the quality gap: lack of staff knowledge of the routine immunization schedule, lack of awareness of when a NICU patient's vaccines were actually due, and parental vaccine hesitancy.

Dr. Stetson and his coworkers then introduced three quality improvement measures: They provided easy Intranet access to the Advisory Committee on Immunization Practices (ACIP) routine immunization schedule, plus an Excel-based checklist that automatically red flagged when a baby was due for an immunization that hadn't been given, and guidance on how to address parental vaccine hesitancy. Thereafter, the on-time immunization rate began its sharp upward climb.

Session chair Karina Butler, MD, was clearly impressed.

"You make it sound so easy to get such an increment. What were the barriers and obstacles you ran into?" asked Dr. Butler of Temple Street Children's University Hospital, Dublin.

"Certain providers in our group were a bit more hesitant about giving vaccines," Dr. Stetson replied. "There had to be a lot of provider education to get them to use the resources we'd created. And parental vaccine hesitancy was a barrier for us. Of that 6% of infants who weren't fully up to date at discharge, the majority of those were due to parental vaccine hesitancy. I think that's still a barrier that's going to need more work."

Dr. Stetson reported having no relevant financial disclosures.

bjancin@mdedge.com

SOURCE: Stetson R. E-Poster Discussion Session 04.

CONTINUED FROM PREVIOUS PAGE
during a 7-hour retreat and 10 subsequent 1-hour training/debriefing sessions over 9 months. Explanations of vaccine safety and efficacy, vaccine licensure, how to refute common vaccine myths, and the two differing communication strategies were included in the training. Participants implemented the presumptive/CASE approach for 4 months then crossed over and used motivational interviewing for an additional 4 months.

"Some intensive training and education on the vaccine safety process and scientific evidence dispelling the common myths about vaccine safety were very helpful in boosting provider confidence," Dr. Carson said.

The frequency and duration of training may be essential to success.

"We want to be able to give them the tools to approach these conversations in an educated manner. We want them to feel like they have some ammunition behind the conversation," said Ms. Dybsand, a graduate research assistant at the university.

The study revealed that the CASE approach was easier to learn and used more readily when pediatricians encountered a moderately hesitant parent. However, the investigators found the pediatricians perceived motivational interviewing as useful for the more strongly resistant parent. "For those really resistant parents who have looked at all the websites and are very concerned about vaccines, maybe motivational interviewing is the way to go," Ms. Dybsand said. The goal of motivational interviewing is to build a trusting relationship over time. "You may not be giving that vaccine today, but you may be able to convince them in the future to vaccinate."

The frequency and duration of training may be essential to success. "We didn't really set out to find this, but it really takes more than 1 day of training to get providers to make a meaningful change in their communication strategies," Ms. Dybsand said. When asked how long it might take the average pediatrician to become proficient in both techniques, she said that likely is a focus of future study.

The investigators plan to build on the success of the pilot study by expanding the research to multiple sites. In addition, they want to go beyond assessing provider perceptions of the communication techniques. Dr. Carson said, "These strategies need to be tested in formal clinical trials to see what is successful in actually increasing vaccine acceptance."

Ms. Dybsand and Dr. Carson had no relevant financial disclosures.

pdnews@mdedge.com

COMMENTARY **BY DR. BRYANT**

▶ Think back to your early days of medical school. Were you confident the first time you performed a history and physical exam on a real patient or attempted a lumbar puncture on a febrile infant? If you are like me, your proficiency improved and your anxiety decreased with practice and constructive coaching. Why should talking to vaccine-hesitant parents be any different?

In this pilot study, physicians received intensive training in the CASE method and motivational interviewing, and then they implemented these strategies with vaccine-hesitant parents encountered in practice. While the study was not designed to determine the minimum or optimum amount of training, adult learning theory would support coauthor Ms. Dysband's assertion that it likely takes more than 1 day of training to become proficient in using these techniques and reinforcement over time is better than a "one and done" approach. How much time practicing clinicians can or will devote to such training is a question for another day, but one thing is clear: Going forward, strategies for counseling vaccine-hesitant patients should be taught during medical school and reinforced and practiced during residency.

At present, vaccine curricula vary by medical school and training program. In the not-too-distant future, it may be easier to standardize what our trainees are learning about vaccines and vaccine communication. CoVER – the Collaboration for Vaccination Education and Research – was created to augment residents' skill in immunization practices, to increase residents' knowledge and competency in communicating with patients and patients' families about vaccination, and to promote research on evidence-based vaccine education.

The group has created a vaccine education curriculum consisting of four modules and a face-to-face training. During the last academic year, 26 residency programs participated in a pilot study: Half of the sites were randomized to use the CoVER curriculum, and half served as controls, teaching about vaccines per their usual routine.

Participants were surveyed about knowledge, attitudes, and hesitancy regarding vaccination at the beginning and end of the academic year. According to principal investigator Barb Barbara Pahud, MD, MPH, the initial qualitative results of the pilot are encouraging and the curriculum was well received by residents and program directors. Dr. Pahud notes that these pilot modules will be available on the website of the Pediatric Infectious Diseases Society in the near future.

A program to increase flu vaccine compliance

BY MARTIN I. BERMAN

Mr. Berman has been providing practice management services to physicians and other medical providers since 1983. He is the CEO of a pediatrics practice with locations in Staten Island and Brooklyn, N.Y. He holds a faculty appointment at State University of New York, Brooklyn, as a lecturer for the department of family medicine's residency training program. He has no disclosures to report. Email him at pdnews@mdedge.com.

Establishing a pediatric flu shot program increases vaccine compliance, and makes for happy patients and parents. It won't hurt your bottom line either and actually will help it. A flu shot program potentially can be run by a licensed practical nurse, registered nurse, physician's assistant, or pediatric nurse practitioner, depending on your state's law regarding vaccine administration by other than a physician, thus freeing up the physician to see well-child and sick-call patients.

It's easy to set up a flu shot program and run it. Start preparing in June, preceding the upcoming flu season. Designate several Saturdays and/or Sundays in September, October, November, December, and January as flu shot Saturdays and/or Sundays. And if Columbus Day falls on a weekday, consider adding Columbus Day to your program dates as the kids often are off from school that day. (Check the local school calendar.)

Query your electronic medical records for a list of patients who did not have a flu vaccine in the previous year. Then ask your EMR for patients who did have the flu vaccine last flu season. Finally, have your EMR list all patients not seen by your practice in the past 2 years. The flu shot program may bring them back into your practice. Your EMR lists should include the patient's home address, any telephone numbers on file for the patient, and any email addresses the patient has provided to you. Be certain you have permission on file to send mail, emails, and make telephone calls to the patients.

Next, prepare a postcard to be mailed to all patients on the lists your EMR produced for you. Keep the postcard simple. Announce the program and state the dates the flu shot program is running. Ask parents to call to make an appointment for a flu vaccine by appointment only "with the program." In addition to mailing a postcard, announce the flu shot program by sending out automated telephone calls and emails to all three lists the EMR has produced for you. The postcard mailing is your first contact, essentially announcing the program with dates and times. An automated phone call may be used to announce a specific date for which you are "now booking." A good option when using automated phone calls is to allow the caller to press "zero" to be connected to the office to schedule a "flu shot only" appointment! Finally, emails announcing the dates of the program simply will reinforce information about the program.

Once you run your first flu shot–only program, separate and apart from your daily patient visits, your patients and their families will look forward to it, and book early next year. Remember to send out reminder calls 2 days before the program dates to remind patients of their appointments. Finally, offer the flu shot to parents, making the experience a family affair. Your patients and their parents will be back next season.

YARINCA/ISTOCK

COMMENTARY **BY DR. BRYANT**

▶ Mr. Berman describes a practical approach to increasing influenza immunization rates in children and their parents though an office-based flu shot program. Such approaches are urgently needed. During the 2016-2017 season, parent-reported flu vaccination coverage among children aged 6 months to 17 years was 59%, unchanged from the prior year.

Mr. Berman's recommendation to offer flu shots to parents and make immunization a "family affair" may raise some eyebrows, but recall that fewer than half of U.S. adults receive flu vaccines annually, and sick parents can transmit infection to children too young to be immunized. For a comprehensive discussion of the benefits and challenges of immunizing parents in pediatric practices, dust off the 2012 American Academy of Pediatrics' Technical Report: "Immunizing Parents and Other Close Family Contacts in the Pediatric Office Setting" (Pediatrics. 2012 Jan;129[1]:e247-e53), reaffirmed in August 2016.

Measles exacts a high toll among Europe's youngest citizens

BY MICHELE G. SULLIVAN
REPORTING FROM ECCMID 2018

MADRID – Children younger than 2 years who contracted measles were significantly more likely to die of the disease than were older children, according to new data from the European Center for Disease Control and Prevention.

Infants younger than 12 months faced the worst mortality outcomes, with a sevenfold increased risk of death, compared with children aged 2 years or older, Emmanuel Robesyn, MD, said at the European Society of Clinical Microbiology and Infectious Diseases annual congress. Infants and children younger than 2 years also were much more likely to develop severe complications of the disease, including pneumonia and encephalitis.

The statistics should drive home the point that measles can be a life-threatening disease, especially for small children, said Dr. Robesyn, an expert in outbreak response at the European Center for Disease Prevention and Control, Stockholm.

MICHELE G. SULLIVAN/MDEDGE NEWS

Dr. Emmanuel Robesyn said the statistics should remind us that measles is a life-threatening disease.

"We want the population to understand that measles is much more than a nuisance illness of childhood," he said. "Already this year we have recorded 13 deaths from measles," which were not included in the data he presented.

"As you know, measles has been set for elimination" as a communicable disease, he said. "We need high immune coverage to achieve that, meaning 95% of the population covered with two doses. That is a challenge."

Infants are especially vulnerable, and they fully reliant on the immunity of others to avoid measles.

"Vaccination recommendations begin at age 1, so before that, infants are dependent on their mothers' antibod-

CONTINUED ON FOLLOWING PAGE

COMMENTARY **BY DR. BRYANT**

▶ Dr. Robesyn's report on the morbidity of measles is both timely and sobering as outbreaks of measles continue across Europe. According to the European Centre for Disease Prevention and Control (ECDC) Communicable Disease Threat Report for July 8-14, 2018, outbreaks of measles are ongoing in the Czech Republic, Croatia, France, Greece, Italy, Romania, Slovakia, and the United Kingdom. In 2018 to date, Romania has reported the most cases (4,317) followed by France (2,588). French public health authorities report the highest incidence of disease is in children less than 1 year of age. Nearly one of four people with measles have been hospitalized, two people died, and most were unvaccinated.

Measles vaccination coverage in most of Europe is suboptimal: In 2016, coverage for a second dose of measles-containing vaccine was below 95% in 22 of 29 EU/EEA (European Union/European Economic Area) countries providing data. ECDC projects "a high risk of continued measles transmission with mutual exportation and importation between EU/EEA member states and third countries." Remember the 2015 measles outbreak linked to Disneyland? The source of that outbreak was never identified, but CDC experts have reported that the outbreak "likely started from a traveler who became infected overseas with measles, then visited the amusement park while infectious." Notably, an identical strain of measles virus was associated with a large outbreak in the Philippines in 2014.

The message for North American pediatricians is that outbreaks in Europe and elsewhere in the world have the potential to affect children in our practices and young children, as Dr. Robesyn points out, are likely to suffer the greatest morbidity. International travel is a risk factor for measles and so is staying at home. Infants aged 6-11 months who are traveling outside the United States need a dose of MMR vaccine before departure, but this dose does not count toward the recommended two-dose series. All infants should initiate the MMR series at 12-15 months of age. While a second dose of vaccine is typically given at 4-6 years of age, it can be given as early as 28 days after the first dose.

Hawaii is experiencing a statewide outbreak of mumps

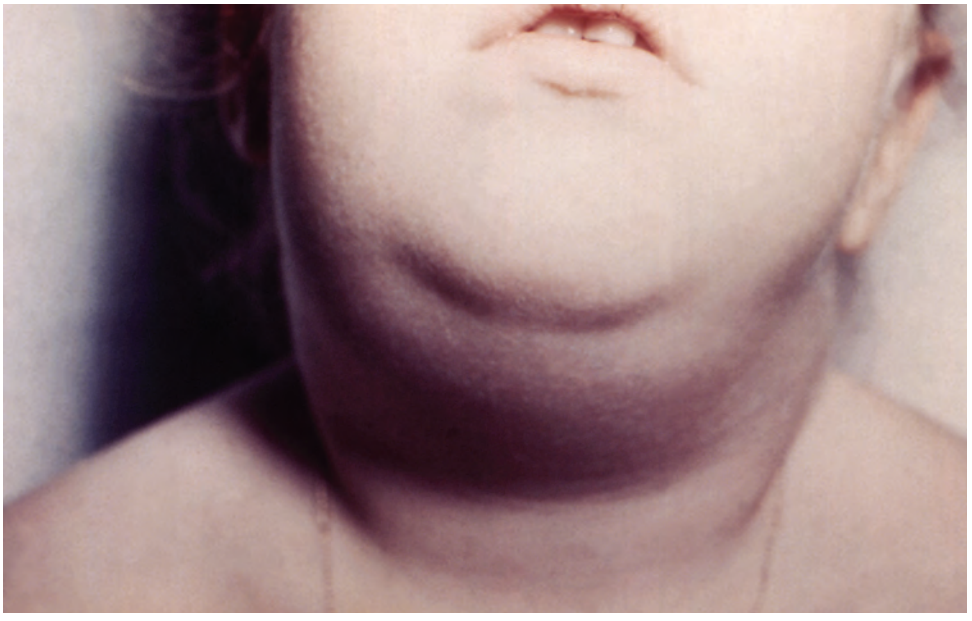
BY IAN LACY

As of July 26, 2018, 1,003 cases of mumps had been confirmed in Hawaii, according to the state's Department of Health.

The Hawaii DOH originally reported 14 confirmed mumps cases statewide in April 2017.

The disease appears to be affecting both vaccinated and unvaccinated people and has been confirmed in adults and children. In fact, approximately 60% of confirmed cases have been in adults aged 18 years or older. Complications caused by mumps infection

CONTINUED ON FOLLOWING PAGE



COURTESY CDC

CONTINUED FROM PREVIOUS PAGE

ies, and on herd immunity. It's very important that we have high vaccine coverage to protect them."

Dr. Robesyn described measles outcomes in children 24 months and younger in 30 member states of the European Union and the European Economic Area during 2013-2017. Data were extracted from the European Surveillance System, which collects and analyzes infectious disease data across Europe.

During that period, there were 37,365 measles cases in people of all ages. Most were in Italy, Romania, Germany, the Netherlands, and the United Kingdom, with each reporting more than 5% of the cases. These countries also had the most cases that had not been connected with importation of the disease.

Overall, the patients were a mean of 12 years old. Less than 2% had been fully vaccinated against the disease. Complications (diarrhea, otitis media, pneumonia, or encephalitis) occurred in 13.6%, and about 33% of patients had to be hospitalized. Most cases (81%) occurred in people aged 2 years and older, 9% occurred in children who were 12-24 months old, and 10% occurred in children younger than 12 months. These younger children, however, accounted for 61% of the deaths in the cohort, Dr. Robesyn said.

Most of the cases occurred in unvaccinated or incompletely vaccinated patients. Forty-six died from measles, a mortality rate of about 1 per 1,000 who contracted the disease. Of these deaths, 16 were among children younger than 12 months, 12 among children aged 12-24 months, and the remainder among those older than 2 years.

These younger patients were also more susceptible to complications of measles, both mild (diarrhea and otitis media) and severe (pneumonia and encephalitis). Most of the uncomplicated cases (75%) occurred in children older than 24 months, with just 25% of uncomplicated cases occurring in the younger groups.

"When we looked at age as a continuous variable, we saw that the chance of having no complications or just mild complications increased with age, and the chance of having severe complications decreased with age," Dr. Robesyn said.

"We definitely saw that these two groups are at increased risk. The consequences however, are different. For the children who are 1 year of age or older, the message is that it's really important to strictly follow national recommendations and get timely and complete vaccination. For those younger than 1 year, we have to rely on the population to be vaccinated. It is very important that we reach this 95% coverage rate to protect these youngest children. We need adolescents and young adults who have missed vaccinations to get them completed," he said.

Dr. Robesyn had no financial disclosures.

msullivan@mdedge.com

SOURCE: Robesyn E et al. ECCMID 2018, Abstract O0060

OMV meningococcal vaccine also protected against gonorrhea

BY MARY ANN MOON
FROM THE LANCET

A group B meningococcal outer-membrane-vesicle (OMV) vaccine used during a meningitis outbreak in New Zealand also protected against gonorrhea, according to a report published online in the Lancet.

Even though *Neisseria meningitidis* and *Neisseria gonorrhoeae* cause distinctly different diseases, the bacteria are closely related and are genetically and antigenically very similar. Most of the virulence factors present in one pathogen have an equivalent in the other, "providing at least one biologically plausible mechanism for cross-protection," said Helen Petousis-Harris, PhD, of the department of general practice and primary health care, University of Auckland (New Zealand), and her associates.

Approximately 1 million people – 81% of the New Zealand population younger than 20 years – received almost 3 million doses of the OMV meningococcal B vaccine (MeNZB) in a 2-year mass immunization program during the outbreak, allowing the investigators to compare the rate of gonorrhea between vaccinated and unvaccinated people. They performed a retrospective case-control study

CONTINUED ON FOLLOWING PAGE

CONTINUED FROM PREVIOUS PAGE

have been reported, with 32 people experiencing orchitis – inflammation of the testicles – and hearing loss.

In the midst of the outbreak, the Hawaii DOH has recommended that all adolescents aged 10-19 years old, as well as adults born in or after 1957, receive an additional MMR vaccine dose as soon as possible. The outbreak dose is recommended regardless of previous vaccination or documented immunity to mumps. Administering additional doses of vaccine is not an ideal situation, the DOH noted, but said it should not cause any medical complications.

The Hawaii DOH will investigate mumps cases statewide as the outbreak continues.

pdnews@mdedge.com

COMMENTARY **BY DR. BRYANT**

▶ Unilateral or bilateral tender swelling of the parotid gland is the typical clinical finding associated with mumps infection. Low-grade fever, myalgias, decreased appetite, malaise, and headache may precede parotid swelling in some patients. Other patients infected with mumps may have only respiratory symptoms, and some may have no symptoms at all.

It is a credit to our national immunization program that many practicing clinicians have never actually seen a case of mumps. Nearly 92% of children in the United States receive at least one dose of MMR vaccine before their third birthday. The vaccine is immunogenic, with 94% of recipients developing measurable mumps antibody (range, 89%-97%). Overall, mumps cases have declined more than 99% since routine mumps vaccination was recommended in 1967, but the outbreak in Hawaii is not an isolated event. Outbreaks tend to occur in settings where people have close, prolonged contact – think universities – and it is not uncommon to see mumps in people who have had two doses of vaccine.

Vaccinologist Stanley Plotkin, MD, eloquently detailed potential reasons for these outbreaks in a commentary published in the Journal of the Pediatric Infectious Diseases Society entitled "Mumps: A pain in the neck" (2018 May 15;7[2]:91-2). These include poor B-cell memory after vaccination that results in waning immunity over time. In the past, antibodies against mumps were boosted by exposure to wild-type mumps virus, but such exposures have become rare for most of us. Finally, currently circulating mumps strains are genotype G, which is different than the genotype A Jeryl Lynn strain contained in the vaccine. Dr. Plotkin calls for the development of a new inactivated mumps vaccine based on a genotype G strain.

Until such a vaccine is available, providers should be aware of an updated Centers for Disease Control and Prevention recommendations for use of mumps vaccine. In 2017, the Advisory Committee on Immunization Practices made recommendations concerning persons identified by public health authorities as being at "increased risk" for acquiring mumps during an outbreak because of close exposure to an infected person; these people, including those who have already received two doses of mumps-containing vaccine, should receive a third dose. Routine immunization of all persons with a third dose of MMR vaccine is not recommended.

CONTINUED FROM PREVIOUS PAGE
involving 14,730 participants, using information from a national health care database, a national immunization registry, and 11 sexual health clinics covering diverse geographic regions. This included 1,241 cases of gonorrhea (cases), 12,487 cases of chlamydia (controls), and 1,002 cases of gonorrhea plus chlamydia coinfection (categorized as controls or cases in separate analyses).

"The adjusted estimate for vaccine effectiveness of the MeNZB against confirmed cases of gonorrhea" was 31% (95% confidence interval, 21-39; *P* less than .0001), a finding that remained robust across several sensitivity analyses, Dr. Petousis-Harris and her associates said (Lancet. 2017 Jul 10. doi: 10.1016/S0140-6736[17]31449-6).

> "Ours is the first study to show an association between a vaccine and a reduction in the risk of gonorrhea."

"To our knowledge, ours is the first study to show an association between a vaccine and a reduction in the risk of gonorrhea," they noted. "The potential ability of an OMV group B meningococcal vaccine to provide even modest protection against gonorrhea would have substantial public health benefits in view of the prevalence of gonorrhea. Modeling suggests that a vaccine with 30% efficacy could decrease the prevalence of gonorrhea by more than 30% within 15 years, if immunity is maintained."

These findings also are important in view of the organism's increasing resistance to existing antibiotics. Moreover, if further study confirms that the MeNZB vaccine offers some degree of cross-protection against gonorrhea, these data can inform the development of a gonorrhea vaccine, the investigators added.

This study was funded by GlaxoSmithKline Vaccines and Auckland UniServices. Dr. Petousis-Harris reported serving as a consultant for GSK, Merck, and Pfizer, and one of her associates reported ties to Novartis Vaccines, GSK, Protein Sciences, and Merck.

pdnews@mdedge.com

Courtesy CDC

COMMENTARY **BY DR. BRYANT**

▶ According to the Centers for Disease Control and Prevention, gonorrhea is the second most commonly reported notifiable disease in the United States. More than 468,000 cases were reported in 2016 alone, up 19% from the year before. The highest rates of infection were observed in individuals aged 20-24 years. Increasingly, isolates of *Neisseria gonorrhoeae* are resistant to antibiotics used for treatment. Preventing just a fraction of the cases that occur each year would beneficial.

It is not clear that Bexsero, a group B meningococcal outer-membrane-vesicle (OMV) vaccine currently licensed in the United States, will offer similar protection against gonorrhea as that provided by the vaccine studied in New Zealand, but there are important similarities. If protection is ultimately demonstrated, this would be a windfall for public health. It also might turn into a public relations nightmare for Bexsero. Let's review what happened with the quadrivalent meningococcal vaccine and human papillomavirus vaccine (HPV).

Public acceptance of a vaccine to prevent meningitis is well established. Routine immunization of 11- to 12-year-olds with a tetravalent meningococcal polysaccharide-protein conjugate vaccine was first recommended in 2005. At that time, there were an estimated 1,400-2,800 cases of meningococcal disease in the United States each year, two-thirds of which were potentially vaccine preventable. According to the most recent National Immunization Survey–Teen report, in 2016, 82% of adolescents aged 13-17 years had received at least one dose of MenACWY vaccine.

In contrast, the response to a vaccine that prevents a sexually transmitted infection that can ultimately cause cancer has been less enthusiastic. The initial Advisory Committee on Immunization Practices recommendation was published in 2007 for use of an HPV vaccine in girls for the prevention of HPV type–related cervical cancer, cervical cancer precursors, vaginal and vulvar cancer precursors, and anogenital warts. At that time, there were an estimated 6.2 million new HPV infections every year and infection with high-risk HPV types was accepted as the most important risk factor for cervical cancer and cervical cancer precursors. It was projected that immunization of an entire cohort of 12-year-old girls could reduce the lifetime risk of cervical cancer in that group by 20%-66%. Nevertheless, in 2016, only 65% of girls had received at least one dose of HPV vaccine. While researchers have identified a number of reasons for the relatively low vaccine uptake, some parents simply don't believe their kids are at risk for HPV infection. That makes me wonder whether parents would be ready and willing to protect their children against gonorrhea?

MDedge™ | Pediatric News®

Keeping you informed. Saving you time.

MDedge: The Information access platform that makes you a better Doctor.

Consolidates the resources of our 35 publications and websites, including *Pediatric News*

Expert physician guidance – 700+ MDs/KOLs on our 35 boards

Improved patient care via superior conference coverage, original research, and expert commentary

Time-saving personal development via special reports, summarized articles, and the business of medicine

- Daily Briefing and Podcast
- Personalized content
- Digital and print access

Come visit us at **mdedge.com/pediatricnews**

...painlessly register to gain access to special reports