and *Enterococcus faecalis*; 33.3% of *S. aureus* isolates and 36.1% of *S. epidermidis* isolates were methicillin resistant. All of the GPC isolates were vancomycin susceptible. Overall, 66 stool samples from 53 patients with diarrhea that developed during their hospitalization were evaluated for the presence of *C. difficile* A and B toxins; 20 patients (37.7%) had culture results positive for *C. difficile*.

To the best of our knowledge, this is the first attempt at a comprehensive review of the epidemiology of microbial organisms causing healthcare-associated infections in Georgia. The study results clearly show that there is a considerable burden of antibiotic-resistant nosocomial infections among 4 tertiary care hospitals in Tbilisi, the capital city. Some gram-negative organisms are resistant to nearly all available antibiotics. Susceptibility to colistin is retained among most GNRs (perhaps because of limited use in recent years), and this agent remains the antibiotic of last resort in many cases of GNR infection, but the appearance of colistin-resistant isolates is alarming. One-third of *S. aureus* isolates were methicillin resistant, which should be considered during the choice of initial empirical antibiotic selection among patients with possible nosocomial gram-positive infection.

There is an urgent need to establish a comprehensive surveillance system for nosocomial infections in Georgia to better define the epidemiology of HAI in the country and to facilitate robust public health interventions to improve infection control and prevention efforts at healthcare facilities in Georgia.

ACKNOWLEDGMENTS

Financial support. This work was supported in part by the National Institutes of Health/Fogarty International Center AIDS International Training and Research Program of Emory University (D43 TW01042) and the Emory-Georgia TB Research Training Program (D43 TW007124).

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.

George Kandelaki, MD;[1] Maia Butsashvili, MD, PhD;[1] Mariam Geleishvili, MD;[2] Nato Avaliani, MD, MPH;[1] Nino Macharashvili, MS;[3] Marina Topuridze, MD, MS;[1] Carlos Del Rio, MD;[4] Henry Michael Blumberg, MD;[4] Tengiz Tsertsvadze, MD, PhD[3]

Affiliations: 1. National Center for Disease Control and Public Health of Georgia, Tbilisi, Georgia; 2. Centers for Disease Control and Prevention, Georgia Country Office, Tbilisi, Georgia; 3. Infectious Diseases, AIDS and Clinical Immunology Research Center, Tbilisi, Georgia; 4. Emory University School of Medicine, Atlanta, Georgia.

Address correspondence to Maia Butsashvili, MD, PhD, National Center for Disease Control and Public Health of Georgia, M. Asatiani Street N9, Tbilisi 0177, Georgia (maiabutsashvili@gmail.com).

Received May 16, 2011; accepted May 22, 2011; electronically published July 21, 2011.

Infect Control Hosp Epidemiol 2011;32(9):933-934

 0899-823X/2011/3209-0021$15.00. DOI: 10.1086/661788

REFERENCES

1. Klevens RM, Klevens RM, Edwards JR, et al. Estimating health care associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep* 2007;122(2):160–166.
2. Chen YY, Chou YC, Chou P. Impact of nosocomial infection on cost of illness and length of stay in intensive care units. *Infect Control Hosp Epidemiol* 2005;26(3):281–287.
3. Roberts RR, Scott RD 2nd, Hota B, et al. Costs attributable to healthcare-acquired infection in hospitalized adults and a comparison of economic methods. *Med Care* 2010;48(11):1026–1035.
4. Butsashvili M, Kamkamidze G, Umikashvili L, et al. Knowledge of health care-associated infections among Georgian obstetricians and gynecologists. *J Infect Dev Ctries* 2010;4(5):329–333.
5. Lomtadze M, Chkhaidze M, Mgeladze E, et al. Incidence and risk factors of nosocomial infections after cardiac surgery in Georgian population with congenital heart diseases. *Georgian Med News* 2010;(178):7–11.
6. Bartels MD, Nanuashvili A, Boye K, et al. Methicillin-resistant *Staphylococcus aureus* in hospitals in Tbilisi, the Republic of Georgia, are variants of the Brazilian clone. *Eur J Clin Microbiol Infect Dis* 2008;27(8):757–760.
7. Jashiashvili N, Nanuashvili A. Hospital pneumonia following cardiac surgery in children. *Georgian Med News* 2005;(127):22–25.
8. Low CE, Macharashvili N, Kourbatova EV, et al. Hospital acquired blood-stream infections among intensive care unit (ICU) patients in Tbilisi, Georgia. *Eur J Epidemiol* 2008;23(6):441–442.

Seasonal and Novel H1N1 Influenza Vaccination at a Children's Hospital

To the Editor—In their survey of 4,046 healthcare workers (HCWs), Kaboli et al[1] demonstrated that receipt of seasonal vaccine during the 2008–2009 influenza season was the most important predictor of intention to be vaccinated against H1N1 virus during the 2009–2010 influenza season. Maurer et al[2] reached a similar conclusion after surveying a nationally representative sample of 2,067 US adults. In that population, prior seasonal vaccine receipt was highly associated with the intention to receive H1N1 vaccine (73% vs 34.2%; $P < .001$). However, intention to receive influenza vaccine may not correlate with actual patterns of vaccination.[2,3] Few published data have confirmed the association between receipt of seasonal vaccine and receipt of H1N1 vaccine.[4]

We sought to measure the association between H1N1 vaccination of HCWs and prior receipt of seasonal vaccine at our institution, a free-standing, tertiary care children's hospital. Because 2009 H1N1 vaccine became available after seasonal vaccine, we included seasonal vaccine receipt during the 2008–2009 and 2009–2010 influenza seasons in our analyses. HCWs were not required to receive either vaccine, but those who refused vaccination were asked to complete a declination form. We also reviewed declination forms for H1N1 vaccine and compared reasons for vaccine refusal between HCWs who refused both vaccines and those who refused only H1N1 with use of χ^2 testing.

Vaccination data were available for 1,884 HCWs. Of these, 1,868 (99%) were employed during both study years. Uptake of seasonal vaccine was 53% during the 2008–2009 season and 74% during the 2009–2010 season. Uptake of H1N1 vaccine was 58% (75% of those who received the vaccine received the injectable form, and 25% received nasal spray) during the 2009–2010 season. Receipt of H1N1 vaccine was associated with receipt of seasonal vaccine during the 2008–2009 season (72% vs 39%; $P < .001$) and the 2009–2010 season (73% vs 17%; $P < .001$). Because receipt of seasonal vaccine during the 2008–2009 season was also associated with receipt during the 2009–2010 season (90% vs 51%; $P < .001$), we assessed the data for effect modification, which was present. The probabilities of H1N1 vaccination, based upon prior seasonal vaccine receipt, are presented in Table 1.

A total of 379 HCWs completed declination forms for H1N1 vaccine. These forms included 10 closed-response options and a write-in "other" option. HCWs could report more than 1 reason for declination. The most common reasons for declination included "I prefer to only get the seasonal flu vaccine" (29%), "I may be at risk, but I never, or rarely, get sick" (15%), and "I am allergic to eggs, egg protein, gentamicin, gelatin or arginine" (6%). Twenty-four percent of those who declined the vaccine submitted an open response; of these, more than half reported that vaccination was a personal decision.

There were several differences in the reported reasons for declination between those who refused both vaccines and those who refused H1N1 vaccine only. Decliners of both vaccines were more likely to report that they never or rarely got sick (20% vs 10%; $P = .005$), that they had an allergy (11% vs 1%; $P < .001$), and that vaccination was inconvenient (5% vs. 1%; $P = .01$). In contrast, seasonal vaccine recipients who declined H1N1 vaccination were more likely to report that they preferred seasonal vaccine only (53% vs 5%; $P < .001$) and that they had a history of prior H1N1 infection (6% vs 1%; $P = .001$). Although there was no difference in the percentage of respondents who had general concerns about the safety of H1N1 vaccine, a specific concern about Guillain-Barré syndrome was reported only by those who declined both vaccines (2% vs 0%; $P = .044$).

The strong association between H1N1 vaccine receipt and prior seasonal vaccination at our institution supports the findings of Kaboli et al[1] and is consistent with other studies that have shown that receipt of seasonal influenza vaccine is associated with receipt of vaccination during the previous year.[5] These results suggest that personal beliefs and behaviors associated with influenza vaccines in general, rather than factors unique to a novel influenza pandemic, drove H1N1 vaccine receipt in 2009. Although our declination forms were not designed for research purposes, they provide qualitative data to further support this hypothesis.

TABLE 1. Probability of H1N1 Vaccine Receipt, by Receipt of Seasonal Vaccine during 2008–2009 and 2009–2010 Influenza Seasons

	Received 2009–2010 seasonal vaccine	
Received 2008–2009 seasonal vaccine	Yes	No
Yes	0.757	0.349
No	0.649	0.118

Nearly two-thirds of those who declined H1N1 vaccine preferred to receive only seasonal vaccine or had already had what they believed to be H1N1 infection by the time that H1N1 vaccine was available. These logistical issues were less relevant during the 2010–2011 influenza season, because a single influenza vaccine incorporating 2009 H1N1 was available at the start of the season. Perhaps more concerning is the persistence of personal choice and perceived low susceptibility to infection as reasons for declination despite an aggressive long-term influenza education program at our institution. Although our overall seasonal and H1N1 vaccination rates were well above the national estimates,[6] there is still much room for improvement. Further increases in annual influenza vaccination rates may require penalties for those who refuse vaccination.[7]

ACKNOWLEDGMENTS

Potential conflicts of interest. M.J.S. has received research support from Novartis and Sanofi Pasteur. K.A.B. has served as a consultant to GlaxoSmithKline and Sanofi Pasteur; has served on an advisory board for GlaxoSmithKline; has received research support from Wyeth (now Pfizer), Novartis, GlaxoSmithKline, MedImmune, and Astellas; and has received honoraria for speaking from Sanofi Pasteur. R.D.S reports no conflicts of interest relevant to this article.

Michael J. Smith, MD, MSCE;[1]
Robyn D. Schmucker, MD;[1]
Kristina A. Bryant, MD[1]

Affiliations: 1. Division of Pediatric Infectious Diseases, University of Louisville School of Medicine, Louisville, Kentucky.

Address correspondence to Michael J. Smith, MD, MSCE, Division of Pediatric Infectious Diseases, University of Louisville School of Medicine, 571 South Floyd Street, Suite 321, Louisville, KY 40202 (mjsmit22@louisville.edu).

Received May 16, 2011; accepted May 22, 2011; electronically published July 21, 2011.

Presented in part: 48th Annual Meeting of the Infectious Diseases Society of America, Vancouver, Canada, October 2010 (Abstract 481).

Infect Control Hosp Epidemiol 2011;32(9):934-936

 0899-823X/2011/3209-0022$15.00. DOI: 10.1086/661786

REFERENCES

1. Kaboli F, Astrakianakis G, Li G, Guzman J, Naus M, Donovan T. Influenza vaccination and intention to receive the pandemic H1N1 influenza vaccine among healthcare workers of British Columbia, Canada: a cross-sectional study. *Infect Control Hosp Epidemiol* 2010;31(10):1017–1024.
2. Maurer J, Harris KM, Parker A, Lurie N. Does receipt of seasonal influenza vaccine predict intention to receive novel H1N1 vaccine: evidence from a nationally representative survey of U.S. adults. *Vaccine* 2009;27(42):5732–5734.
3. Kwon Y, Cho HY, Lee YK, Bae GR, Lee SG. Relationship between intention of novel influenza A (H1N1) vaccination and vaccination coverage rate. *Vaccine* 2010;29(2):161–165.
4. Virseda S, Restrepo MA, Arranz E, et al. Seasonal and pandemic A (H1N1) 2009 influenza vaccination coverage and attitudes among health-care workers in a Spanish university hospital. *Vaccine* 2010;28(30):4751–4757.
5. Nichol KL, Hauge M. Influenza vaccination of healthcare workers. *Infect Control Hosp Epidemiol* 1997;18(3):189–194.
6. Interim results: influenza A (H1N1) 2009 monovalent and seasonal influenza vaccination coverage among health-care personnel–United States, August 2009–January 2010. *MMWR Morb Mortal Wkly Rep* 2010;59(12):357–362.
7. Harris K, Maurer J, Black C, Euler G, Kadiyala S. Workplace efforts to promote influenza vaccination among healthcare personnel and their association with uptake during the 2009 pandemic influenza A (H1N1). *Vaccine* 2011;29(16):2978–2985.

Adult Measles in a Traveller: Infection Control Implications of Instituting Proper Precautions

To the Editor—Recently, an overseas adult traveller was admitted to our hospital with rash and fever. His case illustrated the difficulties encountered in the differential diagnosis of measles in adult travellers and the importance of placing hospitalized patients under proper precautions.[1-5] The traveller was a 30-year-old male mechanical engineer from France who visited family and friends in the United States. Days after his arrival, he became ill with fever, rash, and cough and was admitted to the hospital. His rash began on the face and both wrists. Subsequently, the rash spread to his trunk and extremities, including the palms and soles. The patient had conjunctival suffusion and later developed aphthous ulcers. He denied recent contact with sick individuals and stated that he had completed his childhood vaccinations. The infectious disease consultant performed a differential diagnosis that included Mediterranean spotted fever (MSF), Coxsackie infection, scarlet fever, leptospirosis, adenovirus, and measles. The dermatology consultant thought that the most likely diagnosis was either scarlet fever or viral exanthem. Although measles was included in the differential diagnosis, it was thought to be unlikely because the patient's rash was atypical (eg, was found on the palms and soles) and because of the patient's history of childhood vaccinations. The patient was placed under droplet precautions and empirically treated with doxycycline because of the possibility of MSF, and serum specimens were tested for all of the infectious diseases included in the differential diagnosis. On hospital-day 4, the patient's measles immunoglobulin (Ig) G titer was reported as undetectable. Being nonimmune to measles increased the possibility that the patient had measles, and the patient was placed under airborne precautions.[6-10] Measles is a highly contagious viral infection that primarily affects children but also occurs in nonimmunized or partially immunized adults. In adults, measles may be more severe than in children, and the diagnosis may be difficult if the presentation is atypical or does not occur during a measles outbreak. Measles virus is transmitted through the air, and hospitalized patients require airborne precautions.[1-5] Most patients with measles are thought to be infectious from 4 days prior to the appearance of the rash through 4 days after the rash has appeared. The incubation period for measles is 8–12 days.

Before being placed under airborne precautions, the patient with measles potentially exposed a large number of individuals (eg, ambulance personnel, healthcare workers [HCWs], other patients, and visitors and family members) in the emergency department and hospital. These potential hospital exposures had important employee health and public health implications that necessitated a comprehensive contact investigation. Before airborne precautions were instituted, a contact investigation determined that 205 HCWs were potentially exposed to measles. There were also 254 potential measles exposures involving patients and visitors in the emergency department and hospital. Those not immunized against measles may be given measles vaccine within 3 days after exposure. At the time that measles was diagnosed in this case, the window of opportunity for measles vaccination had passed. Administration of Ig can achieve passive immunity against measles in nonimmune individuals; the Ig should be administered within 6 days after exposure.

During the contact investigation, individuals were considered to have immunity to measles if they were born before 1957, had 2 documented measles vaccinations, or had measles diagnosed by a physician. As a condition of employment, all of our hospital personnel must demonstrate evidence of immunity against measles. For HCWs, proof of immunity is acceptable if HCWs received 2 or more measles vaccinations and have a negative measles IgG titer. All of our 7,000 HCWs met these criteria and were considered to be immune to measles. Of the 7,000 HCWs, 4 had received 2 doses of measles vaccine and had undetectable measles IgG titers. These 4 HCWs were offered passive immunity with Ig, but none elected to receive Ig. Of the 254 patients and visitors potentially exposed to measles, 3 had no measles immunity or questionable measles immunity, and they were offered and received Ig. The contact investigation involved 459 potential measles exposures. A contact list was maintained regarding