3. Weissenböck H. Kolodziejek J, Url A, Lussy H, Rebel-Bauder B, Nowotny N. Emergence of Usutu virus, an African mosquito-borne *Flavivirus* of the Japanese encephalitis virus group central Europe. Emerg Infect Dis. 2002;8:652–6.
4. Chvala S, Bakonyi T, Bukovsky C, Meister T, Brugger K, Rubel F, et al. Monitoring of *Usutu virus* activity and spread by using dead bird surveillance in Austria, 2003–2005. Vet Microbiol. 2007;122:237–45.
5. Meister T, Lussy H, Bakonyi T, Šikutová S, Rudolf I, Vogl W, et al. Serological evidence of continuing high *Usutu virus* (*Flaviviridae*) activity and establishment of herd immunity in wild birds in Austria. Vet Microbiol. 2008;127:237–48.
6. Bakonyi T, Erdélyi K, Ursu K, Ferenczi E, Csörgő T, Lussy H, et al. Emergence of *Usutu virus* in Hungary. J Clin Microbiol. 2007;45:3870–4.
7. Buckley A, Dawson A, Moss SR, Hinsley SA, Bellamy PE, Gould EA. Serological evidence of *West Nile virus*, *Usutu virus* and *Sindbis virus* infection of birds in the UK. J Gen Virol. 2003;84:2807–17.
8. Murgue B, Murri S, Zientara S, Durand B, Durand JP, Zeller H. West Nile outbreak in horses in Southern France, 2000: the return after 35 years. Emerg Infect Dis. 2001;7:692–6.
9. Sánchez-Seco MP, Rosario D, Domingo C, Hernández L, Valdés K, Guzmán MG, et al. Generic RT-nested-PCR for detection of ?aviviruses using degenerated primers and internal control followed by sequencing for speci?c identi?cation. J Virol Methods. 2005;126:101–9.
10. Figuerola J, Jiménez-Clavero MA, Rojo G, Gómez-Tejedor C, Soriguer R. Prevalence of West Nile virus neutralizing antibodies in colonial aquatic birds in southern Spain. Avian Pathol. 2007;36:209–12.

Address for correspondence: Núria Busquets, Unitat de Malalties Víriques, Edi?ci CRESA, Universitat Autònoma de Barcelona, Bellaterra 08193, Spain; email: nuria.busquets@cresa.uab.es

Letters

Letters commenting on recent articles as well as letters reporting cases, outbreaks, or original research are welcome. Letters commenting on articles should contain no more than 300 words and 5 references; they are more likely to be published if submitted within 4 weeks of the original article's publication. Letters reporting cases, outbreaks, or original research should contain no more than 800 words and 10 references. They may have one Figure or Table and should not be divided into sections. All letters should contain material not previously published and include a word count.

Rotavirus P[4]G2 in a Vaccinated Population, Brazil

To the Editor: Gurgel et al. provide an early examination of postmarketing surveillance data from Brazil, one of the ?rst countries to implement routine childhood immunization with Rotarix vaccine (*1*). In a community with reported vaccination coverage of 50%, the P[4]G2 strain was detected in all 21 rotavirus-positive stool samples identi?ed during November 2006–February 2007. Although monitoring effectiveness of Rotarix against P[4]G2 strains is of interest (*2*), the small sample size, short duration of surveillance, and lack of a comparison group preclude ?rm assessment of an association between P[4]G2 predominance and vaccination.

Because Rotarix was introduced in Brazil in March 2006, most children >12 months old (66 [51%] of 129) in the study were ineligible for vaccination. Genotype P[4]G2 was the only strain identi?ed even in older children, which suggests either a change in disease ecology from vaccination or the random circulation of P[4]G2 strains in the community. Ongoing hospital-based surveillance during 2006 in 3 regional countries that had not introduced rotavirus vaccine (El Salvador, Guatemala, and Honduras) showed that P[4]G2 was the predominant circulating strain (prevalence 68%–81%). Thus, as previously documented (*3*,*4*), the predominance of P[4]G2 strains after Rotarix introduction in Brazil could represent a natural shift unrelated to vaccination.

Evaluation of vaccine effectiveness against speci?c strains will allow full assessment of the public health impact of vaccination. Although the data are sparse in the study from Gurgel et al., a comparison of the odds of vaccination among rotavirus-positive (cases) versus rotavirus-negative (controls) children shows 80% vaccine effectiveness against P[4]G2 strains among infants <1 year of age, in accordance with recently published data from a controlled trial (*5*). To further elucidate vaccine impact, we are providing support for vaccine effectiveness studies in Nicaragua and El Salvador and conducting strain monitoring before and after licensure throughout Latin America.

Manish M. Patel,*
Lucia Helena de Oliveira,†
Ana Maria Bispo,†
Jon Gentsch,*
and Umesh D. Parashar*

*Centers for Disease Control and Prevention, Atlanta, Georgia, USA; and †Pan American Health Organization, Washington, DC, USA

References

1. Gurgel RQ, Cuevas LE, Vieira SCF, Barros VCF, Fontes PB, Salustino ET, et al. Predominance of rotavirus P[4]G2 in a vaccinated population, Brazil. Emerg Infect Dis. 2007;13:1571–3.
2. Glass RI, Parashar UD, Bresee JS, Turcios R, Fischer TK, Widdowson MA, et al. Rotavirus vaccines: current prospects and future challenges. Lancet. 2006;368:323–32.
3. Desselberger U, Iturriza-Gomara M, Gray JJ. Rotavirus epidemiology and surveillance. Novartis Found Symp. 2001;238:125–47.
4. Santos N, Hoshino Y. Global distribution of rotavirus serotypes/genotypes and its implication for the development and implementation of an effective rotavirus vaccine. Rev Med Virol. 2005;15:29–56.
5. Vesikari T, Karvonen A, Prymula R, Schuster V, Tejedor JC, Cohen R, et al. Ef?cacy of human rotavirus vaccine against rotavirus gastroenteritis during the ?rst 2 years of life in European infants: randomised, double-blind controlled study. Lancet. 2007;370:1757–63.

Address for correspondence: Manish M. Patel, Viral Gastroenteritis Section, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop A47, Atlanta, GA 30333, USA; email: aul3@cdc.gov

To the Editor: Gurgel et al. described the predominance of P[4]G2 rotaviruses in a vaccinated population in Aracaju, northeastern Brazil (*1*). However, several limitations need to be addressed to avoid misinterpretation of data that could lead to loss of con?dence in the vaccine in Brazil and other countries.

Brazil was one of the ?rst countries in Latin America to introduce a live, oral, attenuated human rotavirus vaccine into a public-sector health program. Nevertheless, vaccine coverage levels vary considerably across regions (≈40% to >80%) and are ≈50% in some parts of northern and northeastern Brazil. Therefore, drawing conclusions about the vaccine's protection and prevailing rotavirus genotypes in a setting where coverage is still low seems premature.

Two ?ndings require special consideration. First, although the number of patients is small, children <1 year of age showed a reduced risk for severe rotavirus diarrhea among vaccinated (7%) patients compared with nonvaccinated (26%) patients: p<0.05; odds ratio (OR) 0.20; exact 95% con?dence interval (CI) 0.029–1.24. Second, surveillance was conducted for only 4 months, which did not allow for demonstration of a true representative pattern of strain distribution over time. The sequential changing predominance of rotavirus serotypes occurring over time has been well documented for many years (*2*).

The authors stated that the "vaccine does not afford complete protection against infection" (*1*). For those not paying close attention to data analysis, this statement could be misinterpreted to mean that the vaccine may not protect against P[4]G2. To the contrary, even with a small sample size and low vaccine coverage, additional analyses of the original data show that the live, oral, attenuated human rotavirus vaccine can protect against the 100% predominance of P[4]G2.

In a large phase III trial conducted in Latin America and Finland, a nonsigni?cant but protective trend was observed against severe disease associated with P[4]G2 (*3*). Furthermore, in a subsequent meta-analysis, protection against P[4]G2 rotavirus gastroenteritis of any severity was 81% (95% CI 31–96) and protection against severe rotavirus gastroenteritis was 71% (95% CI 20–91) (*4*).

To reinforce the hypothesis that predominance of P[4]G2 strains in Aracaju is unrelated to vaccine use, it is worth mentioning that P[4]G2 rotaviruses appear to display an ≈10-year cyclic pattern of occurrence in Brazil (*5*). Although the data presented in the original article may cause misinterpretation about vaccine protection, the article highlights the need for well-designed postmarketing studies to assess both vaccine impact and strain surveillance, in compliance with recent World Health Organization recommendations (*6*).

Alexandre C. Linhares*
and F. Raúl Velázquez†

*Ministério da Saúde, Belém, Pará, Brazil; and †Instituto Mexicano del Seguro Social, Mexico City, Mexico

References

1. Gurgel RQ, Cuevas LE, Vieira SCF, Barros VCF, Fontes PB, Salustino EF, et al. Predominance of rotavirus P[4]G2 in a vaccinated population, Brazil. Emerg Infect Dis. 2007;13:1571–3.
2. Velázquez FR, Calva JJ, Guerrero ML, Mass D, Glass RI, Pickering LK, et al. Cohort study of rotavirus serotype patterns in symptomatic and asymptomatic infections in Mexican children. Pediatr Infect Dis J. 1993;12:54–61.
3. Ruiz-Palacios GM, Pérez-Schael I, Velázquez FR, Abate H, Breuer T, Costa-Clemens SA, et al. Safety and ef?cacy of an attenuated vaccine against severe rotavirus gastroenteritis. N Engl J Med. 2006;354:11–22.
4. O'Ryan M. Rotarix (RIX4414): an oral human rotavirus vaccine. Expert Rev Vaccines. 2007;6:11–9.
5. Linhares AC. Rotavirus infection in Brazil: epidemiology and challenges for its control [in Portuguese]. Cad Saude Publica. 2000;16:629-46.
6. World Health Organization. Rotavirus vaccines. Wkly Epidemiol Rec. 2007;82:285–96.

Address for correspondence: Alexandre C. Linhares, Instituto Evandro Chagas, Ministry of Health-Secretaria de Vigilância em Saúde Av Almirante Barroso, 492 Belém, Pará 66.090-000, Brazil; email: alexandrelinhares@iec.pa.gov.br

In Response: We acknowledge the comments by Patel et al. (*1*) and by Linhares and Velázquez (*2*) about our article that documented the presence of a single rotavirus genotype (P[4]G2) in Aracaju, northeastern Brazil, after the introduction of a human, monovalent rotavirus vaccine (*3*). Both letters emphasize that the predominance of P[4]G2 may be caused by a natural genotype variation unrelated to vaccination. We agree that our observation could be explained by natural variation of circulating rotavirus genotypes in the region, but an alternative possibility is that the introduction of the G1P[8] rotavirus vaccine into the childhood immunization schedule created conditions in which P[4]G2 strains had a selective advantage over strains with which the vaccine shares G type, P type, or both.

According to a systematic review of rotavirus genotypes reported in the 25 years preceding introduction of the vaccine in Brazil, the prevalence of P[4]G2 strains varied from 19% (1986–1995) to 12% (1996–2000) to 1% thereafter, thus not reaching the detection rate we observed in Aracaju (R.Q. Gurgel et al., unpub data). Furthermore, in the ensuing 8-month period, no genotype other than P[4]G2 had been detected in Aracaju, suggesting that our initial ?ndings were not spurious (R.Q. Gurgel et al., unpub data). In addition, in a separate study we conducted in Recife, a city 500 km north of Aracaju, we observed a signi?cant increase in the proportion of G2 strains

detected from 47% (21/45) during the 3-month period immediately after vaccine introduction (March 2006–May 2006) to 100% (11/11) during the same 3-month period 1 year after the vaccine introduction (March 2007–May 2007) (*4*). We believe that our ?ndings are consistent with results of ?eld trials that indicated that the vaccine provided relatively less protection against P[4]G2 strains than against other rotavirus strain types (*5*).

The bene?cial impact of rotavirus vaccination in northeastern Brazil is re?ected in the reduction of the detection rate of rotavirus among severe diarrhea cases in our study in Recife, which fell from 27% (45/166 cases) to 5.0% (11/221 cases) in the postvaccine 3-month reporting periods, respectively (*4*). Our data from Aracaju are indicative of heterotypic protection, although this is not statistically signi?cant (*1*), against P[4]G2 strains. Further postlicensure studies in Brazil are required to document continuing effectiveness of the national vaccination program as well as to closely monitor the circulating rotavirus strain types (*6*).

Ricardo Queiroz Gurgel,*†
Sarah Cristina Fontes Vieira,*
Vanessa Cristiane Farias Barros,* Paula Brandão Fontes,*Eduardo F. Salustino,*
Osamu Nakagomi,‡
Toyoko Nakagomi,‡
Winifred Dove,†
Nigel A. Cunliffe,†
and Luis E. Cuevas†§

*Federal University of Sergipe, Aracaju, Brazil; †University of Liverpool, Liverpool, UK; ‡Nagasaki University, Nagasaki, Japan; and §Liverpool School of Tropical Medicine, Liverpool, UK

References

1. Patel MM, de Oliveira LH, Bispo AM, Gentsch J, Parashar UD. Rotavirus P[4]G2 in a vaccinated population, Brazil [letter]. Emerg Infect Dis. 2008;14:863.
2. Linhares AC, Velázquez FR. Rotavirus P[4]G2 in a vaccinated population, Brazil [letter]. Emerg Infect Dis. 2008;14:864.
3. Gurgel RQ, Cuevas LE, Vieira SCF, Barros VCF, Fontes PB, Salustino ET, et al. Predominance of rotavirus P[4]G2 in a vaccinated population, Brazil. Emerg Infect Dis. 2007;13:1571–3.
4. Nakagomi T, Cuevas LE, Gurgel RQ, Elrokhsi SH, Belkhir YA, Abugalia M, et al. Apparent extinction of non-G2 rotavirus strains from circulation in Recife, Brazil, after the introduction of rotavirus vaccine. Arch Virol. 2008;153:591–3.
5. Ruiz-Palacios GM, Perez-Schael I, Velazquez FR, Abate H, Breuer T, Clemens SC, et al. Safety and ef?cacy of an attenuated vaccine against severe rotavirus gastroenteritis. N Engl J Med. 2006;354:11–22.
6. Rotavirus vaccines. Wkly Epidemiol Rec. 2007;82:285–96.

Address for correspondence: Ricardo Gurgel, Federal University of Sergipe-Medicine Post Graduation Nucleus, Rua Claudio Batista S/N Bairro Sanatorio, Aracaju Sergipe 49000 100, Brazil; email: ricardoqg@infonet.com.br

Erratum: Vol. 14, No. 4

In the article "Reassortant Avian In?uenza Virus (H5N1) in Poultry, Nigeria, 2007" by I. Monne et al., the author af?liations contained errors. Isabella Monne, Tony M. Joannis, Alice Fusaro, Paola De Benedictis, Giovanni Cattoli, and Ilaria Capua are af?liated with Istituto Zoopro?lattico Sperimentale delle Venezie, Legnaro, Padova, Italy.

We regret any confusion this error may have caused.