

## A DISEASE MOST FOWL\*—CHICKENPOX IN THE THIRD MILLENIUM

**L**IVE, ATTENUATED varicella virus vaccine (Varivax<sup>®</sup>, Merck and Company, West Point, PA) was licensed in 1995 and is recommended for all healthy, varicella-susceptible individuals >12 months old. Beginning in the fall of 2000, a requirement for varicella vaccination of susceptible Oregon schoolchildren was phased in, beginning with kindergarten and 7<sup>th</sup> grade; vaccination of children in out-of-home day care was also required. At this point, only 5<sup>th</sup>, 6<sup>th</sup>, and 12<sup>th</sup> graders are not yet subject to the requirement. This issue of the *CD Summary* reviews these salutary changes in the epidemiology of chickenpox, along with some potential problems out for which to look.

### THE DECLINE OF CHICKENPOX

During the last nine years, increasingly widespread use of the vaccine in the United States has significantly altered the epidemiology of chickenpox; substantial decreases in both incidence and complications have been realized. In 2003, the national Centers for Disease Control and Prevention (CDC) reported a reduction of up to 84% in incidence from 1990 to 2001 in selected states and surveillance sites.<sup>1,2</sup> Review of a national sample of hospital discharges demonstrated that varicella-related hospitalizations declined by 75% from 1993 to 2001; and although the reductions were greatest in the 0- to 4-year-olds, they were seen in adults as well. The decline in hospitalizations was accompanied by \$100 million savings in hospital charges annually.<sup>3</sup>

### THE RASH OF CHICKENPOX

Chickenpox is a highly infectious, systemic infection with fever and a generalized, typically itchy, three- to five-day maculopapulovesicular rash, which, in normal hosts, evolves as a series of "crops." The presence of lesions in various stages of vesiculation is one of the symptoms that distinguish chickenpox from smallpox. Before vaccine licensure,

a case of chickenpox frequently involved hundreds of vesicles in crops so dense that lesions encroached one upon the other. Constitutional symptoms could be severe. Indeed, the extent of the rash usually correlated with the severity of other symptoms of the illness.<sup>4</sup> Nowadays, in the 1%–4% of persons who get "breakthrough" chickenpox (i.e., despite being vaccinated), the disease is of shorter duration, systemic symptoms are less severe, the skin lesions are fewer and more likely to be macular, and residual scarring is less common.<sup>4,5</sup>

### DIAGNOSTIC CHALLENGES

With the disease becoming less prevalent and therefore less familiar to parents, teachers, and physicians; less severe and therefore less likely to call attention to itself; and with the lesions of breakthrough chickenpox harder to find and of non-classical appearance, diagnosing chickenpox will necessarily become more difficult. Moreover, Bayes's theorem decrees that as the incidence of chickenpox declines, so must the reliability of clinical diagnosis. Therefore, it will become increasingly important to exclude conditions that may mimic chickenpox, including generalized herpes simplex, rickettsialpox, impetigo, allergic reactions (including Stevens-Johnson syndrome), contact dermatitis, insect bites, and infection by other viruses—e.g., coxsackie.

Patients with breakthrough chickenpox can transmit the infection to others, but they appear to be less contagious for having been vaccinated; a study of transmission within households found that it was transmitted only about half as often as was chickenpox from unvaccinated cases.<sup>6</sup> In any event, when faced with diagnostic uncertainty regarding a maculopapulovesicular rash, eliciting a history of contact with a case of chickenpox in the 7–21 days before rash onset is helpful.<sup>7</sup>

### VARIVAX<sup>®</sup> CONTROVERSIES Vaccine effectiveness and duration of immunity

Despite the reduction of chickenpox incidence, day care and school outbreaks have occurred in which the vaccine effectiveness was lower than the  $\geq 80\%$  observed in pre-licensure clinical trials, sparking speculation about the need for a second dose of chickenpox vaccine. For example, an Oregon elementary school experienced several generations of chickenpox transmission despite vaccination coverage of 98%; measured vaccine effectiveness in this outbreak was 72%.<sup>8</sup> Analyses in two outbreak investigations suggested that vaccine effectiveness dropped off about 5 years after vaccination.<sup>8,9</sup> On the other hand, a large case-control study with cases ascertained over 6 years through active surveillance of 20 pediatric practices in Connecticut demonstrated 81% vaccine effectiveness in years 7–8 after vaccination.<sup>10</sup> Given the size and breadth of this study, the results are reassuring, and most experts are not recommending booster doses of chickenpox vaccine yet.

### Age at vaccination

Some data suggest that vaccination at younger than about 15 months of age may increase the risk of breakthrough varicella.<sup>9,12</sup> On the other hand, practical concerns suggest that it might be a bad idea to delay chickenpox vaccination. Children are typically seen at 12 months of age, at which time they get their measles-mumps-rubella (MMR) vaccinations. Withholding varicella vaccination at this visit poses the risk that some children might never return to receive it. Moreover, the general rule is that any two parenteral, live, viral vaccines should either be given simultaneously; or they should be separated by a 4-week interval.<sup>13</sup> This principle holds regarding the administration of the (live, atten-

\*Clever title stolen from: *Informed* 1999; 5(4). Available at <http://www.ices.on.ca/informed/periodical/issue/868-vol5issue4.pdf>.



If you need this material in an alternate format, call us at 503/731-4024.

IF YOU WOULD PREFER to have your CD Summary delivered by e-mail, zap your request to [cd.summary@state.or.us](mailto:cd.summary@state.or.us). Please include your full name and mailing address (not just your e-mail address), so that we can effectively purge you from our print mailing list, thus saving trees, taxpayer dollars, postal worker injuries, etc.

uated) chickenpox vaccine and the (live, attenuated) MMR vaccine. And, indeed, an increased risk of breakthrough chickenpox has been demonstrated in children who got their chickenpox vaccine not simultaneously with but within 30 days after receiving MMR.<sup>14</sup>

#### Will zoster incidence increase?

Some have suggested that the exposure to chickenpox boosts one's immunity against varicella-zoster virus and makes reactivation—i.e., zoster—less likely.<sup>15</sup> Brisson et al. modeled the effects of various vaccination strategies and coverage rates and estimated that if, in fact, exposure to chickenpox provides a protective “boosting” effect against zoster, then the vaccine, by reducing such exposure, would result in a temporary increase in zoster cases. The duration and magnitude of the increase would be based upon just how protective exposure is and upon the percentage of the population that gets vaccinated.<sup>15</sup> CDC has established active zoster surveillance in a few locations around the country.

#### SUMMARY

Widespread use of live, attenuated varicella vaccine in the United States has led to salutiferous declines in the incidence and severity of chickenpox, and the disease that sometimes occurs in vaccinated persons tends to be much less severe. Though questions remain about duration of immunity in the absence of periodic exposure to wild-type chickenpox and about what will happen to the incidence of zoster, these are to be expected in the early years of widespread vaccine use and will be answered

with traditional surveillance; recommendations will change accordingly. Meanwhile, Oregon physicians are encouraged to vaccinate their varicella-susceptible patients to prevent severe disease with long “down time” and to reduce the incidence of this now preventable disease.

*Substantially adapted from Vázquez M. Varicella infections and varicella vaccine in the 21<sup>st</sup> century. *Pediatr Infect Dis J* 2004;23:871–2.*

#### REFERENCES

1. CDC. Decline in annual incidence of varicella—selected states, 1990–2001. *MMWR* 2003;52:884–5.
2. Seward J, Watson B, Peterson C, et al. Varicella disease after introduction of varicella vaccine in the United States, 1995–2000. *JAMA* 2002; 287:606–11.
3. Davis MM, Patel MS, Gebremariam A. Decline in varicella-related hospitalizations and expenditures for children and adults after introduction of varicella vaccine in the United States. *Pediatrics* 2004;114:786–92.
4. Vázquez M. Varicella infections and varicella vaccine in the 21<sup>st</sup> century. *Ped Infect Dis J*;23:871–2.
5. Vázquez M. The effectiveness of the varicella vaccine in clinical practice. *New Eng J Med* 2001; 344:955–60.
6. Seward JF, Zhang JX, Maupin TJ, Mascola L, Jumaan AO. Contagiousness of varicella in vaccinated cases: a household contact study. *JAMA* 2004;292:704–8.
7. Chickenpox/herpes zoster. In: Heymann DL, ed. *Control of Communicable Diseases Manual*. 18th ed. Washington, D.C.: American Public Health Association; 2004. p. 94–9.
8. Tugwell BD, Lee LE, Gillette H, et al. Chickenpox outbreak in a highly vaccinated school population. *Pediatrics* 2004;113:455–9.
9. Lee BR, Feaver SL, Miller CA, Hedberg CW, Ehresmann KR. An elementary school outbreak of varicella attributed to vaccine failure: policy implications. *J Infect Dis* 2004;190:477–83.
10. Vázquez M, LaRussa PS, Gershon AA, et al. Effectiveness over time of varicella vaccine. *JAMA* 2004;291:851–5.
11. Galil K, Fair E, Mountcastle N, et al. Younger age at vaccination may increase risk of varicella vaccine failure. *J Infect Dis* 2002;186:102–5.
12. Dworkin MS, Jennings CE, Roth-Thomas J, Lang JE, Stukenberg C, Lumpkin JR. An outbreak of varicella among children attending preschool and elementary school in Illinois. *Clin Infect Dis* 2002;35:102–4.
13. Centers for Disease Control and Prevention. General recommendations on immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Family Physicians (AAFP). *MMWR* 2002;51(RR-2). Available at <http://www.cdc.gov/mmwr/PDF/rr/rr5102.pdf>.

14. Verstraeten T, Jumaan AO, Mullooly JP, et al. A retrospective cohort study of the association of varicella vaccine failure with asthma, steroid use, age at vaccination, and measles-mumps-rubella vaccination. *Pediatrics* 2003;112:e98–103.
15. Brisson M, Edmunds WJ, Gay NJ, Law B, De Serres G. Modelling the impact of immunization on the epidemiology of varicella zoster virus. *Epidemiol Infect* 2000;125:651–69.

## Lymphogranuloma Venereum Among MSM

**L**YMPHOGRANULOMA venereum (LGV) is a systemic, sexually transmitted disease caused by selected serovars of *Chlamydia trachomatis* that are seldom seen in the United States. In the past 18 months, >90 cases of LGV have been identified among men who have sex with men (MSM) in the Netherlands. LGV has also been identified recently among MSM in San Francisco and other parts of the U.S.

The clinical and histologic presentation of LGV proctocolitis can be similar to that of inflammatory bowel disease. Primary infection may be asymptomatic or denoted by a small, painless ulcer occurring 3–30 days after exposure. Patients commonly have tender inguinal or femoral lymph nodes and symptoms of proctitis from rectal exposure. The recommended treatment is doxycycline, 100 mg twice daily for 21 days. Recent sex partners should also be evaluated and treated.

Please report any suspected LGV case promptly to your local health department. If you are interested in specialized testing for LGV-specific serovars of *C. trachomatis*, call our STD program at 503/731-4026. For more information on LGV, see *MMWR* 2004;53:985–8, available at [www.cdc.gov/mmwr/preview/mmwrhtml/mm5342a2.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5342a2.htm).