able household-based vaccination information and at least one provider questionnaire were available. Of the 1762 children, 949 (54%) had vaccination cards available. For the remaining 813 (46%), vaccination status was reported by parental recall.

The sensitivity for vaccination cards for the 4:3:1:3 series was 83.9%, and for the individual vaccines, sensitivity ranged from 51.2% for MMR to 76.1% for DTP. The specificity for the 4:3:1:3 series was 71.9%, and for the individual vaccines specificity ranged from 84.1% for DTP to 95.0% for MMR. The positive predictive value of the vaccination card (the percentage of children not up-to-date according to vaccination cards who were actually not up-to-date) was 48.9%. The negative predictive value (percentage of children up-to-date according to the card that actually were up-to-date) for the 4:3:1:3 series was 93.3%.

For vaccination status based only on parental recall, the specificity for the 4:3:1:3 series was 78.5%, with a range for the individual vaccines from 78.8% for Hib to 94.6% for MMR. The positive predictive value for the 4:3:1:3 series was 40.2%, and the negative predictive value was 73.2%.

The sensitivity of parental recall to identify children undervaccinated for the 4:3:1:3 series was 24.6%—parents of only about one-quarter of undervaccinated children were aware that their children were not up-to-date. Because almost all parents thought their child was up-to-date, the specificity was 96.0%. Parental recall had a positive predictive value of 69.2% and a negative predictive value of 77.5%.

The results of this study show that parental recall is an inadequate method of identifying undervaccinated children because parental recall fails to identify most of the children in need of vaccination. Vaccination cards are much better able to identify children in need of vaccination, although with some loss of specificity. The loss in specificity means that many completely vaccinated children will be misclassified as needing vaccination. Those involved in planning interventions to increase vaccination coverage levels should be aware of these limitations in identifying their target populations.

As we move to state-based vaccination registries, a provider will have the ability to assess more accurately whether a child is in need of vaccination. Unfortunately, registries will not improve parents' perception of whether their child is in need of vaccination. Educating parents about both the complexity of the vaccination schedule and the importance of talking with their providers about vaccination is an important step.

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More on Measles

In his letter [Nov/Dec 1998;113: 479-80], Dr. Tulchinsky highlights the magnitude of the global morbidity and mortality due to measles, a ubiquitous disease that has been preventable since the development and routine use of measles vaccine. Indeed, there are few, if any, other low-cost public health interventions that can greatly reduce and possibly eradicate a disease that accounts for up to 10% of all mortality among children younger than 5 years old in developing countries. We support expanding measles control through increasing vaccination coverage and the number of doses offered in national immunization schedules.

Since 1989, the US Advisory Committee on Immunization Practices has recommended two doses of measles-containing vaccine.[1] Recognizing the impact that two-dose vaccination strategies have had on measles transmission in the United States and other countries as well as the effect of multiple doses delivered routinely and in vaccination campaigns in the Americas,[2] the Centers for Disease Control and Prevention (CDC) co-sponsored a series of annual meetings from 1995 to 1997 with the Pan American Health Organization, the World Health Organization (WHO), and the United Nations Children's Fund to expand strategies for measles control and elimination globally. Participants at the meetings concluded that "measles eradication is technically feasible with existing vaccines" and that, "although existing vaccines are adequate for eradication, vaccination strategies that rely on administration of a single dose of vaccine are not."[3] In 1998, the CDC committed approximately $8 million to assist international efforts to improve measles control and to support regional measles elimination initiatives.

Two doses of measles vaccine administered to more than 95% of people born since the introduction of routine measles vaccination is required to adequately protect a population from measles outbreaks. The second dose effectively immunizes the small percentage of people who failed to respond to the first dose. Periodic campaigns may be more appropriate for populations that either have difficulty achieving high coverage through routine services or have a rapid build up of measles-susceptible people.

Given the successes of measles control in the Americas[3] and other parts of the world, we strongly support expanding control efforts against measles; however, several issues must be addressed first. In African urban centers, where the average age of exposure to measles is lower than in other settings, the ability to achieve and sustain interruption of virus transmission needs to be demonstrated. In many countries, operational and logistical issues need careful attention. These include the need to deliver injectable vaccines safely through the use of nonreuseable syringes and needles during mass campaigns in populations with high incidences of bloodborne pathogens; and the need for practical methods for disease surveillance and for monitoring age-specific susceptibility in order to target immunization program activities.

In 1997, global measles eradication efforts through the year 2010—the potential time frame for implementing global eradication—were projected to cost approximately $4.5 billion, which included $1.7 billion for developing countries to purchase and administer vaccines.[4] Although this cost may be offset by treatment savings, the financing would need to be committed up front before the savings from ending vaccination could accrue. Nevertheless, we think that this is a small price for preventing up to one million deaths in children annually.

Decisions regarding eradication of a disease must be carefully considered, especially in the case of a highly transmissible agent such as measles for which global coordination is crucial. Dr. Tulchinsky questions the relative priorities of measles control and polio eradication. Given that substantial progress toward polio eradication has already been made, it is inappropriate to reevaluate its priority when eradication is within our grasp. The credibility of any future global eradication initiative would suffer if we fail to eradicate polio. Certainly, those countries actively engaged in polio eradication activities that are able to accelerate measles control should do so; however, planners should be aware of the many logistic and programmatic issues that may stress the immunization delivery system.

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Procter & Gamble Responds on Olestra

I am writing to present Procter & Gamble's perspective on Marion Nestle's article about olestra [Nov/Dec 1998;113:508-20]. We agree with the author's conclusion that there is a "need for vigilance in keeping public health goals at the forefront of national food, nutrition, and health policies." Indeed, Olean cooking oil is one tool that can help consumers address one of our nation's most important public health goals—our need to reduce dietary fat intake, which can, in turn, reduce the risk of obesity, heart disease, some cancers, and other serious health problems.

Today, tens of millions of people are choosing and enjoying snack foods made with Olean that taste great without any added fat and only half the calories. Consumers have enjoyed more than a billion servings of snacks made with Olean—avoiding the more than 20 million pounds of fat and more than 80 billion calories they would have eaten in full-fat snacks. Clearly, consumers are voting in favor of Olean, as have the FDA's internal experts, the FDA's external Food Advisory Committee of experts, and numerous other medical and scientific experts from our nation's leading institutions as well as many public health policy experts and health professional organizations who have familiarized themselves with Olean's approval process, safety profile, and benefits.

Procter & Gamble has been in the consumer products business for more than 160 years. Consumers like our products and they trust us. We earn this trust by taking very seriously our responsibility to provide safe products that improve the lives of consumers. We believe that new products must be thoroughly researched and that P&G has an obligation to educate consumers and professionals about these products. We have done this for many products, including Tide, Crisco, Pampers, and Crest, and now most recently with Olean. We also encourage consumers to tell us if our products are meeting their needs through 800 numbers on all products. Olean is no exception to this long history of thorough research (there are over 150 olestra research publications in top peer-reviewed journals), education, and listening to consumers that is the foundation for all of P&G's products.

Due to space limitations, we are not able to reply as completely as we would like to the issues raised by Dr.