The Children's Hospital

CHILDREN'S OUTCOMES

Vaccine-Preventable Diseases in Colorado's Children, 2004

James Todd MD, Marsha Anderson MD, and Carl Armon MSPH

Introduction

In the last several weeks we've testified before the Colorado Senate and House Health subcommittees in favor of SB087. Jay Markson, Lee Thompson, and Bruce MacHaffie have each been down to testify as well. This bill will encourage providers to use the Colorado Immunization Registry and make it easier to get recall reminders to parents. It doesn't change the parent's right to decline vaccination or to opt-out of the registry. How can you help? **Please call your Senator and ask him/her to support the amended SB087 and call the Governor's office and ask that Governor Owens sign the bill.** Is there room for improvement? Summarized below are some of the highlights of our vaccine-preventable disease 2004 analysis.

Vaccines are very safe in Colorado. Severe adverse events to FDA-approved vaccines are very rare. As illustrated in Table 1, Colorado data in 2002 and 2003 show that there were only 26 "severe" adverse events in children (resulting in hospitalization) reported to VAERS, resulting in no deaths as compared to thousands of illnesses prevented. It is important to be aware that: "*when reporting and evaluating data from VAERS, it is important to note that for any reported event, no cause and effect relationship has been established. The event may have been related to an underlying disease or condition, to drugs being taken concurrently, or may have occurred by chance shortly after a vaccine was administered*." Even so, for every one possible severe event reported, vaccines prevented an estimated 4,000-8,000 severe vaccine-preventable illnesses in Colorado children in 2002-2003.

Table 1: Low rate of severe adverse events in Colorado children possibly related to vaccines compared to high vaccine efficacy (Data Source: VAERS, CDPHE).

Disease/ Vaccine	Estimated # Cases of Disease Prevented	Unverified Adverse Events (VAERS)		Disease Prevented to Severe Adverse Event Ratio
		# Mild	# Severe	
2002	72,850	169	9	8094:1
2003	73,843	375	17	4344:1

Although some advocate against the use of vaccines, claiming their alleged role in the causation of various adverse events including asthma, autism and other neurological complications, a rigorous review of evidence does not validate these hypotheses. As an example, a recent, thorough review by the Institute of Medicine concluded that "the body of epidemiological evidence favors rejection of a causal relationship between thimerosal-containing vaccines (and/or MMR) and autism" (Immunization Safety Review: Vaccines and Autism http://www.nap.edu/catalog/10997.html).

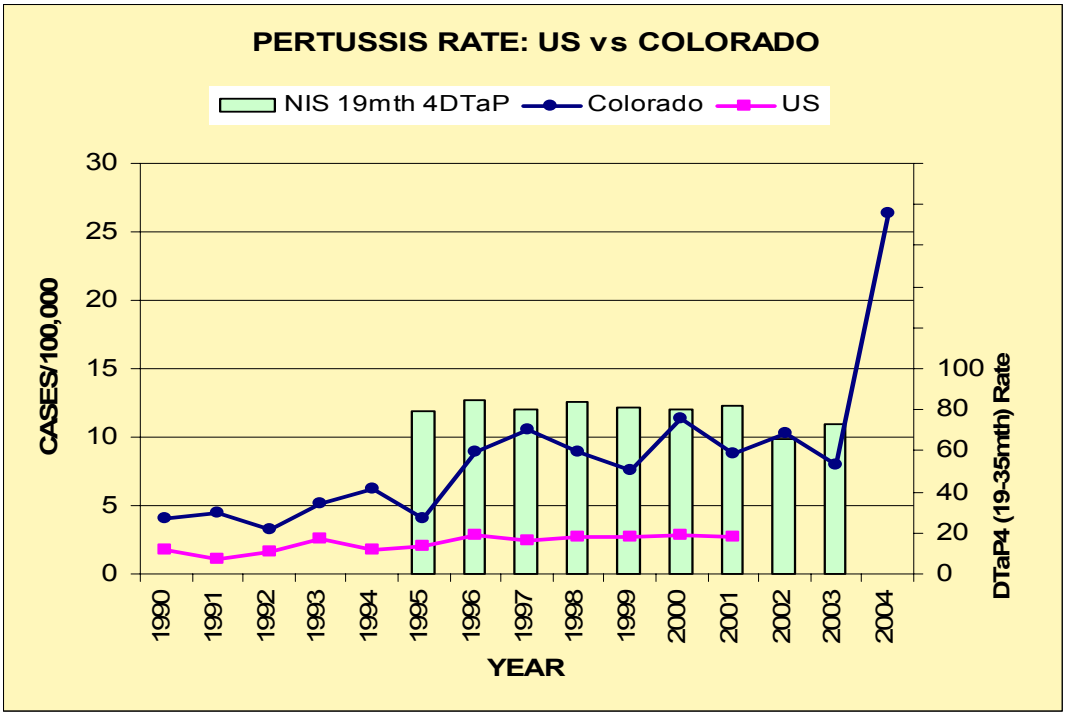
In spite of proven efficacy and safety, the 2002 and 2003 National Immunization Survey (NIS) has ranked Colorado as 50th of 50 states in childhood overall vaccination rates. Although this low ranking in recent years may, in part, have been exaggerated by vaccine shortages, Colorado has consistently ranked in the bottom half of states for most vaccines since 1996. Although efforts are made to account for a biased sample, NIS may actually over-estimate the percentage of Colorado children vaccinated since it is conducted by a phone survey that includes only households with land-line phones.

Additional evidence that the NIS rankings are, at the least, relative if not absolute indicators of the vaccination status of Colorado children include the results of a series of HEDIS audits of the vaccination status of Colorado children covered by Medicaid in 1999, 2001, and 2002. In these surveys only 28.5% to 45.7% of two year old children without an assigned primary care provider had received four DTaP doses as compared to 76.2% in the Kaiser Medicaid managed care program [SHCC: July 2004]. Compared to Kaiser Medicaid clients in 2001, children without an assigned medical home had vaccination rates one and a half to three times lower, suggesting that it is not the patient but rather the system (or lack thereof) that most influences vaccination rates. Whatever the true overall vaccination rate in Colorado there is reasonable evidence that there are pockets of under-vaccination that may leave young children vulnerable to vaccine-preventable diseases.

Delaying vaccination puts Colorado children, especially the more vulnerable infants and young children, at risk for vaccine-preventable diseases (VPD) and their complications. Over half of hospitalized cases related to vaccine-preventable diseases occur in children under two years of age. In addition, these diseases are commonly more severe in the youngest children. As an example, fatality rates are highest for whooping cough in children under one year of age. Although school immunization laws result in a high rate of vaccination by the time a child gets to school, the greatest risk for many of these diseases is in young infants emphasizing the critical need for a system to assure timely vaccination of our youngest children - not waiting until they become school-age.

Carolyn Brock; Program Assistant
brock.carolyn@tchden.org (303) 861-6412

Figure 1: Whooping Cough (pertussis) rates in Colorado are higher than the rest of the US and correlate with low Colorado DTaP4 vaccination rates. [Data Source: CDPHE, NIS]



Commensurate with Colorado's low NIS vaccination rates for pertussis, CDPHE data show a rising rate of pertussis that is significantly higher and increasing faster than the rate for the entire United States (Figure 1). In 2004, Colorado had by far the greatest number of pertussis cases in many years.

Besides the morbidity and mortality associated with vaccine-preventable diseases, delaying or not giving vaccines costs all the people of Colorado money. There has been over $23 million of hospital charges for severe disease associated with these infections (pertussis, varicella, influenza, *Streptococcus pneumoniae*, and *Haemophilus influenza*e) in Colorado children in 2003. This actually underestimates the potential cost savings of improved vaccination rates, since it does not include those hospitalized children with respiratory disease that can be attributed to influenza, or children with vaccine-preventable diseases who are not admitted to the hospital – in the case of influenza and pertussis this may be as much as ten to twenty-fold higher. Better immunization of children will also lead to less exposure of adults -- resulting in an even greater cost savings, and reduced work absenteeism. This may be of great importance in mitigating the impact of influenza outbreaks in the US in the future. Similar benefit/cost ratios that can be achieved by other recommended vaccines have been estimated by the Institute of Medicine (http://www.iom.edu/report.asp?id=14451). Excess benefit ranges from 27-fold for DTaP to 1-fold for the pneumococcal conjugate vaccine.

Vaccine-preventable disease occurs in all parts of Colorado, both urban and rural, and all social strata. The rate of VPD is higher in children who have publicly funded coverage than those with private insurance. In fact, the odds of getting a VPD are 2.3 (95% CI: 2.11, 2.61) times more for children in Colorado with Medicaid/SCHIP coverage than private insurance. Possible explanations for this observation include problems in access to care or delays in implementing the immunization schedule. Of the $24 million in charges for vaccine-preventable diseases in 2003, it is estimated that access to care and vaccination rates equal to private insurance patients could save hospital charges of almost $7 million for Medicaid/SCHIP/No Insurance children. Beside the higher incidence in VPDs in underinsured children, there are high rates of vaccine-preventable disease that occur in many areas throughout Colorado both urban and rural.

Summary: There is a clear association between vaccine-preventable diseases and low vaccination rates in Colorado's children. This appears to be a state-wide problem. The hospital-related charges for treating these vaccine-preventable diseases in children run in the tens of millions of dollars yearly, and significantly impact both the public and private sectors. The fact that Colorado compares poorly in its vaccination rates suggests that proven approaches might be effectively adopted from other states. Although requiring vaccinations prior to school entry ensures school-aged children are ultimately protected, most vaccine-preventable diseases occur prior to school age. Developing systems that assure access to vaccines for all children, as well as timely vaccination will be critically important, especially during the first two years of life, when children are at the highest risk of these diseases.

Carolyn Brock; Program Assistant
brock.carolyn@tchden.org (303) 861-6412