

Project Plan
Cold chain and simultaneous injection study, year 1

Windsor-Essex County Health Unit

November 27, 2007

Goals: To increase Health Care Professionals' (HCP) compliance of:

- the Ontario vaccine storage and handling guidelines.
- delivery of the Publicly Funded Immunization Schedule for Ontario (PFIS).

Objectives:

Storage and Handling

1. To identify the rate of HCP cold chain compliance in Windsor-Essex County.
2. To identify barriers to guideline compliance.
3. To raise awareness regarding the importance of compliance, through computer based training.

Vaccine Delivery

1. To identify the reason for the unequal usage of Pentacel compared to Prevnar.
2. To raise awareness and increase HCP confidence in delivering multiple injections, in order to increase the use of Prevnar, through computer based training.

Project Rational

Storage and Handling

Windsor-Essex County Health Unit Public Health Nurses (PHN) in the Vaccine Preventable Program regularly visit all locations that store and use vaccines, such as doctor offices and hospitals. During these visits the PHN inspects the office for compliance of the Vaccine Storage and Handling Guidelines. The PHNs have observed a number of infractions, including irregular recording of temperatures. This indicates that there is a possibility that the cold chain is broken. A break in the cold chain can render vaccines ineffective.

The literature also suggests a similar profile of inadequate compliance. One of the most commonly cited reasons for breaks in the cold chain is inadequate knowledge of the guidelines (Smythe et al., 2006; Gazmararian et al., 2002; Bell et al., 2001; Wawryk et al., 1997; Thakker and Woods, 1992).

Breaches in vaccine and storage and handling are problematic for 2 main reasons. The first is that vaccine efficacy is reduced. If the vaccine is unidentified as no longer deliverable, patients may receive a vaccine that does not provide sufficient protection. The other issue with breaches in the cold chain is that once it is learned that vaccines have been outside of storage temperatures they must be destroyed. This leads to significant financial losses. In Windsor-Essex County in 2006, there were 21 identified cold chain incidents which totaled a loss of \$68 714. If this is totaled across the province the estimated cost of wasted vaccines in Ontario is greater than \$3 million annually (Weir and Hatch, 2004).

Project Rational**cont'd***PFIS delivery*

The PFIS indicates that the vaccine Pentacel should be delivered simultaneously with Prevnar. Many US studies have found widespread physician acceptance of the importance of the pneumococcal conjugate vaccine (Davis et al., 2003). Acceptance coupled with the recommendations would indicate that the usage of Pentacel equals that of Prevnar. However, the Health Unit Usage Report indicates that the usage of Pentacel is double that of Prevnar. In 2007 (January 1 – November 20) there were 3593 vials of Pentacel given out by the Windsor-Essex County Health Unit Vaccine Program. In the same period only 1648 vials of Prevnar were given out. We hope to identify the reasons for this discrepancy.

Several possibilities exist and are probably all at work to explain part of this puzzle. The following list is based on barriers identified in previous studies:

- Parental concern about pain and necessity.
- HCP perception and overestimation of parental concern (see Melman et al., 1999)
- HCP concern about efficacy of simultaneous injections.
- HCP discomfort and dissatisfaction with delivery of multiple injections.
- HCP acceptance of the vaccine.
- Perceived increase in length of visit and amount of paper work.

Schaffer et al. (2002) found that HCPs delayed vaccine administration because of the reluctance to give multiple vaccinations simultaneously. However, the concern about simultaneous injections usually arose once 4 or more were needed. In Ontario the addition of Prevnar to the infant schedule means an increase from 1 to 2 injections.

There appears to be an evolution in physicians' beliefs about how many injections can be tolerated at one time, which may explain the uptake of Prevnar vs. Pentacel. In 1991, 25% of US physicians believed that the majority of parents would object to 3 injections at 1 time (Freed et al., 1993). By 2003, most physicians in the US administer 4 or more vaccines at the 2 month visit (Davis et al., 2003).

It is important to identify barriers to the simultaneous administration of Pentacel and Prevnar. If they are not administered at the same visit this then the physician may:

- Require a follow up visit within a few weeks of the 2 month visit (when Pentacel is delivered). If a parent goes to all required vaccination visits, instead of the recommended 3 vaccination visits during the first 6 months, they would need to go 6 times in order for the infant to receive the full series of both Pentacel and Prevnar. This is impractical and inconvenient for the parents, which significantly lowers completion of the vaccine series (if it gets started at all). If they do comply then there is an increased load and cost on the health care system.
- Delay vaccine administration. This means that the infant will remain unprotected for that delayed period. Delay can also decrease compliance.

Both of these situations are not ideal, as they both lead to children who are not receiving the vaccines they need.

Project Rational**cont'd***Computer based training*

Computer based training has specific advantages and limitations for health promotion. Advantages include interactivity, active learning, convenience, learner can progress at their own speed, and flexibility in tailoring and adapting the training (Skinner et al., 2006). In health promotion research, tailored information and interactive communication have both been found to be most effective in changing behavior (Neuhauser and Kreps, 2003). To build on this, the training module will be specifically for the HCP in charge of vaccine storage and handling and/or the HCP responsible for giving injections. In the training there will be specific and concrete information about how this translates into practice, fostering empowerment. The nature of computer based training also allows for multimedia delivery to ensure visual, auditory and experiential learning opportunities.

Disadvantages of computer based training are the skills of the learner, access to a computer and comfort with the technology. We intend to address these disadvantages by:

- Making the modules user-friendly, requiring only basic computer skills (ability to turn a computer on; use a mouse; open a web browser or folder) which most of the working population have.
- Providing the training in 3 forms: online, as a CD, in hard copy.
- Focus testing the training and adapting it based on feedback.

Another aspect of successful health communication is creating a two-way dialogue (Neuhauser and Kreps, 2003). This will be accomplished through several ways:

- HCPs will be asked for their perceived barriers to following the vaccine storage and handling guidelines and the PFIS.
- HCPs will be asked for their input on how to improve the training module.
- HCPs will also be asked for other ways to communicate with them that would enhance their practice.