

# Keys to Pain Reduction in Immunization Reviewed

BY CHRISTINE KILGORE  
Contributing Writer

Dr. Della Corcoran's pediatric practice sits over an ice cream shop and across the street from a toy store—a setting that's unfortunate, she said, when it comes to immunization.

"Parents come in [for their children's immunizations] saying 'You're going to get ice cream or a new toy after this.' The kids hear this and think something pretty major is going to happen," she said. Unwittingly, parents can fuel their child's anxiety and distress with such promises.

The notion that parental demeanor before and during immunization should be calm and matter-of-fact, without excessive reassurance—a notion that Dr. Corcoran tries to convey and model in her practice in Hartford, Conn.—is one of the recommended strategies included in a new review of pain reduction during pediatric immunization.

The review, led by Dr. Neil L. Schechter of the Pain Relief Program at Connecticut Children's Medical Center in Hartford, details how the pain of immunization is a source of anxiety and distress in pediatric practice, and concludes that, ironically, there is "limited research available to address the pain associated with the painful procedure most commonly performed in pediatric office settings."

Still, according to Dr. Schechter and the small group of experts who reviewed the literature and filled gaps through consensus development, a more systematic application of existing knowledge "should go a long way" toward reducing pain and alleviating the "air of persistent tension that hangs over the clinical encounter" due to anticipation of an injection (*Pediatrics* 2007;119:e1184-98 [Epub doi:10.1542/peds.2006-1107]).

There is good, consistent scientific evidence, they concluded, to support a number of strategies, from parental demeanor that is supportive and nonapologetic, to the following practices:

► Developmentally appropriate preparation for all children over the age of 2 years.



Children often are more distressed when parents are more rather than less involved. A matter-of-fact, supportive, nonapologetic approach is recommended.

► The use of sucrose (administered on a pacifier or directly instilled into the mouth) for children younger than 6 months of age.

► The use of distraction techniques during injection.

► Selective use of local anesthetics in children who are especially fearful.

Of these measures, the use of sucrose solution is "something that has not been as universally accepted, yet this probably has the strongest database," Dr. Schechter said in an interview. "There are at least 50 articles that support the routine use of sucrose in infants under 6 months."

Sucrose loses its efficacy by 4-6 months of age and requires more testing with and without other modalities, but at this point it "clearly has efficacy for young infants," reliably reducing evidence of distress with injections, he and his associates said in the review.

Past infancy, the data on the influence of parental demeanor on child behavior is just as striking, Dr. Schechter said.

"Although it seems counterintuitive, children often are more distressed when parents are more rather than less involved," the

review said. "A matter-of-fact, supportive, nonapologetic approach is endorsed."

Dr. Corcoran, who administers vaccines herself, said she tries to guide parents by example and counters excessive reassurance with pinwheels and other distraction stimuli. In response to parents' promises of toys or ice cream, she makes comments like, "Oh, you won't need a new toy after this, you'll be just fine."

This isn't to say children shouldn't be given "realistic information" about how immunizations will feel, the review said. This information, along with what will happen and how to cope (relaxation, breathing, distraction), should all be part of preparing the child.

Coping isn't necessarily something parents help with, the authors noted: One survey of parents of preschool children showed only 10% offered any strategies to their children at all.

Pediatricians should routinely use—and instruct parents to use—engaging distraction techniques that match the child's age and temperament, because there are "strong data" that distraction reduces distress, the review said. It's unclear, howev-

er, whether particular techniques—from blowing or deep breathing to counting backward or listening to a story—are optimal.

The expense and time required for topical anesthetic use means that "universal use of local anesthetics cannot be endorsed at this time," Dr. Schechter and his associates said. Still, for children who are needle phobic and particularly anxious, these agents "should be considered."

Evidence is not as strong or consistent in the areas of needle length and injection site, the reviewers said. Up to 18 months of age, the standard injection site is the anterior thigh, with a 7/8- to 1-inch needle for children more than 2 months of age. Over 36 months of age, the deltoid should be used, and at any age, the ventrogluteal site may be an alternative.

Between 18 and 36 months of age, "there is controversy regarding the most appropriate site," the reviewers said.

Until more research is done, pediatricians "should do what they're comfortable with—there is nothing definitive at this point," Dr. Schechter said in the interview. "I think if evidence emerges, it will add pluses and minuses and not be powerful one way or the other."

Pressure at the injection site, applied either manually or with the aid of a mechanical device, has some support in the literature and, because pressure has no adverse effects, it may have value, the reviewers said.

"The adolescents and young women coming in for the Gardasil vaccine are even anxious about these shots," which says something about the anxiety and distress that routine immunizations cause, Dr. Corcoran said. "The pain [of immunization] is real, and it's magnified significantly by anxiety."

Since finishing the review, Dr. Schechter has launched the "Injection Protection Project," an educational effort to bring information and tools—from a poster and video for staff to a brochure for parents—into pediatric practices. Thus far, he has visited about 20 offices, including the three-pediatrician practice of Dr. Corcoran. ■

## Nitrous Oxide–EMLA Combination Best Eases Injection Pain

BY KATE JOHNSON  
Montreal Bureau

TORONTO — In France, a 50/50 mixture of inhaled nitrous oxide and oxygen is widely used for painful procedures in emergency departments and pediatric wards, noted Dr. Ricardo Carbajal, of the Hôpital d'enfants Armand-Trousseau in Paris.

"This is used in millions of patients," he said in an interview. "Every time there is a painful procedure people should consider nitrous oxide. It is very short-acting and has an excellent to very good effect for children aged 24 to 30 months old or older, with a little bit less of an

effect in younger children."

At the annual meeting of the Pediatric Academic Societies, Dr. Carbajal presented his randomized, double-blind study involving 55 children younger than 24 months who received intramuscular injections of palivizumab for the prevention of severe lower respiratory tract infections due to respiratory syncytial virus. Patients received three consecutive monthly injections using three different analgesic protocols: inhaled nitrous oxide and oxygen (N<sub>2</sub>O/O<sub>2</sub>) and a placebo cream; EMLA (Eutectic Mixture of Local Anesthetics) cream and inhaled air (placebo); and a combination of both treatments.

All injections were videotaped, and infant pain levels were assessed from the time of needle insertion until 30 seconds after needle withdrawal; the researchers used the Modified Behavioral Pain Scale (MBPS) running from 0 (no pain) to 10. A secondary outcome was pain as assessed by parents on a 0 to 100 numeric scale.

The combination of inhaled N<sub>2</sub>O/O<sub>2</sub> and EMLA cream was the most effective in alleviating injection pain, compared with either medication alone, Dr. Carbajal said. EMLA cream was the least effective, with a score of 9.25 during injection and 7.76 post injection, compared with 8.76 and 7.42, respectively, for inhaled

N<sub>2</sub>O/O<sub>2</sub>. When both medications were combined, the pain score during the injection was 8.24, dropping to 6.95 after injection.

Parents scored the medications similarly: EMLA alone scored 36, inhaled N<sub>2</sub>O/O<sub>2</sub> scored 35, and the combination scored 26.

Dr. Carbajal noted that, given the high level of pain caused by intramuscular palivizumab, "the development of new analgesic strategies is still needed."

North American delegates at the meeting were intrigued by the common use in France of inhaled N<sub>2</sub>O/O<sub>2</sub>, which Dr. Carbajal said has a well-established safety profile "if you don't mix it with other [systemic] medications ... probably we

have had more than a million users now with no accidents."

He said French nurses are trained to give the medication and physicians are not required to be present because in France the 50/50 ratio of N<sub>2</sub>O/O<sub>2</sub> is not considered to be an anesthetic.

Dr. Shetal Shah, a neonatologist at the State University of New York at Stony Brook, commented in an interview, "I think there may be barriers in the United States toward implementing this... specifically, if it gets classified as a conscious sedation technique, then you may wind up having to create a whole new level of certification for outpatient nursing staff." ■