

Evidence in Action: Are You Prepared for the Questions Your Patients May Ask You? aka “Should I Use That Plastic Bottle?”

By Dana J. Lawrence, DC

A patient asks you an unexpected question.

A pregnant patient comes in concerned about a news report she read. That report suggested that it was potentially dangerous to her fetus for her to use water bottles that contain the chemical bisphenol. She read one report that suggested using a bottle with bisphenol could lead to developmental defects in children. On the other hand, she had seen industry pushback that suggested this danger was not just overstated but nonexistent. She seeks your thoughts on this question.

You decide to search the literature. You go to PubMed, and using the key terms *bisphenol* and *childhood development* in a simple initial search, you are able to locate 40 related articles. A quick scan of these articles eliminates many; they are either basic science presentations or too highly technical to be of use. But you find one paper that seems to cast light on this particular question: Braun JM, Kalkbrenner AE, Calafat AM, Yolton K, Ye X, Dietrich KN, Lanphear BP. Impact of early-life bisphenol A exposure on behavior and executive function in children. *Pediatrics* 2011;128(5):873-82. Epub 2011 Oct 24.

Objectives: To estimate the impact of gestational and childhood bisphenol A (BPA) exposures on behavior and executive function at three years of age and to determine whether child gender modified those associations.

Methods: We used a prospective birth cohort of 244 mothers and their three-year-old children from the greater Cincinnati, Ohio, area. We characterized gestational and childhood BPA exposures by using the mean BPA concentrations in maternal (16 and 26 weeks of gestation and birth) and child (one, two and three years of age) urine samples, respectively. Behavior and executive function were measured by using the Behavior Assessment System for Children 2 (BASC-2) and the Behavior Rating Inventory of Executive Function-Preschool (BRIEF-P).

Results: BPA was detected in >97 percent of the gestational (median: 2.0 µg/L) and childhood (median: 4.1 µg/L) urine samples. With adjustment for confounders, each 10-fold increase in gestational BPA concentrations was associated

with more anxious and depressed behavior on the BASC-2 and poorer emotional control and inhibition on the BRIEF-P. The magnitude of the gestational BPA associations differed according to child gender; BASC-2 and BRIEF-P scores increased nine to 12 points among girls, but changes were null or negative among boys. Associations between childhood BPA exposure and neurobehavior were largely null and not modified by child gender.

Conclusions: In this study, gestational BPA exposure affected behavioral and emotional regulation domains at three years of age, especially among girls. Clinicians may advise concerned patients to reduce their exposure to certain consumer products, but the benefits of such reductions are unclear.

What does this mean to you?

First, you decide to familiarize yourself with the instruments used here to assess childhood behavioral and emotional development. To that end, you do a quick Google search on the Behavior Assessment System for Children 2 (BASC-2) and the Behavior Rating Inventory of Executive Function-Preschool (BRIEF-P). You find that the first instrument (BASC-2) is a set of rating tools completed by parents and teachers, and that it is used for children of a wide age range. It is something that has long been validated, and it is also quite reliable. The BRIEF-P is used for children as young as two but not older than five. It looks at executive function in five areas. It is also valid and reliable. Thus, you feel the paper you are reviewing for your patient is using trustworthy instruments.

You note that this is a cohort study. You remember that there are three kinds of epidemiological studies: cross-sectional, case control and cohort. A cross-sectional study looks at relationships between factors of interest and is essentially a snapshot taken in present time. An example would be a survey. A case control study is one that looks at past exposures to risk factors in two groups of people: one is a group with the condition of interest (the *cases*) and one is a group without that condition (the *controls*). Here, by looking at past medical records, you would

Dana Lawrence, DC, MMedEd, MA is the Senior Director of the Center for Teaching and Learning at Palmer College of Chiropractic.

look for exposure to a risk factor such as bisphenol and then see if the rate of behavioral problems is higher in the case group of children compared to the control group. While this is stronger than a cross-sectional study, it still is not the best way to link an exposure to a condition. For that you need a cohort study, in which at the outset no one has the condition of interest, and then the group is tracked over time prospectively to see if the group later exposed to the risk factor has a higher rate of the condition compared to the group that is not exposed.

The study you found is a cohort study that followed children from before birth out to about three years of age. It uses valid and reliable measurement instruments. It is by your estimates a strong study that showed exposure to bisphenol did have an impact on emotional and behavioral function in small children, with a larger effect in girls. Though you know a single study is never conclusive, you

feel comfortable telling your patient to discard the old water bottle and to obtain a new one that is bisphenol free. It is an easy decision, given that costs are minimal, peace of mind is high and evidence informs your decision.

Note

Please note that you used two different literature search strategies in attempting to answer your patient's question. In the first case, you conducted a dedicated literature search on PubMed, which is the best engine for obtaining good clinical information. Here, you had to limit your search in order to find a good study to answer the question. When you needed just general information to understand the two assessment instruments used in the study you found, you used Google. These two engines look for data using different algorithms, but in both cases, you found what you needed. ■

STUDENTS & EDUCATION (continued from page 35)

COLLEGE NEWS

NYCC and Marist College Sign Articulation Agreement

New York Chiropractic College (NYCC) will partner with Marist College in Poughkeepsie, N.Y., through an articulation agreement resulting in a new 3+1 dual-degree pre-chiropractic program. The relationship will enable qualified Marist College students who pursue a Baccalaureate of Science degree in biology to complete their final year of undergraduate studies at NYCC. This will permit Marist students to earn their baccalaureate and doctoral degrees in six years rather than seven — and to enter the chiropractic profession sooner.

Parker Provides More Than 2,000 Volunteer Hours to Charitable Organizations

Parker University closed its campus in late September to send more than 500 Parker students, faculty and staff to volunteer for more than 2,000 cumulative hours at charitable organizations in the North Texas community. The volunteer initiative, named Parker Serves 2013, was created by the university's new president, Dr. Brian McAulay, in lieu of a traditional president investiture ceremony.

Parker students and employees volunteered at Dallas LIFE, a shelter that reaches out to homeless men, women and children with food, clothing, education and long-term rehabilitation programs. Parker senior student interns and chiropractic faculty members provided chiropractic adjustments to Dallas LIFE clients. Parker also organized donations as well as prepared and served meals at Dallas LIFE. Monica Alonzo, Dallas City Council councilwoman from District 6, also joined in the volunteer efforts at Dallas LIFE.

In addition, Parker students and employees volunteered at North Texas Food Bank, Educational First Steps, Goodwill Industries, Promise House, Resource Center of Dallas, Mission Arlington, Park Cities YMCA and other charitable organizations.



Top: (from left to right): NYCC President Frank Nicchi, DC, MS; James DuMond, PhD, dean of the School of Science at Marist College; John Pecchia, MBA, vice president of business affairs and CFO for Marist College; and Michael Mestan, DC, EdD, vice president and provost of NYCC. Above: Parker students and faculty adjusting clients at the Dallas LIFE homeless shelter.