Letters to the Editor

Online-Only Letters to the Editor

Responses to Article Regarding a Diagnostic Approach to Pruritus
Joseph E. Scherger, MD, MPH

Alan Blum, MD

Reply by Brian V. Reamy, MD (http://www.aafp.org/afp/2012/0501/ol1.html)

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Clarification Regarding Epidemiologic Concepts

Original Article: Usefulness of Procalcitonin Measurement in Reducing Antibiotic Use and Identifying Serious Bacterial Illness [*AFP* Journal Club]

Issue Date: July 15, 2011

Available at: http://www.aafp.org/afp/2011/0715/p177.html

TO THE EDITOR: I appreciated the thoughtful and critical analysis by the authors of the *AFP* Journal Club on the impact of procalcitonin measurement in treating children one to 36 months of age presenting with fever without a source. However, in the discussion of the impact of disease prevalence on a diagnostic test's performance characteristics, the authors may have confused two concepts in clinical epidemiology: sensitivity/specificity and predictive value.[1]

One author stated that the sensitivity and specificity of a test may change depending on the prevalence of disease in the population in which the test is used. Yet, according to the textbook *Clinical Epidemiology: The Essentials*, "…the sensitivity and specificity of a test are said to be independent of the prevalence of the diseased individuals in the sample in which the test is being evaluated."[2] In theory, the sensitivity and specificity of procalcitonin measurement are independent of the prevalence of the target disease.

The test characteristic concept that the author may have actually been alluding to is the test's predictive value. The prevalence of the target disease in a population would affect the predictive value; positive predictive value decreases as the prevalence of the target disease decreases, and negative predictive value decreases as the prevalence of the target disease increases.

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2. Fletcher RH, Fletcher SW, Wagner EH. *Clinical Epidemiology: The Essentials.* 3rd ed. Philadelphia, Pa.: Williams & Wilkins Co.; 1996:54-59.

IN REPLY: Dr. McDiarmid is entirely correct. This discussion should have referred to positive and negative predictive value rather than sensitivity and specificity. I apologize for the confusion.

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EDITOR'S NOTE: As Dr. McDiarmid points out, sensitivity and specificity are characteristics of the test itself, and generally do not vary with disease prevalence, although this is not a hard and fast rule.[1] Positive and negative predictive values are inherently tied to disease prevalence. As most clinicians know, a positive test in a population with a very low disease prevalence is likely to be a false positive. Similarly, a negative test in a patient you think does have a certain disease has a good chance of being a false negative. Thus, positive and negative predictive values vary not only with disease prevalence, but, almost magically, with your clinical suspicion that a patient does or does not have the disease for which he or she is being tested.

For more information about the terms and concepts of clinical epidemiology, see our glossary of terms used in evidence-based medicine at http://www.aafp.org/online/en/home/publications/journals/afp/ebmtoolkit/ebmglossary/afppoems.html. This is one of several features in our Evidence-Based Medicine Toolkit available at http://www.aafp.org/afp/ebmtoolkit.

The online version of this *AFP* Journal Club discussion has been corrected to reflect the changes mentioned above.

JAY SIWEK, MD
Editor, *American Family Physician*

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Synthetic Cannabinoids and "Bath Salts" Should Be Considered Drugs of Abuse

TO THE EDITOR: With the ease of instantaneous communication, the Internet has facilitated the introduction of a new class of drugs of abuse. Bath salts and synthetic cannabinoids are being sold in stores throughout the world, packaged for a variety of uses, and labeled as "not to be taken internally." However, these products are being promoted online as "legal highs."

Bath salts have already been linked to an alarming number of emergency department visits in the United States. Analysis of these white powders has identified them as mephadrone and Methylenedioxypyrovalerone (MDPV), two substances known to interfere with dopamine reuptake in areas of the brain identified as important in the development of drug dependency.[1] Their central action is similar to that of cocaine. Office-based physicians, emergency department staff, and psychiatric emergency services have witnessed an epidemic of presentations among users of these drugs with symptoms including tachycardia, chest pain, elevated blood pressure, seizures, and hallucinatory delirium with associated paranoia and violent behaviors.[2] Several homicides and suicides have been reported following the use of these drugs.

Although administration of bath salts is primarily by nasal insufflation, a rise in intravenous use has been described.[3] Experienced users report that these substances are highly addictive. Many have described a pattern of repetitive dosing every three or four hours to maintain stimulant effect. Although outlawed in several states, they remain widely available and are now among the most popular drugs used in dance clubs in urban areas.

Marketed online as "synthetic marijuana," synthetic cannabinoids are agonists of brain receptors that were originally developed to assist in the understanding of the cannabinoid neurotransmitter system. Information about the synthesis of these agents, generally published in specialized research-oriented journals, has been exploited by some with sufficient biochemical sophistication to manufacture these substances in unidentified overseas laboratories. These agents have a potentcy that is estimated at four to 10 times that of marijuana.[4] Sold as "K-2" or "Spice," these packets are widely available in local shops. Users generally smoke these products like marijuana. Anxiety, panic, palpitations, chest pain, and precipitation of schizophrenic-type psychosis have been reported in persons using these drugs.[5,6]

On October 21, 2011, the U.S. Drug Enforcement Administration (DEA) used its emergency scheduling authority to ban the sale and possession of mephadrone and MDPV, chemicals commonly found in bath salts. Synthetic cannabinoids have been DEA schedule I drugs since March 1, 2011.

The manufacturing, sale, and promotion of these new substances depend heavily on information spread by electronic media. Because of their rapidly increasing prevalence, family physicians should familiarize themselves with the signs and symptoms of intoxication with these drugs and be prepared to provide early interventions and referral.

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3. Centers for Disease Control and Prevention. Emergency department visits after use of a drug sold as "bath salts"—Michigan, November 13, 2010-March 31, 2011. *MMWR Morb Mortal Wkly Rep.* 2011;60(19):624-627.
4. Wells DL, Ott CA. The "new" marijuana. *Ann Pharmacother.* 2011;45(3):414-417.
5. Vandrey R, Dunn KE, Fry JA, Girling ER. A survey study to characterize use of Spice products (synthetic cannabinoids) *Drug Alcohol Depend. 2012;120(1-3):238-241.* http://www.sciencedirect.com/science/article/pii/S0376871611003152. Accessed November 21, 2011.
6. American Association of Poison Control Centers. http://www.aapcc.org/dnn/default.aspx. Accessed August 29, 2011.

Correction

In the "*AFP* Journal Club," titled "Usefulness of Procalcitonin Measurement in Reducing Antibiotic Use and Identifying Serious Bacterial Illness," (July 15, 2011, page 177), the terms "sensitivity and specificity" were used instead of "positive predictive value" in the last sentence of the second paragraph of the left-hand column on page 178. This sentence should have read: "To state this succinctly, the positive predictive value of a test changes depending on the prevalence of disease in the population in which it is used." The article has been corrected online. ■