contained as flavorings in toothpastes may act as asthma-inducing agents.

Recently, I have experienced three patients with aspirin-induced asthma who also complained of dyspnea when they brushed their teeth, chewed gum with mint flavor, or had a cough drop. I am interested by the relationship between aspirin sensitivity and mint flavor intolerance.

Methylsalicylate (oil of wintergreen), thymol (oil of thyme), and menthol (oil of peppermint) are often used as flavorings in toothpastes, and wintergreen and peppermint are also used for candies and chewing gum. Methylparaben (methylparahydroxybenzoate) and sodium benzoate are used as preservatives in toothpastes, certain foods, and beverages. Aspirin is a brand name of acetylsalicylic acid and salicylic acid is also called orthohydroxybenzoic acid.

Looking at their chemical structures (Fig 1), I have noticed the resemblance between them, especially between methylsalicylate and methylparaben. To my knowledge, there have been no reports that point out the similar chemical structures in aspirin, parabens, and artificial flavors. Although the exact pathogenesis of aspirin-induced asthma is unclear, flavor-induced bronchospasm might be in part due to the same mechanism.

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Reduce Sympathetic Hyperreactivity

To the Editor:

Dr. Wheeler is to be congratulated with his excellent and updated review on sedation, analgesia, and paralysis in the ICU which appeared in the August 1993 issue of Chest.1 However, we believe that one important item deserves to be highlighted. The reduction of opioids and benzodiazepines after long-term sedation can sometimes induce symptoms similar to those observed in patients with acute alcohol withdrawal. When present, this phenomenon severely hampers weaning from the ventilator and significantly increases the patient's morbidity. It might be the result of opioid-mediated sympathetic overshoot through down-regulation of adrenergic receptors in the presence of ongoing norepinephrine secretion.2 Clonidine, a central α2-agonist, which has proven as highly effective in the treatment of opioid and benzodiazepine withdrawal,3,4 may reduce this sympathetic hyperreactivity. Although the precise dose requirements to reach this goal remain to be determined, our experience shows that up to 6 mg, administered as a continuous IV infusion, may be needed for adequate symptom control. Of course, any contraindications for use of the drug have to be carefully evaluated and excluded.

A prospective study to investigate the potential benefit of clonidine for this indication seems warranted.

Bayes Theorem

Diagnostic Testing for Tuberculosis in Children

To the Editor:

In his editorial Dr. Starke says that a new diagnostic test for tuberculosis in children must maintain "... a very high specificity—approaching 100 percent—in high- and low-prevalence populations... ."1 Dr. Starke is confusing specificity with the predictive value of a negative result. These concepts can be tricky so let's review them.

First, sensitivity, which is defined as the proportion of positive test results in a population known in some other way (by the "gold standard") to actually have the disease being tested for. For example, if 100 such diseased people are tested and 60 of them have a positive result, the sensitivity of the test is 0.6.

Next, specificity, which is defined as the proportion of negative test results in a population known in some other way to not have the disease being tested for. For example, if 100 healthy people are tested, and 75 of them have a negative result, the specificity of the test is 0.75.

You see, then, that sensitivity and specificity are characteristics of a test and not of a population. Once these characteristics are known, the test can be used both to diagnose and to exclude the disease among the particular members of a population with a known prevalence of the disease. That is, if 1,000 people to be tested belong to a group with a 5 percent prevalence of disease, then about 50 of them will actually have the disease. But how reliably can we identify these 50, and the 950 who don't? This is the heart of the problem.

How well a particular test of known sensitivity and specificity (remember, characteristics of the test!) does each of its two tasks depend on the prevalence of the disease in the population being tested. I must mention that a true positive test (TP) is defined as a positive result from a diseased person; a false positive (FP) is a positive result from a healthy person. Similarly, a true negative (TN) result is a negative test from a healthy person; a false negative (FN) is a negative result from a diseased person.

In any particular population, the predictive value of a positive test is defined and calculated a priori from the sensitivity, specificity, and prevalence. It is the proportion of all those with a positive test who actually have the disease, i.e., the probability of a true positive result divided by the sum of the probabilities of true positive and false positive results (TP/TP+FP). (The details of the calculation are explained elsewhere.)2,3 In analogous fashion, the predictive value of a negative result is calculated a posteriori and is defined as the proportion of all those with a negative result who are free of disease, i.e., the probability of a true negative result

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