

## **The Mammogram Experiment: How Emotions Can Affect High-Stakes Decision-Making**

A breast cancer scare that turns out to be a false alarm is cause for relief, but may also trigger delays in future mammogram screenings, according to new Wharton research.

In a controlled experiment that surveyed women waiting for mammograms at the Hospital of the University of Pennsylvania, Wharton marketing professors [Barbara Kahn](#) and [Mary Frances Luce](#) found that the emotional stress of believing they may have breast cancer, even for just a few days, causes patients to indicate they would be likely to delay mammograms.

With mammogram error rates estimated to be as high as 20%, the findings could have broad implications for health-care providers and patients, said the researchers, who are also senior fellows at Wharton's Leonard Davis Institute of Health Economics.

"The personal testing experience itself, and false positive results in particular, could in and of themselves significantly influence future decisions about whether to get tested regularly," the authors write in a paper titled *Understanding High-Stakes Consumer Decisions: Mammography Adherence Following False Alarm Test Results*, forthcoming in [Marketing Science](#).

"Since preventive screening is most successful if women get mammograms annually or bi-annually as recommended, understanding and managing this testing experience is obviously important," the paper continues.

The study could also have implications for the diagnostics industry, a growing sector in the nation's \$1.5 trillion health care market. The National Cancer Institute estimates 31 million women each year have a mammogram at an average cost of \$100. "In general consumers are now much more responsible for their own health care and the opportunity to engage in medical testing is really exploding," said Luce.

In addition, the authors note, there may be spillover effects in other areas of health-screening, such as cholesterol testing, as well as other screening measures such as those for radon or lead in the home.

Kahn said the decision to schedule a mammogram is just one example of high-stakes decision-making that increasingly is shifting to consumers. The move from traditional defined-benefit pension plans to defined-contribution 401(k) retirement plans is another important example. "We used to have a more paternal society where the doctor or the benefits officer made these decisions for you," Kahn noted. "More and more the consumer is becoming empowered – which is good. But the question is, 'How do the emotional aspects frame their decisions?'"

According to Luce, emotions can kick in when it comes to other big decisions, such as purchasing insurance, a costly consumer-durable, such as a car, or even choosing which college a child should attend. "It's not hard to think of stresses."

### **Delay as a Way to Cope**

One might suppose that the fear generated by several days of worrying about whether they may have breast cancer would make women more conscientious about future testing. That way they would have a better chance of surviving the disease. But Luce and Kahn found the opposite occurs. "One coping strategy to deal with the stress is to delay," said Kahn.

Luce compares the fear of thinking about having breast cancer to an "emotional roller coaster" in which a woman can conjure up a sense of vulnerability to the disease, even after learning the mammogram results were wrong. "There are lingering effects from the time spent thinking about why it might be positive. They're thinking, 'I smoke' or 'my aunt had breast cancer.' Some of that tends to stick around and create further anxiety, so we do think there are likely to be some lasting negative effects."

Luce said the experiment's results did not indicate that the women would never be tested again, only that they might put it off.

The findings showed there would be no delay for women who were told their results were normal. Women who were asked whether they would delay if they had an increased risk of breast cancer, such as a family history of the disease, also said they would not put their mammograms off.

The results held up against a control experiment in which the women were asked to simulate responses to learning the density of their skin made them prone to wrinkles. That news, presumably, was less traumatic and did not suggest the likelihood for delay, the researchers found.

"It's interesting that one of the characteristics of medical testing is that sometimes it can be extremely emotionally stressful for people, but other times it can be very different psychologically," said Luce. "Getting a test for strep or the flu might be different than getting tested for a life-threatening illness such as cancer."

The difference in a patient's potential response to future testing is something that doctors – and patients themselves – need to understand, and may have important implications over time, Luce suggested.

Only a small percentage of mammograms that initially indicate trouble – an estimated 2-6% – result in a breast cancer diagnosis. But the cumulative risk of a patient facing a false positive over 10 tests is 49.1%, according to research cited by Luce and Kahn. "It's more important to get tested as patients get older. But if false alarms are going to scare people away, they may become less likely to take the test as they get older," said Luce.

### **The Power of Information**

The research by Kahn and Luce also found some potential prescriptions to prevent delays in testing generated by a false positive. They found that if the subjects who were told they had a false positive were given information about preventative care, including breast-self examination, they were less likely to delay future screenings.

Likewise, if the same subjects were given information about the odds of a false positive at the time of the first screening, before they had time to stew about it, they also were likely to follow up with regularly scheduled mammograms.

"Thus, in contexts where repeated false positives are likely, policy makers should ensure that patients are given tools to deal with test- and disease-related stress," the paper states. Luce said the results of the experiment may actually underplay the extent to which women in a larger sampling would respond. She noted that the women surveyed in the research project were among those that were conscientious enough to come for the exam in the first place. And, she added, the women may have been hesitant to give the "wrong" answer, which would be to delay.

She also did not think the "emotional" response would be any less for a prostate test or any other screening administered to men. "Women are much better about medical decision-making than men are," she said. "Women are usually the ones who make the health-care decisions in the family. I think men are even more likely to deal with the stress by total avoidance. They might not even think about testing."

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