

# Effect of a Patient's Psychiatric History on Physicians' Estimation of Probability of Disease

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**A questionnaire was mailed to 300 Iowa family physicians to determine the influence of a prior psychiatric history on decision making. The response rate was 77%. Respondents were less likely to believe that a patient had serious illness when presenting with a severe headache or abdominal pain if the patient had a prior history of depression ( $P < .05$ ) or prior history of somatic complaints ( $P < .05$ ), compared with a patient with no past history. Respondents were less likely to report that they would order testing for a patient with headache or abdominal pain if the patient had a history of depression ( $P < .05$ ,  $P = .08$ , respectively) or somatic complaints ( $P < .01$ ). Differences in likelihood of ordering tests were not significant after adjusting for differences in estimated probability of disease. We conclude that physicians respond differently to patients with psychiatric illness because of their estimation of pretest probability of disease rather than bias. We conclude that past psychiatric history influences physicians' estimation of disease presence and willingness to order tests.**

**KEY WORDS:** bias; medical decision making; depression; somatization.

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To estimate the probability of disease, physicians rely on heuristics (cognitive shortcuts or rules of thumb).<sup>1,2</sup> One frequently used heuristic is the representative heuristic.<sup>3</sup> Estimations using the representative heuristic are based on the "representativeness" of a clinical finding or how closely the finding resembles the essential features of a population with known disease. However, by overemphasizing the resemblance factor and underemphasizing the prevalence of disease, representativeness can lead to errors. For example, a healthy 19-year-old is not likely to have cardiac disease despite having classic cardiac symptoms.

The representative heuristic allows physicians to make use of a patient's past medical history. This history might have great relevance, such as a history of myocardial infarction in a patient with chest pain. However, the past history can also be used inappropriately, with weight

being given to features that are not diagnostic of the condition in question.<sup>4</sup>

This study addresses three questions. First, do physicians take psychiatric history into account when deciding whether or not a patient has a serious illness? Second, are physicians less likely to order further testing for patients with a history of psychiatric disease? Third, if physicians are less likely to order further testing, is this a function of the estimation of disease probability or does some other factor (e.g., bias) play a role?

## METHODS

A questionnaire was mailed to 300 systematically chosen family physicians practicing in Iowa. Every third name was selected to reach the predetermined number of participants. Demographic information was obtained from a database including physician gender, age, and year of graduation from a family medicine residency (if applicable). Participants were asked to read 2 scenarios about patients with new, potentially serious complaints (severe headache and acute abdominal pain) that were suggestive of potentially fatal illnesses (subarachnoid hemorrhage and aortic aneurysm). Participants were randomized to 3 experimental groups. Group 1 was given no additional past medical history, group 2 was told about a past history of depression, and group 3 was told about a long history of somatic complaints without obvious organic etiology. Physicians were asked to estimate the probability of serious disease and the likelihood that they would recommend further investigations (Table 1). The information was presented in the format of history, past medical history, and physical examination that is generally used to collect clinical information. This protocol was approved by the University of Iowa Human Subjects Committee.

Responses were summarized using means and standard deviations. An analysis of covariance (ANCOVA) model was used to test for difference among groups, adjusting for gender and year of residency completion. However, because the responses were not normally distributed, the findings were confirmed using an ordinal logistic regression model, which does not assume normality. All analyses were performed in Stata 4.0 (StataCorp, College Station, Tex, 1995).

## RESULTS

Of the 300 questionnaires, 232 were returned (77% response rate).

As shown in Table 2, respondents were less likely to

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Table 1. Case Scenarios and Variations

Case Description	Experimental Conditions	Questions
<b>Case 1:</b> 43-year-old female who presents to the office with a history of a severe headache with a sudden onset 4 days ago. She relates no prior history of headaches and notes associated photophobia and nausea. She also complains of a stiff neck. On exam, the vital signs are normal and there are no focal neurologic findings. Funduscopic exam in normal.	1. No past history included. 2. Past medical history: History of major depressive disorder. Social history: The patient reports a number of social stressors in the past several months.	1. What is the probability that you would order further immediate investigations for this patient? 2. What is the probability that this patient has a subarachnoid hemorrhage?
<b>Case 2:</b> 62-year-old male presents to your office complaining of abdominal pain. The pain is somewhat ill defined, but on further history you find that the pain had a sudden onset in the mid-abdomen and is colicky in nature. There are no other associated gastrointestinal or genitourinary symptoms. Vital signs are normal except for a pulse rate of 100 beats per minute.	3. Past medical history: Multiple visits for somatic complaints for which no organic basis has been found.	1. What is the probability that you would order further immediate investigations for this patient? 2. What is the probability that this patient has a serious problem?

believe that a patient had a serious illness when presenting with a severe headache or severe abdominal pain if the patient had a prior history of depression or prior history of somatic complaints compared to a patient with no past history provided. Respondents also were less likely to report that they would order additional testing for a patient with a severe headache or abdominal pain if the patient had a history of depression ( $P < .05$  for headache; borderline  $P$  value of .08 for abdominal pain) or a history of somatic complaints ( $P < .01$  for either symptom) compared to a patient with no past psychiatric history.

Estimates of disease probability and likelihood of ordering further tests were highly correlated. Once the estimated disease probability was put into the ordinal logistic regression model, the differences across groups in the likelihood of ordering tests were no longer significant for either headache or abdominal pain ( $P = .19$  and  $P = .22$ , respectively). This suggests that physicians respond differently to patients with psychiatric illness because of

their estimation of the pretest probability of disease rather than because of bias.

## DISCUSSION

Physicians make mistakes when analyzing data. Some of the factors that wrongly influence physicians' decision making include the order in which information is presented,<sup>5</sup> the proportion of positive and negative tests in a series of tests,<sup>6</sup> the race and gender of the patient,<sup>7</sup> and the demeanor of the patient.<sup>8</sup>

This study identifies another factor that influences decision making, a patient's history of depression or somatic disease. While this study cannot determine the exact relation between psychiatric history, estimation of disease probability, and test-ordering behavior, it suggests that prior psychiatric history influences estimates of disease likelihood and this influences decisions about fur-

Table 2. Estimated Probability of Disease and Likelihood of Ordering Tests By Presenting Symptoms and Type of Psychiatric History in the Case Scenarios

Case Scenario	Question	Means of Physician-Reported Probabilities, %			P Values*		
		Group 1, No Past History	Group 2, Depression	Group 3, Somatic Complaints	Group 2 vs Group 1	Group 3 vs Group 1	Overall
Headache	Order more tests?	94 (17)	87 (22)	80 (30)	.04	.008	.03
	Subarachnoid hemorrhage?	39 (29)	30 (29)	21 (24)	.02	<.001	.002
Abdominal pain	Order more tests?	90 (19)	81 (29)	72 (34)	.08	.003	.01
	Serious problem?	46 (24)	36 (23)	30 (24)	.03	<.001	.002

\*P values are adjusted for gender and year of residency completion.

ther testing. This order of decision making has been borne out in other studies.<sup>9</sup>

Patients with psychiatric disease have varied responses to their illness, and not all will have prominent somatic complaints.<sup>10,11</sup> In this study, it was specified in the case of the headache that the patient had not had similar complaints in the past. Yet physicians still generalized their belief about depressed and somatic patients to our hypothetical patients.

It can be argued that heuristics should change the pretest probability in some illnesses. For example, most physicians would estimate the probability of colon cancer to be much lower in a 19-year-old with guaiac-positive stool than in a 65-year-old with guaiac-positive stool because of the known relation between age and colon cancer. The cases in this study are not analogous. In our study, the histories were suggestive of potentially fatal acute illnesses (subarachnoid hemorrhage, possible aortic aneurysm) that should be considered regardless of the presence or absence of psychiatric disease.

The major limitation of this study is that the patients were not physically present. However, patient presence does not guarantee an accurate assessment; the demeanor of the patient may be misleading.<sup>8</sup> To avoid confounders, we tested the effect of psychiatric history in isolation from other clinical information. The second limitation is that physicians may act differently toward patients that they know. However, this study realistically approximates the situation of a physician on-call for a colleague's patients or that of a physician working in an emergency department. The third limitation is that the subjects in the study were family physicians. However, the potential for different findings in other groups does not invalidate the findings as they apply to this group. Given the similarity of education, the findings are likely to be generalizable to other primary care physicians.

In summary, physicians in this study modified their estimates of probability of disease and the likelihood they

would pursue further diagnostic evaluations in patients with a history of depression or somatic complaints. Physicians need to be cognizant of the role that psychiatric history may play in clinical decision making.

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