**Invited Commentary**

**Informed Choice in Cancer Screening**

A couple of years ago one of my undergraduate students was interested in how men felt about overdiagnosis in prostate cancer screening. He surveyed 30 men who worked for Dartmouth College Facilities or the local police and fire departments. Their mean age was 50 years; half had been screened with prostate-specific antigen. Ten percent would not agree to screening if it resulted in more than 1 overtreated person per 1 cancer death adverted, and 63% would not agree to screening if it resulted in 25 or more overtreated persons per 1 death adverted.

He never submitted his work for publication. (I never submitted anything for publication as an undergraduate. Did you?) Luckily, he is not the only one interested in the topic. Wegwarth and Gigerenzer begin to provide a broader view of how Americans feel about screening when given the context of overdiagnosis. They performed an online survey of 317 men and women aged 50 to 69 years, most of whom had undergone screening. They found that 51% would not agree to screening if it resulted in more than 1 overtreated person per 1 cancer death adverted and 87% would not agree if more than 20 received overtreatment per 1 death adverted.

Wow. That implies that millions of Americans might not choose to be screened if they knew the whole story; however, most do not.

Many of our patients understand that treatments have benefits and harms. They understand there are reasons not to take medication (because it can produce adverse effects) and reasons not to undergo surgery (because it can lead to complications). In addition, they get the idea that the benefits outweigh the harms when given severe symptoms and effective treatment, but may not given when mild symptoms or minimally effective treatment.

Our patients have been taught to think differently about screening. There are no harms. It’s always good to know. It is just about gathering information. Of course you want it. It is a brain-dead decision.

In reality, the truth is more nuanced. There are benefit and harms to consider in screening—just as there are in treatment. There’s no longer any argument about this. Even the American Cancer Society signs on to the idea of overdiagnosis—using the word in its materials on breast, lung, and prostate cancer screening. The arguments are, instead, about the magnitude of the benefits and harms.

Informed Choice in Cancer Screening.

The diagnostic yield of cardiac catheterization in low-risk troponinemia.

Serum cardiac troponin I (cTnI) is a sensitive indicator of myocardial necrosis. However, many disease states can result in an elevated cTnI level without clinical evidence of myocardial infarction, resulting in possible misdiagnosis of epicardial coronary artery disease (CAD). In the present study, we investigated the prevalence of CAD and associated patient characteristics in patients with mildly elevated cTnI levels without clinical evidence of acute coronary syndrome.

Methods | This study was approved by the institutional review board of the University of California, Davis. All patients had agreed to the use of their medical records for research purposes.
This was a single center, retrospective cohort study that examined patients 18 years or older who presented with a peak cTnI level between 0.05 ng/mL (>99th percentile of normal population) and 2 ng/mL (nanograms per milliliter to micrograms per liter is a 1-to-1 conversion) within 30 days prior to coronary angiography. Patients were excluded if they had chest pain with cardiac features, a history of known CAD, or ischemic changes on electrocardiography or stress test.

Baseline characteristics recorded included age, sex, history of heart failure, diabetes, dyslipidemia, peripheral vascular disease, lung disease, smoking, kidney disease, hypertension, and pulmonary hypertension, as well as data related to the index episode such as level of peak troponin, B-type natriuretic peptide (BNP) level, left ventricular ejection fraction, and hemoglobin and serum creatinine levels.

The primary end point was the presence of significant CAD, defined as 50% or greater left main stenosis, 70% or greater stenosis of another epicardial coronary artery, or fractional flow reserve of less than 0.8. Secondary end points were revascularization by percutaneous coronary intervention or coronary artery bypass grafting. The final presumed cause of elevated troponin level was also assessed.

### Results

Of 140 patients, 16 (11%) were found to have significant CAD. Of these patients, 12 underwent revascularization, 10 with percutaneous coronary intervention and 2 via coronary artery bypass grafting. Patients with CAD were older ($P = .006$), with none younger than 49 years. Patients with CAD were more likely to have a presenting symptom of syncope ($P = .02$) or have evidence of a new arrhythmia ($P = .003$ by univariate analysis and $P = .03$ after multiple regression analysis) (Table I). Patients with diabetes were more likely to have CAD ($P = .01$) by univariate analysis. A history of stroke was associated with CAD, but only after multiple regression analy-
in this population don’t have significant CAD. However, in this population, other risk factors such as syncope, hypertrophic cardiomyopathy, or significant aortic valve disease—accounted for 81.5% of the patients without CAD. Other causes of “troponinemia” included increased oxygen demand due to infection, tachycardia, or sympathomimetic abuse such as cocaine or methamphetamine.

Discussion | The use of sensitive biomarkers such as cTnI is becoming more widespread, with as many as 50% of hospitalized patients having a troponin test ordered during their hospitalization.4 Given the need to limit ineffective medical testing and associated costs and risks of cardiac catheterization (estimated at a complication rate of approximately 1.7% and $5000 for an outpatient procedure5), it is imperative to appropriately triage patients with low-level elevations of troponin in the absence of clinical acute coronary syndrome. Some of the risk factors identified by this study were diabetes, age, chronic kidney disease, and disease of other vascular beds; however, in this population, other risk factors such as syncope and supraventricular tachyarrhythmia appear to confer increased risk as well. Appropriate management of patients with low-level elevations of troponin should consider the pretest probability of CAD and the likelihood that most patients in this population do not have significant CAD.

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References