may promote HBV screening.² We did not find insurance status to be correlated with HBV screening. A possible explanation could be the mandatory HBV screening in pregnant women that occurs independent of insurance status.

In summary, in this academic primary care practice, HBV testing has been inadequate, with an extremely low frequency of provider-initiated screening. Multifaceted approaches, including provider education and automatic reminders in electronic medical records, need to be studied to improve HBV screening in target individuals.

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EDITOR’S NOTE

Increase Screening for Hepatitis B Among Asians

Hepatitis B is a treatable disease. Treatment decreases viral replication and hepatic enzyme levels, causes histologic improvement of the liver, and increases survival in treatment responders.¹ Persons who are infected with hepatitis B also benefit from surveillance for hepatocellular cancer. Of course, for persons to benefit from advances in hepatitis B treatment, they have to know that they are infected. This research letter demonstrates that even in a best-case scenario, where patients are empaneled in primary care practices in an academic setting, screening for hepatitis B among Asians is extremely low. We hope that publication of this research letter reminds practicing physicians that they should screen their patients who were born in Asia or who are Asians who were born in this country but not vaccinated as infants.

Mitchell H. Katz, MD


RESEARCH LETTER

Within-Person Variability in High-Sensitivity C-Reactive Protein

CRP-reactive protein (CRP) is a marker of systemic inflammation and cardiovascular disease.¹⁻³ Based on findings from recent clinical trials, CRP has been recommended as an adjunct screening tool to stratify cardiovascular risk in the general population.⁴ However, evidence regarding within-person variability of CRP in the general population is limited. Short-term variability in CRP has important implications for its use and interpretation in clinical practice and research studies. Thus, the objective of this study was to evaluate the short-term, within-person variability in CRP measurements and to quantify the impact of repeated testing on CRP-based cardiovascular risk classification.

See Editor’s Note at end of letter

Methods. We included 541 participants aged 16 to 69 years who completed repeated examinations of the 2001-2002 National Health and Nutrition Examination Survey (NHANES). Briefly, a 5% nonrandom sample of 2001-2002 NHANES participants was recruited for the second examination, occurring approximately 2.5 weeks after the original examination. Participants represented a uniform distribution of individuals by age, sex, and race/ethnicity. The study design and methods for NHANES are detailed elsewhere.⁵
High-sensitivity serum CRP was measured using latex-enhanced nephelometry. We used a cut point of a minimum level of 10.0 mg/L to define an elevated CRP level, based on the NHANES laboratory reference values and American Heart Association/Centers for Disease Control and Prevention recommendations. We also conducted sensitivity analyses using a higher cut point (CRP level ≥ 20.0 mg/L). (To convert CRP to nanomoles per liter, multiply by 9.524.)

The Spearman rank correlation and intraclass correlation (ICC) coefficients, and the within-person coefficient of variation (CVw) were used to characterize short-term, within-person variability. A persistently elevated CRP level was defined as CRP level of at least 10.0 mg/L at both examinations. We used scatterplots and Bland-Altman plots to visually display measurement variability. Finally, we calculated the percentage of participants whose risk category was reclassified owing to repeated testing.

Results. The mean (SD) age of participants was 38.0 (16.5) years. Fifty percent of the study population were female, and 48% were of non-Hispanic white race/ethnicity. The mean time between examinations was 18.9 days. The mean CRP level was 4.5 mg/L (95% CI, 3.9-5.1) at the first examination and 4.3 mg/L (95% CI, 3.8-4.9) at the second examination (P value for the difference, .45). The Spearman rank correlation between visits was 0.65, the ICC was 0.77 (95% CI, 0.69-0.84), and the CVw was 46.2% (95% CI, 42.9%-49.3%). The high variability in CRP can be seen visually on the scatterplot (Figure), although the Bland-Altman plot shows that most of the discordance between examinations occurred at higher values (>10.0 mg/L) (eFigure; http://www.archinternmed.com). The variability was particularly high among persons with CRP levels greater than 20.0 mg/L.

The prevalence of an elevated CRP level of at least 10.0 mg/L was 10.5% at the first examination and 10.4% at the second; 7.2% of participants had persistently elevated CRP levels (eTable). Of those with a normal CRP level at the first examination, only 3.5% had CRP levels of at least 10.0 mg/L at the second. Of those with CRP levels of at least 10.0 mg/L at the first examination, 32% were reclassified as having normal CRP levels at the second; 1.5% of participants had CRP levels of at least 20.0 mg/L at both examinations, representing an approximately 65% decrease in prevalence.

Comment. In this sample of the general population, we observed significant short-term (approximately 2.5 weeks) within-person variability in CRP levels, particularly at high values. Approximately one-third of persons with elevated CRP levels were reclassified as having normal CRP levels after repeated testing. Our results are consistent with those of previous studies conducted in small selected populations (eg, patients with ischemic heart disease) or in which measurements were months or years apart. Of note, we observed greater variation at higher values in cases in which clinicians are most likely to intervene.

The 2010 American College of Cardiology Foundation/American Heart Association guidelines for the assessment of cardiovascular risk in asymptomatic adults includes recommendations for CRP level to select patients for statin therapy when the low-density lipoprotein cholesterol concentration is level than 130.0 mg/L. Our results suggest that use of a single CRP measure for risk
stratification may lead to substantial misclassification. Recommendations for repeated testing to confirm elevations in CRP level prior to altering medical decision-making may be warranted, particularly among those with CRP values near the risk cut points.

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Drafting of the manuscript: Bower.

Critical revision of the manuscript for important intellectual content: Bower, Lazo, Juraschek, and Selvin.

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Online-Only Material: The eTable and eFigure are available at http://www.archinternmed.com.


