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### In reply

Our report provides the first safety assessment of the VHA's inpatient medication systems in terms of patient outcomes.<sup>1</sup> Data were collected in the year 2000 in the setting of the first-generation computerized patient record system and bar-coded medication administration. Our findings complement those of Koppel et al<sup>2</sup> and others and highlight the need for evaluation that does not solely rely on process end points such as medication errors.

As noted by Perlin, the VHA has deployed an unparalleled breadth of personnel-based and computer-based interventions to promote medication safety. Since our study, the VHA has significantly upgraded these systems and is now developing next-generation systems as part of the Pharmacy Reengineering project. This project is applying more sophisticated decision support to the problem areas identified in our report: drug selection, dosing, and monitoring. In addition, this project will provide tools for identifying, mitigating, and documenting adverse drug events. As major upgrades are added to medication safety systems, it will be important to evaluate them in terms of process and cost end points. Of course, the chief measure of success of these systems should be their benefit to patients.

As noted by Safyer and Bellin and others, electronic medical records and associated decision support promise a wide range of improvements in medical care. The VHA is helping fulfill this promise on a grand scale. Although individual sites around the world are making important contributions to computer-assisted medication safety, the VHA is deploying its systems to hundreds of sites with a coordinated program of innovation, education, incentives, and feedback. Indeed, the Institute of Medicine and empirical studies have identified high quality of care in the VHA and the strength of its integrated health information system.<sup>3</sup> The value of VHA information systems is also reflected by a newly announced program whereby Medicare will provide the VHA's electronic medical record to all outpatient clinics in the United States.<sup>4</sup>

We look forward to the continuing VHA partnership of veterans, clinicians, researchers, and informaticists in developing and evaluating computerized medication systems that benefit patients.

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### The Prediction of Insulin Resistance With Serum Triglyceride and High-Density Lipoprotein Cholesterol Levels in an East African Population

We refer to a recent publication<sup>1</sup> and comment<sup>2</sup> on the lack of association between insulin resistance and plasma triglyceride (TG) and high-density lipoprotein cholesterol (HDL-C) levels and the TG/HDL-C ratio in African Americans. To add some information in a non-American population, we present data from the Seychelles (Indian Ocean), where most of the population is of African descent. We assessed cardiovascular risk factors, including fasting blood markers, in a representative sample of the population aged 25 to 64 years.<sup>3</sup> We calculated homeostasis model assessment of insulin resistance (HOMA-IR)<sup>4</sup> as

$$\frac{\text{Fasting Serum Insulin Level } (\mu\text{U/mL}) \times \text{Fasting Blood Glucose Level } (\text{mmol/L})}{22.5}$$

Participants were categorized as "African," "mixed," or "non-African" (white, Indian, or Chinese) based on morphological criteria. Results presented herein are based on nondiabetic individuals who are overweight (body mass index [calculated as weight in kilograms divided by the square of height in meters]  $\geq 25$ ). Insulin resistance was defined within each ethnic group for subjects with HOMA-IR values within the upper tertile.

In the African, mixed, and non-African groups, the mean  $\pm$  SD HOMA-IR was 4.20  $\pm$  3.81, 4.21  $\pm$  2.67, and 4.17  $\pm$  2.01, respectively; the mean  $\pm$  SD TG level (mg/dL) was 88.1  $\pm$  57.6, 102.0  $\pm$  86.9, and 115.2  $\pm$  46.2 (1.0  $\pm$  0.7, 1.2  $\pm$  1.0, and 1.3  $\pm$  0.5 mmol/L), respectively; the mean  $\pm$  SD HDL-C level (mg/dL) was 50.8  $\pm$  16.4, 48.2  $\pm$  14.6, and 44.3  $\pm$  16.5 (1.3  $\pm$  0.4, 1.2  $\pm$  0.4, and 1.1  $\pm$  0.4 mmol/L), respectively; and the mean  $\pm$  SD TG/HDL-C ratio was 2.17  $\pm$  3.09, 2.58  $\pm$  4.19, and 2.99  $\pm$  1.63. The **Table** shows that the HDL-C and TG levels and TG/HDL ratio were each significantly associated with insulin resistance in African individuals. Odds ratios adjusted for age and sex were virtually identical. Odds ratios for TG level and the TG/HDL-C ratio tended to be higher in non-African individuals. Areas under the receiver operating characteristics curves (AUROCs) in African individuals were 0.64 (95% confidence interval [CI], 0.56-0.71) for TG level, 0.61 (95% CI, 0.54-0.68) for HDL-C level, and 0.65 (95% CI, 0.58-0.72) for TG/HDL-C ratio. The predictive power of these lipid markers was better than for age (AUROC, 0.53; 95% CI, 0.45-0.60) and sys-

**Table. Univariate Associations Between Insulin Resistance and Lipid Markers (1-SD Intervals) Among Overweight Nondiabetic Individuals\***

Marker	African (n = 296)	Mixed (n = 279)	Non-African (n = 45)
HDL-C (16 mg/mL [0.4 mmol/L])	0.32 (0.14-0.74)	0.09 (0.03-0.26)	0.32 (0.03-3.03)
Triglycerides (72 mg/mL [0.8 mmol/L])	2.30 (1.42-3.72)	2.59 (1.49-4.50)	3.07 (0.72-13.1)
TG/HDL-C ratio (3.5)	1.86 (1.17-2.96)	2.90 (1.63-5.13)	5.35 (1.15-24.9)

Abbreviations: HDL-C, high-density lipoprotein cholesterol; TG, triglyceride.  
\*Data are given as odds ratio (95% confidence interval).

tolic blood pressure (AUROC, 0.53; 95% CI, 0.46-0.60) but less than for body mass index (AUROC, 0.68; 95% CI, 0.61-0.74), waist circumference (AUROC, 0.70; 95% CI, 0.63-0.76), or fasting blood glucose level (AUROC, 0.72; 95% CI, 0.65-0.78).

Although it has some limitations, HOMA-IR is considered an adequate index for insulin resistance<sup>5</sup> particularly for population studies. Our findings suggest a potential role for TG level and/or TG/HDL-C ratio to predict insulin resistance in nondiabetic overweight individuals in an East African population. On the other hand, our observations are also compatible with a weaker association in African than in non-African individuals. Further investigation is warranted to explore underlying mechanisms that are ethnic-specific and to relate such findings to specific cutoff points.

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## Is High-Utilization Chiropractic Treatment Efficacious in Whiplash?

In a recent article by Côté et al,<sup>1</sup> the authors appeared at first blush to demonstrate that chiropractic management of whiplash injuries might delay recovery. Superficially, it suggests that patients who see general practitioners in “low-utilization” settings recover from their injuries more quickly compared with those who see general practitioners in “high-utilization” settings and that patients who see chiropractors and a medical practitioner have slower recoveries. Those who see only chiropractors in the “high-utilization” setting have the slowest recovery.

If one looks closer at this study, several troubling details emerge. The first is the definition of “recovery.” As the same authors have done in previous studies, claim closure, which is essentially an administrative decision made by the Saskatchewan Government Insurance (SGI), was considered a proxy for “recovery.”<sup>2</sup> The authors did not have any contact with the claimants. All data used was from SGI files. There were no telephone interviews, no mailed questionnaires, and no in-person interviews or actual examinations. The total cost of care was not provided to the reader of this study, nor were the numbers of total visits. And, most troubling of all, we know virtually nothing of the actual degree of recovery of the cohort; and here I am using the orthodox meaning of the word recovery as in “no longer symptomatic or disabled.”

Another troubling point are the somewhat ambiguous—if not misleading—definitions of “low utilization” (1-2 visits for a general practitioner or 1-6 visits for a chiropractor) and “high utilization” (>2 visits for a general practitioner and >6 visits for a chiropractor). Considering the fact that studies typically show that even by 12 weeks after injury only about 50% of subjects with whiplash injury have recovered,<sup>3</sup> coupled with a common treatment frequency of 2 to 3 visits per week in the initial usual treatment regime of chiropractic care, to consider more than 6 visits high utilization clearly mischaracterizes the intervention and expectations of recovery. However, that would not have been an important issue to raise had the authors actually given us data on the actual treatment numbers. In fact, they did not. There is nothing in this report to allow the reader to gauge in any meaningful way whether chiropractic care—alone or in