First, the finding of excessive sodium in the meals offered to patients with diabetes and those with sodium restrictions underscores the potential for inpatient food service to contribute to the exacerbation or slow resolution of the very conditions that may have led to the hospitalization, including the common salt-sensitive conditions of heart, kidney, and liver failure. Therapeutic goals and nutritional goals should be aligned, particularly for these conditions, and optimized to ensure the best outcomes in the hospital and in the ongoing care for these often chronic conditions.

Second, the finding of sodium content in excess of the recommended limit in nearly all of the menu offerings at these institutions suggests that most inpatients may not actually have the option to consume healthy levels of sodium while they are hospitalized. Importantly, Arcand and colleagues quantified the sodium that had already been added to these inpatient meals. Both within the hospital and outside the hospital, most of the sodium consumed in our Western diet is that which is already added to the processed, prepared, and/or packaged foods that we consume.2,3 The choices of inpatients are also constrained by their physical confinement to the hospital and possibly by hospital rules restricting outside food and supplements. A critical first step toward increasing the healthy choices for hospitalized patients may be to prepare all meals with low sodium content and make optional table salt available for those patients who do not have additional restrictions. Interestingly, studies suggest that individuals who are left unencumbered to salt food during consumption rarely add sodium in quantities that match those that are already found in processed food formulations.4

Finally, Arcand and coauthors’ study adds to the growing evidence of unhealthy food environments in our health care institutions. The list of concerns, which is long and varied, includes high sugar and fat content and excessive portion sizes for pediatric patients,5 fast food restaurants on hospital premises,6 and widespread reliance on vending machines after hours, with choices restricted to sodas and other items that are high in sugar.7 The unhealthy food environment in these institutions affects not only patients but also hospital personnel, particularly those who are working after-hours shifts.8,9

Two decades ago, several US hospitals took steps to ban smoking on their premises. Although the explicit motivation was to protect the health of patients, these measures had the critically important additional impact of improving the health of hospital personnel (as measured by successful tobacco quit rates among hospital staff) and positioning health care institutions as leaders in the subsequent efforts to curb smoking in the workplace that have been instrumental in turning the tide on smoking rates in the United States.10 Hospitals again have the opportunity to take the lead and to create food environments that are consistent with their mission to cure the sick and to promote health. Through the simple act of serving food that meets national nutritional standards, our hospitals will act in the best health interests of their patients, and their staff and will undoubtedly again be leaders in our ongoing dialogue on how to improve our food supply, which in turn will improve the health of us all.

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RESEARCH LETTERS

Improved Outcomes in Heart Failure Treated With High-Dose ACE Inhibitors and ARBs: A Population-Based Study

E levated doses of angiotensin II–converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) have similarly reduced morbidity and mortality in congestive heart failure (CHF) trials.1,2 However, despite the recommendations of consensus CHF guidelines to achieve elevated target doses of ACE inhibitors or ARBs,3,4 patients often receive doses that are lower than those used in large clinical trials, possibly owing to adverse effects.2,5 We conducted a population-based retrospective cohort study to estimate the effect, in real-world clinical practice, of different doses of ACE inhibitors and ARBs on all-cause mortality and CHF readmission in patients with a first CHF admission.

Methods. Data on all patients 65 years or older who were admitted for a first CHF diagnosis in the province of Quebec, Canada, between January 1, 1998, and March 31, 2007, were obtained from the hospital discharge summary database of Quebec and the provincial physician
and drug claims databases. All patients had CHF recorded as the primary diagnosis (International Classification of Diseases, Ninth Revision, code 428). Patients were included in the cohort if they had a first CHF-related hospital admission, were discharged alive, and filled prescriptions for an ACE inhibitor (captopril, cilazapril, enalapril, fosinopril, lisinopril, perindopril, quinapril, ramipril, and/or trandolapril) or ARB (candesartan, eprosartan, irbesartan, losartan, telmisartan, and/or valsartan) after discharge. Follow-up for each patient was from the time of first prescription filled for any ACE inhibitor or ARB (time 0) to the time of death, CHF readmission, end of the study period, or switch to a different drug class. Three study groups were formed according to the initial dose of ACE inhibitor or ARB prescribed: low-, medium-, and high-dose groups.

In addition to descriptive statistics on baseline characteristics, multivariate Cox proportional hazards models were used to assess the associations between dose and all-cause mortality or the composite end point of all-cause mortality or CHF readmission. The medium-dose groups for ACE inhibitors and ARBs were used as the reference, and adjusted hazard ratios (HRs) and 95% CIs were estimated for the low- and high-dose groups, with adjustments made for all baseline characteristics and potential confounders, including cardiovascular and lung diseases, chronic kidney and liver conditions, diabetes mellitus, dementia, malignancy, concurrent use of other cardioprotective medications, in-hospital therapeutic procedures, length of hospital stay, specialty of the treating physician, year of hospitalization, and time to the first ACE inhibitor or ARB prescription. Sensitivity analyses were also performed among dose groups, which were adjusted with propensity score analysis to further control for selection bias and potential residual confounding.

Results. The study included 43 405 individuals (mean [SD] age, 79.5 [7.5] years; 45% men). After discharge, 73% filled a prescription for an ACE inhibitor, 27% for an ARB. Of these, 29% received a low-dose prescription of either drug. Compared with patients in the low- and medium-dose groups, those receiving a high dose of either drug were more likely to have hypertension (52% vs 40%) and diabetes mellitus (45% vs 35%), whereas, patients receiving low doses of either drug were more likely to have renal disease (31% vs 21%). The rest of the baseline characteristics were similar among the 3 groups.

After adjusting for all baseline variables and potential confounders, we found that low-dose users of either drug class had significantly higher mortality and CHF readmissions than patients who filled prescriptions for medium or high doses (Figure). Treatment with high-dose ACE inhibitors significantly decreased mortality and the composite end point, while high-dose ARB treatment improved mortality and the composite end point only when compared with middle- and low-dose treatment combined. Sensitivity analyses between dose groups were adjusted with propensity scores, and Cox regres-

\[ n = 5128 (38\%) \]

\[ n = 5731 (42\%) \]

\[ n = 19,318 (61\%) \]

\[ n = 18,973 (60\%) \]
Comment. To our knowledge, this is the first study to estimate the effect of different doses of ACE inhibitors and ARBs on all-cause mortality and CHF readmission in patients 65 years or older with a first CHF admission. Unlike clinical trials, our study included a representative sample of unselected patients with CHF and reflects real-world clinical practice. We demonstrated that, of over 43,000 patients with CHF, approximately one-third were prescribed low doses of ACE inhibitors or ARBs. Low-dose users had significantly greater all-cause mortality and CHF readmissions. Both ACE inhibitors and ARBs decreased mortality and the composite end point in a dose-dependent manner, with high-dose users having the best outcome. However, ACE inhibitors were more effective than ARBs at reducing the composite end point. Our results demonstrate that target doses of ACE inhibitors or ARBs are reached in only one-third of patients with CHF. Physicians should strive, whenever possible, to treat patients with CHF with high doses of ACE inhibitors or ARBs to improve outcomes.

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Frequency of Prescription Pain Reliever Nonmedical Use: 2002-2003 and 2009-2010

The public health consequences associated with the nonmedical use of prescription pain relievers such as oxycodone, hydrocodone, and methadone have dramatically increased over the last decade. In 2009, 15 597 people died of overdoses involving these drugs—a 109% increase since 2002. Prior studies examining prescription pain reliever overdose deaths found that nonmedical use was common among decedents before death. National estimates of past-year nonmedical use of these drugs, however, have remained stable since 2002. These estimates include the spectrum of nonmedical users from those who used pain relievers once or twice to those who were more frequent or chronic nonmedical users. This Research Letter attempts to determine if the subset of chronic nonmedical users of pain relievers—those using 200 days or more in the past year—has increased since 2002, in parallel with fatal overdoses of these drugs. Understanding trends in the frequency of nonmedical use can help identify populations at greatest risk for overdoses.

Methods. The National Survey on Drug Use and Health (NSDUH), an annual survey of the noninstitutionalized, civilian population 12 years and older, provides national estimates of substance use in the United States. Information on NSDUH survey methodology has been reported elsewhere. Data from the NSDUH public use files were combined for years 2002-2003 and 2009-2010 to improve the detection of differences among specific subpopulations. The NSDUH defines past-year nonmedical use (PYNMU) of prescription pain relievers as use in the prior 12 months without a prescription or use simply for the experience or feeling it causes. Drugs in this category include prescription opioid pain relievers and selected barbiturate combination products. Once respondents are identified as having PYNMU, they are asked to state the number of days they used pain relievers nonmedically in the past year.

Frequency of PYNMU of pain relievers was categorical into the following 4 groups: 1 to 29 days, 30 to 99