Physician Training Award in Preventive Medicine (grant PTAPM-96-156-16) from the American Cancer Society (ACS).

Disclaimer: The contents are solely the responsibility of the authors and do not necessarily represent the official views of HRSA or ACS.

Previous Presentation: The results of this analysis were presented in poster form at the Society for General Internal Medicine 2012 meeting; May 10, 2012; Orlando, Florida.

Online-Only Material: The eTable is available at http://www.jamainternalmed.com.

### REFERENCES


### EDITOR’S NOTE

**Time to Unveil the Risk of Imaging to Patients**

Despite the increased attention to the radiation risks of computed tomographic scans, this Research Letter by Caverly et al illustrates that most patients who are undergoing imaging tests are not aware of the associated risks of radiation exposure. It is likely that many physicians also do not know the risks, and so it is not surprising that even when there are discussions with patients about risks and benefits of the procedure, patients clearly still do not understand the true risk of radiation exposure. If we are to achieve optimal shared decision making on the decision to undergo imaging studies, much work needs to be done in educating physicians on the magnitude of radiation used for commonly used computed tomographic scans and the risks of radiation exposure so that we can unveil the true risk of imaging radiation exposure to our patients. This information, presented in a way that assures patient understanding of the risks, should be part of every discussion surrounding the decision to image.

*Patrick G. O’Malley, MD, MPH*

### RESEARCH LETTERS

#### Benefits of Participation in Diabetes Group Visits After Trial Completion

Group medical clinics (GMCs) represent a potentially scalable and sustainable intervention for patients with diabetes. A recent trial randomized 239 patients with uncontrolled diabetes (hemoglobin A1c [HbA1c] level ≥7.5%) and hypertension (blood pressure [BP] ≥140/90 mm Hg) to GMC attendance every 2 months for a year or usual care. Each session included group education and structured group interactions moderated by a registered nurse or certified diabetes educator. Individual medication adjustments were made by a pharmacist and general internist to manage HbA1c, BP, and cholesterol.

Group medical clinic patients had greater reductions in systolic BP (SBP) (−7.3 mm Hg) and low-density lipoprotein cholesterol (LDL-C) levels (−9.2 mg/dL) than usual care patients. The purpose of this Research Letter was to examine the economic and clinical benefits of GMC attendance 18 months following completion of the trial.

**Methods.** Expenditure and utilization outcomes were obtained from Department of Veterans Affairs (VA) claims data, and expenditures were inflation adjusted to 2010 dollars. Outpatient expenditures, total expenditures, and probability of inpatient admission during seven 6-month periods (2 prior to, 2 during, and 3 after the trial) were modeled using generalized estimating equations. These models included treatment arm, indicators for each 6-month period, and interactions of treatment and period for the five 6-month periods following intervention initiation.

Systolic BP, LDL-C, and HbA1c measurements were ascertained from the VA electronic health record taken during any outpatient visit in the 42-month observation period. Unlike study-specific outcome values obtained at baseline, 6 months, and 12 months during the trial, each patient in this follow-up study had a varying number of clinic-based outcomes that were captured at different time intervals. There were natural transition points at baseline and trial conclusion, so piecewise quadratic mixed-effects models were fit with treatment by time interactions for differential trends by arm. These models had separate quadratic functions for the trial and posttrial periods, with time coded continuously as the number of weeks from baseline and centered at the points of discontinuity (baseline and trial conclusion). The models for SBP and LDL-C included patient-level random effects for intercept and linear slope, quadratic time slope, and correlations between intercept and slopes. The model for HbA1c included patient-level random effects for intercept and linear time and their correlation.

The GMC trial was approved by the institutional review boards of the Durham, North Carolina, and Richmond, Virginia, Veterans Affairs Medical Centers (VAMCs). The follow-up study reported herein was approved by the Durham VAMC institutional review board.
Results. See eTable 1 (http://www.jamainternalmed.com) for patient characteristics. Forty-seven percent of usual care patients and 39% of GMC patients incurred 1 inpatient admission or more during our study period. Mean expenditures are given in eTable 2. Group medical clinic patients had a lower estimated probability of an inpatient admission compared with usual care patients 13 to 18 months after the trial (Table). Estimated mean outpatient expenditures were similar between arms during and after the trial, while estimated mean total expenditures for the GMC patients were significantly lower ($7504 (95% CI, $14 286 to $721; P = .003) 13 to 18 months after the trial owing to lower observed inpatient admissions during the same period (Table and eFigure 1). A sensitivity analysis of the probability of inpatient admissions with a primary diagnosis related to diabetes, cardiovascular disease, or renal disease7 showed similar results.

The 239 patients in this GMC trial had a mean of 25.4 SBP values, 8.1 HbA1c values, and 6.1 LDL-C values obtained during routine clinic visits over the 42-month observation period. Trends in clinic SBP values diverged from baseline to become significantly lower (relative improvement of 3.1 mm Hg; 95% CI, 5.3 to 0.9 mm Hg; P = .007) for GMC compared with usual care patients by the end of the 12-month trial. This improvement was sustained for the first 6 months after trial completion (estimated SBP was 3.1 mm Hg lower [95% CI, −5.8 to −0.4 mm Hg; P = .03] for GMC compared with usual care patients). However, relative improvement in clinic SBP declined for GMC patients compared with usual care patients (18 months after the trial, 0.8 mm Hg lower [95% CI, −5.7 to 4.2 mm Hg; P = .76]). Estimated HbA1c and LDL-C trends were similar between arms over the entire study period (eTable 3 and eFigure 2).

Comment. To our knowledge, this is the first study to examine the long-term economic and clinical posttrial impacts of GMCs. We found that GMC patients had significantly lower probability of inpatient admission and total expenditures than usual care patients 13 to 18 months after trial completion.

Clinically meaningful improvements in BP may have led to risk reduction substantial enough to translate into lower health expenditures by forestalling cardiovascular events requiring hospitalization, which is consistent with United Kingdom Prospective Diabetes Study (UKPDS), which showed that tight BP control resulted in lower 10-year risk of peripheral vascular disease for

<table>
<thead>
<tr>
<th>Period</th>
<th>Usual Care Control</th>
<th>GMC</th>
<th>P Valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before trial, mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>−12 to −7</td>
<td>3837 (3374-4364)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>−6 to −1</td>
<td>3853 (3393-4376)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>During trial, mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 6</td>
<td>6212 (3464-11 139)</td>
<td>5179 (4451-6025)</td>
<td>.55</td>
</tr>
<tr>
<td>7 to 12</td>
<td>5178 (4211-6367)</td>
<td>5049 (4249-5999)</td>
<td>.85</td>
</tr>
<tr>
<td>After trial, mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 to 18</td>
<td>4582 (3719-5645)</td>
<td>4701 (3926-5630)</td>
<td>.85</td>
</tr>
<tr>
<td>19 to 24</td>
<td>4970 (3939-6270)</td>
<td>4727 (4030-5545)</td>
<td>.72</td>
</tr>
<tr>
<td>25 to 30</td>
<td>6981 (4397-11 083)</td>
<td>5018 (4206-5986)</td>
<td>.19</td>
</tr>
</tbody>
</table>

| Estimated Mean (95% CI) Total Expenditures, $b |
|--------|------------------|------------------|------------------|
| Before trial, mo | | | |
| −12 to −7 | 4999 (4096-6103) | NA | |
| −6 to −1 | 4403 (3765-5150) | NA | |
| During trial, mo | | | |
| 1 to 6 | 7917 (4787-13 093) | 7701 (5574-10 639) | .93 |
| 7 to 12 | 5930 (4774-7365) | 6336 (4967-8082) | .68 |
| After trial, mo | | | |
| 13 to 18 | 9214 (4897-17 336) | 6496 (4863-8677) | .32 |
| 19 to 24 | 7876 (5818-10 664) | 5545 (4526-6795) | .05 |
| 25 to 30 | 13 967 (8645-22 565) | 6461 (5217-8001) | .003 |

Abbreviations: GMC, group medical clinics; NA, not applicable.
a The P value corresponds to a test of treatment effect.
b Total = outpatient + inpatient.
the subset of UKPDS patients with uncontrolled diabetes and hypertension. The Steno-2 follow-up study found that intensive control of BP, HbA1c, and LDL-C among patients with diabetes and persistent microalbuminuria reduced cardiovascular-related adverse event and death rates 5.5 years after trial completion. It is also possible that resource use declined because GMC patients learned to address health concerns directly with their usual physicians; GMC patients self-reported significantly greater confidence in managing diabetes at the completion of the trial compared with usual care.

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Trial Registration: clinicaltrials.gov Identifier: NCT00286741

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Caffeine Content of Dietary Supplements Consumed on Military Bases

Excessive caffeine consumption, particularly when combined with other stimulants, may increase the risk of hypokalemia, rhabdomyolysis, and other heat-related injuries among athletes and military personnel. Caffeine is consumed in a wide range of popular items including coffee, teas, sodas, energy drinks, energy gels, chocolate, gums, and over-the-counter medications. Dietary supplements, which are commonly consumed by military personnel, are a poorly characterized source of caffeine. Only with accurate information about the quantity of caffeine in dietary supplements can consumers and clinicians be assured of safe use. As part of an ongoing multidisciplinary collaboration to promote dietary supplement safety, we analyzed some of the most popular supple-