The use of patient and physician reminders for preventive services: results from a National Study of Physician Organizations

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Abstract

Background. Clinical preventive services improve patient health, and reminder systems can increase the use of such services. However, physician organizations often underutilize clinical preventive service reminders. Little is known about the incentives, capabilities, and organizational characteristics associated with the use of reminders by physician organizations.

Methods. The predictors of patient and physician reminder system use were examined in a sample of 1,104 US physician organizations. The cross-sectional sample was obtained through a telephone survey with a 70% response rate.

Results. Fifty-one percent of physician organizations used mammogram reminders, 41% used influenza immunization reminders, and 26% used eye exam reminders for patients. Eighteen percent of physician organizations used computer-generated reminders to physicians. Required reporting of data (P = 0.0006), public recognition for quality (P = 0.0002), and IT capabilities (P < 0.0001) were strongly associated with patient reminder use. Medical groups were more likely to use patient-level reminders than independent practice associations (IPAs) (P < 0.0001). Physician reminder use was related to required reporting of data (P < 0.0001) and IT capabilities (P < 0.0001).

Conclusions. Physician organizations have relatively low use of preventive service reminders to patients and physicians. Offering quality incentives to physician organizations and improving their IT capabilities may increase the use of preventive service reminders and improve the delivery of preventive care.

Keywords: Reminders; Reminder systems; Preventive services; Incentives

Introduction

Screening to detect serious illness, examinations to detect threatening complications from chronic illness, and immunization to prevent communicable disease for at-risk populations are critical components of clinical preventive care [1]. Numerous studies have shown that preventive services can be both clinically effective at preventing disease and cost-effective in terms of resource use [1–4]. Despite evidence that clinical preventive services work, many studies show that they are underutilized [3,4]. For example, one study estimated that fewer than 25% of patients at high risk for influenza receive an influenza vaccine each year [5]. Another study found that fewer than half of patients with diabetes are screened yearly for diabetic retinopathy [6].

A large body of literature suggests that reminder systems can improve the rates of delivery of clinical preventive services [3,4,7–11]. There are two different types of reminder systems: those targeting patients and those targeting physicians. Patient reminder systems actively remind patients to receive clinical preventive services at proper time intervals. Both mailed and telephone reminders to at-risk patients have been shown to be effective at increasing screening and immunization rates across a wide variety of patient populations and health care settings [3,4,7–11]. Computer-generated physician reminders can prompt physicians to arrange proper preventive care and thereby increase...
the use of these services. Studies show that reminders to the
physicians of patients who need screening and immuniza-
tion increase patient use of these services [4,5,9,11–13].

While patient- and physician-level reminders are pow-
eful tools, some evidence suggests that physician groups
and health plans do not employ these reminders to the full
extent possible. For example, one study found that only
27% of primary care offices surveyed used mammogram
reminders for their female patients [14]. However, the
overall level of clinical preventive care reminder use
among physician organizations has rarely been studied.
The determinants of the use of preventive services
reminders are also largely unknown. There is currently
no literature examining what organizational incentives,
capabilities, and characteristics may lead physician or-
ganizations to increase their use of patient and physician
reminders.

The purpose of this study is to use data from a
nationwide survey of medical groups and independent
practice associations (IPAs) to (1) assess the level of use
of patient and provider reminders for clinical preventive
services and (2) examine the relationship between a
physician organization’s incentives, capabilities, and gen-
eral characteristics on the use of reminder systems. This
study focuses on the general use of computer-generated
physician reminders for preventive services and on patient-
level reminders for three specific adult preventive services:
mammograms for women over 50; diabetic retinopathy
exams for patients with diabetes; and influenza screening
for high-risk populations.

Methods

Data source

Data for this study were obtained from the National
Study of Physician Organizations and the Management
of Chronic Illness (NSPO). This survey, conducted from
September 2000 to September 2001, was designed to
measure the organizational characteristics, care manage-
ment processes, and health promotion practices among all
US medical groups and IPAs with 20 or more physicians.
Telephone interviewers used a computer-assisted telephone
interview (CATI) system to administer the approximately
60-min questionnaire to the CEO, president, or medical
director of each medical group or IPA. The response rate
of the 1,590 physician organizations in the census was
70%; this resulted in a study population of 1,104. While
we have limited information on the non-respondents to the
survey, they were similar in size and location to the
respondents. IPAs did have a significantly higher response
rate than medical groups (79% vs. 66%; $P < 0.0001$).
Further information about the development, administration,
and content of the survey is available from other sources
[15].

Interviewers assessed each physician organization’s use
of patient-level reminders for three essential adult screening
and immunization practices: mammograms for women over
age 50; influenza vaccines for high-risk populations; and
eye exams for patients with diabetes.

These services are representative of the basic types of
preventive services recommended for general adult popula-
tions (mammograms), high-risk populations (influenza vac-
cines), and those with chronic illness (screening for diabetic
retinopathy). Physician organizations were also asked if
they used computer-generated provider-level reminders for
preventive services. All questions were asked on a yes/no/
don’t know basis. For the purpose of this analysis, an
answer of “don’t know” was classified as “no”.

Interviewers asked a series of six questions to determine
whether the physician organization had external incentives
to improve their quality of care. These included four
questions regarding whether the physician organization
was required to report patient satisfaction results, quality
improvement project results, outcomes data, or HEDIS data
to any outside organization; and two questions as to whether
the physician organization received additional income or
public recognition for scoring well on quality measures.

Each physician organization’s clinical information tech-
ology capabilities were assessed with seven questions.
Physician organizations were asked if they had an electronic
medical record for each patient, and if they could prepare
reports on the following sets of patients within 5 days:
number of patients with diabetes; percentage of children
ages 0–2 with immunizations; and percentage of adults
under 50 receiving annual exams. The final three questions
asked if physician organizations could link lab findings,
prescribed medications, or clinical guidelines in an elec-
tronic data system.

The survey also collected organizational characteristics
such as type (medical group vs. IPA), number of physicians,
number of specialty vs. primary care physicians, ownership
type, number of clinic sites, state, and whether an HMO
delegates utilization management responsibility for its
patients to the physician organization. The county-level
HMO penetration of each physician organization’s main
clinical site was assessed using Interstudy 1999 data [16].

Statistical analysis

We used multivariate logistic and linear regression anal-
ysis to examine the relationship between a physician organ-
ization’s health reminder practices and external incentives,
clinical IT capabilities, organizational characteristics, and
HMO penetration. Logistic regression was used to predict
the use of each of the three individual screening and
immunization reminder activities, and the use of computer-
ized reminders to physicians for preventive services. Physi-
cian organizations that were not eligible to provide a
specific patient service (i.e., an orthopedic group that does not treat diabetes would not need to remind diabetic patients to get eye exams) were excluded from each individual patient reminder analysis. Linear regression was used to predict the number of screening and immunization reminder activities used by each physician organization.

The three patient-level health reminder practices were examined using principal components analysis to see if it was appropriate to include them in one dependent variable index. All three questions loaded onto the same component, with factor loading coefficients all equal to or exceeding 0.81. Therefore, we combined all three questions into an index ranging from 0 to 3. This comprehensive index was used to help examine the generalizability of findings across different types of reminders. The index had a high level of internal consistency reliability, with a Cronbach’s alpha coefficient of 0.77. This index was denominator-adjusted to account for the fact that not all groups were eligible to provide each of the three patient preventive services.

Since the four external incentive questions regarding reporting to outside organizations were highly correlated, these were combined into an index ranging from 0 to 4. Principal component analysis showed that all questions loaded onto the same component and had a Cronbach’s alpha of 0.89. Additionally, the four questions regarding the electronic data system in each physician organization (electronic medical records, lab findings, prescribed medications, and clinical guidelines) were all highly correlated and also combined into an index ranging from 0 to 4. Principal component analysis showed these four IT questions loading onto the same component with a Cronbach’s alpha of 0.70. Finally, the three clinical IT questions regarding the ability to generate patient reports in fewer than 5 days were also highly correlated and were combined into an index ranging from 0 to 3; again, principal component analysis showed these questions to load on one factor and to have a Cronbach’s alpha of 0.78.

Results

Of the 1104 physician organizations in our study, approximately two-thirds were medical groups (n = 738) and the remaining 366 were IPAs. The general characteristics of these organizations are described in Table 1.

Overall, 61% of the physician organizations in this study provided either patient or provider reminders for preventive care (Table 2). One-quarter to one-half of the physician organizations in the study used patient reminders for any of the three patient-level preventive services: 51% of eligible organizations reminded women over 50 about mammograms; 41% reported using reminders for influenza vaccines; and 26% used patient reminders for diabetic eye exams. However, these numbers varied considerably by medical group vs. IPA, with a larger percentage of medical groups providing these patient-level reminders than IPAs. The largest discrepancy was with mammograms: 62% of
medical groups reminded patients about mammograms, compared with 28% of IPAs. Computer-generated physician reminders were used by 18% of the physician organizations in the study; this percent was generally similar for medical groups and IPAs (20.1% vs. 14.0%).

The multivariate analysis for the three individual patient-level health reminders shows that external incentives are consistently associated with the use of health reminders (Table 3). Physician organizations with outside data-reporting requirements are more likely to use all three types of health reminders. Those who receive public recognition for quality are more likely to use patient reminders for mammograms and diabetic eye exams, while receiving income for quality is associated with the use of influenza vaccine reminders. IT capabilities are also associated with the use of patient-level reminders: each additional electronic record capability (EMR, lab results, prescription information, and clinical guidelines) results in a 14–40% increase in the use of mammogram, influenza vaccine, and eye exam reminders. The ability to quickly generate patient reports for target groups of patients was also associated with the use of mammogram and influenza vaccine reminders.

Organizational type is a consistent predictor of using patient-level reminders. Physician organizations that are medical groups are almost three times more likely than IPAs to use patient reminders for mammograms, and about twice as likely to use patient reminders for influenza vaccines and diabetic retinopathy eye exams.

Percent of physicians who practice primary care is associated with each of the three patient-level reminder services; as the percent of primary care physicians in the physician organization increases, the likelihood of using each type of patient-level reminder also increases.

Table 2
Number and percentage of groups using individual health reminders

<table>
<thead>
<tr>
<th>Type of service</th>
<th>Total (n = 1,104)</th>
<th>Medical groups (n = 738)</th>
<th>IPAs (n = 366)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any patient or provider health reminders: no. (%)</td>
<td>674 (61.1%)</td>
<td>516 (69.9%)</td>
<td>158 (43.2%)</td>
</tr>
<tr>
<td>Patient reminders for mammograms: no. (%)</td>
<td>512 (45.6%)</td>
<td>412 (62.4%)</td>
<td>100 (28.4%)</td>
</tr>
<tr>
<td>Patient reminders for influenza vaccines: no. (%)</td>
<td>434 (41.1%)</td>
<td>343 (49.1%)</td>
<td>91 (25.4%)</td>
</tr>
<tr>
<td>Patient reminders for eye exams for patients with diabetes: no. (%)</td>
<td>271 (26.3%)</td>
<td>204 (30.3%)</td>
<td>67 (18.9%)</td>
</tr>
<tr>
<td>Provider reminders—use of generated by computer tracking systems: no. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3
Logistic regression predicting individual patient health reminders (adjusted odds ratios with 95% confidence intervals)

<table>
<thead>
<tr>
<th></th>
<th>Mammogram</th>
<th>Influenza vaccine</th>
<th>Diabetic eye exam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External incentives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside reporting index</td>
<td>1.2* (1.04,1.3)</td>
<td>1.1* (1.00,1.2)</td>
<td>1.2*** (1.1,1.4)</td>
</tr>
<tr>
<td>Income for quality</td>
<td>1.3 (0.94,1.8)</td>
<td>1.5* (1.1,2.0)</td>
<td>1.2 (0.85,1.7)</td>
</tr>
<tr>
<td>Public recognition for quality</td>
<td>1.9*** (1.3,2.8)</td>
<td>1.3 (0.90,1.9)</td>
<td>1.8** (1.2,2.6)</td>
</tr>
<tr>
<td><strong>IT capabilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT records index</td>
<td>1.2* (1.04,1.4)</td>
<td>1.14* (1.01,1.3)</td>
<td>1.4*** (1.2,1.5)</td>
</tr>
<tr>
<td>IT patient ID index</td>
<td>1.2** (1.1,1.4)</td>
<td>1.4*** (1.2,1.5)</td>
<td>1.1 (0.95,1.3)</td>
</tr>
<tr>
<td><strong>Organizational type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical group (vs. IPA)</td>
<td>2.9*** (1.8,4.7)</td>
<td>2.4*** (1.5,4.0)</td>
<td>1.7* (1.01,3.0)</td>
</tr>
<tr>
<td><strong>Other characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of primary care MDs</td>
<td>1.006* (1.001,1.01)</td>
<td>1.01*** (1.006,1.02)</td>
<td>1.007* (1.001,1.01)</td>
</tr>
<tr>
<td>Percentage of hospital delegation</td>
<td>1.00 (0.99,1.01)</td>
<td>1.003 (0.99,1.01)</td>
<td>1.00 (0.99,1.005)</td>
</tr>
<tr>
<td>Practice size</td>
<td>1.00 (0.99,1.001)</td>
<td>1.001*(1.001,1.01)</td>
<td>1.001** (1.01,1.002)</td>
</tr>
<tr>
<td>Percentage of HMO penetration</td>
<td>0.99 (0.98,1.00)</td>
<td>1.006 (0.99,1.02)</td>
<td>0.99 (0.98,1.01)</td>
</tr>
<tr>
<td>Owned by hospital/Health plana</td>
<td>1.003 (0.71,1.4)</td>
<td>1.4* (1.005,2.0)</td>
<td>1.07 (0.74,1.6)</td>
</tr>
<tr>
<td>Other/non-MD ownedb</td>
<td>0.92 (0.56,1.5)</td>
<td>1.2 (0.74,1.9)</td>
<td>0.92 (0.54,1.6)</td>
</tr>
<tr>
<td>Age of group</td>
<td>1.02** (1.006,1.02)</td>
<td>0.99 (0.98,1.007)</td>
<td>1.009* (1.001,1.02)</td>
</tr>
<tr>
<td>Number of clinics</td>
<td>1.00 (0.99,1.001)</td>
<td>0.99 (0.98,1.00)</td>
<td>1.00 (0.99,1.001)</td>
</tr>
<tr>
<td>C-Statistic</td>
<td>0.77</td>
<td>0.76</td>
<td>0.75</td>
</tr>
<tr>
<td>Hosmer and Lemeshow</td>
<td>17.2*</td>
<td>11.9</td>
<td>12.3</td>
</tr>
</tbody>
</table>

Results also adjusted for region.

a Referent is physician/joint physician ownership. This category combines hospital/health system ownership with HMO/health plan ownership.

b Referent is physician/joint physician ownership. This category combines the non-MD manager and ‘other’ owned.

* Parameter estimate significant at $P < 0.05$.

** Parameter estimate significant at $P < 0.01$.

*** Parameter estimate significant at $P < 0.001$. 

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<td>Provider reminders—use of generated by computer tracking systems: no. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
organization increases, use of patient reminders for mammograms, influenza vaccines, and eye exams all increase.

When the three patient-level reminders were combined into one index, linear regression results (Table 4) were very similar to those of the individual reminder analysis (Table 3). In this combined analysis, outside-reporting requirements, income for quality, and public recognition for quality are all strong predictors of patient-level reminder use; these external incentive variables were also consistent significant predictors in the individual reminder analysis (Table 3). Both types of IT capabilities significantly predict greater patient-level health reminder use; IT capabilities were similarly strong predictors in the individual analysis. Just as medical groups were more likely than IPAs to provide each of the individual reminder types, being a medical group predicted a greater overall level of reminder use. Percent of physicians who are primary care MDs was again a significant predictor of patient-level health reminder use, just as this variable was significant across reminder types in the individual analysis.

External incentives and IT capabilities are important for provider reminders as well as patient reminders (Table 5). Each additional outside data-reporting requirement resulted in a 30% increase in the use of provider-level reminders, and each IT electronic record and target group reporting capability resulted in a 60% increase in the use of provider-level reminders. Larger practice size is also associated with the use of additional provider-level reminders. However, unlike patient reminders, whether a physician organization was a medical group or an IPA is not associated with the use of computer-generated provider health reminders.

### Table 4

Linear regression predicting patient health reminders index

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter estimate</th>
<th>SD of estimate</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.02</td>
<td>0.15</td>
<td>0.89</td>
</tr>
<tr>
<td><strong>External incentives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside reporting index</td>
<td>0.09***</td>
<td>0.02</td>
<td>&lt;0.0006</td>
</tr>
<tr>
<td>Income for quality</td>
<td>0.16*</td>
<td>0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Public recognition for quality</td>
<td>0.30***</td>
<td>0.08</td>
<td>&lt;0.0002</td>
</tr>
<tr>
<td><strong>IT capabilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT records index</td>
<td>0.11***</td>
<td>0.03</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>IT patient ID index</td>
<td>0.12***</td>
<td>0.03</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Organizational type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical group (vs. IPA)</td>
<td>0.43**</td>
<td>0.10</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Other characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of primary care MDs</td>
<td>0.005***</td>
<td>0.001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Percentage of hospital delegation</td>
<td>0.0007</td>
<td>0.0009</td>
<td>0.39</td>
</tr>
<tr>
<td>Practice size</td>
<td>0.0003**</td>
<td>0.0009</td>
<td>0.006</td>
</tr>
<tr>
<td>Percentage of HMO penetration</td>
<td>−0.001</td>
<td>0.002</td>
<td>0.64</td>
</tr>
<tr>
<td>Owned by hospital or health plan</td>
<td>0.09</td>
<td>0.08</td>
<td>0.23</td>
</tr>
<tr>
<td>Other/non-MD owned</td>
<td>−0.02</td>
<td>0.10</td>
<td>0.87</td>
</tr>
<tr>
<td>Age of group</td>
<td>0.004*</td>
<td>0.002</td>
<td>0.01</td>
</tr>
<tr>
<td>Number of clinics</td>
<td>−0.0001</td>
<td>0.0001</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Results also adjusted for region. R-squared = 0.25. Adjusted R-Square = 0.24.

a Referent is physician/joint physician ownership. This category combines hospital/health system ownership with HMO/health plan ownership.
b Referent is physician/joint physician ownership. This category combines the non-MD manager and ‘other’ owned.

***Parameter estimate significant at $P < 0.001$. **Parameter estimate significant at $P < 0.01$. *Parameter estimate significant at $P < 0.05$.

### Table 5

Logistic regression predicting use of computer-generated provider health reminders

<table>
<thead>
<tr>
<th>External incentives</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside reporting index</td>
<td>1.3*** (1.1,1.5)</td>
</tr>
<tr>
<td>Income for quality</td>
<td>1.2 (0.8,1.8)</td>
</tr>
<tr>
<td>Public recognition for quality</td>
<td>1.4 (0.9,2.1)</td>
</tr>
<tr>
<td><strong>IT capabilities</strong></td>
<td></td>
</tr>
<tr>
<td>IT records index</td>
<td>1.6*** (1.4,1.9)</td>
</tr>
<tr>
<td>IT patient ID index</td>
<td>1.6*** (1.3,1.8)</td>
</tr>
<tr>
<td><strong>Organizational type</strong></td>
<td></td>
</tr>
<tr>
<td>Medical group (vs. IPA)</td>
<td>0.97 (0.5,1.8)</td>
</tr>
<tr>
<td><strong>Other characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Percentage of primary care MDs</td>
<td>1.005 (0.998,1.01)</td>
</tr>
<tr>
<td>Percentage of hospital delegation</td>
<td>0.999 (0.994,1.004)</td>
</tr>
<tr>
<td>Practice size</td>
<td>1.001* (1.000,1.0001)</td>
</tr>
<tr>
<td>Percentage of HMO penetration</td>
<td>0.994 (0.98,1.008)</td>
</tr>
<tr>
<td>Owned by hospital or health plan*</td>
<td>1.01 (0.67,1.5)</td>
</tr>
<tr>
<td>Other/non-MD owned*</td>
<td>1.1 (0.62,1.99)</td>
</tr>
<tr>
<td>Age of group</td>
<td>1.005 (0.996,1.01)</td>
</tr>
<tr>
<td>Number of clinics</td>
<td>1.000 (0.999,1.001)</td>
</tr>
<tr>
<td>C-statistic</td>
<td>0.78</td>
</tr>
<tr>
<td>Hosmer and Lemeshow</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Results also adjusted for region.

a Referent is physician/joint physician ownership. This category combines hospital/health system ownership with HMO/health plan ownership.
b Referent is physician/joint physician ownership. This category combines the non-MD manager and ‘other’ owned.

***Parameter estimate significant at $P < 0.001$. **Parameter estimate significant at $P < 0.05$.

### Discussion

Many physician organizations in the US (39%) are not providing either patient or provider reminders for clinical preventive services. Despite evidence that reminders are an effective way to increase the use of preventive services, only 50% of physician organizations provide reminders for mammograms, and even fewer provide reminders for influenza vaccines and diabetic eye exams. The use of computer-generated preventive service reminders for physicians was even lower: only 20% of physician organizations provided these reminders to their MDs. Overall, only 6% of physician organizations ($n = 68$) used all four types of reminders studied here (data not shown).

The results from this study suggest that external data-reporting requirements, incentives for quality such as income and public recognition, and clinical IT capabilities are
important factors associated with a physician organization’s use of patient- and provider-level reminders for preventive services. However, results show that the use of these incentives and capabilities is quite limited. Physician organizations in this study, on average, were required to report less than one set of quality data (patient satisfaction results, quality improvement project results, clinical outcomes, or HEDIS data) to any outside organization, and had an average of only one out of four electronic patient record capabilities (Table 2). Improving external incentives for quality and clinical IT capabilities may be important steps in increasing the use of reminder services and ultimately delivering the appropriate levels of preventive care.

Organizational type is a strong predictor of reminder service performance at the patient level. Medical groups, even after adjusting for other organizational characteristics, provide more patient reminders than IPAs. The literature suggests that medical groups are formed specifically to organize and coordinate patient care, while IPAs are primarily organized for contracting and financial purposes [17,18]. Medical groups may have structural, procedural, and cultural differences from IPAs that lead to their greater use of patient-level reminder services.

Another key predictor of patient-level reminder services is the percent of physicians in the physician organization who are primary care MDs. Preventive care often stems from the primary care encounter [19], and therefore greater emphasis on primary care may lead to a higher priority for preventive services. Some have argued that emphasis on a primary care philosophy involves an emphasis on care continuity and coordination [20]. It is possible that groups with more primary care physicians place a greater emphasis on models that increase continuity and coordination through the use of patient reminders for screening and immunization services.

Limitations

This study focuses on only three clinical preventive services: there are other preventive services for adults that were not included in the NSPO survey. Examples are colonoscopy screening reminders or reminders for male-specific services such as prostate cancer screening. It is possible that focusing on these three alone allows for a misrepresentation of the level of health reminders offered by the physician organization population.

However, the NSPO survey remains a unique data set for exploring the use of health reminder services by national physician organizations. The use of reminders for such widely accepted preventive practices such as mammogram screenings and flu shots likely provides a somewhat optimistic view of reminder system use nationally. In addition, the three services studied here represent examples of several key types of preventive care: screening for general adult populations, immunization for high-risk populations, and screening to prevent serious complications from chronic illness. The analysis across these categories consistently showed the relationship between external incentives and IT capabilities with the use of reminders; such consistency may indicate that incentives and IT may also be related to the use of other health reminders.

Another limitation of this study is that we do not know what specific methods physician organizations use to remind patients about preventive services (i.e., mail vs. phone) nor how often reminders are sent (i.e., one vs. multiple mailings or calls). However, the literature supports the idea that any reminders to patients are effective, no matter whether they are done by phone or mail, or single vs. multiple times [21–23]. No matter how physician organizations implement patient reminders, they are likely to have a positive impact on patient use of preventive services.

We also did not examine physician organizations’ use of noncomputer-generated provider reminders for clinical preventive services; physician organizations may be using other types of reminders such as chart stamps or stickers. However, the literature gives only mixed support for the effectiveness of such reminders [24,25] while it gives strong support that reminders coming from computerized tracking systems are effective in increasing the provision of preventive care.

A general concern about self-report data such as the NSPO data set is that the fact that the survey may be filled out by different types of organization representatives, in this case CEOs, medical directors, or presidents. Differences in organizational knowledge and perspective may lead to bias in the types of survey answers provided. For example, medical directors may have better knowledge of the types of reminder systems utilized in the organization than CEOs, who may be less focused on the details of clinical services. However, an analysis that compared the number of reminder systems utilized by the type of respondent to the survey indicated no such bias (CEO mean = 1.2; medical director mean = 1.3; president mean = 1.1; P = 0.11).

Finally, our study focuses on physician organizations with at least 20 MDs; we cannot assess the extent to which physician organizations with fewer MDs use patient and physician reminders for preventive services. It is likely that physician organizations with fewer MDs have a lesser capacity to implement reminder systems, and that the numbers we present in this study represent an optimistic picture of the use of reminder systems.

Conclusion

Many physician organizations in the US are not using reminder systems that have been proven to be effective tools in increasing the appropriate use of preventive care and promoting health. Only 25–50% of all physician organizations studied used patient-level reminders for mammograms, influenza vaccines, and exams to detect diabetic retinopathy. Less than 20% used computer-generated reminders to physicians for any preventive services. However, the study also suggests that there are ways to improve the use of these
services. By requiring that physician organizations be accountable for quality, by rewarding them for quality, and by providing funding and incentives for the greater use of clinical information technology, physician organizations may be able to significantly increase their use of reminders and improve their delivery of preventive care. Other studies suggest that external incentives and IT capabilities also play an important role in the use of care management processes [15]. This study suggests that through the use of targeted incentives and infrastructure improvements, health plans, purchasers, and policy makers can play an active role in encouraging physician organizations to increase the appropriate use of clinical preventive services.

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