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Comparative Effectiveness of Mailed Reminder Letters on Mammography Screening Compliance

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Abstract

Objective—Reminder letters are effective at prompting women to schedule mammograms. Less well studied are reminders addressing multiple preventive service recommendations. We compared the effectiveness of a mammogram-specific reminder sent when a woman was due for a mammogram to a reminder letter addressing multiple preventive services and sent on a woman's birthday on mammography receipt.

Methods—The study included 48,583 women 52-74 years enrolled in Group Health Cooperative, a health plan in Washington State. From 2005-2009, women were mailed 88,605 mammogram-specific or birthday letters. In this one group pretest-posttest study, we modeled the odds of obtaining a screening mammogram after receiving a letter by reminder type using logistic regression, controlling for demographic and healthcare use characteristics and stratifying by whether women were overdue or up-to-date with mammography at the mailing.

Results—Among women up-to-date with screening, birthday letters were negatively associated with mammography receipt compared to mammogram-specific letters (birthday letters with 1-2 recommendations: OR=0.73; 95% CI:0.68-0.79; 3 recommendations: OR=0.74; 95% CI:0.69-0.78; 4-8 recommendations: OR= 0.62 95% CI:0.55-0.68) after. Among overdue women, birthday letters with 4-8 recommendations were negatively associated with mammography receipt.

Conclusions—Transitioning from mammogram-specific reminder letters to multiple preventive service birthday letters was associated with decreased mammography receipt.

INTRODUCTION

Mammography is currently the most effective method for detecting breast cancer early and reducing mortality from breast cancer (Nelson et al., 2009; Institute of Medicine, 2005; Tabar et al., 2011). Reminder letters are an effective strategy for improving mammography rates (Task Force on Community Preventive Services, 2008; Ahmed et al.; Bonfill et al.,

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2001; Wagner, 1998; Vernon et al.). Most reminder letter evaluations have focused on one preventive service at a time, and little is known about reminder letters that address multiple preventive services. Addressing multiple needs in one reminder could mutually reinforce each other to promote service completion, or conversely, may compete with each other, overloading the recipient and decreasing adherence (Burack et al., 2003; Valanis et al., 2003). Further, most prevention recommendations do not follow the same testing or screening intervals, so the ideal timing for sending one reminder is unclear.

This study evaluated one health system's recent change from a mammogram-specific reminder letter to an annual outreach letter that addresses multiple preventive care services on mammography adherence.

METHODS

Setting and Study Sample

The study sample included women 52-74 years who were enrolled in Group Health Cooperative (GHC), an integrated health plan in Washington State and who received ≥1 reminders to obtain a screening mammogram between January 1, 2005 and December 31, 2009. Women had to be continuously enrolled for 12 months before the date the reminder was sent until the end of a follow-up period described below. All study procedures were approved by GHC's Human Subjects Review Committee.

Independent Variable: Reminder Letter

Mammogram-Specific Letter—Beginning in 1996, GHC sent a reminder letter 4 months before a woman was due for a screening mammogram (Taplin et al., 1990). If a woman did not receive a mammogram within 12 months, GHC sent another reminder one year after the initial letter was mailed indicating she was overdue for a mammogram. Mammogram-specific letters were phased-out between 2007 and 2009 and replaced with an annual letter sent on a member's birthday.

Birthday Letter—The birthday letter included upcoming preventive care recommendations based on a member's age, sex, and health history (up to 8 recommendations, e.g., Pap, chlamydia, cholesterol, and colon cancer screening and hemoglobin A1c testing). For women who had a mammogram at GHC within the past 2 years (i.e., women up-to-date with screening), the birthday letter provided a mammogram due date corresponding to two years from the last known mammogram. For women who had not had a mammogram at GHC within the past 2 years (i.e., women overdue for screening), the letter included a text phrase indicating the woman should schedule a mammogram.

Because there was a transition in reminder systems, with an overlap period where both letters were used, some women received both reminder letters in the same calendar year; those letters (N=84,451) were excluded from analyses because any subsequent mammogram could not be attributed to only one letter.

Dependent Variable: Screening Mammogram Adherence

For overdue women, adherence was defined as screening mammogram receipt ≤6 months from the date the mammogram-specific or birthday letter was mailed. Up-to-date women were adherent if they received a mammogram ≤6 months (4 months plus 2 additional months) from the date the mammogram-specific reminder letter was mailed or if they received a screening mammogram between the date the birthday letter was mailed and 2 months after the mammogram due date listed on the letter. Two additional months accommodated potential delays scheduling a mammogram appointment. Because birthday

letters were mailed on women's birthdays and not when women were due for a mammogram, follow-up time varied from 6-26 months (median=10 months).

Covariates

All analyses were adjusted for age, body mass index, insurance type (commercial or Medicare), geocoded median household income, well-care visit <1 year before mailing the reminder letter, gynecological visit <2 years before mailing the reminder letter, and year the letter was mailed.

Data Analysis

This was an observational, one group pretest-posttest study. The unit of analysis was the reminder letter; women were included in the analysis as separate observations each time they received a letter. To account for correlation between repeated observations over time, we used generalized estimating equations assuming an independent working correlation structure and robust standard errors to fit logistic regression models estimating the odds ratio for mammography adherence by reminder type. In the models, the birthday letter was coded as a categorical variable based on the number of recommendations per letter (1-2, 3, or 4-8 recommendations). Covariate-adjusted models were stratified by whether a woman was up-to-date or overdue when the reminder letter was mailed. Analyses were conducted using Stata 11.0 (StataCorp, College Station, TX).

RESULTS

The study sample included 88,605 reminder letters—61,160 mammogram-specific letters and 27,445 birthday letters--sent to 48,583 women. Women received a median of 2 letters during the study (range 1-5). Up-to-date women were less likely to be obese, had higher incomes, and were more likely to have had a well-care or gynecological visit prior to receiving a reminder letter as compared to overdue women (Table 1).

Fifty-one percent of mammogram-specific letters were followed by a mammogram. Overall, 44% of birthday letters were followed by a mammogram; adherence decreased with increasing number of recommended preventive services-- 46% with1-2 recommendations, 44% with 3 recommendations, and 36% with 4-8 recommendations. Table 2 summarizes the proportion of up-to-date and overdue letters followed by a mammogram.

Among women receiving up-to-date letters, birthday letters were associated with lower adherence compared to the mammogram-specific letter, regardless of the number of recommendations included in the birthday letter (Table 2). Among overdue letters, only birthday letters with 4-8 recommendations were associated with decreased adherence compared to mammogram-specific letters (Table 2).

DISCUSSION

These results suggest that a broader prevention outreach reminder was associated with decreased mammography adherence compared to a reminder targeted specifically towards that care. The birthday and mammogram-specific letters differed in content and in timing when the letter was mailed, both of which likely explain our findings. Birthday letters acknowledged they were tailored to a woman's preventive care needs based on her age and health history, and research suggests that tailored reminders are more effective than general reminders (Bonfill et al., 2001; Sohl and Moyer, 2007; Wagner, 1998; Gierisch et al., Ornstein et al., 1994; Kaczorowski et al., 2009). However, the multiple service reminder list may also be perceived as too overwhelming and diffuse compared to a single service reminder. How women with ≥1 recommendation in the birthday letter prioritized

mammography or how due dates of other recommendations affected their prioritization is also unclear. Birthday letters could have improved adherence to other preventive services that took priority over mammography. Research is warranted to assess the effectiveness of the birthday letter on adherence to recommendations other than mammography.

Importantly, the timing of the birthday letter may not be opportune because letters are not necessarily received near service due dates. Without a reminder near the mammogram due date, women may be less likely to adhere in a timely manner. Finally, neither reminder letter had much impact on women overdue for mammograms; these women likely require more aggressive outreach than a reminder letter can provide.

This was an observational study of reminder systems as implemented within one health system, and as with any natural experiment, limitations exits. There may be residual confounding by patient behaviors and beliefs about mammography, which may change over time. Additionally, mammography rates may have been declining nationally during this study (Breen et al., 2007), which may influence findings and not be completely accounted for in the models by adjusting for calendar year.

CONCLUSION

When designing systems for preventive care outreach, health systems must consider the potential effectiveness of both the content and timing of patient reminders in activating individuals to obtain preventive services.

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Table 1

Characteristics of Women When a Mammogram-Specific or Birthday Reminder Letter is Mailed[a]

Characteristic, Column %	Total Sample N =88,605	Up-to-Date N=54,817		Overdue N=33,788	
		Mammogram-Specific Letters N=37,867	Birthday Letters N=16,950	Mammogram-Specific Letters N=23,293	Birthday Letters N=10,495
Age					
52-64 years	75.8	71.8	79.2	78.35	78.6
65-74 years	24.3	28.2	20.8	21.65	21.4
Body Mass Index (kg/m^2)					
Underweight/Normal Weight (<24.9)	30.2	31.6	32.5	26.5	28.1
Overweight (25.0-29.9)	28.53	31.4	30.8	23.5	25.8
Obese (≥30.0)	37.1	36.7	36.5	37.5	38.7
Missing	6.0	0.45	0.51	17.0	10.2
Insurance Segment					
Commercial	71.5	67.2	76.2	74.2	75.0
Medicare Advantage	27.9	32.8	23.8	24.7	24.2
Median Income Quartiles (US$)					
1 (0-43,750)	13.5	12.0	11.2	16.8	15.2
2 (43,864-52,098)	16.1	15.5	15.0	17.5	17.0
3 (52,115-60,726)	20.0	19.7	20.0	20.5	19.7
4 (60,741-72,262)	23.0	23.1	23.6	22.4	23.3
5 (72,267-200,001)[b]	27.4	29.7	30.1	22.8	24.8
Well Care Visits					
1+ well care visits in the past year	27.5	33.4	37.5	14.5	19.3
Gynecological visits[c]					
1+ visits <2 years before receiving a reminder letter (required 2 years continuous enrollment)	17.7	20.9	24.9	8.2	11.0
Cannot be assessed because not continuously enrolled for 2 years	33.1	42.9	6.3	46.6	11.2
Number of clinical/preventive service recommendations per letter					
1-2 recommendations	N/A	N/A	32.7	N/A	29.6
3 recommendations			56.5		56.3
4-8 recommendations			10.8		14.1

[a] Because a woman could have received >1 reminder letter over the study period, her sociodemographic characteristics and visit history may be reflected multiple times in this table.

[b] Median income at the census block group is top-coded at $200,001.

[c] The proportion of letters sent to women who had 1+ gynecological visit is restricted to letters sent to women continuously enrolled for 2 years before receiving a reminder letter. The denominator for this measure is as follows: total sample of letters=59,291, up-to-date mammogram-specific letters=21,630, up-to-date birthday letters=15,890, overdue mammogram-specific letters=12,448, and overdue birthday letters=9,323. Visit data was not assessed prior to January 1, 2004, so gynecological visits could not be described for women whose mammogram-specific letters were mailed in 2005.

N/A: Not Applicable

The study sample included women 52-74 years who enrolled in Group Health Cooperative and who received ≥1 reminders to obtain a screening mammogram between January 1, 2005 and December 31, 2009.

Table 2

Proportion of Reminder Letters Followed by a Screening Mammogram and Adjusted Odds Ratios of Screening Mammography Adherence for Categorical Birthday Letter Compared to Mammogram-Specific Letter

	Proportion of Reminder Letters Followed by a Screening Mammogram	
	Up-to-Date with Screening	**Overdue for Screening**
	N Letters =54,817	**N Letters =33,788**
Mammogram-Specific Letter	71%	19%
Birthday Letter: 1-2 recommendations in the letter	60%	21%
Birthday Letter: 3 recommendations in the letter	59%	19%
Birthday Letter: 4-8 recommendations in the letter	52%	17%

	Adjusted Odds Ratio[a]	
	Up-to-Date with Screening	**Overdue for Screening**
Mammogram-Specific Letter	Referent	Referent
Birthday Letter: 1-2 recommendations in the letter	0.73 (0.68-0.79)***	1.03 (0.90-1.18)
Birthday Letter: 3 recommendations in the letter	0.74 (0.69-0.78)***	0.89 (0.79-1.01)
Birthday Letter: 4-8 recommendations in the letter	0.62 (0.55-0.68)***	0.76 (0.64-0.91)*

[a]Models adjusted for age, body mass index, insurance segment, income quintiles, year the reminder letter was mailed, well-care visit use in the year before mailing the reminder letter, and gynecological visit use in the 2 years before mailing the reminder letter.

*p<0.01

***p<0.001

The study sample included women 52-74 years who enrolled in Group Health Cooperative and who received ≥1 reminders to obtain a screening mammogram between January 1, 2005 and December 31, 2009.