The Effect of Patient Reminders and Gas Station Gift Cards on Patient Adherence to Testing Guidelines for Diabetes

Sam Austin, MA; Barbara L. Wolfe, PhD

ABSTRACT

Objective: Analysis of the effectiveness of a small financial incentive and a written reminder to encourage test taking among persons with diabetes who have missed glycosylated hemoglobin (HbA1c) and low-density lipoprotein cholesterol (LDL-C) screenings.

Research Design and Methods: The analysis uses data from the University of Wisconsin Medical Foundation medical records of persons diagnosed with diabetes who had not received an HbA_{1c} screening or had not received an LDL-C screening over the previous year (prior to October 2005). This study uses a quasi-experimental design comparing 464 diabetic patients (cases) who received a letter reminder of screening and financial incentive for undergoing screening, and 693 controls who did not receive a letter or financial incentive. The treated patients (464) all were seen in 1 of 4 clinics while those not treated used different clinics within the same system of care. Propensity scores served as the matching procedure using the following covariates: age, gender, ethnicity, marital status, number of HbA_{1c} tests and number of LDL-C tests in the year prior to pilot program, mean HbA_{1c} levels in the year prior to the pilot program (when available), census income data, and a comorbidity measure.

Results: During the 2 years following the pilot program, on average the target or "treated" population received significantly more screenings—3.34—compared to 2.69 screenings for the matched comparison group, and a far smaller proportion of the target population had no screening at all.

Conclusions: The results provide evidence that a small financial incentive coupled with a written reminder work to increase test taking (especially the HbA_{1c} screening) and suggest greater control of HbA_{1c} levels among persons who had previously missed screenings.

INTRODUCTION

Effectively controlling diabetes requires a combination of lifestyle changes and regular clinical visits and laboratory tests. Changes in lifestyle include dietary adjustment, exercise, weight loss, and adherence to medical regimens. Two important laboratory tests for diabetes control are glycosylated hemoglobin (HbA_{1c}), which measures blood glucose control over time, and low-density lipoprotein cholesterol (LDL-C), an indicator of cardiovascular health. The American Diabetes Association (ADA) recommends a minimum of 2 annual HbA_{1c} tests, with a reading of 7% generally considered "controlled" for persons with diabetes.[1] LDL-C tests are recommended to be conducted at least once a year, with a target of below 100 mg/dl.[2] When patients regularly receive these tests, health care professionals can more easily assess the severity of a person's diabetes and can adjust care accordingly. Adherence to appointments and medication has been shown to improve HbA_{1c} levels.[3] In fact, immediately providing the results of these tests at the clinic visit by performing point-of-care testing also may improve glycemic control.[4]

This paper analyzes the effect of a program designed to encourage HbA_{1c} and LDL-C test taking among persons with diabetes who had been out of compliance on at least 1 of these tests for a year or more. It is an example of a quality improvement program termed "Patient Reminders" according to the taxonomy defined by the US Agency for Healthcare Research and Quality,[5] but implicitly it also had a goal of organizational change should the intervention be successful in improving test taking among diabetics. The program, implemented in 2005 as a quality improvement measure by UW Health in Madison, Wisconsin, provided a written reminder to the test-takers who were out of compliance, with an offer of a small financial incentive after they received the missing test. This study uses a quasi-experimental approach, by matching a comparison group of patients whose

• • •

Authors' Affiliations: La Follette School of Public Affairs, University of Wisconsin-Madison.

Corresponding Author: Barbara L. Wolfe, PhD, Professor, Departments of Economics, Population Health Sciences and the La Follette School of Public Affairs, University of Wisconsin-Madison, Madison, WI 53706; phone 608.263.2029; fax 608.265.3233; e-mail bwolfe@wisc.edu.

clinics were not targeted in the initiative to the group who received the reminder letter and the incentive offer.

Box 1. A sample letter

Dear _____:

To help improve your health, UW Health and the American Diabetes Association recommend that you have specific laboratory tests performed at regular intervals. These lab tests help us decide what steps to take to help lower your risks of developing problems that can be caused by diabetes.

Our records indicate that you are due for:

☑ A1C. This blood test tells us your level of glucose (blood sugar) control in the past 3 months

☑ Lipid Panel (LDL). This blood test tells us your good and bad cholesterol levels. You should have this test done yearly.
(This test requires a 12 hour fast--drink water only. You can take your pills/medications.)

Please bring this letter that serves as your lab request to the …UW Health Lab for the identified test(s). The preferred days to obtain your lab tests are Tuesdays through Fridays. We will contact you with the results either by phone or letter approximately 2 weeks after you have had your test(s).

If you feel you have received this letter in error or if our records are incorrect in any way, please contact the UW Health medical management department at … to make the needed corrections.

To thank you for making diabetic care a priority in your health care needs, enclosed is a coupon to receive a complimentary Kwik Trip gas/gift card. Please present this card and letter to the lab staff.

Sincerely,
Dr……

METHOD

In the fall of 2005, UW Health implemented a pilot program to improve rates of receiving HbA_{1c} and LDL-C tests by providing screening reminder letters and offering a small financial incentive.[6] At the time, 32% of the more than 7000 persons diagnosed with diabetes in the UW Health system had received < 2 annual HbA_{1c} tests; nearly 25% had not received an annual LDL-C screening.[7]

The pilot program focused on 4 clinics in the UW Health system, targeting patients who had not received an HbA_{1c} screening from October 2004 to October 2005, or had not received an LDL-C screening during that same period. A Diabetes Improvement Team reviewed patient records to assess if individual patients were diabetics and if so, their test-taking history. The list of those to receive a reminder then was reviewed and corrected by clinic staff. UW Health sent each of these patients a letter, signed by their physician, informing them of the missing tests, and offering each patient a gift card worth $6 at a local gas station (a "gas card") if they received the tests. During the 3-month pilot program period (October to December 2005), gasoline sold for between $2.15 and $2.90 a gallon.[8]

The letter (Box 1) reminded the recipient of the tests he or she had missed and directed the recipient to bring the letter to the UW Health Lab. The recipient then could talk with the lab staff and redeem a coupon included with the letter. The recipient was not required to see his or her primary care provider to receive the gas card. Upon receiving the tests, patients also received an educational packet outlining the importance of the HbA_{1c} and LDL-C tests.

Participants

Only patients who had not received an HbA_{1c} or LDL-C screening were eligible for inclusion in this study. Pilot program participants ("treated group members") were identified in 2 ways: using UW Health's definition of current diabetes management, which uses Wisconsin Collaborative for Healthcare Quality (WCHQ) standards,[9] or identification by the individual's primary care provider. The WCHQ definition includes all patients who had 2 diabetes-coded ambulatory care encounters during a 24-month period. At least 1 of the encounters must have been with a primary care physician (the second encounter could have been with either primary care or endocrinology), and at least 1 encounter had to have occurred in the most recent 12 months. Of this population, only those persons with diabetes who had not received an HbA_{1c} or LDL-C screening during the previous 12 months received a reminder letter.

The pilot program targeted 464 persons with diabetes who fit the WCHQ criteria. This population included 230 female and 234 male participants, with a mean age of 63.7 years. The top panel of Table 1 shows the frequency of HbA_{1c} and LDL-C tests received by the treatment group in the 12 months prior to the pilot program.

Research Design

As the original pilot program conducted by UW Health did not include a randomly assigned control group, the research design of this study mimicked the randomization process. First, the research team constructed a population of persons whose primary care physician was a UW Health provider. The providers for this patient group were not located at 1 of the 4 targeted clinics, and therefore did not participate in the pilot program. This potential comparison group population was drawn from

Table 1. Descriptives for the Pilot and Control Populations

	Percentage of Pilot Program Population (n=464)	Percentage of Potential Comparison Group Population (n=2101)
Number of HbA_{1c} Screenings (in year previous to pilot program)		
0	20.69	33.32
1	34.70	30.41
2	25.65	17.18
3	12.07	9.80
4	4.31	5.00
5	2.16	2.19
6	0.22	0.86
7	0.22	0.81
8	0	0.29
9	0	0.10
10	0	0.05
Number of LDL-C Screenings (in year previous to pilot program)		
0	89.22	83.91
1	9.7	12.71
2	0.65	2.57
3	0.43	0.57
4	0	0.19
5	0	0.05
Marital Status		
Divorced	7.54	9.28
Married	48.71	48.31
Separated	1.08	0.57
Single	23.49	27.61
Unknown	0.65	1.48
Widowed	18.53	12.76
Ethnicity		
Hispanic/Latino	2.59	4.81
Not Hispanic/Latino	89.01	79.30
Unknown	8.41	15.90
Gender		
Male	50.43	46.83
Female	49.57	53.17
Known Deceased, as of Dec 31, 2007	10.13	8.04
Known Alive, as of Dec 31, 2007	89.87	91.81
Unknown Status	0.00	0.14
Mean Age (in years)	63.7	58.6
Imputed Annual Income	$48,576.51	$49,220.95

Abbreviations: LDL-C = low-density lipoprotein cholesterol; HbA_{1c} = glycosylated hemoglobin.

the UW Health patient database; all patients were defined as persons with diabetes by WCHQ standards and met the same HbA_{1c} and LDL-C truancy requirements as the pilot program population. This population totaled 2101 persons with diabetes who met these criteria; 984 patients were male, 1117 were female, and the mean age was 58.6 years. Table 1 shows the frequency of HbA_{1c} and LDL-C tests received by the potential comparison group in the 12 months prior to the pilot program and shows a comparison of the characteristics of the pilot and potential comparison populations.

Using this potential comparison population, matched comparison groups were constructed to determine program effects, using propensity scores as the matching procedure. The propensity score method determines a conditional probability of having received the treatment (in this case, of having received the reminder letter and offer of a gas card), given a set of covariates.[10] Each patient in the pilot program population received a propensity score, as did each patient in the potential comparison population. A comparison group was then matched to the treatment group by nearest neighbor matching—that is, each pilot program patient was assigned at least 1 comparison patient that was his/her closest match in probability of having been targeted by the pilot program. This propensity score procedure was conducted using the statistical analysis software Stata 10, using the protocol developed by Becker and Ichino.[11]

Covariates Used for Propensity Score Matching

The set of covariates was obtained from University of Wisconsin Medical Foundation (UWMF) and UW Health Clinics (UWHC) administrative and clerical data. It was provided to the researchers in a limited dataset format and covered the period from January 1, 2005 to December 31, 2007. To construct the propensity scores, the following covariates were used: age, gender, ethnicity, marital status, number of HbA_{1c} tests in the year prior to the pilot program, number of LDL-C tests in the year prior to the pilot program, and mean HbA_{1c} levels in the year prior to the pilot program (when available). Because many patients had not received an HbA_{1c} test over the 12 months prior to the pilot program, many had no recorded mean HbA_{1c} level. Due to this limitation, 2 versions of matching procedure were conducted: a version that only included patients who had a recorded mean HbA_{1c} measure and a version that included all pilot program patients, but excluded mean HbA_{1c} level.

In addition to these covariates taken directly from UWMF and UWHC records, 2 additional measures were derived using the data. First, a proxy measure for patient income was constructed by matching patient ZIP code to the US Census Bureau data for income. This measure gives the median income for every ZIP code block, providing an approximation of patient income.

Finally, a comorbidity variable was included in the propensity score specification, using the procedure developed by Elixhauser et al.[12] This "Elixhauser Method" defines a set of 30 comorbidity measures created from diagnosis codes included in patient data. The 30 comorbidity groups are available from the authors.

Primary Outcome Variables

Two main outcome variables are specified to determine the effects of the gas card pilot program: frequency of HbA_{1c} screenings and frequency of LDL-C screenings after the program. We also wished to learn if additional testing led to improved control. Too few patients received an LDL-C screening in the pre-pilot period to allow analysis of the effect of the pilot program on LDL-C levels. We test for HbA_{1c} levels after the program as a third outcome, however, the fact that many patients do not have a prior measure limits the usefulness of this outcome.

The first measure took patient data on number of HbA_{1c} screenings from October 1, 2005 to December 31, 2007, and divided it into 5 time periods (see Table 2). Breaking each year into 2 measurement periods attempts to analyze the success of the program in encouraging patients to receive the recommended biannual HbA_{1c} screening. In addition, the total number of HbA_{1c} screenings from January 1, 2006 to December 31, 2007 was analyzed. As noted above, 2 rounds of matching were conducted: 1 with the mean HbA_{1c} measure included as a covariate and 1 without that measure.

The LDL-C screening frequency outcome measure was broken down into 3 time periods (see Table 2). Because each patient with diabetes is recommended to receive 1 annual LDL-C screening, the outcome variable is broken down into 1-year periods. Two rounds of matching were conducted: 1 with the mean HbA_{1c} measure as a covariate and 1 without that measure.

Finally, the mean HbA_{1c} level measure analysis was broken down into the same time periods as the HbA_{1c} screening frequency analysis. As mentioned above, mean HbA_{1c} level was not available for all patients. For this analysis, only those patients who had a mean HbA_{1c} measure in the pre-pilot period *and* in the outcome period of interest were used in the propensity score matching procedure.

Table 2. Screening Frequency Results

Number of HbA_{1c} Tests (With and Without HbA_{1c} Level Covariate)

Sample with HbA_{1c} Levels Included in Matching[a]

	ATT	Standard Error	t-statistic
Time Period			
Oct 2005–Dec 2005	0.047	0.049	0.963
Jan 2006–June 2006	0.116[d]	0.065	1.790
Jul 2006–Dec 2006	0.217[c]	0.151	1.437
Jan 2007–June 2007	0.178[e]	0.072	2.457
July 2007–Dec 2007	-0.067	0.062	-1.077

Sample without HbA_{1c} Levels Included in Matching[b]

	ATT	Standard Error	t-statistic
Time Period			
Oct 2005–Dec 2005	0.082[d]	0.043	1.925
Jan 2006–June 2006	0.225[e]	0.055	4.109
Jul 2006–Dec 2006	0.434[e]	0.122	3.554
Jan 2007–June 2007	0.171[e]	0.059	2.893
July 2007–Dec 2007	0.082[c]	0.05	1.631

Number of LDL-C Tests (With and Without HbA1c Level Covariate)[†]

	ATT	Standard Error	t-statistic
Time Period			
1 Oct 2005–31 Dec 2005	0.208[e]	0.035	5.888
1 Jan 2006–31 Dec 2006	-0.101	0.064	-1.593
1 Jan 2007–31 Dec 2007	-0.156[d]	0.068	-2.297

Sample without Hb_{A1c} Levels Included in Matching[b]

	ATT	Standard Error	t-statistic
Time Period			
1 Oct 2005–31 Dec 2005	0.234[e]	0.031	7.614
1 Jan 2006–31 Dec 2006	-0.02	0.047	-0.422
1 Jan 2007–31 Dec 2007	-0.041	0.054	-0.757

Abbreviation: ATT = Average effect of treatment on the treated
[a]with Hb_{A1c} as covariate, treated patients (n=364), matched comparison patients (n=300)
[b]without Hb_{A1c} as covariate, treated patients (n=464, matched comparison patients (437)
[c]Significant at 10% level
[d]significant at 5% level
[e] significant at 1% level

RESULTS

Number of HbA_{1c} Tests

The propensity score matching procedure calculated the average effect of treatment on the treated (ATT) for each outcome variable. As the top 2 panels of Table 2 show, the pilot program patients show statistically significant increases in Hb_{A1c} test-taking frequency over most of the time periods following the program's conclusion. The 2 different matching specifications show different results during the pilot program itself, with no significant difference when including HbA_{1c} levels in the matching procedure, and a small but significant increase when excluding HbA_{1c} levels from the matching procedure. In general, patients in the pilot program received more HbA_{1c} screenings after the pilot program than the matched comparison group received.

There is a suggestion of an immediate short-term response

Table 3: Distribution of Receipt of Test for Pilot Group and Potential Controls

	Pilot Group N = 464	Potential Comparison Group N = 2101
Average Number of Hb_{A1c} Tests, October 2005-December 2007	3.34	2.69
Average Number of LDL-C Tests, October 2005-December 2007	1.29	1.26
	% of Group Receiving Specified Number of Tests	
Number of Hb_{A1c} Tests, October 2005-December 2007		
0	14.87	23.51
1	11.85	13.52
2	11.85	16.14
3	15.09	12.90
4	14.87	11.85
5	12.07	8.14
6	9.05	6.47
7	4.96	4.05
8	4.09	1.90
9	0.86	1.05
10	0.43	0.33
11	0.00	0.10
12	0.00	0.00
13	0.00	0.00
14	0.00	0.05
	% of Group Receiving Specified Number of Tests	
Number of LDL-C Tests, October 2005-December 2007		
0	34.05	41.08
1	28.45	24.51
2	20.04	16.28
3	11.85	9.14
4	3.66	5.19
5	1.51	2.43
6	0.00	0.86
7	0.43	0.33
8	0.00	0.14
9	0.00	0.00
10	0.00	0.05

and then a gradual return to earlier patterns of test taking. This is not unexpected, because the patients received only a small, 1-time financial incentive. Nevertheless, there is clearly a significant increase in the frequency of screening for the first 2 years following the reminder and the incentive offer. Over the entire period, those in the pilot sample had 3.34 screenings on average, compared to 2.69 for the comparison group, an increase of roughly two-thirds (.65) of a visit on average. And as shown in Table 3, a smaller proportion of the group that was offered a gas card had 0 tests over the period of analysis (14.9% of the target group vs 23.5% of the comparison group).

Number of LDL-C Tests

For the number of LDL-C tests, there is a significant increase in the number of LDL-C screenings received during the pilot program period for the targeted group, as seen in the bottom 2 panels of Table 2. On average, each patient received 0.21 more tests during that period. However, this positive effect on the pilot program patients disappeared following the program; in fact, the pilot program patients may have received *fewer* LDL-C screenings than the comparison group in both 2006 and 2007. The evidence is mixed, but suggests no overall increase in these screenings. Over the entire period, the number of visits is nearly identical between the 2 groups: (1.29 for the target group vs 1.26 for the comparison group). However, as highlighted in Table 3, there is evidence that a small financial incentive reduced the numbers of patients who received 0 tests over the analysis period. For the LDL-C test, the proportions receiving no tests over the entire period are 34% for the target group vs 42% for the comparison group.

HbA_{1c} Levels

We report results separately for those who had an HbA_{1c} test in the pre-pilot period and those who did not (Table 2). In both cases, we report simple numbers of those patients with HbA_{1c} levels determined to be "in control" and those patients with HbA_{1c} levels determined to be "not in control." Although glycemic control can be defined at different levels, this study defines "in control" as having an HbA_{1c} level at or below 7%. Interestingly, the largest difference in percentage of patients with HbA_{1c} in control is among those who did not have a pre-pilot HbA_{1c} test. Among this group, nearly half (49%) of those who received a gas card had HbA_{1c} levels under control while 36% of the comparison groups have HbA_{1c} levels under control. However, the pattern among those with a prior test is puzzling. Among both groups, a smaller proportion had HbA_{1c} levels under control after the treatment than the proportions under control prior to treatment. However, the decrease in proportion under control is greater for the comparison group than for those who received a reminder letter and a gas card (8.7% increase among controls compared to 2.7% increase among the treated). Thus, both comparisons are suggestive of a positive influence of the gas card program in terms of an increase of diabetes patients with HbA_{1c} levels that are under control.

DISCUSSION AND CONCLUSIONS

From this quasi-experimental analysis, we see that the UW Health Gas Card Pilot Program had generally positive effects on the HbA_{1c} test-taking behavior of the targeted patients. During the 2 years following the pilot program, on average the target patient population received about two-thirds more screenings than the matched comparison group, and a smaller proportion

had no screening at all during the period. The improvement appears to persist for a relatively long time period, given the nature of the initiative.

The results of the LDL-C test-taking behavior analysis are harder to interpret. The pilot program had a limited effect during the pilot period itself, with each targeted patient receiving 0.21 more LDL-C screenings on average during those 3 months. However, during the following 2 years, the targeted patients were less likely than the comparison patients to receive an LDL-C screening. The reasons for this are unclear, although the requirements of the LDL-C test itself (involving a 12-hour fast prior to the test) and the low recommended frequency may influence the long-term impact of the pilot program on this screening. More encouraging is the finding that a considerably lower proportion of the population offered this financial incentive had no LDL-C screening over the period compared to the controls.

The evaluation also suggested that the pilot program had some success in increasing the proportion of participants with levels of HbA_{1c} levels that are "under control." However, the lack of recorded HbA_{1c} levels for many patients limits the analysis of this outcome.

This evaluation suggests that the UW Health Pilot Program was relatively successful in its stated goals of improving test-taking behavior among persons with diabetes. The program was more effective during the pilot period for LDL-C screening, but more effective over the subsequent years for HbA_{1c} screenings. For both screenings, the gas card program clearly reduced the number of patients who received no tests for diabetes during the 2 years following the program. Overall, this evaluation suggests that a relatively inexpensive financial incentive coupled with a reminder can increase compliance with test taking among diabetics and may well pass a cost-benefit test.

One important limitation facing this analysis is the bundled nature of the UW Health intervention. Given that this research was conducted on a program that provided a reminder letter *and* a financial incentive to patients, it is impossible to determine which component is responsible for the program effects. A program that provided a reminder letter and financial incentive to 1 group of patients and a reminder letter without a financial incentive to another group of patients would allow for a more complete analysis. However, because this study analyzed a pilot program that had already been designed and conducted, this analysis was not possible.

Finally, it is important to consider the potential perverse effects of regularly providing financial incentives for basic medical procedures. If patients come to expect a gas card for every procedure that they receive, from routine blood screening to routine appointments, will this reduce compliance? As UW Health and other health care professionals continue to innovate and move forward with similar initiatives, these issues should be considered in subsequent evaluations that more fully address the broader issues of incentives and compliance.

Acknowledgments: We would like to thank in particular Sally Kraft, MD, MPH, Maureen Smith, MD, MPH, PhD, Grace Flood, MD, staff at UW Health, and the Referees of this journal.

Funding Support: Mr Austin's work on this project was supported in part by the UW Institute for Clinical and Translational Research. Dr Wolfe's work is supported by Robert Wood Johnson Foundation Health Policy Scholars and the William T. Grant and Russell Sage Foundations.

REFERENCES

1. American Diabetes Association. American Diabetes Association's New Clinical Practice Recommendations Promote A1C as Diagnostic Test for Diabetes. http://www.diabetes.org/for-media/2009/cpr-2010-a1c-diagnostic-tool.html. Accessed April 30, 2011.

2. American Diabetes Association. Treating High Cholesterol in People with Diabetes—All About Diabetes. http://www.diabetes.org/type-1-diabetes/well-being/treating-cholesterol.jsp. Accessed April 30, 2011.

3. Rhee MK, Slocum W, Ziemer DC, et al. Patient adherence improves glycemic control. *Diabetes Educator.* 2005;31:240-250.

4. Cagliero E, Levina EV, Nathan DM. Immediate feedback of HbA1c levels improves glycemic control in type 1 and insulin-treated type 2 diabetic patients. *Diabetes Care.* 1999;22:1785-789.

5. Shojania K, McDonald K, Owens D. Evidence-based review methodology for the closing the quality gap series. In: Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies Volume 1—Series Overview and Methodology. Technical Review 9. Rockville, MD: Agency for Healthcare Research and Quality. August 2004 . Publication No. 04-0051-1. Contract No. 290-02-0017 to the Stanford University–UCSF Evidence-Based Practices Center.

6. Wisconsin Collaborative for Healthcare Quality. Diabetes: LDL cholesterol testing. http://www.wchq.org/reporting/results.php?category_id=0&topic_id=27&providerType=0&region=0&measure_id=75&sequence_id=2. Accessed April 30, 2011.

7. Wisconsin Collaborative for Healthcare Quality. Diabetes: blood sugar (A1c) testing. http://www.wchq.org/reporting/results.php?category_id=0&topic_id=27&providerType=0&region=0&measure_id=72&sequence_id=2. Accessed April 30, 2011.

8. Energy Information Administration. Midwest all grades all formulations retail gasoline prices (cents per gallon). http://www.eia.doe.gov/oog/ftparea/wogirs/xls/pswrgvwall.xls. Accessed April 30, 2011.

9. Hatahet MA, Bowhan J, Clough EA. Wisconsin Collaborative for Healthcare Quality (WCHQ): lessons learned. *WMJ.* 2004;103:45-48.

10. Rosenbaum P, Rubin D. The central role of the propensity score in observational studies for causal effects. *Biometrika.* 1983;70:41-55.

11. Becker S, Ichino A. Estimation of average treatment effects based on propensity scores. *Stata J.* 2002;2:358-377.

12. Elixhauser A, Steiner C, Harris DR, Coffey RM. Comorbidity measures for use with administrative data. *Medical Care.* 1998;36:8-27.

advancing the art & science of medicine in the midwest

WMJ

WMJ (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

Visit www.wmjonline.org to learn more.