Effects of population tracking and follow-up on patient lipid profile and diabetic HbA1c improvement

Molly M. King, BA and David A. Dorr, MD, MS

Department of Medical Informatics & Clinical Epidemiology, Oregon Health and Science University, Portland, OR

Research Objectives

Proactive tracking and follow-up of key quality measures, such as LDL – cholesterol level for coronary artery disease risk and HbA1c for diabetes maintenance, are endorsed widely, yet few studies have conclusively demonstrated the best timing for tracking. Two tracking activities – early laboratory tests and/or early encounters/contacts with patients – were explored to determine their efficacy in improving LDL and HbA1c standards adherence. Few studies have investigated the differences in effective strategies for different conditions and patient contexts.[1]

Study Design

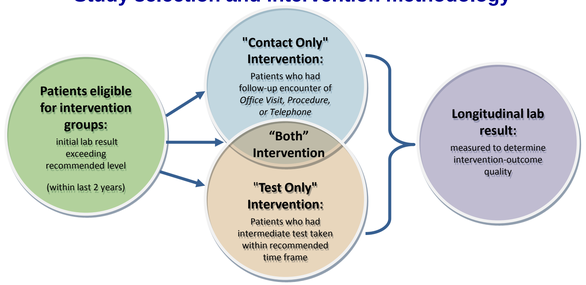
This retrospective study used electronic health record data to study interventions for patients with initial LDL or HbA1c laboratory measures exceeding the recommended values. Encounter and laboratory records from electronic chart data were used to extract quality outcome measures and intervention occurrence. Patients were divided into three intervention groups – "Contact only," those with an intermediate encounter; "Test only," patients who had an intermediate lab test but no encounter with a clinical staff member; and "Both," those with both an intermediate lab and encounter – and a reference group, those who received no intermediate intervention . All had outcome values measured.

Quality measures for study selection and outcomes

Measure*	Recommended value	Intervention time frame	Time span for outcome measure of improvement
Lipid Profile for patients without diabetes	LDL-C < 130 mg/mL	1 – 13 months	6-24 months
Lipid Profile for patients with diabetes	LDL-C < 100 mg/mL	1 – 13 months	6-24 months
A1c Management	HbA1c < 7.0%	3 – 6 months	3-18 months

*Measures derived from the AHRQ National Quality Measures Clearinghouse database (http://www.qualitymeasures.ahrq.gov/) and the AMA Physician Consortium for Performance Improvement (PCPI) measures (http://www.ama-assn.org/)

Study selection and intervention methodology



Principal Findings

Patients without diabetes: LDL

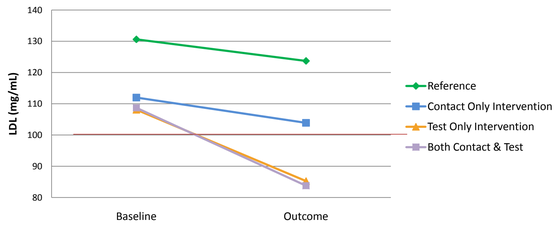
Patients who received an early test *and* contact trended towards being more likely to have a controlled outcome than those in the reference group (46.3% vs. 38.9% adherence), while those patients receiving only the contact intervention did not improve LDL results as much as the reference group.

Patients with diabetes: LDL

Patients receiving an intermediate lab test decreased 15.0 mg/mL more than the reference group, making them 21.9% more likely to achieve LDL control than those without any intervention. (44.4% vs. 22.5%). Patients with diabetes who received both the test and contact intervention decreased 18.0 mg/mL more than control (24.9 mg/L vs. 6.9 mg/mL), making them 20.7% more likely to achieve control.

Interestingly, these significant measure decreases are correlated with significantly earlier outcome test occurrences: 51 weeks for test intervention and 45 weeks for early test and contact, vs. 75 weeks for the no intervention group (p<.001). Patients with an intermediate contact but no lab showed no significant difference in improvement or time to outcome measurement compared with the reference group.

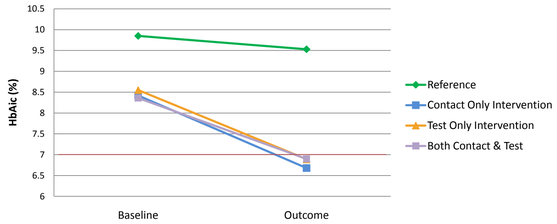
Patients with diabetes (goal LDL <100)



Patients with diabetes: HbA1c

Patients with diabetes who received any of the treatments showed significant improvement in HbA1c measures (decreases of 1.42% for contact, 1.34% for test, and 1.14% for both) compared to the reference group, despite having outcomes measured significantly sooner. Patients were also more likely to be adherent to the guideline at the outcome measurement after receiving an intermediate intervention.

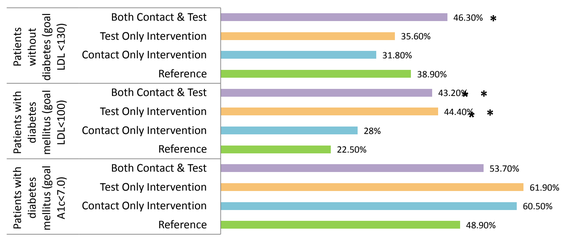
Patients with diabetes (goal HbA1c < 7.0%)



Reductions in LDL and HbA1c levels and guideline adherence rates for different intervention groups

		N with outcome measured	Outcome	Change	Adherence Rate, n (%)
Patients without diabetes (goal LDL <130)					
LDL	**Reference**	126	135.1	-20.4	38.9%
	Contact Only Intervention	110	142.5	-9.9*	31.8%
	Test Only Intervention	323	139.1	-15.9	35.6%
	Both Contact & Test	242	136.4	-25.9	46.3%
Patients with diabetes mellitus (goal LDL<100)					
LDL	**Reference**	40	130.6	-6.9	22.5%
	Contact Only Intervention	250	112*	-8.1	28%
	Test Only Intervention	171	108.1*	-22.8*	44.4% *
	Both Contact & Test	88	108.7*	-24.9*	43.2% *
Patients with diabetes mellitus (goal A1c<7.0)					
A1c	**Reference**	31	9.85	-0.32	48.9%
	Contact Only Intervention	25	8.42	-1.74*	60.5%
	Test Only Intervention	21	8.55	-1.66*	61.9%
	Both Contact & Test	54	8.36	-1.46*	53.7%

Adherence Rate (%)



Conclusions

An intermediate contact alone showed no significant improvement in LDL outcome or difference in time to measurement in either patients with or without diabetes. Rather, the critical effect of a follow-up LDL laboratory test suggests that engaging diabetic patients with more frequent and earlier LDL lab tests may have a substantial positive effect on patient outcomes, even if those lab tests do not include a direct clinical contact.

In contrast, patients with diabetes who received *any* of the three interventions fared much better on the longitudinal HbA1c outcome measures. Those patients who had a contact improved the most on average lab results, although they were significantly less likely to have an outcome measured than those in the intermediate test group. Patients who received an intermediate test also exhibited the greatest average adherence rates.

Implications for Policy, Delivery & Practice

While the current U.S. health care system usually incents frequent visits, encouraging repeat LDL measurement in an at-risk population may be more important. Improvement on HbA1c outcomes, in contrast, may be achieved through a variety of intermediate interventions. Measuring the effects of intermediate interventions, rather than just taking population snapshots of quality measures at predefined time points, is critical for developing the most efficacious quality improvement programs. More condition- and measure-specific studies and protocols are needed to aid maximal improvement of clinical outcomes. These results also speak to the great value of care management activities for improving patient outcomes.[2]

Contact

Molly M. King, kingmo@ohsu.edu
David A. Dorr, dorrd@ohsu.edu
www.caremanagementplus.org

OHSU Dept. of Medical Informatics
Mailcode Bicc 504
3181 SW Sam Jackson Park Road
Portland OR 97202

Acknowledgements

Funding for this project was generously provided by the John A. Hartford Foundation, the Agency for Healthcare Research and Quality, and a National Library of Medicine summer fellowship grant. We thank the CMP research team for their input and support.

References

1. Shojania, K.G., Grimshaw, J.M. 2005. "Evidence-Based Quality Improvement: The State Of The Science." *Health Affairs* 24(1): 138-150.
2. Dorr, D.A., Wilcox, A., Donnelly, S.M., Burns, L., Clayton, P.D. 2005. "Impact of Generalist Care Managers on Patients with Diabetes." *Health Services Research* 40(5, Part 1):1400-21.