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Transitioning Patients with Diabetes Out of Emergency Departments: A Path Towards Better Outcomes and Lower Costs?

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There are at least 29.1 million people with diabetes and <6,000 board-certified endocrinologists in the United States (1,2). Given these numbers, it is not surprising that many patients turn to Emergency Departments (EDs) for diabetes care that often could take place in an outpatient setting (3). Innovative ways to triage patients for access to outpatient care are needed.

Few have attempted to address this problem. A multi-center, randomized controlled trial (RCT) found that an intensive program of primary care outpatient follow-up after hospital discharge surprisingly increased re-admissions among veterans with chronic conditions, including diabetes (4). Among patients with uncontrolled type 2 diabetes being discharged from an ED, a single-center RCT providing diabetes medication management and self-management education improved glycemic control and medication adherence at 4 weeks (5). This program had the advantage of delivering the intervention to all participants but the disadvantage of being limited by the availability of in-person diabetes education (6). Thus, a less resource-intensive intervention that leverages existing infrastructure is appealing.

In the current issue of *Endocrine Practice*, Palermo and colleagues (6) present a single-center study of an Emergency Department Diabetes Rapid-referral Program (EDRP) that provided ED staff the ability to directly schedule patients a specialized visit at the diabetes center within 24 hours. Eligible patients were those who presented to the ED with uncontrolled diabetes, no evidence for hyper-glycemic crisis, and no other condition requiring hospitalization. In the ED, these patients received usual acute management for their hyper- or hypoglycemia and were discharged with a scheduled diabetes center visit. These follow-up visits included individualized diabetes medical management and education delivered either by a nurse practitioner or an attending physician and a diabetes educator. For subsequent follow-up, patients were sent to their primary care providers, who were given an option to refer the patients back to the diabetes clinic for ongoing collaborative care. Patients who were started on insulin therapy during the diabetes clinic visit were seen again 1 week later and then were sent to their primary care providers.

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EDRP patients were compared to a historical control group who may have been eligible for the EDRP based on a blood glucose between 200 and 600 mg/dL and not requiring hospital admission. There were 420 patients referred to the EDRP and 791 historical controls. EDRP patients were less likely than control patients to be hospitalized (27.1% vs. 41.5%; $P<.001$) or return to the ED (52.5% vs. 62.3%; $P=.001$) during the subsequent year. Total hospitalizations during this period were also lower among EDRP patients compared with controls, as were mean healthcare costs for the institution by \$5,461 per patient. In addition, EDRP patients had a greater glycated hemoglobin (HbA1c) reduction than control patients at 1 year (−2.66% vs. −2.01%; $P<.001$). Not surprisingly, the glycemic benefit was more pronounced among patients who arrived at the EDRP visit than among those who did not show up for the visit (−2.71% vs. −1.37%; $P<.05$).

One is struck by the 1-year duration of the effects of this apparently short-term intervention. It would be illuminating to know how many of the EDRP patients were referred by their primary care providers back to the diabetes clinic for ongoing care and if these patients were more likely to benefit over time than those who did not receive ongoing diabetes specialty care. Regardless of the answer, Palermo and colleagues have provided evidence for a tremendously important concept, that diabetes specialty-level care, even on a short-term basis, improves outcomes for patients who utilize EDs for uncontrolled diabetes. Furthermore, they may have found a recipe for the holy grail of healthcare reform: better outcomes achieved with lower costs.

Of course, enthusiasm for this ED rapid referral program to a diabetes clinic must be tempered by the substantial limitations of the study. The authors acknowledge that they performed a single-center study using historical controls. Historical controls are imperfect but better than no control group at all; in this case, one could speculate that the historical controls may have been less ill than EDRP patients because patients who might have been hospitalized were instead enrolled in the EDRP, while historical controls were admitted or discharged in the absence of the EDRP option. However, historical controls and EDRP patients were not significantly different in terms of age, sex, race/ethnicity, baseline HbA1c, creatinine, and comorbidity burden. As well-balanced as the EDRP and control groups appear to be with the exception of health insurance type, there are likely to be many other unmeasured potential confounders for the association with subsequent hospitalization, including employment status, distance from home to the hospital, admission hematocrit, the burden of diabetes-related complications, and use of insulin (7). Clearly, stronger evidence about the effect of the EDRP would be obtained from a RCT.

The authors also acknowledge that the EDRP required certain infrastructure, including a critical mass of clinicians and diabetes educators in the same clinic location with the capacity to see these patients. Before widespread adoption is pursued, it will be important for other centers to replicate the EDRP and establish that the program is effective in different institutions and populations. One technical concern is that no adjustment for multiple comparisons is reported. This is probably not relevant for the primary outcome of hospitalization rate or HbA1c change given the robustness of the differences; however, adjusting for multiple comparisons would attenuate if not obliterate the statistically significant differences found within the subgroups analyses between arrived and no-show

EDRP patients. Lastly, the follow-up rate and proportion of missing data over the 1-year study period is not reported.

Limitations notwithstanding, Palermo and colleagues have made an important contribution. With ever-rising healthcare costs in the United States (8), such innovative, cost-effective programs are welcome. In the setting of fee-for-service payment structures, appetite for a program that reduces hospital utilization may be limited because less utilization translates into less revenue. However, in a value-based payment system, to which Medicare is transitioning over the next few years (9), such programs become cost savers for the healthcare institution and hence revenue generators (10).

Management of patients with diabetes in acute care settings is ripe for innovation to reduce utilization and costs while improving outcomes. A key aspect of the EDRP is that it selects patients in an ED, who are at higher risk for subsequent acute-care use than outpatients. Targeting high-risk patients will maximize potential benefit and thus is a key ingredient for cost effectiveness of interventions for reducing acute-care utilization, especially given the high prevalence of diabetes patients in EDs and hospitals (3,11). Explicitly targeting high-risk hospitalized patients for intervention by using a tool that predicts hospital re-admission risk, such as the recently developed and validated Diabetes Early Readmission Risk Indicator (DERRI) (12), may also lead to better outcomes and lower healthcare costs. Telemedicine is another approach that may help optimize care delivery to diabetes populations (13).

In conclusion, providing patients with diabetes being discharged from an ED with rapid diabetology follow-up probably reduces subsequent hospital utilization and improves glycemic control over 1 year. This concept deserves further study in RCTs at different institutions to confirm efficacy and replicability. Interventions that target high-risk patients, such as by recruiting in EDs or using predictive models, are more likely to be successful than interventions delivered to broader populations.

References

1. Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: U.S. Department of Health and Human Services; 2014.
2. Vigersky RA, Fish L, Hogan P, et al. The Clinical Endocrinology Workforce: current status and future projections of supply and demand. *J Clin Endocrinol Metab.* 2014; 99:3112–3121. [PubMed: 24940655]
3. Washington, RE.; Andrews, RM.; Mutter, R. Healthcare Cost and Utilization Project (HCUP) Statistical Briefs. Rockville, MD: 2006. Emergency department visits for adults with diabetes, 2010: statistical brief 167.
4. Weinberger M, Oddone EZ, Henderson WG. Does increased access to primary care reduce hospital read-missions? Veterans Affairs Cooperative Study Group on Primary Care and Hospital Readmission. *N Engl J Med.* 1996; 334:1441–1447. [PubMed: 8618584]
5. Magee MF, Nassar CM, Mete M, White K, Youssef GA, Dubin JS. The Synergy to Enable Glycemic Control Following Emergency Department Discharge Program for adults with type 2 diabetes: step-diabetes. *Endocr Pract.* 2015; 21:1227–1239. [PubMed: 26214111]

6. Palermo N, Modzeluski KL, Farwell AP, et al. Open access to diabetes center from the emergency department reduces hospitalizations in the subsequent year. *Endocr Pract.* 2016; 22:1161–1169. [PubMed: 27732094]
7. Rubin DJ. Hospital readmission of patients with diabetes. *Curr Diab Rep.* 2015; 15:17. [PubMed: 25712258]
8. The Henry J. Kaiser Family Foundation. [Accessed Februar 18, 2016] The facts on medicare spending and financing. 2015. Available at: <http://kff.org/medicare/fact-sheet/medicare-spending-and-financing-fact-sheet/>
9. Centers for Medicare and Medicaid Services. [Accessed June 30, 2016] Fact sheet for the 2016 Value-Based Payment Modifier. Available at: [https://www.cms.gov/medicare/medicare-fee-for-service-payment/physicianfeedbackprogram/valuebasedpayment-modifier.html#What%20is%20the%20Value-Based%20Payment%20Modifier%20\(Value%20Modifier](https://www.cms.gov/medicare/medicare-fee-for-service-payment/physicianfeedbackprogram/valuebasedpayment-modifier.html#What%20is%20the%20Value-Based%20Payment%20Modifier%20(Value%20Modifier)
10. Rushakoff, R. Remote monitoring of and support for inpatient diabetes management through the inpatient EMR (3-CT-SY19). Presented at: American Diabetes Association 76th Scientific Sessions; June 10-14, 2016; New Orleans, LA.
11. Agency for Healthcare Research and Quality (AHRQ). [Accessed February 1, 2016] HCUP Nationwide Inpatient Sample (NIS). 2013. Available at: <http://hcupnet.ahrq.gov/HCUPnet.jsp>
12. Rubin DJ, Handorf EA, Golden SH, Nelson DB, McDonnell ME, Zhao H. Development and validation of a novel tool to predict hospital readmission risk among patients with diabetes. *Endocr Pract.* 2016; 22:1161–1169. [PubMed: 27732094]
13. Klonoff DC. Telemedicine for diabetes: economic considerations. *J Diabetes Sci Technol.* 2016; 10:251–253. [PubMed: 26856626]