Improved Patient Outcomes in 3 Years with a System of Care for Diabetes

Frederick J. Bloom, Jr., MD, Thomas R. Graf, MD, and Glenn D. Steele, Jr., MD, Geisinger Health System

October 2012

Diabetes mellitus (DM) and associated complications are increasing in the United States, with prevalence up 40 percent from 2002 to 2010. Randomized controlled studies have shown reductions in the increased cardiovascular disease risk associated with diabetes when glucose, cholesterol, and blood pressure are better controlled and there are standards of care for improving patient outcomes, including recommendations for medical care from physician-coordinated teams.

In spite of this evidence, provision of state-of-the-art care is rare, and it is unclear how quickly patient-level impact is achieved. To confront this discrepancy, Geisinger Health System designed a team-based system of care to consistently provide evidence-based diabetes care. This system used an all-or-none bundle of diabetes measures and electronic health record (EHR) tools to improve the consistency with which patients receive all elements of care. These measures resulted in reduced risk of retinopathy, stroke, and myocardial infarction (MI) within 3 years.

Geisinger Health System is an integrated health system with 38 Community Practice Service Line (CPSL) sites in central and northeast Pennsylvania. The DM bundled system of care was instituted in CPSL in 2005 after a multispecialty, multidisciplinary group redesigned care for patients with diabetes based on evidence-based guidelines. The workgroup defined nine measures that comprised an all-or-none diabetes bundle (Table 1). Workflows were developed that were measurable, scalable, reliable, and not dependent on the diligence of individuals. The system includes team-based care with delegated accountable responsibilities, EHR decision support, auto-generated patient report cards, and auto-updating of patient registry. The individual metrics and all-or-none bundle results for each office-based team and for each individual provider are reported monthly and shared transparently. Physician and team quality and innovation incentives are based on all-or-none care performance and are up to 20 percent of total cash compensation.

Analysis of claims data from our propensity-matched observational design shows a statistically significant lower risk of macrovascular and microvascular disease endpoints in the first 3 years in the new system compared to primary care outside the system. This impact is substantial. Only 82 treated patients are needed to prevent 1 MI, 178 to prevent 1 stroke, and 151 to prevent 1
case of retinopathy. Perhaps the most notable finding is the apparent early impact of system implementation. The findings suggest that this occurs within the first 3 years, with the possibility that a reduction in risk begins to emerge after the first year. This finding is consistent with prior randomized controlled trials indicating that reduction in risk of cardiovascular outcomes can be achieved. However, the early impact of a diabetes system of care has important clinical implications.

If reproducible, these implications for patients, providers, and payers are substantial. Patients will know that the difficult changes required to manage chronic disease will improve their health in ways they can appreciate. Payers and health systems can innovate and invest together to build similar systems of care, knowing that the benefit for their patients with diabetes will be prompt. The ability to control the total cost of care by improving the quality of care and health of patients is key. The promising success of this new system hinged on creating a culture of team-based care, judicious use of EHR tools, having accurate clinical information, and aligning team incentives.

Frederick J. Bloom is the Assistant Chief Quality Officer for the Geisinger Health System. Thomas R. Graf is Chairman of the Community Practice Service line for Geisinger. Glenn D. Steele, Jr. is President and Chief Executive Officer of Geisinger.

References

### Table 1

<table>
<thead>
<tr>
<th>Bundle Element</th>
<th>Quality Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>HgbA1c measurement</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>HgbA1c control—patient-specific goal</td>
<td>&lt;7 or 7-8%</td>
</tr>
<tr>
<td>LDL measurement</td>
<td>Annually</td>
</tr>
<tr>
<td>LDL control—patient-specific goal</td>
<td>&lt;70 or &lt;100 mg/dl</td>
</tr>
<tr>
<td>Blood pressure measurement</td>
<td>&lt;140 SBP, &lt;80 DBP</td>
</tr>
<tr>
<td>Urine protein testing</td>
<td>Annually</td>
</tr>
<tr>
<td>Influenza immunization</td>
<td>Annually</td>
</tr>
<tr>
<td>Pneumococcal immunization</td>
<td>Once before 65, once after 65</td>
</tr>
<tr>
<td>Smoking status assessment</td>
<td>Nonsmoker</td>
</tr>
</tbody>
</table>

*Table 1* Diabetes Bundle Protocol Implemented in the Diabetes Bundle Sites on January 1, 2006, Geisinger Health System Diabetes Bundle Care Model
Note: Authored commentaries in this IOM Series draw on the experience and expertise of field leaders to highlight health and health care innovations they feel have the potential, if engaged at scale, to foster transformative progress toward the continuously improving and learning health system envisioned by the IOM. Statements are personal, and are not those of the IOM or the National Academies.

In this commentary, Frederick Bloom, Thomas Graf, and Glenn Steele describe Geisinger Health System’s experience in developing a bundled system of care for diabetes. Their discussion touches on several issues and lessons central to the delivery of care that is effective, efficient, and continuously improving, including the importance of:

- Incorporating well-defined, reliable, systems-based workflows into routine care provision to ensure consistent delivery;
- Defining clear, accountable responsibilities for each team member;
- Implementing foundational digital health tools to facilitate decision support, tracking of adherence to the system of care, and real-time updates to patient records; and
- Aligning team incentives so that each member is vested in improving the quality of care and health of patients, thereby controlling the total cost of care.

Information on the IOM’s Learning Health System work may be found at www.iom.edu/learninghealthsystem.