Bridging the gap among payer, provider, and patient perspectives

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Evidence-Based Diabetes Management

SPECIAL ISSUE: ALL ABOUT MEASUREMENT

Mayo Clinic

When Quality Fails Patients: *Finding the Best in Diabetes Care*

IAN HARGRAVES, PHD; RENE RODRIGUEZ-GUTIERREZ, MD; AND VICTOR M. MONTORI, MD, MSC

Recently, while visiting a primary care clinic, one of the authors saw a sign posted on an exam room wall encouraging patients with diabetes to have their cholesterol measured. Amidst the noise of notices to be found in clinical spaces this seemed innocuous enough. The sign went on to explain that patients were encouraged to measure their low-density lipoprotein cholesterol (LDL-C) levels, so that the clinic could meet its quality target of 100% of diabetes patients with measured cholesterol levels. We also recently heard the story of a woman who underwent mammography, only because she did not want to affect her clinician's screening numbers. In both cases, the rationale for therapy was cast in terms of meeting target quality measures, rather than in terms of doing what is best for the patient. In the care of patients with diabetes, a common marker of quality has been the achievement of tight glycemic control (eg glycated hemoglobin (A1C) - below 7%).[1,2] Failure to respond to higher A1C levels with treatment intensification has been called "clinical inertia," and patients who do not achieve this target are often seen as "noncompliant" or difficult.[3] The focus on A1C is so pervasive, that a survey of patients, with diabetes, identified lowering A1C as a more important justification to try a new diabetes drug than avoiding amputations, blindness, or kidney damage.[4] The only outcome surveyed patients ranked higher than A1C was avoiding death. How is it that lowering A1C, as a goal, can be second only to avoiding death?

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National Quality Forum

Getting to Better Care and Outcomes for Diabetes Through Measurement

HELEN BURSTIN, MD, MPH, AND KAREN JOHNSON, MS

Diabetes is the 7th leading cause of death in the United States and afflicts more than 29 million Americans, often causing major complications, such as heart disease, retinopathy, and chronic kidney disease.[1] Existing quality measures have provided an important foundation to help improve diabetes care. Specifically, healthcare performance measures are important tools used to quantify the quality, cost, and efficiency of care provided to patients. Healthcare providers use measurement results to gauge the quality of care that is being provided, determine where improvement efforts are most needed, and monitor whether or not improvement activities are having the desired effects. The primary goal of healthcare performance measurement is to improve the quality of healthcare received by patients and their families, and ultimately, to improve health.

To help drive broader health improvements for people living with diabetes or prediabetes, the healthcare community needs to address the lack of measures in numerous important areas, such as measures to better assess patients' health outcomes, measures targeted to those with metabolic syndrome, and measures that use various types of clinical and patient-reported information.

NQF MEASURE ENDORSEMENT

The mission of the National Quality Forum (NQF), a nonprofit, nonpartisan, membership-based organization, is to

(continued on SP145)

Joslin Diabetes Center

Measuring the Quality of Diabetes Care

JOANNA MITRI, MD, MS, AND ROBERT A. GABBAY, MD, PHD, FACP

INTRODUCTION

The prevalence of diabetes continues to rise worldwide, placing an increasing burden on healthcare systems, payers, and providers. Despite a national decline in glycated hemoglobin (A1C), 33% to 49% of patients still do not meet targets for glycaemia, blood pressure (BP), or low-density lipoprotein (LDL) cholesterol control, and only 14% meet targets for all 3 measures and nonsmoking status[1].

The huge gap between ideal and actual diabetes care is not surprising. Diabetes management is complex. Our healthcare system is more acute care–oriented and not well equipped to meet the needs of chronic disease management, which requires a focus on self-management support, patient engagement, team-based care, and population management.

Diabetes management should also extend beyond glycemic control. Optimal diabetes management requires not only control of blood glucose levels; BP and cholesterol control are also critical to prevent cardiovascular disease—the leading cause of mortality for those with diabetes. In addition, screening for early complications through annual eye and foot exams, and lifestyle modifications, such as physical activity, dietary modification, and smoking cessation require extensive counseling and coordination. Without appropriate tracking, these items are likely to be missed.

The driving force for any quality measurement program is to improve medical care to produce better health outcomes. Among chronic diseases,

(continued on SP147)

THE NEW TOBACCO? An interview with nutrition advocate Marion Nestle, PhD, MPH, on her book *Soda Politics*, which traces how Coca-Cola and PepsiCo came to occupy their places in our culture and our refrigerators. With CDC data on soda consumption, diabetes, and obesity.

Also In This Issue...

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ACO Emerging Healthcare Delivery Coalition

ACO Spring 2016

As accountable care organizations and other emerging delivery and payment models move healthcare away from traditional fee-for-service toward cost-effective and value-based care, the need to understand how these models will evolve is critical to building long-term strategic solutions.

The mission of *The American Journal of Managed Care's* ACO & Emerging Healthcare Delivery Coalition is to bring together a diverse group of key stakeholders, including ACO providers and leaders, payers, IDNs, retail and specialty pharmacy, academia, national quality organizations, patient advocacy groups, employers, and pharmaceutical manufacturers to work collaboratively to build value and improve the quality and overall outcomes of patient care.

Coalition members share ideas and best practices through 2 live meetings and 4 Web-based interactive sessions each year. Distinguishing features are the Coalition's access to leading experts and its small workshops that allow creative problem solving. To learn more and to sign up as a member, visit **www.ajmc.com/acocoalition.**

Our next live meeting is April 28-29, 2016, at the JW Marriott Camelback Inn in Scottsdale, Arizona.
To register, visit **www.ajmc.com/acocoalition/spring16.**

"We have some great speakers lined up for the spring meeting. But even more important are the conversations that occur after the speakers. How are we facilitating dialogue that continues to advance our thinking, so when we go back to work on Monday we can actually implement what we learned."
Anthony D. Slonim, MD, DrPH, CPE, FACPE, president and CEO, Renown Health; ACO & Emerging Healthcare Delivery Coalition Chair

Please contact us at ***ACO_Coalition@ajmc.com*** with any questions or for additional information. We look forward to hearing from you soon.

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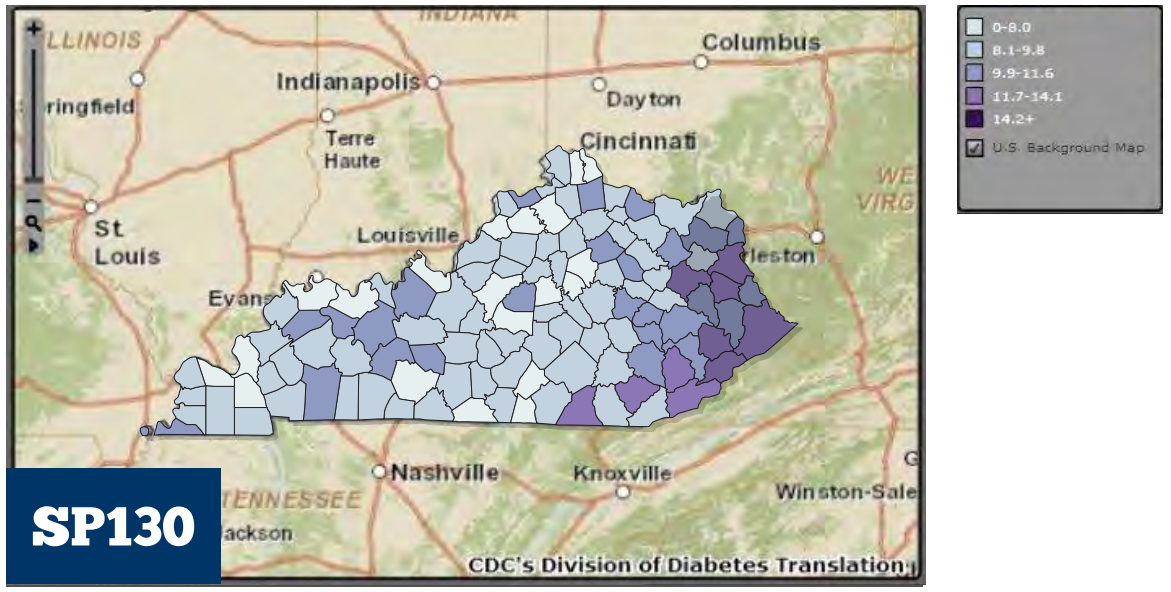
Trends in Diabetes and Risk Factors, 2004 to 2012*
Diabetes Incidence Among Adults | Age-Adjusted per 1000 | 2012*



Source: CDC

The Next Wave of Diabetes Measurement


MIKE HENNESSY, SR

With this issue of *Evidence-Based Diabetes Management*, we show what *The American Journal of Managed Care* does best: bring together the views of stakeholders from across the healthcare spectrum on a matter of importance to our primary audience, payers, and also to leading providers, regulators, policy leaders, and advocacy groups for patients. Increasingly, measurement and reimbursement go hand-in-hand, and nowhere is that more true than in diabetes care. As this issue of *EBDM* goes to press, HHS Secretary Sylvia Burwell has announced that CMS is meeting its 2016 target that 30% of Medicare payments will be tied to alternate payment models rewarding quality. Our own editor in chief, Dr Robert A. Gabbay of Joslin Diabetes Center, has been a pioneer in connecting payment with quality performance, in a multi-payer patient-centered medical home model. But with years of experience in diabetes measurement behind us, the tools of measurement are being refined to better reflect the individual needs and differences in the population—that one size doesn't fit all. This issue covers both the lessons learned in the first wave of measurement in diabetes care, and the new frontiers such as use of biomarkers to prevent cardiovascular events. A case study from Aetna's subsidiary, Coventry Healthcare, reveals how measurement can be a cornerstone of good case management and produce tangible results, even in the most challenging populations. There's always room for innovation, as we learn from Dr Gabbay and co-author Dr Joanna Mitri, who outline the parameters and rational for the Joslin Clinical Analytic Tool. Dr Gabbay will be the chair and Dr Mitri will be presenting at our upcoming conference, Patient-Centered Diabetes Care, set for April 7-8, 2016, in Teaneck, New Jersey. If you have not registered, I encourage you to visit **http://www.ajmc.com/meetings/pcdc16**, for information. Please join us, and thank you for reading.

> **"This issue covers both the lessons learned in the first wave of measurement in diabetes care, and the new frontiers, such as use of biomarkers to prevent cardiovascular events."**

Sincerely,

Mike Hennessy, Sr
CHAIRMAN AND CEO

EDITORIAL MISSION

To present policy makers, payers, and providers with the clinical, pharmacoeconomic, and regulatory information they need to improve efficiency and outcomes in diabetes.

Evidence-Based Diabetes Management

EDITORIAL BOARD

Understanding Matters of Measurement in Diabetes Care

ROBERT A. GABBAY, MD, PHD, FACP

This issue addresses an area of increased importance in diabetes care: measurement. It helps us understand the progress of an individual patient and the performance of a practice, and is the first step towards improving quality. Big data can serve as an early warning system that a new therapy poses a risk, or that there is a weakness in a care delivery system.

I have said often that the movement toward rewarding value began in diabetes care, and our field remains at the forefront of the revolution that is happening today in healthcare. Those of us who have spent years in diabetes care are already seeking ways to improve on the early steps. At Joslin Diabetes Center, we have done this with the Joslin Clinical Analytic Tool, (JCAT), which my colleague Joanna Mitri, MD, MS, and I discuss in this issue.

The logic of JCAT is simple: measurement matters, not just for payment, but especially for driving better care. Actionable data empowers provider teams to improve their outcomes, ultimately, for the benefit of patients. Ultimately, we need tools that address the uniqueness that each patient presents and aligns with individual goal setting.

As Ian Hargraves, PhD, and his co-authors from the Mayo Clinic address in their commentary, our quest for hitting quality targets must never be at the expense of the patient in front of us; fortunately, both guidelines and measures are moving in a direction that takes this into account.

The National Quality Forum (NQF) understands the need to continually refine diabetes measures; as Chief Scientific Officer Helen Burstin, MD, MPH, and Senior Director Karen Johnson, MS, discuss in their article, the firm foundation that NQF has created is forming the basis for the "next generation" of measures that will be driven by patients and the trend toward greater self-management. A combined focus on process measures, intermediate clinical outcome measures and population-level health outcomes can significantly improve care, particularly as payment models reward quality and value.

This issue of *Evidence-Based Diabetes Management* also features perspectives on the role of the pharmacist in driving better clinical outcomes, a case study from a payer that produced improved measures in a hard-to-treat diabetes population in Kentucky, and a discussion of the potential role of biomarkers to guide treatment.

Bringing stakeholders in diabetes care together is the mission of both *EBDM* and *The American Journal of Managed Care*. We do this both in our print publication and at our live meeting, Patient-Centered Diabetes Care, which will convene next month, April 7-8, 2016, in Teaneck, New Jersey. Dr Mitri and several other outstanding faculty from Joslin will join me in presenting the program, which for the first time will feature special sessions on obesity. Please visit **http://www.ajmc.com/meetings/pcdc16** to register, and I hope to see you. **EBDM**

ABOUT THE EDITOR IN CHIEF

Joslin Diabetes Center

ROBERT A. GABBAY, MD, PHD, FACP

Dr Gabbay is chief medical officer and senior vice president of Joslin Diabetes Center. He serves as editor in chief of *Evidence-Based Diabetes Management*.

The Role of the Clinical Pharmacist in Achieving Clinical and Quality Outcomes in Diabetes Management

JOSEPH MANGANELLI, PHARMD, MPA

ABOUT THE AUTHOR

JOSEPH MANGANELLI, PHARMD, MPA

Dr Manganelli is senior director, Network Care Management, Pharmacy Program, Montefiore Care Management Organization.

When clinical pharmacists are part of the interdisciplinary team that manages chronic conditions, such as diabetes, their interventions contribute to positive patient outcomes. As the trend toward value-based contracting with both private and government healthcare payers accelerates, clinical pharmacists can play a vital role in achieving cost and quality benchmarks.

At Montefiore Health System, which has such arrangements covering more than 350,000 lives, including over 50,000 in a Pioneer Model accountable care organization (ACO), clinical pharmacists at the Care Management Organizaton (CMO), Montefiore Care Management, are integral participants in the interdisciplinary care teams that provide healthcare and care coordination services.

All of the CMO's pharmacists are licensed doctors of pharmacy; most have completed postgraduate residencies, and several have additional credentialing in ambulatory care or other specialties. As part of orientation and training, each must complete a course in motivational interviewing.

Diabetes is a condition that affects approximately 29.1 million individuals in the United States[1] and is prevalent in the population served by Montefiore Care Management. The organization has dedicated resources, including robust case management programs for beneficiaries with type 2 diabetes (T2D), as well as chronic conditions, such as heart failure and respiratory conditions.

The clinical pharmacists have various roles in diabetes management. Some are centrally based and interact with patients telephonically and with providers via the electronic health record (EHR). Other pharmacists are embedded in community-based primary care sites, where they meet face-to-face with patients by appointment or by physician referral. The pharmacists who practice at the primary care sites are trained as Certified Diabetic Educators.

Medication therapy management (MTM) ensures that Part D-covered drugs are used to optimize therapeutic outcomes through improved medication use. MTM programs are developed in cooperation with licensed and practicing pharmacists and physicians, and are intended to reduce the risk of adverse events.[2] Diabetes remains among the top targeted diseases for MTM initiatives.

When reviewing pharmacotherapy, a form of MTM is performed by all pharmacists regardless of practice location. Montefiore Care Management pharmacists provide cognitive services and are referred to patients by providers throughout the integrated delivery network. After a review of lab results and prescription and nonprescription therapies, the pharmacist offers recommendations intended to optimize medication treatment for diabetes and other conditions.

Providers are encouraged to document the reason when they refer cases for pharmacist review. In general, the reasons for referral include at least one of the following:

- **Transitions of Care.** When a patient transitions across care settings such as from hospital to home, discrepancies in medications prescribed or taken may occur. In these cases, the pharmacist must access several databases to reconcile medication lists from the prehospital admission, the hospital stay, and the postdischarge setting.
- **Polypharmacy.** Frequently, patients presenting with diabetes are taking several medications to treat the condition, as well as medications that treat comorbid conditions. Patients who are struggling with complex medication regimens are contacted by a pharmacist to discuss strategies that address adherence. Some of our recommendations include keeping medication lists and using pillboxes or blister-packaging prescription drugs. If a combination agent is available that would decrease daily pill burden, this agent will be recommended.
- **Financial Issues**. Montefiore serves an area where poverty affects a large portion of the population. Patients who take multiple medications for diabetes and other conditions often have challenges with medication costs and co-payments. ACO pharmacists are often called upon to connect these patients with resources, such as pharmaceutical manufacturer programs, to help cover the costs of therapy.
- **Patient Education.** Educated patients are empowered to self-manage their medications and their health conditions. The Montefiore Care Management pharmacists provide telephonic and face-to-face education to make sure patients understand their medications' indications and proper utilization. During the education process, pharmacists use "teach-back" methods to ensure that patients are using their medications and devices correctly. Motivational interviewing strategies are employed during these interactions.

When a patient transitions across care settings such as from a hospital to a home, discrepancies in medications taken or prescribed may occur.

The next level of pharmacist intervention involves joint ventures with providers, known as collaborative drug therapy management (CDTM). A CDTM arrangement allows pharmacists to initiate, adjust, and monitor pharmacotherapy. The pharmacists must have specialized training in the condition being managed and patients must consent to this co-management. Upon successful completion of the credentialing process, the pharmacists are granted limited prescribing privileges in the EHR of the integrated delivery system. There is always physician oversight, and a defined escalation protocol is written into the collaborative agreement. CDTM agreements are currently in place for the co-management of anticoagulation, heart failure, and respiratory conditions. A CDTM is being developed for the co-management of T2D and is expected to be implemented in early 2016.

Organizations that participate in ACOs and other value-based contracts are responsible for meeting quality and financial benchmarks to earn shared savings. Pharmacist intervention can positively impact several of these measures. For example, in the domain of "care coordination/patient safety," medication reconciliation after discharge is a service Montefiore Care Management pharmacists are performing. Talks with patients about preventive health, such as influenza immunization and pneumococcal vaccination, have been woven into the pharmacist's script. Vaccination status is then documented in the EMR.

While conducting comprehensive medication reviews, the pharmacist also has a key role in meeting the measures that address "at-risk populations-diabetes," such as control of glycated hemoglobin (A1C), low-density lipoprotein (LDL) cholesterol, and blood pressure. Pharmacists also inquire

about tobacco use, and connect patients who are still smoking with tobacco- cessation programs.

Another important component of the comprehensive medication review is making sure that all therapy recommendations are aligned with the patient's formulary. Some medications or pen devices may not be on a preferred drug list. There are also many coverage edits associated with diabetes treatments, such as quantity limitations and prior authorizations. Coverage of diabetic supplies may default to a medical benefit versus a pharmacy benefit. The coverage process may be confusing and frustrating for both providers and patients. If this results in nonadherence, poor outcomes can be expected. Having a pharmacist who is a member of the interdisciplinary care team intervene and resolve these problems has reduced barriers to diabetic medications and supplies, and has had a positive effect on outcomes.

As the drug experts, pharmacists also conduct or arrange periodic continuing staff education for case managers, as well as medical and pharmacy residents in the ACO's integrated delivery network. There have been several new treatments and devices approved for diabetes. It is important to keep all members of a patient's interdisciplinary care team informed and up-to-date.

In conclusion, when an interdisciplinary team that includes clinical pharmacists is charged with managing diabetes in a population, the results are positive, with significant clinical and quality outcomes. Internal data analysis reveals an overall lowering of A1C, LDL cholesterol, and blood pressure. It has also been noted that there has been a decrease in inpatient admissions and the 30-day readmission rate. Most of all, at Montefiore, we have observed reduced morbidity and mortality in our population, and therefore, an improvement in patient quality of life. **EBDM**

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POPULATION HEALTH

Closing the Gap on Health Inequality

HARVEY W. KAUFMAN, MD, MBA, FCAP

Although the US healthcare system is the envy of much of the world, it is troubling that persistent and well-documented health disparities still exist between different racial and ethnic populations.

But evidence is emerging that, as a nation, we are beginning to make inroads into achieving health equity and eliminating health disparities by investing in prevention and wellness.

A study conducted by Quest Diagnostics, and published in a recent issue of *Diabetes Care*,[1] found that people in states that expanded Medicaid under the Affordable Care Act (ACA) are far more likely to be newly diagnosed with diabetes than those in states that elected not to expand the program. Based on an analysis of de-identified test results of 434,288 Americans from Quest's uniquely large database, we found that diagnoses of newly identified diabetes in Medicaid patients surged 23% in expansion states in the first few months after the ACA went into effect, but increased just 0.4% in those states that opted out of Medicaid expansion during the same time period.

While we did not examine demographics beyond age and state, it is likely that many of the newly identified individuals from the Quest study are part of a racial or ethnic minority, given that African Americans and Hispanic/Latino Americans are at a sharply increased risk of diabetes than non-Hispanic whites. And with new US Census Bureau data[2] showing the uninsured rate among blacks, Hispanics, and Asians all declined by more than 4 percentage points between 2013 and 2014, attributable to Medicaid expansion, our findings suggest that increasing access to healthcare could serve as a catalyst for improved health statuses for all Americans, especially minorities.

Early diagnosis and treatment of diabetes can lead to fewer complications and more effective disease management—and potentially, lower long-term costs. Too often, people don't know they have the disease or are at risk of developing it, which is why it is critical they receive a blood test called an A1C (which measures their levels of glycated hemoglobin) to help diagnose it. Our study suggests that increased access to care helps people get this simple blood test, receive a diagnosis, and hopefully act on it by improving their diet or medication use, to arrest further disease progression.

The Quest study also suggests that preventive screening under the ACA may produce the same impact on chronic diseases and conditions beyond diabetes, including hypertension and chronic kidney disease. For many of these conditions, the gap in health status by race, ethnicity, and socioeconomic status has widened over the last decade. National Health Disparities Reports, produced by the federal Agency for Healthcare Research and Quality, have demonstrated that racial and ethnic minorities often receive poorer quality of care and face more barriers in seeking care—including preventive services, acute treatment, or chronic disease management—than do non-Hispanic white patients. Minority groups experience rates of preventable hospitalizations that are, in some cases, almost double that of non-Hispanic whites. Today, a person who is black has a 1.5-times greater rate of heart disease death and a 1.8-times greater rate of fatal stroke than a white person. Increased access to preventive care will help close this gap and improve health outcomes.

We see great potential in using nationally representative de-identified laboratory data to reveal important insights into population health. The US Health and Human Services' Action Plan to Reduce Racial and Ethnic Health Disparities calls for increasing the availability, quality, and use of data to improve the health of minority populations. This surveillance and monitoring should be implemented broadly across a variety of sectors, both public and private, to ensure that we are accurately identifying where health disparities exist and how they are being addressed. These efforts will help us progress toward equality of care for all Americans. **EBDM**

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ABOUT THE AUTHOR

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Dr Kaufman is senior medical director at Quest Diagnostics. He was the lead author of the 2015 study in *Diabetes Care*, which found a 23% increase in new diabetes cases among Medicaid patients in states that expanded the program under the Affordable Care Act.

Impact of the Coventry Complex Case Management Program in the Kentucky Medicaid Population

KENNETH J SNOW, MD, MBA

INTRODUCTION

Diabetes is an increasingly common and costly issue for both the state of Kentucky and the United States, as a whole. According to the National Diabetes Statistics 2014 Report, prepared by the CDC, 29.1 million, or 9.3% of Americans had diabetes in 2012.[1] This was an increase of 3.3 million Americans with diabetes just since 2010. While there is no large statistical difference between the incidences in men (15.6 million) versus women (13.5 million), there are large discrepancies by race/ethnicity in terms of who is more at risk for diabetes. In descending order, the age-adjusted percentage for individuals 20 years of age or older, with a diagnosis of diabetes, is as follows: American Indians/Alaska Natives (15.9%), non-Hispanic blacks (13.2%), Hispanics (12.8%), Asian Americans (9.0%), and non-Hispanic whites (7.6%).[1]

In addition, the risk of having diabetes is independently related to socioeconomic status. Comparing prevalence by education level, high school dropouts are twice as likely to have diabetes as men who have attended college.[2] Having less than a high school education is associated with a 2-fold higher mortality rate from diabetes. Having a family income, below the federal poverty level, is also associated with a 2-fold higher mortality rate compared with adults with the highest family incomes. These relationships hold true even after controlling for well-known risk factors, such as age, race/ethnicity, and body mass index.[3] Many effective therapies exist to control blood glucose levels in people with diabetes and to control comorbidities, such as hypertension, and high cholesterol that contribute to the complications associated with diabetes. However, left inadequately controlled, diabetes is a leading cause of blindness, kidney failure, amputation, heart attack, and stroke.

The rise in the prevalence of diabetes in Kentucky has been faster than the national rate. According to the 2013 Commonwealth of Kentucky Diabetes Report,[4] the percentage of residents with diabetes has nearly tripled from 3.5% in 1995 to 10% in 2010. Among Kentucky's Medicaid population, the prevalence of diabetes is 18%. The highest rates of diabetes are in the rural eastern counties, where the prevalence of diabetes exceeds 20%. This region is home to 26% of members involved in the CoventryCares Comprehensive Diabetes Care HEDIS® Measure.[5] (HEDIS refers to the Healthcare Effectiveness Data and Information Set, a tool of 81 measures created by the National Committee on Quality Assurance. It used by most major health plans to measure care and service.)

TABLE 1. CoventryCares Comprehensive Diabetes Care Submeasures, 2013

CDC SUBMEASURE	COMPLIANT	NONCOMPLIANT	NONCOMPLIANT	PERCENTILE
A1C with CCM	1510	371	80.28%	25th
A1C without CCM	1467	414	77.99%	10th
DRE with CCM	637	1244	33.86%	<10th
DRE without CCM	593	1288	31.53%	<10th
Nephrop screening with CCM	1476	1476	78.47	50th
Nephrop screening without CCM	1386	495	73.68%	25th

A1C indicates glycated hemoglobin; CCM, Complex Case Management; CDC, Comprehensive Diabetes Care; DRE, diabetic retinal examination; and nephrop, nephropathy.

TABLE 2. CoventryCares Comprehensive Diabetes Care Submeasures, 2014

CDC SUBMEASURE	COMPLIANT	NONCOMPLIANT	NONCOMPLIANT	PERCENTILE
A1C with CCM	592	112	84.09%	50th
A1C without CCM	6752	1389	82.9%	25th
DRE with CCM	272	432	38.6%	10th
DRE without CCM	2422	5719	29.0%	<5th
Nephrop screening with CCM	591	113	83.9	75th
Nephrop screening without CCM	6118	2023	75.2%	10th

A1C indicates glycated hemoglobin; CCM, Complex Case Management; CDC, Comprehensive Diabetes Care; DRE, diabetic retinal examination; and nephrop, nephropathy.

TABLE 3. CoventryCares Comprehensive Diabetes Care Comparison, 2013-2014

	A1C SCREENING		DIABETIC RETINAL EXAMS		NEPHROPATHY SCREENING	
	Compliant	Percentile	Compliant	Percentile	Compliant	Percentile
+ CCM 2013	80.28%	25th	33.86%	<10th	78.47%	50th
+ CCM 2014	84.09%	50th	33.86%	10th	83.9	75th
No CCM 2013	77.99%	10th	31.53%	<10th	73.68%	25th
No CCM 2014	82.9%	50th	29.0%	<5th	75.2%	10th

A1C indicates glycated hemoglobin; CCM, Complex Case Management.

COVENTRY COMPLEX CASE MANAGEMENT PROGRAM

Coventry Healthcare, a subsidiary of Aetna, initiated the Complex Case Management (CCM) program to strive for excellence in case management. The CCM program provided quality services to members, met industry and accreditation standards, and supported Coventry's goals for cost management. CCM is a collaborative process based on assessment, planning, implementation, coordination, monitoring, and assessment of options and services to meet an individual member's healthcare needs. Communication with the individual member or caregiver, and healthcare provider, combined with the availability of resources, assists in promoting quality cost-effective outcomes.

Members eligible for CCM were identified through a variety of referral sources, including, but not limited, to the use of a predictive modeling tool, disease management, concurrent review, self-referrals, and provider referrals. HEDIS data were integrated into each member's record in the care management system, providing a snapshot of compliance for each case manager. As part of the case management process, HEDIS measures were then addressed accordingly. This process included educating members on the importance of condition-specific testing through direct contacts and mailers, assisting members to locate specialists, and assisting members with the scheduling of appointments. CoventryCares was an opt-out option offered by Kentucky's CCM program, in which every eligible member could choose to decline participation.

The purpose of the Coventry Health CCM Program is to improve members' adherence to appropriate indicators, including glycated hemoglobin (A1C) screening (assessing diabetes control), diabetic retinal exams (DRE) (assessing eye involvement and the need for therapy to prevent blindness), and nephropathy screening (assessing kidney involvement and the need for therapy to prevent kidney failure). These indicators are taken from the Comprehensive Diabetes Care (CDC) HEDIS Measure diabetes submeasures.

RESULTS

The CDC HEDIS member data showed 5917 CDC submeasures reported for 2013. Of these, 1881 were contacted by CCM and another 1881, who were not contacted, were randomly chosen to serve as a comparator group. The improvement in compliance was significant enough to move to a higher percentile in 2 of the 3 measures. The results are shown in **TABLE 1**.

Members enrolled in CCM showed compliance rates that were higher for all 3 of the submeasures compared with members not in CCM. Members in CCM had a compliance rate of 80.28% (25th percentile) compared with 77.99% (10th percentile) for the members not enrolled in CCM for A1C screening, 33.86% (<10th percentile) compared with 31.53% (<10th percentile) for DRE screening, and 78.47% (50th percentile) compared with 73.68% (25th percentile) for nephropathy screening. See **FIGURE 1**.

In 2014, the CDC HEDIS member data showed 9186 CDC submeasures had been reported. Of these, 1022 were contacted by CCM. The remaining 8164, not contacted by CCM, were used as the comparator group. Once again, higher levels of compliance were seen in all 3 measures among those members contacted by CCM compared with those who were not. The improvement was great enough to increase the percentile for all 3 measures. The results are shown in **TABLE 2**.

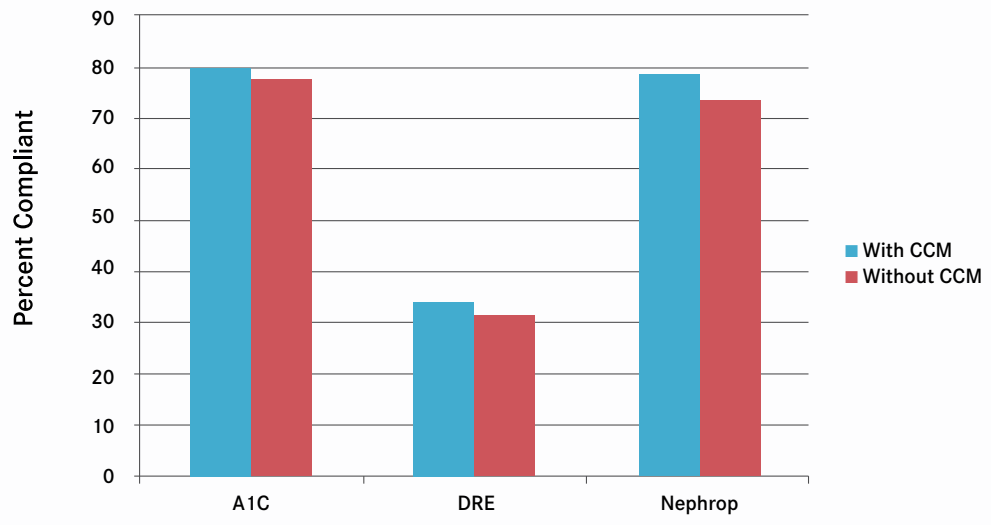
Members in CCM had a compliance rate of 84.09% (50th percentile) compared with 82.9% (25th percentile) for the members not enrolled in CCM for A1C screening; 38.6% (10th percentile) compared with 29.0% (<5th percentile) for DRE screening; and 83.9% (75th percentile) compared with 75.2% (10th percentile) for nephropathy screening. See **FIGURE 2**.

Comparison of year-to-year change is shown in **TABLE 3**. Performance in all 3 submeasures improved in the CCM group. A1C screening increased from the 25th to 50th percentile, digital retinal exams increased from less than the 10th percentile to the 10th percentile, and nephropathy screening increased from the 50th to the 75th percentile. While the performance in A1C screening also improved in the group without CCM (from the 10th to the 50th percentile), performance on retinal exams and nephropathy screening actually declined. These observations suggest that the improvement seen in the CCM group was not simply an improvement in the entire population, but was related to the CCM program.

SUMMARY

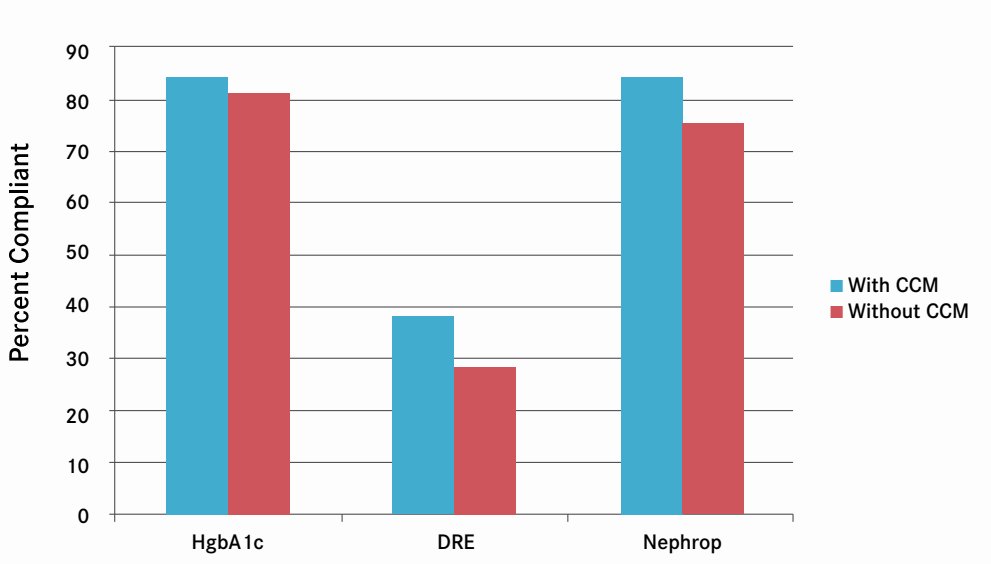
Diabetes is an increasingly common and expensive disease nationwide, and especially for populations such as those covered by Kentucky Medicaid. The implementation of the Coventry CCM program demonstrated the ability to improve compliance rates to HEDIS submeasures in this challenging population. This improved compliance rate exceeded the improvement in the population, as a whole, resulting in a higher percentile performance. **EBDM**

FIGURE 1. 2013 Compliance Rates for A1C, Diabetic Retinal Exam, and Nephropathy Screening With and Without Complex Case Management



A1C indicates glycated hemoglobin; CCM, Complex Case Management; DRE, diabetic retinal exam; and nephrop, nephropathy.

FIGURE 2. 2014 Compliance Rates for A1C, Diabetic Retinal Exam and Nephropathy Screening With and Without Complex Case Management



A1C indicates glycated hemoglobin; CCM, Complex Case Management; DRE, diabetic retinal exam; and nephrop, nephropathy.

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Evidence for the Benefit of Targeted Proteomics in the Era of the "Big Data" Approach

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Payers, pharma and patients all stand to benefit from a novel serum biomarker test to predict cardiovascular events.

There is much discussion today concerning our ability to analyze and interpret large data sets with the goal of better understanding complex multigenic diseases and drug effects. These data sets are based on the careful collection of disease cohorts and controls, and include standard demographic and clinical information that can be analyzed with data from high-throughput biomarker platforms. Most such studies have been based on genetic analysis from a single nucleotide polymorphism or sequencing data and many include transcriptome data. Patients, pharma, and payers are all benefiting from this approach:

- **Patients** benefit through early detection of disease when intervention is most successful and with "personalization" of treatments based on targeted therapies and predictive diagnostic tests.
- Enormous data sets provide **pharma** the opportunity to better understand disease and, therefore, guide more effective drug development, including optimal stratification of patients.
- **Payers** benefit from the treatment and care efficiencies that result from these novel therapeutics and diagnostics. Big data studies will increasingly be a key component of the strategy to transition to population-based payments, or "volume to value."

To date, the most strikingly successful application of big data approaches leading to dramatic improvements in health outcomes for patients is in oncology. Starting about 15 years ago, researchers identified candidate drug targets in specific tumor types in big data studies that relied on the use of high-throughput sequencing technology and large patient cohorts. This approach led to the targeted therapy drug revolution for personalized treatment in cancer, with dramatic improvements in quality of life and remission rates.

These therapeutic developments have been followed by advances in diagnostic tests, such as for KRAS and HER2/NEU, which identify potential responders to targeted therapy, and patients with increased cancer risk, as exemplified by the BRCA1 and BRCA2 tests for breast and ovarian cancer. We have now entered the era of gene panels replacing single gene tests for hereditary risk assessment in oncology risk and treatment. For example, Myriad Genetics' myRisk Hereditary Cancer test is a 25-gene panel that identifies an elevated risk for 8 important cancers. However, the big data advances in other disease areas have not been as dramatic, with little progress being made in prevalent, chronic diseases, such as diabetes, cardiovascular disease, autoimmune disease, and neurodegenerative disease.

A NOVEL PREDICTIVE-BIOMARKER STUDY IN DIABETES

A recent issue of *Circulation* highlights a big data approach that includes high-throughput quantitation of blood-based serum protein biomarkers using a multiplexed immunoassay platform perfectly suited for big data studies.[1] The researchers hoped to identify biomarkers that could predict cardiovascular events in a population of 8401 carefully characterized individuals in the Outcome Reduction with Initial Glargine Intervention (ORIGIN) trial. To our knowledge, this is the most ambitious targeted proteomic study ever performed, with nearly 2 million protein measurements.

The 7-year trial, sponsored by Sanofi and managed by the Population Health Research Institute (PHRI), was designed to investigate the effects seen in a population of patients with type 2 diabetes who were on Sanofi's long-acting insulin glargine, Lantus.[2] Blood samples were drawn at 3 time points over the 7-year period, and baseline serum samples were subjected to targeted proteomic testing that generated a data set containing 2 million points. The generation of this large data set was made possible using a targeted proteomic platform, DiscoveryMAP®, developed and commercialized by Myriad RBM, a wholly owned subsidiary of Myriad Genetics.[3] This testing platform provided quantitative concentrations on 237 individual protein targets in the serum using less than 1.0 mL of sample. The 237 targets cover many biochemical pathways and mechanisms of therapeutic intervention. This study would simply not have been possible using conventional immunoassay technologies due to cost and sample volume requirements to measure so many protein biomarker targets.

Using the protein measurements generated in this study, and a sophisticated data mining approach, Hertzel C. Gerstein, MD, MSc, FRCPC, deputy director of PHRI and lead study investigator, correlated 10 specific blood proteins with a future cardiovascular event or death over the 7-year period of the study. The 10 markers, along with the predictive values for the clinical risk factors, identified individuals with dysglycemia who are at greater risk of a cardiovascular event. Some of the markers were already known to be associated with cardiovascular disease, adding confidence to the quality of the study and approach. Others were more novel and require additional validation.

In addition to these 10 biomarkers, 5 other markers had the greatest impact to predict death over the 7 years in this patient population. These are remarkable findings that provide a window into the future of these individuals. But from the perspectives of the patient, pharma, and payer, what will be the utility of such a biomarker test?

IDENTIFYING STAKEHOLDER BENEFITS

For patients, cardiovascular disease is still the number-one killer in the world, with 3 in every 10 deaths being attributable to the disease. Any improvement in risk prediction, prevention, and treatment can have a dramatic impact on saving patients from a premature death and improve their quality of life. By further improving our ability to stratify patients, patient management can be more personalized and tailored to optimize prevention and treatment, thus reducing morbidity and mortality. Prevention measures for cardiovascular disease, including lifestyle changes, are beneficial to all. However, changing behavior patterns is very challenging. Individuals are more likely to change behavior with direct feedback about their condition.[4,5] This newly reported test for predicting cardiovascular events should be a powerful motivator for lifestyle changes. Beyond prevention, the other obvious benefit of such a test for patients is confidence in stratifying individuals. Those at high risk would be eligible for more aggressive prevention and therapy programs, while lower-risk patients would be best maintained on less aggressive and less costly intervention and therapy.

For pharmaceutical companies, the novel serum multi-biomarker test for cardiovascular events has several applications. These novel biomarkers open up avenues for understanding

and exploring new drug targets and mechanisms of action. Preclinical and exploratory human research into the biomarkers will further our understanding of their relationship to cardiovascular disease. The new test could also have significant implications for cardiovascular clinical trials. New drugs for cardiovascular disease and diabetes have to undergo large and lengthy clinical trials to monitor cardiovascular events and death. Use of the cardiovascular risk panel could help reduce the size and complexity of such trials. Such a test could also potentially be used to correlate decreased cardiovascular risk with therapeutic intervention.

For the payer, the rapid formation and consolidation of population-based health systems are increasingly turning to big data analytics to mine ever more sophisticated electronic health records (EHRs). This provides the cost-effective management of their patients as payers shift from fee-for-service to a capitated system of value-based payment. Reducing acute cardiovascular events is one of the most effective ways of reducing healthcare costs and improving a health system's quality scores. Each year, a larger percentage of value-based reimbursements are tied to a provider's patient population quality metrics. As structured, the additional bonus payments by payers to healthcare systems for improvements in patient quality scores is more than offset by the savings to the payer in reduced costs for healthcare services. Providers are incentivized to use data from EHRs to more directly and personally interact with their patients through innovations such as the patient-centered medical home.[6,7]

This personalized approach by providers can have profound improvements on prevention via additional incentives for patients to alter their behavior and adhere to prescribed therapies. The new cardiovascular risk panel discovered by this big data study could be a powerful new addition to the EHR for managing a subpopulation of patients with dysglycemia who are at a higher risk for acute cardiovascular events and death.

The implementation of "big data" analyses should include not only molecular genetics approaches but also a targeted proteomics approach as documented by Gerstein et al. This study revealed a set of protein biomarkers in the blood whose concentrations could predict cardiovascular events and/or death within a 7-year period. Going forward, the impact of these types of studies to the patient, pharma, and payer will be to decrease morbidity and mortality in the higher risk populations, help develop more effective drugs, and, ultimately, save the healthcare system money through more efficient, tailored treatments. **EBDM**

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HEALTH IT

In Mississippi, Telehealth Makes a Measurable Difference in Diabetes Care

MARY CAFFREY

For decades, staying on top of those with type 2 diabetes (T2D) in the Mississippi Delta region seemed an unsolvable problem. Poverty and limited resources meant just reaching patients was a challenge, much less getting them to stay on a regimen to keep glycated hemoglobin in check.

Today, however, a state that historically has had little to brag about when it comes to healthcare is leading the nation in managing diabetes through telehealth, which it is using to get to patients earlier, drive behavioral change, and keep patients out of the hospital. The Diabetes Telehealth Network, which began in 2014, is part of a larger commitment to remote delivery of health services through the Center for Telehealth at the University of Mississippi Medical Center (UMMC), located in the state capital of Jackson. The state's former US senator, Trent Lott, is now a lobbyist and proponent of the technology.[1] (CMS has continued to update rules to expand Medicare reimbursement for telehealth, although advocates say it would enjoy even greater use with additional changes.[2])

Through a partnership with GE Healthcare and C-Spire,[3] UMMC began a research project in Sunflower County, a poor area of the Mississippi Delta best known for being home to the state penitentiary. US Census Bureau 2015 data on the county listed the population at 72.9% African American; of those under age 65, 10.1% had a disability and 21.3% had no health insurance. The median household income is $27,941, and 34.8% of the residents live in poverty.[4]

Rates of T2D here are 12%, and 293 people died of complications of the disease in 2010.[3] To change that, in late 2014, UMMC started toward a goal of enrolling 200 patients in a study, with each patient receiving 18 months of remote care. This involves teaching patients about their diabetes and using tablet technology to check in with them to monitor their disease.

According to Michael Adcock, administrator at the Center for Telehealth, each enrollee receives a remote patient-monitoring kit that includes an iPad Mini and peripherals, such as a blood glucose meter, that allow patients to manage several types of chronic conditions, including diabetes/hypertension, chronic obstructive pulmonary disease, and congestive heart failure. Daily health lessons are delivered to the patient on the iPad, which is set with an alarm as a reminder to start the lesson.

"Whatever time you want it, you let us know when you want the alarm," Adcock said in an interview with *Evidence-Based Diabetes Management*. The lessons are interactive: patients have to answer questions through a "decision tree."

> **"Whatever time you want it, you let us know when you want that alarm."**
>
> —MICHAEL ADOOCK, ADMINISTRATOR, UMMC CENTER FOR TELEHEALTH

"It asks, 'Did you take your medication?' but if the answer is negative, it asks, 'Why not?'" Adcock explained. If a prescription hasn't been filled, there's a contact to a pharmacy. If there are transportation issues, UMMC tries to address those. Most of all, the system allows for intervention at the first sign of trouble: if UMMC can't reach a patient who typically logs in for a lesson, the staff reach a designated alternate contact person.

Alhough unpublished thus far, Adcock said the early results are attracting notice. "Of the first 100 patients we enrolled, we had zero readmissions," he said. "There were zero ER visits for uncontrolled diabetes."

At the time of the *EBDM* interview, the study had enrolled 141 patients; with the first 100 patients, the project uncovered 18 cases of diabetic retinopathy that would not have been found otherwise, Adcock said. Reimbursement for telehealth is not an issue, he said, because the Mississippi legislature requires coverage. The program is creating significant cost savings because in addition to keeping patients out of the hospital, it is also eliminating travel costs to the state medical school for specialized care.

"We've saved 10,000 miles of travel for our first 100 patients," Adcock said.

Beyond improved clinical outcomes, reduced travel, and avoided readmissions, there are the intangibles of empowering patients to take control of their own care, as well. "Daily interaction with the tablet has made a huge difference," according to Adcock. Getting day-to-day reinforcement about positive changes—and coaching for confessions like "I just ate a piece of pie"—help patients slowly change a lifetime of habits.

Those who had expected to see themselves slowly decline with diabetes, to lose toes or feet the way older relatives had, suddenly awaken to the idea that things don't have to be that way. "It's truly life-altering," Adcock said. "They had never really been engaged in technology." **EBDM**

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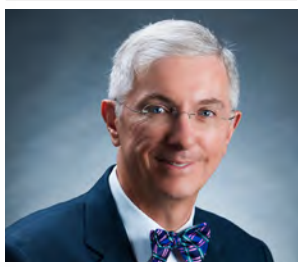
DATA PROTECTION

Getting the Most From Healthcare Data Requires Steps to Prevent Breaches

LEE BARRETT

ABOUT THE AUTHOR



LEE BARRETT

Mr Barrett is the executive director of the Electronic Healthcare Network Accreditation Commission.

"Who's going to hack our data?" — I fielded this question recently from a care provider at a medical and dental practice where I serve as chief compliance officer, in addition to my full-time position as executive director of the Electronic Health Network Accreditation Commission (EHNAC).

No doubt the provider was thinking about data breaches at Anthem, Premera Blue Cross, and Excellus Health Plan, as well as other major breaches in the first 9 months of 2015, which affected an eye-popping 109 million individuals.[1] While those breaches certainly made huge headlines, the theft, loss, unauthorized disclosure, or hacking of patient data is reported almost daily to the Office of Civil Rights (OCR), the federal agency charged with compiling and publishing data on breaches that affect more than 500 individuals.[2]

"If you don't protect your data, you may not have a practice," I replied to the physician. I explained that a single significant breach affecting the data of more than 500 patients requires reporting to the OCR and local media, and would potentially subject the practice to significant fines, as well as erosion of patient trust and credibility with shareholders.

After hearing all of this, the physician quickly understood the importance of data security. "You're right," is all he said.

BREACHES ARE BECOMING WIDESPREAD

Six major breaches of more than 1 million records each represented the lion's share of affected records. However, an additional 200 breaches reported to OCR during the first 9 months of 2015 hit more than 3.6 million patient records.[1] The offenders included a nursing home, a cancer center, a dentist, and medical practices in urology, neurology, radiology and anesthesiology. Business associates were affected, too, including several billing practices and an attorney. Medical Informatics Engineering, an IT software development firm, reported a breach of 3.9 million records in July.

Why are breaches so widespread? The emergence of electronic medical records and increasing use of electronic means to transmit and share data allow not only providers, health plans, payers, and others to share critical patient data and make better care decisions, but it also gives more entry points to criminals.

According to the Ponemon Institute's 5th annual privacy and security report, criminal attacks are the primary cause of data breaches in healthcare. Breaches have been reported by 90% of healthcare organizations and 60% of their business associates.[3] Since 2010, nearly 8 in 10 healthcare organizations have reported more than one breach.[3]

On the black market, a credit card record is worth $1. However, because of the rich amount of personal information contained in a medical record that can be easily used to commit medical fraud, each of these records commands between $5 and $10.

GREAT PROMISE IN USING DATA, BUT HIGH STAKES

For providers of any size, the stakes have never been higher to safeguard data. Even solo practitioners are using portals and mobile apps, contracting with business associates and participating in health information exchanges, accountable care organizations (ACOs) and other initiatives where data sharing is crucial to understanding and interacting with patients and other information sources, such as labs, pharmacies, hospitals, etc.

Make no mistake: the ready exchange of patient data helps providers make quicker, more informed diagnoses; helps pa-

tients avoid unnecessary scans and lab tests; and gives the myriad of caregivers who interact with a patient a place to collaborate and to coordinate patient care. But intentional or unintentional breaches can occur at the intersections of each of these data exchange touchpoints.

The fear of a major data breach has elevated the roles of chief information security officer or chief privacy officer, many of whom now report directly to their entity's governing board. Even smaller organizations and practices should have a compliance officer who can put in place policies, procedures, and controls; conduct annual risk assessments; and minimize the risk for a breach. Smaller organizations can use a third-party compliance officer who is well-versed in healthcare.

Tto understand the promise of coordinated care, look no further than the Rio Grande Valley ACO in Texas, which concentrates its efforts on patients with diabetes. In the Rio Grande Valley, nearly 30% of people live with some type of diabetes, a rate 3 times the national average.

Jose F. Pena, MD, CEO and chief medical officer for the ACO, credits a coordinated care approach that optimizes its electronic health record (EHR) system to enable care team members to use pop-up reminders to track such patient measures as glycated hemoglobin, low-density lipoprotein cholesterol, blood pressure, smoking status, and the use of anti-platelet therapy. This coordinated approach modestly improved individual quality measures but dramatically improved compliance with all 5 quality measures (blood pressure, lipids, glucose, aspirin use, and tobacco avoidance), moving from a national average 23% compliance rate in the first year to 48% in the second. A success such as this underlines the importance of getting data security right.

HOW THE INDUSTRY IS RESPONDING

A hospital may use up to 150 information technology systems, many of which need to interact and interface with other systems to push or pull data or compile reports. No hospital has a fully integrated system from a single vendor, so data leakage can occur at the junctures between systems.

As the industry moves from fee-for-service to fee-for-value, interoperability among disparate IT systems has become critical. True interoperability can plug many of the data leakage holes. The CommonWell Health Alliance has been working since 2013 to create interoperability among major EHR systems. Member organizations represent 70% of the acute care EHR market and 24% of the ambulatory care market. Carequality, a public/private collaborative, was formed in 2015 with a similar theme.

The EHNAC/Direct Trusted Agent Accreditation Program (DTAAP) allows accredited health information service providers (HISPs) to send e-mail that is authenticated, encrypted health information directly to known, trusted recipients over the Internet. DTAAP meets Meaningful Use Stage 2 standards. Two accredited HISPs can transmit information to one another with confidence, knowing that sensitive data is properly protected.

The nonprofit Health Level Seven International has developed what it calls a next-generation standards framework: FHIR (Fast Healthcare Interoperability Resources) is still being vetted, but is seen as an emerging standard for the development of interoperable healthcare technology. Truly interoperable systems have fewer data leakage concerns.

Many organizations are specifying accreditation with EHNAC standards for vendors and business associates. Our standards are supported by not only federal and state organizations but also by dozens of leading companies in the healthcare industry. Requiring EHNAC accreditation demonstrates a commitment to data security that resonates with organization executives as well as patients, customers, and stakeholders. Medical Group Management Association and the American Medical Association have created a toolkit for selecting a practice management system that calls for EHNAC accreditation of those practice management vendors as a key step and quality assurance check for providers.

CONTINUAL EMPHASIS ON DATA SECURITY

Regulations are constantly changing. Organizations need to evaluate and purchase new software. Employee training on data security and privacy rules is required on at least an annual, but more importantly, on an ongoing basis. For these reasons and more, protecting an organization's data should be an ongoing concern, which is why companies have chief privacy and chief security officers. It's also why even the smallest organizations should have someone in charge of data security—even if it's a third-party vendor. When possible, specify that the business associates and vendors you work with are accredited to safeguard your sensitive information.

We all are patients and should recognize that the data we protect could be our own. **EBDM**

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PATIENT-REPORTED OUTCOMES

Demystifying "Patient-Centered" Care in Type 2 Diabetes: *The Role of Systematic Measurement*

SHANA B. TRAINA, PHD, AND APRIL SLEE, MS

PRECIS

Questionnaires are noninvasive, inexpensive measures that can identify key elements of the patient perspective that are important for the achievement of better outcomes in diabetes care.

COMMENTARY

Over the last several decades, tremendous advancements have been made in understanding the microvascular and macrovascular pathophysiology of type 2 diabetes (T2D) and in understanding the roles of a healthy diet, physical activity, and pharmacotherapies in reducing morbidity and mortality associated with uncontrolled plasma glucose levels.[1] Major public health initiatives have been implemented to support the prevention and management of T2D, and recent guidelines from the American Diabetes Association (ADA), the

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American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics outline diabetes self-management education and support strategies that healthcare providers and accountable care organizations (ACOs) can use to promote self-care behaviors.[2]

These self-care behaviors include healthy eating, physical activity, daily monitoring activities, medication adherence, problem-solving skills, risk reduction strategies, and healthy coping strategies.[2] These guidelines, along with the joint ADA/European Association for the Study of Diabetes position statement on the treatment of T2D emphasize the importance of considering individual patient perspectives (eg, health and cultural beliefs, health literacy, physical limitations, family support, emotional health, and financial status) when collaborating on disease management strategies.[2,3] Significant emphasis is placed on the role of patient behaviors in determining outcomes associated with T2D.[2,3]

Payers and healthcare consumers are also contributing tremendous financial resources toward T2D management: between 2002 and 2011, the annual direct medical costs of diabetes were estimated to exceed $218 billion.[4] On an individual level, average lifetime medical costs have been estimated to be more than $85,000 per patient with T2D.[5]

Despite recent advances in drug therapies, initiatives to improve self-care, and the enormous financial investments in managing T2D, disease outcomes are still far from ideal. Current approaches that encourage individuals to follow behavior recommendations are simply not working: between 1998 and 2006, significant declines in adherence to healthy behaviors were observed among US adults, including those with diabetes.[6] In addition, analyses of diabetes medication adherence, based on measures such as medication possession ratio (MPR; proportion of doses taken to doses prescribed), found that compliance with treatment is poor.[7] Consequently, a recent analysis of data from the National Health and Nutrition Examination Survey and the Behavioral Risk Factor Surveillance System indicated that fewer than 50% of individuals with diabetes are meeting their recommended glycemic goals.[1]

Provision of high-quality care requires achieving the triple aim of improving the individual experience of care, improving the health of populations, and reducing the per capita cost of care. Meeting these goals will require addressing defects in healthcare quality and reducing wasteful spending on services of limited value.[8] Diabetes care, in particular, presents unique challenges to meeting these goals because high-quality healthcare for chronic diseases is costly, given that effective disease management may require regular appointments with primary care practitioners, as well as diabetes educators and a range of specialists (eg, nutritionists and ophthalmologists).[9] This "performance paradox" in T2D makes it extremely difficult to achieve all of the triple aims at once. For example, data indicate that ACOs reporting the greatest cost savings are simultaneously receiving lower scores for quality of diabetes care, while ACOs with the highest quality scores show only modest cost savings.[9] These findings highlight challenges in the design of programs such as the Healthcare Effectiveness Data and Information Set (HEDIS), the Physician Quality Reporting System (PQRS), and the Medicare 5-star rating program, which all require implementation of quality measures that reduce costs, manage side effects, and support a positive patient experience.

T2D is a chronic disease that requires persistent attention to disease management by individuals. If steps can be taken to help patients become actively engaged in managing the everyday challenges of their disease, they could be in a position to substantially improve their healthcare quality and reduce costs.[10] Thus, it is exceedingly important to empower patients in their role as self-managers of their disease. This empowerment requires measurement of concepts including patient knowledge, skill, belief, confidence, satisfaction, support, and health-related quality of life so that education and support efforts can be tailored to the unique needs of each individual. Starting with appropriate goals that fit each patient's level of knowledge, skill, and engagement, and working toward increasing activation over time, patients can experience small successes and steadily build up the confidence and ability they need to effectively self-manage their disease.[11,12]

In contrast to some other chronic diseases, people often do not experience burdensome symptoms of T2D on a daily basis. The absence of symptoms may limit motivation to adhere to medication and self-care behaviors. In addition, although patients often understand that uncontrolled chronic hyperglycemia can have serious long-term health consequences, the nearer-term burdens of keeping up with diet and exercise regimens and tolerating the potential side effects of antihyperglycemic medications may take precedence. Making lasting lifestyle changes is difficult, and evidence suggests that an investment in ongoing professional support would be required to impact outcomes at a population level.[13] In addition, side effects such as edema, nausea, hypoglycemia, and weight gain, can be disincentives to not only medication adherence, but also performance of healthy behaviors.[14]

In contrast, if individuals feel satisfied with their health, research indicates that they will be more likely to initiate or continue healthy behaviors and experience better long-term outcomes.[15-17] Healthy behaviors can lead to a positive cycle of continuous benefits and reinforcement.[18] Belief in the importance of—as well as confidence in—performing healthy behaviors are necessary components of self-care.[18] Using well-formulated questionnaires to assess concepts such as health satisfaction, belief, and confidence, as well as changes in behavior, is a viable, concrete, and cost-effective way to facilitate the practice of patient-centered care.[18]

There are several well-established questionnaires available to measure and track the concepts related to self-care and adherence. Data from these questionnaires can increase healthcare worker awareness of potential barriers to effective long-term disease management and allow providers to address these issues before unfavorable outcomes occur. Patient-provider discussions of questionnaire responses can provide a forum for increased patient engagement and clinical practice improvement. Collecting these data in electronic form and incorporating them into the medical record would be valuable, allowing for insights into the patient experience over time. Conversing about these types of data will aid in operationalizing the central role of the patient in collaborative disease management efforts. **EBDM**

If individuals feel satisfied with their health, they will be more likely to initiate or continue healthy behaviors and experience better long-term outcomes.

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Janssen Global Services, LLC

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PHARMA UPDATE

MannKind: *Path to Afrezza Survival Involves Lower Prices to Woo Payers*

ANDREW SMITH

MannKind Corp has been racing to reinvent itself since Sanofi backed out of a deal to market its inhalable insulin.[1] However, the product remains in limbo. Until the companies can complete a complex transition, Sanofi maintains control over Afrezza. MannKind cannot market the drug, negotiate coverage with insurers, file for regulatory approval in new jurisdictions, or take any other steps to turn the notorious flop into the success that MannKind's leaders still hope it can be.

Nonetheless, a flurry of announcements has kept the California-based company in the news, sometimes to the delight of investors and sometimes to their chagrin. In less than 3 months, MannKind's founder left the board and passed away; it parted ways with 2 chief executives, attracted a class-action lawsuit, begun the hunt for a chief marketing officer, negotiated with potential international marketing partners, signed a deal that could be worth more than $100 million with a mysterious biotech, discussed potentially illegal short-selling with regulators, and announced its intention to win insurer coverage by lowering Afrezza prices.

"We learned many things in 2015, and those lessons will benefit us greatly as we look forward to launching our own strategies this year," said CEO Matthew Pfeffer during a February 3, 2016, investor conference call,[2] which provided the most detailed glimpse to date of his plans for the company.

Pfeffer is the fourth man to run MannKind since November, when CEO Hakan Edstrom resigned after just 11 months on the job and founder and chairman Alfred Mann stepped in on a temporary basis.[3] MannKind offered the post to Duane DeSisto, the former CEO of the insulin pump maker Insulet, but Insulet protested on grounds of a noncompete agreement. MannKind withdrew the offer[4] just after DeSisto had started and offered the job to Pfeffer, who had been serving as the company's chief financial officer and now fills both roles.

"The Afrezza transition is MannKind's top priority, and it is getting the full attention it deserves," Pfeffer told investors, noting the company's particular focus on insuring continuity of supply for the few people who do use the drug. "The transition teams have been formed and include operations, scientific, and legal personnel from both MannKind and Sanofi. The teams have met and begun discussions about the complex process that a transfer like this involves. MannKind is targeting April 5 as the transition date for the rights to develop and commercialize Afrezza, but may request that Sanofi agree to a later date.

"There are many factors that influence when the transition will occur, including a myriad of regulatory, commercial, and development activities, many of which involve third-party vendors or regulatory authorities, and all of which need to be transferred in a smooth and coordinated fashion," Pfeffer said.

In a short span, MannKind's founder passed away, it parted ways with 2 chief executives, and it lost its marketing partner.

BRINGING PAYERS ON BOARD

MannKind's basic plan for boosting Afrezza sales in the United States is to lower prices enough to get insurers to cover the product on favorable terms and then market it in unconventional ways rather than sending an army of sales representatives to doctors. Sanofi failed to get any major payer to include Afrezza on its standard formulary in 2015, even though the drug became available as a fast-acting prandial insulin for patients with type 1 diabetes (T1D) early in the year. Thus, nearly all would-be users needed to secure prior authorization from their doctors before they could get any coverage for the drug.

Both MannKind and outsiders who believe Afrezza can still be a big seller agree that securing widespread coverage is a necessary first step to success. Of course, lowering prices will

ABOUT MANNKIND

ALFRED E. MANN, MS

Mr Mann died February 25, 2016, at age 90 shortly after leaving the MannKind board. He had a long career in the biomedical industry before founding MannKind and developing Afrezza with his own funds.

MATTHEW J. PFEFFER

Mr Pfeffer became CEO on January 10, 2016, after an earlier choice had to step down due to a post-employment restriction. He has been chief financial officer since 2008.

hurt margins on existing sales, but Pfeffer hopes to offset the damage by launching Afrezza in some of the many foreign markets that will rapidly approve drugs that already have FDA approval. MannKind reports that it is already in talks with potential partners from a number of countries that could approve Afrezza without any additional trials. These partners would use their knowledge of the local market not only to shepherd Afrezza onto pharmacy shelves, but also to market it to doctors and patients. Thanks to the potential for fast approval, such partnerships could begin boosting Afrezza sales just months after they start, said Pfeffer, who noted that any substantial increase in sales volume would mitigate the effect of domestic price cuts on margins by allowing MannKind factories to operate more efficiently, thus reducing unit costs.

"Much of Afrezza's future hinges on what kind of deals MannKind signs with companies in foreign markets," Keith Markey, PhD, who follows MannKind for Griffin Securities, said in an interview with *Evidence-Based Diabetes Management (EBDM)*. "If MannKind only signs a couple low-dollar deals, then it will struggle to offer Afrezza at competitive prices here and it will struggle to escape its current situation. If MannKind can generate significant near-term revenues from foreign deals, though, it will have a real chance of turning things around. Any real cash flow would ease fears about the company's financial position and increase its ability to market Afrezza in the US. Significant extra sales would also create the sort of economies of scale that would allow MannKind to price Afrezza competitively and still profit on its US business."

REKINDLING MARKETING EFFORTS

As MannKind develops its plans for negotiation with payers after the Afrezza transfer from Sanofi, it is also developing plans for marketing the product. In the days after Sanofi announced that it would back out of its deal to market and develop Afrezza, MannKind said that it would try something very different than the traditional campaign Sanofi had attempted, a campaign that largely hinged on sending sales personnel to doctors' offices. MannKind also said that it would begin using social media to share more information, in a timelier fashion, with people who wish to follow the company. These statements led many to hope—or even to wrongly believe—that the company planned to market Afrezza via social media, both because the product already has a number of enthusiastic supporters on sites like Twitter and because social media can allow savvy companies to reach large numbers of people more cheaply than they can with traditional marketing and advertising.

"Unfortunately," Pfeffer said during the conference call, "that is not allowed under FDA regulations, which prohibit us from disseminating anecdotal information of any kind. In fact, no promotional information regarding Afrezza can be disseminated by us without including the black box warning and all associated safety information. Since these user accounts [with positive stories about Afrezza] obviously do not include such information, we cannot be directly associated with them. This means that MannKind's Facebook and Twitter accounts may not even like or retweet such posts."

Pfeffer said that MannKind is actively seeking a seasoned executive to run its sales and marketing efforts. He also said the company had formed an advisory council consisting of physicians, Afrezza users, and other stakeholders both to bind it more closely to the sort of opinion makers who can drive sales and to ask them for ideas about how a money-losing company that started the year with only $60 million in cash can afford to market a drug effectively.[5]

MannKind may get some additional cash to spend from an organization that says it will use Afrezza at outpatient diabetes clinics scheduled to open in major cities across the nation by the end of the first quarter, with a pilot facility in New Jersey. MannKind, which has not disclosed the name of the company opening those clinics, may also get some help with the cost of domestic marketing by finding a new partner in the United States, but it has no plans to enter an agreement like the one it signed with Sanofi and may not sign with anyone at all.

"MannKind is looking at other potential partners that may see Afrezza as a value-adding addition to their portfolios. But in addition, we are putting plans together to market and sell Afrezza ourselves," Pfeffer said. "We're also evaluating contract commercial organizations that can provide the necessary infrastructure as we build, or in lieu of, our own commercial infrastructure. Regardless of whether we take on another partner, it is our full intention to market the product ourselves retaining full rights of ownership, and Afrezza, at most, will be co-promoted with an additional partner or partners."

Investors will have to wait until at least the second quarter of 2016 to see MannKind's new marketing strategy and get any sense of its potential, but they may soon get some data about how better insurance coverage will affect Afrezza sales. According to Markey, Sanofi signed deals that would make the drug a part of the standard formulary offered by 2 organizations as of January 1, 2016. The first, Harvard Pilgrim Health Care, is a small regional insurer, but the second, CVS Caremark, is the pharmacy benefits manager for nearly aquarter of all privately-insured Americans.[6] MannKind's next quarterly results, in other words, will be the first to cover a period when any substantial number of Americans could get an Afrezza prescription covered by standard insurance.

Analysts who cover the company are not expecting any dramatic sales surge—the company's stock still trades around $1 and a recent consensus target price was under $3[7]—but Afrezza sales have been so low to date that a relatively small sales increase would be easy to see. This might indicate that there is some pent-up demand for the product among patients who have been unable to get it at reasonable prices so far. Indeed, it is hard to overstate how disappointing sales have been to date: before Afrezza hit the market, estimates of peak annual revenues ranged from $182 million to $2 billion.[8] In its first 9 months on the market, however, total sales revenues barely exceeded $5 million.[9]

The big question, of course, is why sales have been so poor. MannKind and Afrezza supporters have always contended there would be strong demand for a product that not only would save patients with T1D from more than 1000 injections per year but also work faster than other short-acting insulin formulations.[10] Patients with every conceivable condition mostly choose to avoid injectable medications whenever they can because they hate shots. They say this desire is so strong that widespread insurance coverage and decent marketing will allow Afrezza to thrive despite obstacles that include a black box warning about potential harm to user respiration and a requirement that patients undergo a spirometry test before beginning on Afrezza. Other observers disagree vehemently. They say that Afrezza's failure to date, along with the failure of an earlier inhalable insulin called Exubera, demonstrates that patients with T1D simply are not clamoring for any such product.

"It's pretty straightforward in my humble opinion: inhaling insulin is a dumb idea," said Scott Hanselman, who blogs[11] about his experiences with T1D and new options for treating the condition. "The accuracy is questionable because it's hard to translate units injected into units inhaled. It can demonstrably and measurably lower lung function, presumably because lungs aren't meant to absorb insulin," he said in an

interview with *EBDM*. "On the other hand, pens [for injecting insulin] are great: easy and nearly painless. And we'll soon see super–fast acting insulins, and that'll change the game when combined with continuous glucose monitors like the Dexcom G5 and the do-it-yourself open-source closed-loop systems or the Bigfoot Biomedical system. Afrezza is a solution without a problem."

The evidence is also split on how much Afrezza users like the product. MannKind says the feedback it has received is overwhelmingly positive, and a quick search of social media will certainly find enthusiastic users.[12,13] That said, Sanofi's figures indicate that such enthusiasm is far from universal. Company spokeswoman Susan Brooks wrote in an e-mail that, as of January, only 35% of the 6000 patients who have ever started on Afrezza were still using it.

NONSTOP NEWS FOR MANNKIND

As MannKind refines its plans to increase those user figures, the company has also been generating news on other fronts. At least 2 legal practices are trying to launch a class-action lawsuit against the company.[14,15] On the flip side, Pfeffer said during the conference call that the company had noticed what some of its investors considered suspicious short-selling and that MannKind was investigating the allegations and speaking to regulators about protecting the company's investors.

The other big news from MannKind this year has struck some observers as even more mysterious. The company signed a deal to work on developing inhalable treatments for conditions, such as chronic pain, with a company called Receptor Life Sciences. MannKind announced that the deal could eventually bring in more than $100 million in milestone payments, but the most intriguing thing about the pact may be the utter lack of public information about Receptor.[16]

"I don't understand the secrecy around Receptor Life Sciences and this deal. Is there anything you can say to provide some perspective or some comfort because right now there's nothing for anyone to go on?" JP Morgan analyst Cory Kasimov asked Pfeffer during the conference call. "No one had ever heard of the company before the deal. It has no website. And the CFO is a 12-year valued employee of MannKind. Is there anything at all that you can share on this?"

"We're not at liberty to disclose proprietary information of theirs," Pfeffer said. "I can disclose that the company has been operating for some time. It's not as new as it might seem, although they did recently change their name, which is why it may seem that it sprung up fairly recently. We know a lot about things we cannot talk about, like who the management team is and who's behind the company and how they're funded. They have some reasons of their own why they don't want to make those things public…and we have to respect that."

Receptor will not be paying any cash to MannKind upfront, so the deal should not have any immediate effect on the company's ability to market Afrezza. Finally, as *EBDM* went to press, word came that Mann had passed away in Las Vegas, just a week after leaving the board of the company he founded. MannKind had announced that Kent Kresa, the former chairman and CEO of Northrup Grumman, will become chairman.[17-18] **EBDM**

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ABOUT THE EXPERT

KEITH D. MARKEY, PHD

Dr Markey is an analyst with Griffin Industries. He says MannKind's future depends on the deals it reaches in foreign markets.

The big question about Afrezza is why sales have been so poor, when supporters believed there would be strong demand for a product that would spare those with type 1 diabetes up to 1000 injections a year.

Is Soda the New Tobacco? An Expert, and New CDC Data, Say Yes

MARY CAFFREY

ABOUT THE EXPERT

MARION NESTLE, PHD, MPH

Dr Nestle is the Paulette Goddard Professor of Nutrition, Food Studies, and Public Health at New York University.

The way sugar-sweetened beverages have been marketed—so that get children hooked early, despite long-term health effects—is strikingly similar to how tobacco companies peddled cigarettes, both before and after the 1964 US Surgeon General's report highlighting the link between smoking and cancer.[1]

So argues Marion Nestle, PhD, MPH, in *Soda Politics*, a book that traces the history of how soda giants Coca-Cola and PepsiCo came to occupy their place in both our consciousness and our refrigerators. While US consumption of sugary drinks, especially soda, declined 25% between 1998 and 2014, that drop has been uneven in a way that also resembles tobacco: more sugary drinks are consumed in poorer states that are now plagued with higher rates of diabetes and obesity.

In her introduction, Nestle, the Paulette Goddard Professor of Nutrition, Food Studies, and Public Health at New York University, describes the revelation she experienced at a conference during the 1990s. Already very interested in the effect of sodas on health, she attended a talk on cigarette advertising to global markets, much of it aimed at children. "The speakers demonstrated how cigarette companies deliberately created their ads to blend into the surroundings and slip below the radar of conscious notice or critical thought," she writes. "I left that meeting convinced that those of us who care about diet and health ought to follow the lead of anti-smoking advocates and pay that same kind of close critical attention to the marketing of Coke and Pepsi."[1]

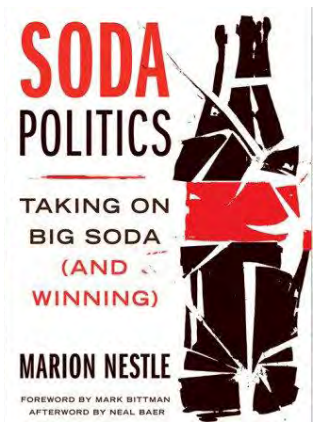
> **"I left that meeting convinced that those of us who care about diet and health ought to follow the lead of the anti-smoking advocates and pay the same kind of close critical attention to Coke and Pepsi."**
>
> MARION NESTLE, PHD, MPH, AUTHOR, *SODA POLITICS*

In gathering information for *Soda Politics*, one of Nestle's biggest challenges was obtaining data on how much soda is produced and consumed. For decades until 2003, the US Department of Agriculture (USDA) published data on the number of gallons of carbonated beverages produced by the industry, until the companies refused to allow publication. Nestle paid to gain access to the industry data, which show production leveling off and declining after 2003.

"The word is out that they're not good for you," Nestle said of soda and sugary drinks in an interview with *Evidence-Based Diabetes Management (EBDM)*. There's been a real shift in consumption patterns, she said, but that doesn't mean the beverage industry is giving up without a fight.

GETTING SODA OUT OF SNAP

Nestle is among the nutrition advocates who argue that tackling America's obesity and diabetes crisis means taking on the soda industry through a variety of means, from taxes to warning labels, and especially getting soda removed from eligibility for the Supplemental Nutrition Assistance Program (SNAP), better known as food stamps. The logic is the same as new laws that are banning smoking from public housing: taxpayers should not subsidize unhealthy behavior, the consequences of which drive up Medicaid and Medicare costs.



A 12-ounce can of Coke has 140 calories, 39 g of sugar, and no nutritional value. If the empty calories from soda are such an obvious cause of obesity, why does SNAP still pay for soda? Because, Nestle writes, the beverage companies have fought every attempt at reform. What sets her apart from many nutrition advocates is her ability to "follow the money" and show the connections between industry influence–peddling and health policy. (Her well-known blog, Food Politics, regularly calls out industry-funded nutrition studies that produce favorable results.)

For example, when New York City sought a waiver from USDA in 2011 to keep soda out of SNAP, she writes, the American Beverage Association (ABA) called it "another attempt by government to tell New Yorkers what they should eat and drink." ABA also targeted members of the Congressional Black Caucus (CBC) and urged them to get USDA to reject the waiver. Coke and Pepsi each also contributed to the CBC Foundation, in the range of $250,000.[1] (Right now, a New York State lawmaker is trying to get soda out of SNAP through legislation.[2])

The CBC contribution is a classic example of soda marketing that Nestle highlights: gifts to charitable causes, especially in minority communities, that build goodwill for soda companies. The soda giants are masters at seizing such moments: in January, Coke and Pepsi (along with Walmart) announced plans to distribute free water to public school children in Flint, Michigan, where lead contamination has made the public water system a health hazard.[3]

Nestle is not alone in taking aim at the soda giants. The Center for Science in the Public Interest (CSPI) has increasingly set its sights on Big Soda, calling for soda taxes and warning labels in order to get sugary drinks out of kids' menus, hospital settings, and government facilities.[4] As *EBDM* went to press, CSPI cited new data from CDC, which bolster Nestle's case that marketing of soda hits hardest on the poor and on minorities, with serious health consequences.[4,5]

And the soda companies, looking to replace lost revenue, have taken one more page from the cigarette manufacturers, Nestle writes: they have looked overseas for new customers, bringing soda to the developing world.

DATA SHOW LINKS WITH DIABETES AND OBESITY

A review of the CDC study, which covered 23 states and the District of Columbia in 2013, identified the share of the population that reported drinking at least 1 sugar-sweetened beverage per day, which could include a nondiet soda, a sweetened iced tea, a sugar-sweetened fruit drink, or a sports energy drink. States with the highest sugary drink consumption were Mississippi (47.5%), Louisiana (45.5%), and West Virginia, (45.2%).[5] According to 2013 data from CDC, these states rank second, seventh, and fourth, respectively, among the 50 states for incidence of diabetes per 100 population (see **TABLE**).[6]

TABLE. States With High Soda Consumption Rank High for Diabetes, Obesity.

STATE	SHARE DRINKING ≥ 1 SODA PER DAY (RANK)[1]	DIABETES INCIDENCE/100 POPULATION (RANK)[2]	OBESITY (RANK)[3]
Mississippi	47.5% (1st)	12.0 (2nd)	35.5% (3rd)
Louisiana	45.5% (2nd)	10.8 (7th)	34.9% (4th)
West Virginia	45.2% (3rd)	11.2 (4th)	35.7% (2nd)

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These states also had 3 of the 4 highest self-reported rates of obesity in the country in 2014, according to the Behavioral Risk Factor Survey System. After Arkansas' rate of 35.9%, West Virginia reported 35.7%, followed by Mississippi at 35.5% and Louisiana at 34.9%.[7] The CDC study also found that sugary

drink consumption was most common among the 18-to-24-year-old age group (43.3%), non-Hispanic blacks (39.9%), the unemployed (34.4%), and those with less than a high school education (42.4%).[5] CSPI called for action because the study found soda consumption is 1.5 times higher among blacks and 1.4 times higher among Hispanics than whites.[4]

RESEARCH, MARKETING, AND MONEY

Much like the tobacco companies before them, Nestle writes, the soda industry and its ally, the sugar industry, have flexed their muscles to open new markets in the developing world, removing any obstacles—including individuals who questioned the health effects of soda.

Nestle chronicles the saga of Derek Yach, MBChB, MPH, formerly of the World Health Organization (WHO). In 2006, he was working on the WHO strategy to extend worldwide the US recommended limits that no more than 10% of daily calories come from sugar. With no warning, Yach was pushed out of his research post. Leaked e-mails later revealed the role that US lobbyists played in getting senators from sugar- and corn syrup–producing states to threaten to cut WHO funding. The report Yach was working on lacked the 10% recommendation, but a report issued in 2015 did call for this limit.[8]

Yach then stunned former colleagues when he accepted a post with PepsiCo to run its global health strategy, to try to change the industry from within. In a response that Nestle published, Yach wrote that distrust of the industry is so massive that he was blackballed from publishing in many academic journals. He reported working with PepsiCo to reduce salt, sugar, and saturated fat in its food products, as well as reformulation strategies for many foods and beverages. He has since left PepsiCo to run the Vitality Institute.

Coca-Cola, meanwhile, copied the tobacco companies of the 1960s by funding research to deflect blame for soda's role in obesity. In her book, Nestle writes about this "physical activity diversion," and just after *Soda Politics* went to press, Coca-Cola's efforts massively backfired. In August 2015, *The New York Times* wrote the first of several stories that would expose that Coca-Cola had more than a funding role in the Global Energy Balance Network (GEBN), whose scholars found that lack of exercise, not calorie consumption, is responsible for obesity.[9] The University of Colorado returned a $1-million grant that had originated with Coca-Cola, and the network has since disbanded.[10]

To Nestle, the GEBN saga was shocking on one level, but not when taken in the context of where things had been headed. Previously, research backed by Coca-Cola had attacked the validity of the National Health and Nutrition Examination Survey (NHANES) data, which ask Americans about what they eat and drink to track consumption and public health trends. As Nestle writes, NHANES data, which have consistently found that about half of Americans drink soda on any given day, also find that about 20% drink more than 4 sodas a day and consumption begins when children are very young.

The media's ability to document how Coca-Cola was directing a research enterprise "was the smoking gun," Nestle said in the *EBDM* interview. "And the fallout has been extraordinary."

DOCUMENTING GLOBAL MARKETING

Nestle's *Soda Politics* is a road map through the paths that beverage companies have plowed into the fabric of American life through marketing, charitable gifts, and, increasingly, targeted outreach to minority groups, especially the growing Hispanic population. Despite this, public health leaders have succeeded in pushing back against Big Soda: a massive change came in 2013 when McDonald's stopped offering soda as the default option with Happy Meals. After 2 years, the share of children ordering soda dropped from 56% to 48%.[11]

Since the Yach incident, advocacy groups are singling out WHO to do more to lead efforts against soda consumption. In February, CSPI issued a report, Carbonating the World, that documents levels of global investment by the soda companies as US consumption has ebbed.[12] The group found that Coca-Cola has invested $12.4 million in Mexico, which leads the world in obesity; other investments include $7.6 billion in Brazil, $17 billion on the African continent, $4 billion in China, $5 billion in India, and $1.2 billion in the Philippines.[12]

Both *Soda Politics* and the CSPI report discuss at length marketing efforts that reach children, and neither is swayed by industry's claims of improved behavior. Nestle spends an entire chapter picking apart the guidelines that bar "direct" advertising when 35% of the audience is under age 12. Like Nestle, the CSPI authors draw multiple comparisons to earlier efforts by Big Tobacco to take their strategies abroad once US sales declined.[1,12]

In response to the CSPI report, the International Council of Beverage Associations (ICBA) called beverage companies "good global citizens" and said the report "ignores the economic importance of jobs and the investments beverage companies bring to the hundreds of thousands of employees and their families." ICBA took particular exception to the claims about marketing to children, saying that tests show 94% compliance with the advertising guidelines in every market.[13]

Nestle is encouraged by the advocacy work she sees, but said more needs to be done. "There is interest in tax initiatives in a lot more locations," she said, and more papers about to be published, but the long road of public education remains. It's a matter of getting children to drink water, getting the FDA to put "added sugar" on food labels, and promoting a simple message: "We shouldn't be drinking sugar." **EBDM**

Much like the tobacco companies before them, Nestle writes, the soda industry and its ally, the sugar industry, have flexed their muscles to open new markets in the developing world.

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Medical World News®

RESEARCH REPORT

Aflibercept Outperforms Bevacizumab for DME in Patients With Moderate Vision Loss

MARY CAFFREY

Results of a 2-year trial show that patients who have already experienced moderate vision loss from diabetic macular edema (DME) would be better off using aflibercept (Eylea) than trying to get by with a cancer drug that some have used for the condition to save money.[1] The National Institutes of Health (NIH) issued a press release February 29, 2016,[2] to announce results of the study, conducted by the Diabetic Clinical Research Network and funded by the National Eye Institute.

Aflibercept and ranibizumab (Lucentis) are approved by the FDA specifically to treat DME and other ocular conditions, while bevacizumab (Avastin), another drug in the class of vascular endothelial growth factor (VEGF) inhibitors, is approved to treat a number of metastatic cancers. The NIH study first reported results a year ago and found a clear advantage for aflibercept for patients with vision of 20/50 or worse at the start of treatment.[3] At the 2-year mark, however, the FDA-approved treatments aflibercept and ranibizumab showed no statistical difference for patients who started with at least moderate vision loss (20/50 or worse). For those with vision of 20/32 to 20/40 at the start of treatment, all 3 drugs produced about the same results, according to the NIH statement.[2]

DME occurs when diabetes progresses to the point that central vision blurs due to leakage of fluid from abnormal blood vessels in the retina. The macula is the area of the retina used when looking straight forward. During treatment, the drug is injected into the eye and blocks the VEGF that normally promotes blood vessel growth and causes the leakage. Although the 3 therapies have a similar mechanism of action, they differ substantially in cost, with bevacizumab costing $60 a dose compared with $1850 for aflibercept and $1200 for ranibizumab.[2]

Besides varying results, dosing protocols are different: both aflibercept and ranibizumab require dosing every 4 weeks for the first 5 cycles, but then aflibercept only requires dosing every 8 weeks. A 2015 analysis by Adverse Events, now Advera Health Analytics, found that this difference, among others, meant that aflibercept was actually more cost-effective in the long run.[4]

The study enrolled 660 patients at 89 clinical trial sites; participants could have type 1 or type 2 diabetes and the average age was 61 years. Participants were randomly assigned to take one of the 3 study drugs and then were evaluated once a month for the first year and between every 4 and 16 weeks during the second year.[1] According to the NIH, most participants received monthly injections during the first 6 months and then additional injections until DME resolved or vision did not improve. Injections could resume if DME worsened, and laser treatments could be added if DME persisted. Before the anti-VEGF class of therapies became standard, laser treatment was the only option for patients with DME.[2]

John A. Wells, MD, the lead author of the study and a specialist at Palmetto Retina Center in Columbia, South Carolina, said, "The study suggests there is little advantage of choosing Eylea or Lucentis over Avastin when a patient's loss of visual acuity from macular edema is mild, meaning visual acuity is 20/40 or better. However, patients with 20/50 or worse vision loss may benefit from Eylea, which over the course of the 2-year study, outperformed Lucentis and Avastin."[2]

The number of injections needed was about the same for all 3 treatment groups, according to the statement from NIH. **EBDM**

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5-Year Study Finds Liraglutide Reduced Risk of Major CV Events

MARY CAFFREY

Topline results show that liraglutide, marketed for patients with type 2 diabetes as Victoza, reduced the risk of major adverse cardiovascular events for these patients over a 5-year period.

Results of the LEADER trial were reported March 4, 2016, by drug maker Novo Nordisk, which also markets a different dose of liraglutide for patients with obesity under the brand name Saxenda.[1] Liraglutide is a glucagon-like peptide (GLP-1) receptor agonist; it is approved in 1.2-mg and 1.8-mg doses for the treatment of type 2 diabetes (T2D). The larger 3-mg dose is approved to treat obesity.

According to a statement from Novo Nordisk, the trial in 9000 adult patients compared the addition of either liraglutide or placebo to standard of care and met the primary endpoint of showing noninferiority as well as demonstrated superiority, with a statistically significant reduction in cardiovascular risk. The primary endpoint of the study was defined as the composite outcome of the first occurrence of cardiovascular death, nonfatal myocardial infarction, or nonfatal stroke. The superior reduction of major adverse cardiovascular events demonstrated by liraglutide was derived from all 3 components of the endpoint. Safety outcomes were consistent with previous clinical trials.

"People with type 2 diabetes generally have a higher risk of experiencing major adverse cardiovascular events. That's why we are very excited about the results from LEADER, which showed that Victoza, in addition to helping people with type 2 diabetes control their blood sugar levels, also reduces their risk of major adverse cardiovascular events," said Mads Krogsgaard Thomsen, executive vice president and chief science officer of Novo Nordisk.

Novo Nordisk's statement said full results will be presented at the 76th Scientific Sessions of the American Diabetes Association, to be held in New Orleans in June 2016.[1] **EBDM**

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CMS, AHIP Align and Simplify Quality Measures With 7 Core Sets

LAURA JOSZT

A collaboration led by CMS and America's Health Insurance Plans (AHIP) has resulted in 7 sets of core quality measures created to support quality improvement and provide better alignment. The measures, developed as part of a broad Core Quality Measures Collaborative of healthcare system participants, are an effort to reduce complexity for reporting clinicians, decrease cost burden to consumers and the system, and ensure high-quality care for patients.

"In the US healthcare system, where we are moving to measure and pay for quality, patients and care providers deserve a uniform approach to measure quality," CMS Acting Administrator, Andy Slavitt, said in a statement. "This agreement… will reduce unnecessary burden for physicians and accelerate the country's movement to better quality."

The core measures released—meant to be implemented in several stages—are in the following 7 sets:

- Accountable care organizations, patient-centered medical homes, and primary care
- Cardiology
- Gastroenterology
- HIV and hepatitis C
- Oncology
- Obstetrics and gynecology
- Orthopedics

While CMS is already using measures from the core sets, it plans to implement new core measures while eliminating those that are redundant. The Health Care

Payment Learning and Action Network will integrate the measures, as will commercial health plans when their contracts come up for renewal.

Helen Burstin, MD, MPH, chief scientific officer of the National Quality Forum (NQF), who also participated in the collaborative's efforts, called the agreement on core measures sets "an important step" toward making healthcare more effective and efficient.

"Clinicians need fewer, and more meaningful measures that reduce the burden of reporting multiple quality measures to different entities and take time away from direct patient care," Burstin said in a statement. "And consumers need measures that provide actionable information to better inform healthcare decisions."

NQF-provided technical assistance, and many of the core measures, are already endorsed by the organization.

The core measure sets will be reviewed on an ongoing basis and the collaborative will develop a process to ensure the measure sets reflect the most up-to-date evidence.

"The collaborative's efforts are a critical step forward in improving health outcomes and quality care for patients," Carmella Bocchino, executive vice president of AHIP, said in a statement. "This process will ensure measures and reporting are consistent across programs in both the private and public sectors." **EBDM**

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When Quality Fails Patients: *Finding the Best in Diabetes Care*

(CONTINUED FROM COVER)

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Arguably, goals and targets are not developed for clinicians and patients to achieve them, but to draw attention to problems in treating and living with diabetes, and open consideration of each patient's situation.

We find ourselves in a situation in which quality targets may not be helping, and in some cases, may be harming patients struggling with the hard work of living with diabetes.[5] Consider the case of Maria, a single mother of 3 who works 2 part-time jobs while living with type 2 diabetes and hypertension. Over the last 2 years, she has partnered with her primary care clinician to improve her diabetes control. During this time, she has worked on improving her diet and regularly taking 2 oral antidiabetic drugs, and a daily injection of long-acting insulin. Her A1C has dropped from 14% to 8%, she has lost weight, and she has been free of hypoglycemia. This is an achievement that Maria and her clinician consider worthy of celebration. Yet, in order to meet a reimbursement-tied A1C quality target <7.5%, she would likely need to switch to a self-managed and complex multi-dose insulin program. This approach is both demanding and expensive. This program will add a financial and treatment burden that may compete with, and even compromise, her ability to maintain the positive lifestyle changes that she has achieved, while contributing to weight gain and hypoglycemia. Is achieving the A1C target really the best for this patient? Was the clinic really not providing high quality care when her A1C dropped from 14% to 8%? Furthermore, are these "wins" not particularly relevant for practices that serve populations with difficult living conditions and poor health profiles, in which the resources to implement complex treatments are more limited? Perversely, by tying reimbursement to strict A1C targets, payers may be penalizing practices that are serving populations, most challenged by the demands of living with diabetes, and rewarding practices that actively exclude those patients from care.

HOW DID WE GET HERE?

Diabetes care is a practice that is rampant with measures—it is through these measures that we commonly detect diabetes, in the first place, and monitor the progression of a disease that often remains asymptomatic. The Diabetes Quality Improvement Project (DQIP), in the early 2000s, proposed A1C, lipid testing, LDL ≤ 130, blood pressure control, foot, eye and renal examinations as measures of diabetes care quality. These measures were widely adopted along with the Healthcare Effectiveness Data and Information Set (HEDIS),[6] and reflected what was easier to retrieve and report to payers or the public from medical records and laboratory results. They do not, however, take into account how care comes together to advance the situation of a given patient.

Many diabetes patients present with multiple competing conditions, many of which are also chronic.[7] Being chronic, these conditions invariably intertwine with one another and the economic, time, familial, and social burdens of day-to-day life. For these patients, it is harder to isolate diabetes as a discrete illness or to separate its management from the other demands of life. Early, single-disease-specific measures, that offer a narrow measure of quality such as A1C, neglect the quality and character of the work that patients and clinicians are doing in treating lives lived with diabetes.

GOALS AND WHAT IS BEST FOR THE PATIENT

Quality targets work well when they promote a practice that is effective, safe, and feasible, regardless of the presence of comorbidities and social and economic complications. In short, quality targets work well to drive compliance when medical science clearly knows what is best for the patient. Most diabetes care fails this criterion. Lowering A1C to <7.5%, for example, is associated with modest beneficial effects, at best, for the average patient.[8] In Maria's case, it is difficult, and likely futile, to isolate diabetes as an object of care given the complex tapestry of personal, social, and economic concerns that characterize her situation. Achieving levels of A1C <7.5% is clearly possible, yet it is not clear that in achieving this target we are providing high-quality care for Maria.

Contemporary diabetes care is not a practice of clearly knowing what is best and applying that knowledge to achieve high-quality care. Diabetes care is practiced in conditions in which it is far from clear what the best course of action is for the individual patient and her family. Goals such as quality targets that dictate action in situations where we clearly know what is best for a patient and her family, do not necessarily work in situations in which we remain uncertain as to what "best" is.[9]

In the context of the intellectually, practically, and emotionally troubling situations of life with comorbid diabetes, medicine must go beyond the application of knowledge. It must partner with patients to create courses of action that address the specific challenges of each patient. When what is best is unclear, processes must be found to find a coherent way forward. These may include activities such as shared decision making—a deliberative act in which patients and clinicians think and talk through hypotheses of how to proceed.[10] In the course of these conversations, goals may emerge—for example, to work on strengthening the patient's mental state and supportive relationships so that she can better deal with challenges. These situational goals, however, will have different qualities than existing fixed targets, specifically:

1. Situational goals arise in order to attend to the problem of an individual's situation. In so doing, a goal will help to discern, from the tangle of contextual complications, the nature of the particular problem that currently requires action, along with the means by which the problem may possibly be addressed.
2. Because the function of a situational goal is to help clinicians deal with the problem of a patient's particular situation, it is integrally connected to the problem at hand. In contrast, external arbiters apply fixed quality targets without regard for their applicability to the problems faced by each patient.
3. Situational goals are flexible and respond to changes in circumstances—as the problems of life with diabetes change, patients and clinicians will develop changing goals to attend to new circumstances.

Fixed quality targets are not intended to attend to the problems of living with and treating diabetes. More commonly, they are adapted to problems of policy, organizational management, and safety. There are significant challenges in all of these aspects of providing diabetes care, and fixed quality targets undoubtedly have a role to play in ensuring that best practices are followed. We should, however, be mindful of the problems that targets were designed to address and modify them when they no longer serve. In some cases, targets like, A1C, belong to a time when the problem of getting a quality measure implemented was more important than getting the right measure implemented.

Arguably, goals and targets are not developed for clinicians and patients to achieve them, but to draw attention to problems in treating and living with diabetes, and open consideration of appropriate ways to address them, given each patient's situation. Nothing is more frustrating for clinicians than to feel pushed to do the wrong thing for a patient by a misguided quality target. If quality targets are designed to improve our practice, then these targets should promote the best practices of patient-clinician collaboration to address the problems of life with comorbid diabetes. This may include, as in the case of Maria, knowing when to celebrate. We may then find that quality in diabetes care is not the application of what medical science knows to be best. Rather, it is finding kind and careful ways forward when what is best is far from clear.

ACKNOWLEDGMENTS

For the last decade, the Patient Advisory Group, a group of patients with diabetes from the community, has met with investigators of the KER Unit, at Mayo Clinic, to ground their work on what matters to patients. The insights developed here would not have been possible without their generous contribution to the science of healthcare.

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AUTHOR CONTRIBUTIONS

IH and VMM conceived and designed the outline for the manuscript. IH drafted the manuscript. RRG and VMM contributed to manuscript critical appraisal and review. VMM is the guarantor of this study. All authors had full access to all of the data and take responsibility for the integrity of the data and the accuracy of data. All authors reviewed and agreed on the final version of the manuscript. **EBDM**

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Getting to Better Care and Outcomes for Diabetes Through Measurement

(CONTINUED FROM COVER)

lead national collaboration to improve health and healthcare quality through measurement. One way that NQF fulfills this mission is to endorse performance measures. Measures endorsed by NQF undergo a stringent evaluation by multistakeholder committees comprised of clinicians and other experts from hospitals and other healthcare providers, employers, health plans, public agencies, community coalitions, and patients—many of whom use measures on a daily basis to ensure better care. NQF-endorsed measures undergo routine reevaluation to ensure that they are still the best available measures and reflect current scientific knowledge. Because NQF's endorsement process is rigorous, fully transparent, and powered by multistakeholder consensus, performance measures endorsed by NQF are considered to be those most likely to facilitate achievement of high quality and efficient healthcare for patients and their families.

NQF'S PORTFOLIO OF DIABETES MEASURES

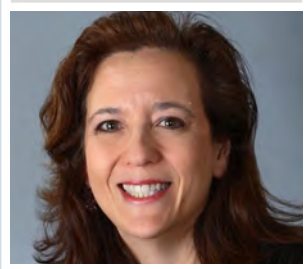
Currently, NQF has a portfolio of 35 endorsed diabetes measures. Many of these measures are among NQF's longest standing measures, several of which have been endorsed since 2002. Many measures in the portfolio are currently used in various public and/or private accountability and quality improvement programs, including public reporting and pay-for-performance programs administered by CMS.

In an effort to illuminate a path forward for diabetes quality measurement, in 2008, a panel of diabetes and measurement experts, convened by NQF, developed a measurement framework for diabetes[2] (see **FIGURE**). This framework reflects the full spectrum of the disease by incorporating 4 trajectories specific to diabetes type and related outcomes and comorbidities. Key measurement opportunities, portrayed in the framework, include prevention through behavioral and lifestyle interventions, as well as glycemic, lipid, and blood pressure management (phase 1); ongoing management that also incorporates the prevention, screening, diagnosis, and early treatment of complications (phase 2); and management and treatment of complications (phase 3). This framework can be used both to map and assess existing performance measures for diabetes as well as to highlight gaps in measurement. NQF's Endocrine Standing Committee, which is responsible for evaluating many of the measures in the diabetes portfolio, reevaluated this framework in 2014 but made no changes.

NQF's portfolio of diabetes measures includes at least a few measures for each of the 3 phases in the measurement framework. These include measures focusing on:

- Weight and body mass index (BMI)
- Eye care
- Foot care

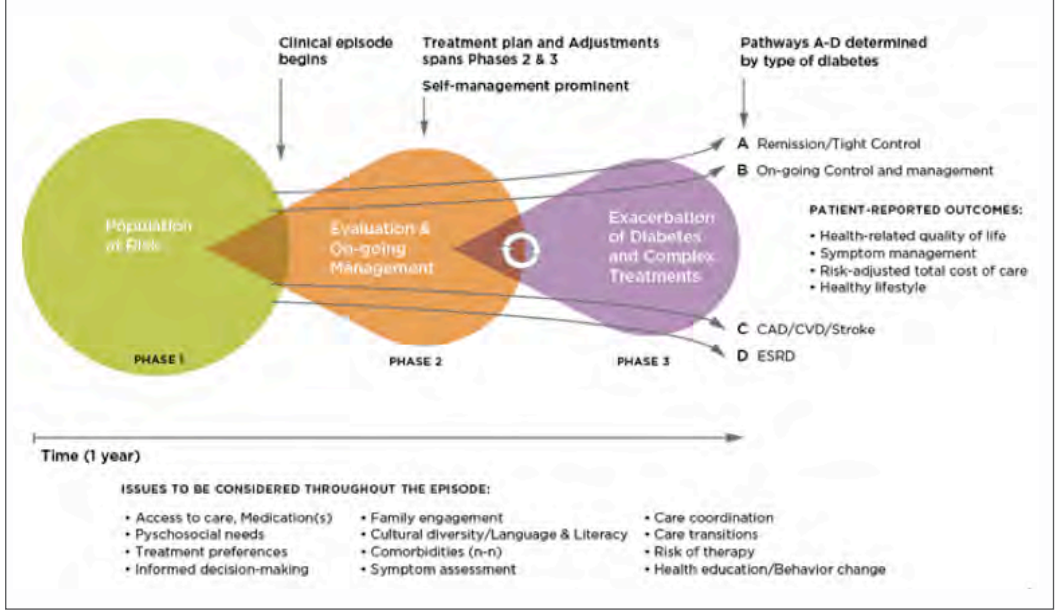
ABOUT THE AUTHOR



HELEN BURSTIN, MD, MPH

Dr Burstin is chief scientific officer, National Quality Forum.

FIGURE. Healthcare Performance Measurement Framework for Diabetes



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- Blood glucose control
- Angiotensin-converting enzyme inhibitor/angiotensin receptor blocker (commonly known as ACEI/ARB) therapy and blood pressure control
- Screening for kidney disease
- Medication adherence
- Hospital admissions for complications
- Rate of lower-extremity amputations
- Per capita resource use for health plans

NQF's portfolio of diabetes measures now addresses, at least to some extent, several of the issues and gaps in measurement identified by the expert panel convened in 2008.

NQF's portfolio of diabetes measures now addresses, at least to some extent, several of the issues and gaps in measurement identified by the expert panel convened in 2008, including expanding measurement to include hospitals and other care settings and providers, measuring resource use, and updating measures, as needed, when clinical evidence changes. Specifically, many of the measures in the current portfolio assess performance for individual clinicians or groups of clinicians, as well as for health plans, a few assess hospital performance, one assesses performance of home health agencies, and a few reflect population health. Two-thirds of the measures assess various processes of care (eg, foot exams, eye care), while the remaining measures assess intermediate clinical outcome measures (eg, good and poor glucose control, blood pressure control, and inpatient days with hyperglycemia or hypoglycemia), population-level health outcomes (eg, amputation rate), and resource use.

The portfolio also includes one all-or-none composite measure that assesses the percentage of patients who have their glucose and blood pressure under control, are taking statins, are non-smokers, and take aspirin or anti-platelet medications if they have ischemic vascular disease. Minnesota Community Measurement (MNCM), the developer of this measure, considers this a patient-centric approach to measurement because individuals with diabetes are more likely to avoid or postpone long-term complications of the disease if they can *simultaneously* reach target blood glucose and blood pressure, take other appropriate medications, and not smoke. MNCM has recently updated this measure to reflect the new cholesterol management guidelines released by the American College of Cardiology and the American Heart Association.[3]

Importantly, 2 of the newest measures in the portfolio, developed under contract to CMS, are some of the first de novo "eMeasures" endorsed by NQF. These measures, which assess the number of inpatient hospital days during which the patient is either hyper- or hypoglycemic, are calculated directly from hospital electronic health records (EHRs). Finally, several of the measures in the portfolio, that were developed by the National Committee for Quality Assurance, are specific to patients who, in addition to diabetes, also have serious mental illness—a high-risk subgroup that is of particular interest within the Medicaid and dual-eligible populations.

WE NEED MORE AND BETTER MEASURES

Clearly, however, many of the issues noted in the measurement framework (eg, need for consideration of access, psychosocial needs, and therapy risk) are not addressed by the measures currently included in NQF's diabetes portfolio. Moreover, the portfolio does not yet include measures based on patient-reported outcomes (eg, patient/family engagement, shared decision-making, etc). Also, although noted as a priority for future measure development by the 2008 expert panel, no new measures of primary prevention of type 2 diabetes have been added to the portfolio.

During its most recent deliberations, the Endocrine Standing Committee identified numerous areas where additional measure development is needed. Some of the most important gaps identified by the Committee include measures for prediabetes or metabolic syndrome and measures of the occurrence and severity of hypoglycemia, particularly among the elderly and in the ambulatory setting. The Committee also noted the need for measures that assess change in intermediate clinical outcomes (eg, glycated hemoglobin or A1C levels) over time and/or across settings of care. Yet, development of such measures likely will be challenging and, potentially, controversial. For example, decisions regarding threshold levels (eg, what constitutes good control of blood glucose levels) are complicated when there is also a need to provide individualized care, allow for patient involvement and choice in decision making, and address the issue of diabetes in the likely context of multiple chronic conditions. Likewise, there are methodological challenges in the development of longitudinal measures—measures that assess care across time—that must be addressed, such as how to attribute outcomes of care to specific providers, which time points should be used in measurement, small sample sizes due to attrition in patient panels over time, etc.

In diabetes, there is a strong measurement base on which to build the next generation of measures. We anticipate that diabetes measures will increasingly reflect the voice of the patient and the vital role of self-management. Further, as the electronic infrastructure improves, critical data accessible in EHRs and patient devices will be leveraged in measurement. As these gaps are filled, measurement will continue to drive improvement in the lives of people living with diabetes. **EBDM**

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Measuring the Quality of Diabetes Care

(CONTINUED FROM COVER)

diabetes has been a focus of performance measurement for many years, and it stands as one of the first conditions for which disease-specific indicators based on evidence-based clinical guidelines have been used to evaluate the quality of care and preventive services.[2-4]

Standardized performance measures are needed in order to assess the quality of care in the United States. CMS, the National Committee on Quality Assurance (NCQA), and the American Diabetes Association (ADA) led the first national effort to develop a set of performance measured for diabetes.[2] The Diabetes Quality Improvement Program measures were first adopted by NCQA to use in the Healthcare Effectiveness Data and Information Set (HEDIS) and subsequently widely adopted for performance assessment in commercial, Medicare, and Medicaid health plans.

CURRENT STATUS OF DIABETES PERFORMANCE MEASURES

Process Measures

These measures are the specific steps in a process that lead—either positively or negatively—to a particular outcome metric. It is easy to identify simple processes such as periodic testing for A1C, LDL cholesterol, microalbuminuria, or retinal examination. This could be done through medical records or health claims. The proportion of patients receiving these processes of care has recently increased.[5] However this does not necessarily translate into improvements in key intermediate outcomes such as A1C, BP, and LDL-C.[6,7] This discrepancy between processes and outcomes raises concern about the value of some process quality indicators and the need to develop alternative process indicators more closely linked to intermediate outcomes of care.

INTERMEDIATE OUTCOME MEASURES

Intermediate outcome measures are strongly linked to health outcomes. Adequate control of intermediate outcomes such as A1C, BP, and LDL levels have been included in most diabetes quality measurement sets. It has been shown that control of risk factors is related to improved outcomes, although this is dependent on patient factors as well as the strategies used to modify these factors.[8]

Limitations of Diabetes Quality measures

Simple reliance on measuring and reporting processes is unlikely to have substantial impact on patient outcomes, and improvement in process measures can no longer be taken as evidence that quality of care has improved.[9] However, process measures can be helpful in quality improvement efforts since they often change first and can indicate some changes in healthcare delivery. Performance measures based on control of risk factors such as A1C, BP, and LDL cholesterol are appealing because these risk factors predict clinical outcomes. However, this approach is complex and holds challenges. Multiple factors can contribute to the control of risk factors, and these could be patient-related (eg, patient behavior, demographics, and comorbidities) and/or provider-related (eg, inadequate escalation of therapy and clinical inertia). Most performance measures have set dichotomized thresholds expressed as a percentage at goal. Although thresholds are simply reported and collected, they obscure the need to individualize goals based on comorbidities and other patient characteristics.

NEW OPPORTUNITIES FOR QUALITY MEASUREMENT IN DIABETES

Individualized glycemic control and multifactorial risk reduction are the cornerstones of high-quality diabetes care. Many trials failed to show increased cardiovascular benefit with aggressive glucose control.[10-12] Since then, there has been emphasis on individualized glycemic targets based on age, coexisting conditions, time since the diagnosis of diabetes, and socioeconomic profile.[13] However, the nature of the individualization makes it a challenge to evaluate the achievement of goals of care in the entire population.

During a consensus-development conference convened by the ADA to discuss the future of performance measurement, experts identified several new opportunities for quality measurement in diabetes.[14] These include:

1. Clinical action measures
2. Weighted quality measures
3. Personalized risk-based quality measures
4. Measures of over treatment
5. Quality measures for primary prevention of diabetes
6. Incorporating measures of adherence into performance measures
7. Incorporating costs into quality measures
8. Using performance measurement to reduce, not worsen, health disparities

Improved quality measures will need to be electronically extractable, result in better quality of care, and be included in EHR so they can be queried to identify individuals with gaps in care. Since many of the items described by the ADA consensus panel have yet to present in most EHRs, attempts to individualize goals for patient groups will require a more focused approach.

JOSLIN CLINICAL ANALYTIC TOOL

At present, the quality of diabetes care is usually assessed by the NCQA and CMS. However, these measures are crude, not adjusted for patient mix, do not reflect data from recent clinical trials to individualize goals, and do little to inform clinicians about specific gaps in care or about which interventions would most benefit their patients.

The Joslin Clinical Analytic Tool (JCAT) was developed to address this deficiency. We currently use JCAT to measure clinical quality of care in our national affiliate network, including primary care practices. It captures data from the EHR for analysis and grades the quality of care of individual providers and entire clinics, and across health systems.

By identifying prescribing patterns in relation to outcomes, JCAT identifies those patients who have more advanced disease and whose disease is difficult to treat. JCAT results will identify opportunities for improvement that can better direct continuous quality improvement projects.

Description of JCAT

The JCAT engine requires readily available data on biomarkers, medications, dates of service, and basic demographics to generate quality scores at the practice and individual-provider level, along with a detailed report covering outcomes in 5 areas, breaking each of these areas into 2 to 5 subgroups. The report discusses each of the specific diabetes care gaps identified and presents comparisons to other providers, practices, and national benchmark data.

The areas and subgroups include:
- glycemic control: 5 subgroups
- BP: 4 subgroups
- lipids, focusing on LDL cholesterol: 2 subgroups
- renal function: 2 subgroups
- smoking: 2 subgroups

By stratifying the population of individuals with diabetes into these treatment groups, subpopulations that are most appropriate for targeted quality improvement efforts are identified. The utility of this grouping can be seen by using A1C and BP. JCAT separates people with early (using 0-2 antihyperglycemic medications), intermediate, and more com-

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Multiple factors can contribute to the control of risk factors, and these could be patient-related and/or provider-related.

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It is clear that the current dichotomized HEDIS and NCQA metrics fail to account for the need to individualize care as recommended by the ADA, the AADE, and others.

plex, and typically longer-duration, diabetes (involving basal and bolus insulin treatment). Although JCAT identifies gaps in all 3 groups, targeting the first 2 groups may be more effective and easier to improve than the more advanced group. The goals have been set based on landmark diabetes studies. It has been shown that a lower A1C is associated with reduction in microvascular complications and may reduce long-term cardiovascular disease rates.[15-17] It has been suggested that targeting a lower A1C is beneficial during the early period after diagnosis of diabetes, while a higher goal is advised[12,17] later in disease, the surrogate of disease stage being medical complexity and hence escalation in anti-diabetes therapy.

Similarly, for BP control, JCAT groups patients based on the number of anti-hypertensive medications they are taking. Those on 3 or more anti-hypertensive medications have less benefit and increased risk side effects, from treatment intensification.

The JCAT report also comprises a table of current practice medication usage including combinations and most used therapies; this is also compared to other practices and national data. If requested, this data can be informed by relevant pharmacy formularies.

Rationale for JCAT

Several recent studies have examined the relationship between HEDIS and NCQA scores and what happens to scores when patient mix or regimen complexity is taken into consideration. The JCAT tool, by adjusting for disease severity and other factors, more accurately assesses the effectiveness of treatment being delivered to a population with a variety of patient characteristics.

JCAT can be used to complement current quality metrics by identifying addressable gaps in care. By using clinical and prescription data from patient charts and EHRs, patients are stratified into appropriate treatment groups. Because of this stratified approach, the tool is applicable to any care setting and any patient mix, and will accurately pinpoint subpopulations in need of targeted quality intervention.

CONCLUSION

Tracking quality of care indicators nationwide is essential, not only to simply assess physician performance, but to plan and implement successful quality improvement measures. It is clear that the current dichotomized HEDIS and NCQA metrics fail to account for the need to individualize care as recommended by ADA, the American Association of Clinical Endocrinologists, and others. A key barrier to optimal quality metrics is access to data, and for now, many providers are limited to what is captured in EHRs. These can and will be augmented by claims data that could flow more quickly to providers to identify care gaps and opportunities for improvement.

The evidence base in diabetes is rapidly evolving. Debates over how to optimize performance indicators continue. More nuanced measures and innovative quality indicators that are evidence-based and patient-centered will continue to evolve. Patients, providers, and systems must all play a role in establishing diabetes outcome measures. **EBDM**

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EYLEA® (aflibercept) Injection For Intravitreal Injection

BRIEF SUMMARY OF FULL PRESCRIBING INFORMATION

For complete details, see Full Prescribing Information.

1 INDICATIONS AND USAGE

EYLEA® (aflibercept) Injection is indicated for the treatment of patients with Neovascular (Wet) Age-Related Macular Degeneration (AMD), Macular Edema following Retinal Vein Occlusion (RVO), Diabetic Macular Edema (DME), and Diabetic Retinopathy (DR) in Patients with DME.

2 DOSAGE AND ADMINISTRATION

2.1 Important Injection Instructions. For ophthalmic intravitreal injection. EYLEA must only be administered by a qualified physician.

2.2 Neovascular (Wet) Age-Related Macular Degeneration (AMD). The recommended dose for EYLEA is 2 mg (0.05 mL or 50 microliters) administered by intravitreal injection every 4 weeks (monthly) for the first 12 weeks (3 months), followed by 2 mg (0.05 mL) via intravitreal injection once every 8 weeks (2 months). Although EYLEA may be dosed as frequently as 2 mg every 4 weeks (monthly), additional efficacy was not demonstrated when EYLEA was dosed every 4 weeks compared to every 8 weeks.

2.3 Macular Edema Following Retinal Vein Occlusion (RVO). The recommended dose for EYLEA is (0.05 mL or 50 microliters) administered by intravitreal injection once every 4 weeks (monthly).

2.4 Diabetic Macular Edema (DME). The recommended dose for EYLEA is (0.05 mL or 50 microliters) administered by intravitreal injection every 4 weeks (monthly) for the first 5 injections followed by 2 mg (0.05 mL) via intravitreal injection once every 8 weeks (2 months). Although EYLEA may be dosed as frequently as 2 mg every 4 weeks (monthly), additional efficacy was not demonstrated when EYLEA was dosed every 4 weeks compared to every 8 weeks.

2.5 Diabetic Retinopathy (DR) in Patients with DME. The recommended dose for EYLEA is 2 mg (0.05 mL or 50 microliters) administered by intravitreal injection every 4 weeks (monthly) for the first 5 injections, followed by 2 mg (0.05 mL) via intravitreal injection once every 8 weeks (2 months). Although EYLEA may be dosed as frequently as 2 mg every 4 weeks (monthly), additional efficacy was not demonstrated when EYLEA was dosed every 4 weeks compared to every 8 weeks.

2.6 Preparation for Administration. EYLEA should be inspected visually prior to administration. If particulates, cloudiness, or discoloration are visible, the vial must not be used. Using aseptic technique, the intravitreal injection should be performed with a 30-gauge x ½-inch injection needle. For complete preparation for administration instructions, see full prescribing information.

2.7 Injection Procedure. The intravitreal injection procedure should be carried out under controlled aseptic conditions, which include surgical hand disinfection and the use of sterile gloves, a sterile drape, and a sterile eyelid speculum (or equivalent). Adequate anesthesia and a topical broad–spectrum microbicide should be given prior to the injection.

Immediately following the intravitreal injection, patients should be monitored for elevation in intraocular pressure. Appropriate monitoring may consist of a check for perfusion of the optic nerve head or tonometry. If required, a sterile paracentesis needle should be available.

Following intravitreal injection, patients should be instructed to report any symptoms suggestive of endophthalmitis or retinal detachment (e.g., eye pain, redness of the eye, photophobia, blurring of vision) without delay (*see Patient Counseling Information*).

Each vial should only be used for the treatment of a single eye. If the contralateral eye requires treatment, a new vial should be used and the sterile field, syringe, gloves, drapes, eyelid speculum, filter, and injection needles should be changed before EYLEA is administered to the other eye.

After injection, any unused product must be discarded.

3 DOSAGE FORMS AND STRENGTHS

Single-use, glass vial designed to provide 0.05 mL of 40 mg/mL solution (2 mg) for intravitreal injection.

4 CONTRAINDICATIONS

EYLEA is contraindicated in patients with

- Ocular or periocular infections
- Active intraocular inflammation
- Known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as severe intraocular inflammation

5 WARNINGS AND PRECAUTIONS

5.1 Endophthalmitis and Retinal Detachments. Intravitreal injections, including those with EYLEA, have been associated with endophthalmitis and retinal detachments (*see Adverse Reactions*). Proper aseptic injection technique must always be used when administering EYLEA. Patients should be instructed to report any symptoms suggestive of endophthalmitis or retinal detachment without delay and should be managed appropriately (*see Dosage and Administration and Patient Counseling Information*).

5.2 Increase in Intraocular Pressure. Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including with EYLEA (*see Adverse Reactions*). Sustained increases in intraocular pressure have also been reported after repeated intravitreal dosing with vascular edothelial growth factor (VEGF) inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately (*see Dosage and Administration*).

5.3 Thromboembolic Events. There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as nonfatal stroke, nonfatal myocardial infarction, or vascular death (including deaths of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 out of 1824) in the combined group of patients treated with EYLEA. The incidence in the DME studies from baseline to week 52 was 3.3% (19 out of 578) in the combined group of patients treated with EYLEA compared with 2.8% (8 out of 287) in the control group; from baseline to week 100, the incidence was 6.4% (37 out of 578) in the combined group of patients treated with EYLEA compared with 4.2% (12 out of 287) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first six months of the RVO studies.

6 ADVERSE REACTIONS

The following adverse reactions are discussed in greater detail in the *Warnings and Precautions* section of the labeling:

- Endophthalmitis and retinal detachments
- Increased intraocular pressure
- Thromboembolic events

6.1 Clinical Trials Experience. Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in other clinical trials of the same or another drug and may not reflect the rates observed in practice.

A total of 2711 patients treated with EYLEA constituted the safety population in seven phase 3 studies. Among those, 2110 patients were treated with the recommended dose of 2 mg. Serious adverse reactions related to the injection procedure have occurred in <0.1% of intravitreal injections with EYLEA including endophthalmitis and retinal detachment. The most common adverse reactions (≥5%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, cataract, vitreous floaters, intraocular pressure increased, and vitreous detachment.

Neovascular (Wet) Age-Related Macular Degeneration (AMD). The data described below reflect exposure to EYLEA in 1824 patients with wet AMD, including 1223 patients treated with the 2-mg dose, in 2 double-masked, active-controlled clinical studies (VIEW1 and VIEW2) for 12 months.

Table 1: Most Common Adverse Reactions (≥1%) in Wet AMD Studies

Adverse Reactions	EYLEA (N=1824)	Active Control (ranibizumab) (N=595)
Conjunctival hemorrhage	25%	28%
Eye pain	9%	9%
Cataract	7%	7%
Vitreous detachment	6%	6%
Vitreous floaters	6%	7%
Intraocular pressure increased	5%	7%
Ocular hyperemia	4%	8%
Corneal epithelium defect	4%	5%
Detachment of the retinal pigment epithelium	3%	3%
Injection site pain	3%	3%
Foreign body sensation in eyes	3%	4%
Lacrimation increased	3%	1%
Vision blurred	2%	2%
Intraocular inflammation	2%	3%
Retinal pigment epithelium tear	2%	1%
Injection site hemorrhage	1%	2%
Eyelid edema	1%	2%
Corneal edema	1%	1%

Less common serious adverse reactions reported in <1% of the patients treated with EYLEA were hypersensitivity, retinal detachment, retinal tear, and endophthalmitis.

Macular Edema Following Retinal Vein Occlusion (RVO). The data described below reflect 6 months exposure to EYLEA with a monthly 2 mg dose in 218 patients following CRVO in 2 clinical studies (COPERNICUS and GALILEO) and 91 patients following BRVO in one clinical study (VIBRANT).

Table 2: Most Common Adverse Reactions (≥1%) in RVO Studies

Adverse Reactions	CRVO		BRVO	
	EYLEA (N=218)	Control (N=142)	EYLEA (N=91)	Control (N=92)
Eye pain	13%	5%	4%	5%
Conjunctival hemorrhage	12%	11%	20%	4%
Intraocular pressure increased	8%	6%	2%	0%
Corneal epithelium defect	5%	4%	2%	0%
Vitreous floaters	5%	1%	1%	0%
Ocular hyperemia	5%	3%	2%	2%
Foreign body sensation in eyes	3%	5%	3%	0%
Vitreous detachment	3%	4%	2%	0%
Lacrimation increased	3%	4%	3%	0%
Injection site pain	3%	1%	1%	0%
Vision blurred	1%	<1%	1%	1%
Intraocular inflammation	1%	1%	0%	0%
Cataract	<1%	1%	5%	0%
Eyelid edema	<1%	1%	1%	0%

Less common adverse reactions reported in <1% of the patients treated with EYLEA in the CRVO studies were corneal edema, retinal tear, hypersensitivity, and endophthalmitis.

Diabetic Macular Edema (DME). The data described below reflect exposure to EYLEA in 578 patients with DME treated with the 2-mg dose in 2 double-masked, controlled clinical studies (VIVID and VISTA) from baseline to week 52 and from baseline to week 100.

Table 3: Most Common Adverse Reactions (≥1%) in DME Studies

Adverse Reactions	Baseline to Week 52		Baseline to Week 100	
	EYLEA (N=578)	Control (N=287)	EYLEA (N=578)	Control (N=287)
Conjunctival hemorrhage	28%	17%	31%	21%
Eye pain	9%	6%	11%	9%
Cataract	8%	9%	19%	17%
Vitreous floaters	6%	3%	8%	6%
Corneal epithelium defect	5%	3%	7%	5%
Intraocular pressure increased	5%	3%	9%	5%
Ocular hyperemia	5%	6%	5%	6%
Vitreous detachment	3%	3%	8%	6%
Foreign body sensation in eyes	3%	3%	3%	3%
Lacrimation increased	3%	2%	4%	2%
Vision blurred	2%	2%	3%	4%
Intraocular inflammation	2%	<1%	3%	1%
Injection site pain	2%	<1%	2%	<1%
Eyelid edema	<1%	1%	2%	1%

Less common adverse reactions reported in <1% of the patients treated with EYLEA were hypersensitivity, retinal detachment, retinal tear, corneal edema, and injection site hemorrhage.

6.2 Immunogenicity. As with all therapeutic proteins, there is a potential for an immune response in patients treated with EYLEA. The immunogenicity of EYLEA was evaluated in serum samples. The immunogenicity data reflect the percentage of patients whose test results were considered positive for antibodies to EYLEA in immunoassays. The detection of an immune response is highly dependent on the sensitivity and specificity of the assays used, sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to EYLEA with the incidence of antibodies to other products may be misleading.

In the wet AMD, RVO, and DME studies, the pre-treatment incidence of immunoreactivity to EYLEA was approximately 1% to 3% across treatment groups. After dosing with EYLEA for 24-100 weeks, antibodies to EYLEA were detected in a similar percentage range of patients. There were no differences in efficacy or safety between patients with or without immunoreactivity.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy. Pregnancy Category C. Aflibercept produced embryo-fetal toxicity when administered every three days during organogenesis to pregnant rabbits at intravenous doses ≥3 mg per kg, or every six days at subcutaneous doses ≥0.1 mg per kg. Adverse embryo-fetal effects included increased incidences of postimplantation loss and fetal malformations, including anasarca, umbilical hernia, diaphragmatic hernia, gastroschisis, cleft palate, ectrodactyly, intestinal atresia, spina bifida, encephalomeningocele, heart and major vessel defects, and skeletal malformations (fused vertebrae, sternebrae, and ribs; supernumerary vertebral arches and ribs; and incomplete ossification). The maternal No Observed Adverse Effect Level (NOAEL) in these studies was 3 mg per kg. Aflibercept produced fetal malformations at all doses assessed in rabbits and the fetal NOAEL was less than 0.1 mg per kg. Administration of the lowest dose assessed in rabbits (0.1 mg per kg) resulted in systemic exposure (AUC) that was approximately 10 times the systemic exposure observed in humans after an intravitreal dose of 2 mg. There are no adequate and well-controlled studies in pregnant women. EYLEA should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

8.3 Nursing Mothers. It is unknown whether aflibercept is excreted in human milk. Because many drugs are excreted in human milk, a risk to the breastfed child cannot be excluded. EYLEA is not recommended during breastfeeding. A decision must be made whether to discontinue nursing or to discontinue treatment with EYLEA, taking into account the importance of the drug to the mother.

8.4 Pediatric Use. The safety and effectiveness of EYLEA in pediatric patients have not been established.

8.5 Geriatric Use. In the clinical studies, approximately 76% (2049/2701) of patients randomized to treatment with EYLEA were ≥65 years of age and approximately 46% (1250/2701) were ≥75 years of age. No significant differences in efficacy or safety were seen with increasing age in these studies.

17 PATIENT COUNSELING INFORMATION

In the days following EYLEA administration, patients are at risk of developing endophthalmitis or retinal detachment. If the eye becomes red, sensitive to light, painful, or develops a change in vision, advise patients to seek immediate care from an ophthalmologist (*see Warnings and Precautions*). Patients may experience temporary visual disturbances after an intravitreal injection with EYLEA and the associated eye examinations (*see Adverse Reactions*). Advise patients not to drive or use machinery until visual function has recovered sufficiently.

REGENERON

Manufactured by:
Regeneron Pharmaceuticals, Inc.
777 Old Saw Mill River Road
Tarrytown, NY 10591-6707

U.S. License Number 1760
EYLEA is a registered trademark of Regeneron Pharmaceuticals, Inc.

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Regeneron U.S. Patents 7,070,959; 7,303,746; 7,303,747; 7,306,799; 7,374,757; 7,374,758; 7,531,173; 7,608,261; 7,972,598; 8,029,791; 8,092,803; 8,647,842; and other pending patents.

LEA-0721

Discover Strength in efficacy

As demonstrated in phase 3 clinical trials in patients with Wet AMD, Macular Edema following RVO, DME, and DR in patients with DME

Choose EYLEA® (aflibercept) Injection from the start

Learn about EYLEA at EYLEA.us/op

INDICATIONS AND IMPORTANT SAFETY INFORMATION

INDICATIONS

- EYLEA® (aflibercept) Injection is indicated for the treatment of patients with Neovascular (Wet) Age-related Macular Degeneration (AMD), Macular Edema following Retinal Vein Occlusion (RVO), Diabetic Macular Edema (DME), and Diabetic Retinopathy (DR) in Patients with DME.

CONTRAINDICATIONS

- EYLEA® (aflibercept) Injection is contraindicated in patients with ocular or periocular infections, active intraocular inflammation, or known hypersensitivity to aflibercept or to any of the excipients in EYLEA.

WARNINGS AND PRECAUTIONS

- Intravitreal injections, including those with EYLEA, have been associated with endophthalmitis and retinal detachments. Proper aseptic injection technique must always be used when administering EYLEA. Patients should be instructed to report any symptoms suggestive of endophthalmitis or retinal detachment without delay and should be managed appropriately. Intraocular inflammation has been reported with the use of EYLEA.
- Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including with EYLEA. Sustained increases in intraocular pressure have also been reported after repeated intravitreal dosing with VEGF inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately.
- There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as nonfatal stroke, nonfatal myocardial infarction, or vascular death (including deaths of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 out of 1824) in the combined group of patients treated with EYLEA. The incidence in the DME studies from baseline to week 52 was 3.3% (19 out of 578) in the combined group of patients treated with EYLEA compared with 2.8% (8 out of 287) in the control group; from baseline to week 100, the incidence was 6.4% (37 out of 578) in the combined group of patients treated with EYLEA compared with 4.2% (12 out of 287) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first six months of the RVO studies.

ADVERSE REACTIONS

- Serious adverse reactions related to the injection procedure have occurred in <0.1% of intravitreal injections with EYLEA including endophthalmitis and retinal detachment.
- The most common adverse reactions (≥5%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, cataract, vitreous floaters, intraocular pressure increased, and vitreous detachment.

Please see brief summary of full Prescribing Information on the following page.

EYLEA is a registered trademark of Regeneron Pharmaceuticals, Inc.

REGENERON

EYLEA®
(aflibercept) Injection
For Intravitreal Injection

TARGETED SCIENCE

05/2015
LEA-0834