

Health Information Technology and Health System Redesign— The Quality Chasm Revisited

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UnitedHealth Group constructed the Diabetes Prevention and Control Alliance (DPCA) in a manner consistent with the recommendations for health system redesign outlined in the Institute of Medicine's *Crossing the Quality Chasm*. This evidence-based, multidisciplinary education and intervention program is enabled by a state-of-the-art health information technology (HIT) infrastructure. DPCA coordinates and connects a variety of interventions through HIT, including community-based services offered by YMCAs and local pharmacists. Our initial experience in operating DPCA gives us confidence that large-scale prevention and disease control management programs make economic sense, are worthy of front-end investment, and can achieve cost-effective results. Others who want to use our model will benefit from policymakers' efforts to prioritize future versions of transaction and coding standards that meet the needs of preventive healthcare as much as they do acute and chronic care.

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As the related epidemics of obesity and diabetes grow at staggering rates in the US population, our nation is producing important research, literature, and theory on their causation and on intervention strategies. We know what works. In 2002, the *New England Journal of Medicine* published the results of the landmark Diabetes Prevention Program trial, which demonstrated that a 16-session lifestyle intervention reduced the conversion to diabetes by 58%.¹ In 2003, the *Journal of the American Pharmaceutical Association* published the 5-year favorable results of the Asheville Project, which was designed to test, and which successfully demonstrated, the effect of non-traditional education and pharmacist-provided coaching guidance on the management of diabetes.² In the intervening 8 years since publication of the results of the Diabetes Prevention Program trial, there have been very few examples of initiatives that make these effective interventions broadly available to the growing numbers of people in need and that would result in significant financial savings for our nation. It is important to better understand why we have not seen more scalable solutions and how this challenge might be creatively addressed.

To be operationally scalable and financially sustainable, organizational innovation for the delivery of health services to prevent chronic illnesses and reduce health risks requires a combination of evidence-based interventions, population and other data necessary to identify people as high-risk individuals, information on clinical performance, the ability to structure consumer and provider incentives, and the health information and technology platforms necessary to implement all of these essential components.

Building on the successful Asheville Project, the Diabetes Ten City Challenge, and the Diabetes Prevention Program, UnitedHealth Group developed the Diabetes Prevention and Control Alliance (DPCA). This evidence-based, multidisciplinary education and intervention program is enabled by a state-of-the-art health information technology (HIT) infrastructure. Our experience in building this infrastructure to deliver a large-scale and economically feasible prevention initiative may provide lessons for other stakeholders interested in the convergence of HIT-enabling technologies and large-scale health promotion and disease prevention initiatives.

It has been almost 10 years since the Committee on Quality of Health Care in America, launched by the Institute of Medicine, called for a

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redesign of the American healthcare system to “deliver on the promise of state-of-the-art health care to all Americans.”³ In its landmark 2001 report, *Crossing the Quality Chasm*, the committee provided a 10-year blueprint for the evolution of the delivery system based on the following guidelines³:

- **Care based on continuous healing relationships.** Patients should receive care whenever they need it and in many forms (eg, in person, telephonically, over the Internet).
- **Customization based on patient needs and values.** The system should have the capability to respond to individual patient choices and preferences.
- **The patient as the source of control.** Patients should have the necessary information and the opportunity to exercise the degree of control over healthcare decisions that affect them.
- **Evidence-based decision making.** Patients should receive care based on the best available scientific knowledge.
- **Safety as a system priority.** Patients should be safe from injury caused by the care system.
- **The need for transparency.** The healthcare system should make information available regarding a provider’s outcomes, evidence-based practice, and patient satisfaction.
- **Anticipation of needs.** The system should anticipate patient needs rather than simply react to acute events.
- **Continuous decrease in waste.** The system should not waste patient resources or time.
- **Cooperation among clinicians.** Clinicians and institutions should actively collaborate and communicate to ensure an appropriate exchange of information and coordination of care.

Finally, and most relevant to this commentary:

- **Shared knowledge and free flow of information.** Patients should have unfettered access to their own medical information and to clinical knowledge. Patients and clinicians should communicate effectively and share information.

Making the committee’s vision come alive has been challenging. It is widely understood that the US healthcare system still falls short of meeting its goals. This is especially true with respect to advancing and leveraging HIT for the fulfillment of health system redesign to manage complex risk factors and diseases such as diabetes and obesity.

CHALLENGES OF OBESITY AND DIABETES

Obesity and diabetes are preventable chronic illnesses

exemplifying the need for HIT-enabled, multidisciplinary interventions. Conditions along the diabetes continuum—overweight, obesity, prediabetes, and diabetes—have emerged at the top of the list of our nation’s health challenges, despite the Surgeon General’s 2001 call to action to prevent and reverse them. The number of US adults with these conditions as of 2008 (based on a US adult population of 219,000,000) is concerning (**Table**).

As recently as August 2010, the Centers for Disease Control and Prevention (CDC) noted that “in 2009, no state met the *Healthy People 2010* obesity target of 15%, and the self-reported overall prevalence of obesity among U.S. adults had increased 1.1 percentage points from 2007.”⁷ The incidence of obesity in the United States has doubled since the 1980s.⁸ From 1980 through 2007, the number of Americans with diabetes tripled (from 5.6 million to 17.4 million).⁹

To control and reverse diabetes and its associated sequelae, interventions must address the following priorities:

- Early identification before prediabetes develops into the full-blown disease.
- More engagement, empowerment, and support for individuals to adopt personally appropriate lifestyle modifications, especially concerning diet and exercise.
- Recruitment of a comprehensive portfolio of community-based services necessary to augment the traditional clinical care delivery system.
- The capability to enroll identified individuals in these supplementary care programs.
- Improved individual and health professional compliance with evidence-based clinical guidance.
- Alignment of financial incentives for demonstrated care quality outcomes.
- Organization of access to necessary comprehensive interventions in a cost-effective and economically sustainable way.

DPCA: A NOVEL HIT-ENABLED DIABETES INITIATIVE

In response to the challenges noted above, UnitedHealthcare, supported by its sister companies at UnitedHealth Group, recently launched DPCA. This is a combination of a prevention program using the recently enhanced services of the YMCA (the Diabetes Prevention Program) and a pharmacy-based supplemental disease management program (the Diabetes Control Program) (**Figure 1**).

The Diabetes Prevention Program focuses on identifying at-risk individuals and providing them with access to specially trained counselors and newly enhanced resources at

■ **Table.** Incidence of Diseases Along the Diabetic Continuum in the United States

| Condition | Number With Condition | Percent With Condition | Number Undiagnosed | Percentage With Condition Undiagnosed |
|-----------------------|-------------------------|------------------------|--------------------------|---------------------------------------|
| Overweight or obesity | 150 million | 68.3 ⁴ | Unknown | Unknown |
| Prediabetes | 57 million ⁵ | 26.0 ⁴ | 50 million | ~90 ⁶ |
| Diabetes | 24 million ⁵ | 10.7 | 5.7 million ⁵ | 24 |

the YMCA to affect nutritional and exercise behaviors. The Diabetes Control Program recruits and empowers pharmacists to engage patients and supplement physician-directed care at the point of pharmacy dispensing. They identify potential complications and missed therapeutic opportunities in people already diagnosed with diabetes. Operated together as DPCA, these programs enhance both the prevention and treatment interventions necessary for optimal health outcomes for at-risk individuals.

The CDC- and National Institutes of Health-sponsored Diabetes Prevention Program and the Asheville Project informed the development of DPCA by demonstrating successful approaches and providing an evidence basis for diabetes interventions. The Diabetes Prevention Program, which studied more than 3000 people diagnosed with prediabetes, demonstrated that both lifestyle changes and drug treatment with metformin reduced the incidence of diabetes in high-risk individuals.¹ In fact, compared with placebo, lifestyle intervention reduced the incidence of diabetes by 58% versus a 31% reduced incidence of diabetes in metformin-compliant patients.¹

The Asheville Project was designed to test the effect of nontraditional education and pharmacist-provided coaching guidance for the management of diabetes.² Pharmacists in 12 community pharmacies were trained in a diabetes certificate program and reimbursed for providing the participants with education and counseling to monitor their illness. The outcomes of the study indicated that the average glycosylated hemoglobin (A1C) levels decreased at all follow-up visits, with more than 50% of patients demonstrating improvements each time. Also, the number of patients with ideal A1C levels (ie, <7%) increased at each follow-up visit, and more than 50% showed improvements in lipid levels at every measurement. Additionally, costs shifted from inpatient and outpatient physician services to prescriptions, with an annual net cost savings from \$1622 to \$3356. Sick days decreased every year from 1997 to 2001 for 1 employer group, with estimated increases in productivity estimated at \$18,000 annually.²

Based on these findings and on our own experience managing healthcare assets for millions of people with preventable chronic illness, UnitedHealth Group created DPCA.

UnitedHealth Group also chose to cover services provided at YMCAs and participating pharmacies at no charge to our employer-sponsored health insurance plan participants. This marks the first time that a health plan has paid for evidence-based diabetes programs such as these. In addition, results-based incentive payments to YMCA coaches who meet clinical goals became a distinguishing feature of the program's design.

HIT INFRASTRUCTURE—MOVING FROM THEORY TO REALITY

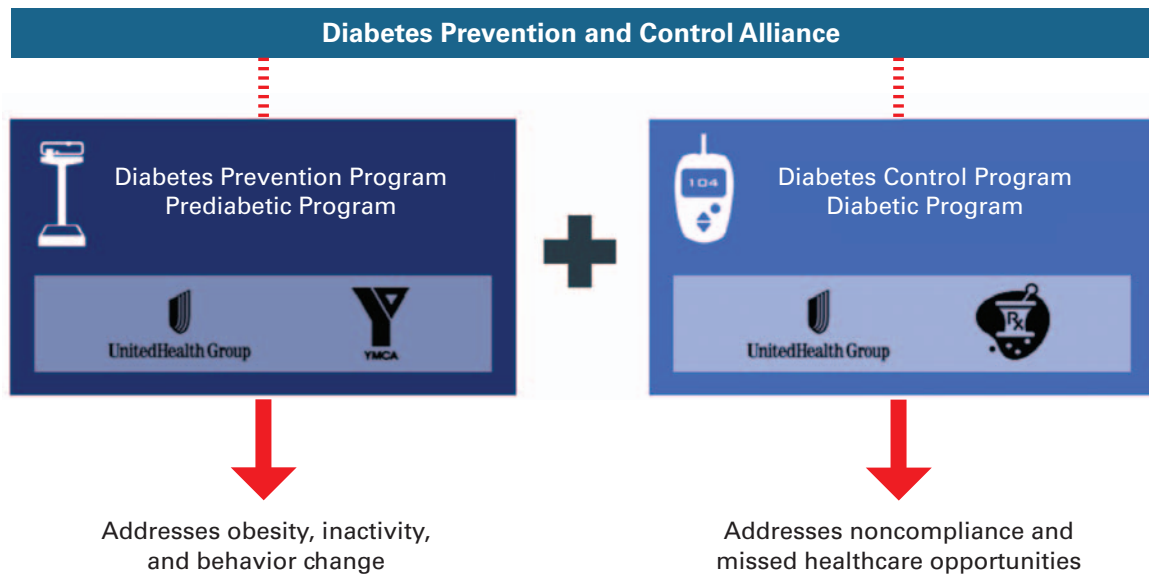
Health information technology is the engine that makes the DPCA work (Figure 2). Operation of DPCA requires advanced analytics, large-scale management of work flow, connections among providers of care across different care settings, and administration of complex, incentive-based payment structures—none of which would be possible without an advanced HIT infrastructure. The UnitedHealth Group family of companies has developed payer-agnostic, relevant assets that are deployed to address the following key program requirements.

Cost-Effective Identification of At-Risk Individuals

An estimated 90% of prediabetic individuals and 24% of diabetic individuals are unaware they have their conditions. (This statistic implies that current screening practices are severely inadequate.) Many employers have started to understand the importance of early identification of prediabetic and diabetic individuals; therefore, they have encouraged their employees to participate in free biometric screening. UnitedHealthcare's goal was to enhance more cost-effective screening of broad workforce populations by using data-driven targeting of high-priority individuals.

UnitedHealthcare's sister company, Ingenix, created the Health Impact: Diabetes Precursor Identification (DPI) tool to accomplish this task. This tool uses advanced predictive modeling analytics derived from a Normative Health Information database of medical and pharmacy claims, lab results, demographic attributes, and other indicators for 63 million lives and 14 years of patient history. These data are then

■ **Figure 1.** Structure of the Diabetes Prevention and Control Alliance



applied to an employer’s medical and pharmacy claims, health assessments, and member demographic information, and used to help us accurately identify subpopulations of individuals who are at risk of having undiagnosed prediabetes and diabetes. In a recent case study of individuals whom DPI identified as having high-risk scores, 80% were correctly identified as having undiagnosed diabetes. As a result, we can work with employers to conduct more targeted and cost-effective biometric screening programs.

Engaging, Enrolling, Scheduling, Tracking, and Reimbursing Care Services for At-Risk Individuals

This continuum of related operational services, which is required to meet the needs of identified at-risk individuals, necessitated development of a new end-to-end solution. This solution was specifically designed for the initiative by UnitedHealth Group’s information technology business unit. Labeled DiPCA-Ware, this Web-based application uses advanced technology to accomplish the necessary tasks in a payer- and platform-agnostic manner. That facilitates the program’s scalability and broad dissemination regardless of the health plan sponsor. This information technology platform performs the following functions.

Facilitation of Biometric Screening for Previously Identified At-Risk Individuals. DiPCA-Ware extracts the at-risk population list from the Ingenix DPI tool, sets up biometric screening events, and focuses the marketing campaign solely on those individuals most in need of engagement. For individuals already diagnosed with diabetes or prediabetes, DiPCA-

Ware facilitates their enrollment in the program. This entire engagement process is managed by an automated call center integrated with the DiPCA-Ware technology.

Determination of Individual Health Benefit Eligibility for Services. Our HIT solution has the automated ability to receive and analyze eligibility files and then enroll prediabetic individuals in the Diabetes Prevention Program and diabetic individuals in the Diabetes Control Program. Consistent with our goal of achieving a payer-agnostic system, the software has the ability to integrate eligibility information from any payer into the application process.

Facilitation of Management of Individually Tailored Education and Lifestyle Components Offered at Participating YMCAs. DiPCA-Ware provides the infrastructure for the YMCA to schedule classes, manage coaches, enroll walk-in participants, record session weight/activity data, report on program milestones, and actively engage participants via e-mail to keep them informed of class schedules, meeting reminders, and other important information.

Engagement of Efficient Pharmacist Participation. DiPCA-Ware has the pharmacy-agnostic ability to funnel enrollment data to a retail pharmacy’s intervention management system.

Addressing YMCA and Retail Pharmacy Reimbursement Challenges by Automatically Submitting and Processing Claims Electronically. DiPCA-Ware will perform these functions in a way consistent with the individual’s health plan benefits. Additionally, diabetic patients enrolled in the Diabetes Control Program receive a stored-value swipe

■ **Figure 2.** How Advanced Health Information Technology Enables the Diabetes Prevention and Control Alliance

| | Description | Tools |
|------------------------------------|--|--|
| Identification | DPCA identifies prediabetics and diabetics who may not know they have the conditions. | Ingenix DPI tool —individuals with high-risk scores in the top 20% are correctly identified as having undiagnosed diabetes more than 80% of the time. |
| Engagement | DPCA reaches out to high-risk candidates identified by the DPI tool via a marketing campaign. Willing plan participants undergo biometric screening to determine A1C levels. | DiPCA-Ware contact management functionality manages outbound and inbound calls, and tracks effectiveness of various marketing approaches. |
| Enrollment | Prediabetics are enrolled in DPP and transferred to the care of the YMCA. Diabetics are enrolled in DCP and receive a payment swipe card and at-home blood test kit. | DiPCA-Ware enrollment and fulfillment system functionality allows the call center representative to enroll the member in the correct program, DPP or DCP, and trigger the program fulfillment materials, like welcome letters, home lab kits, and stored value cards. |
| Program Management/Tracking | DPP members attend 16 group lifestyle coaching sessions with a YMCA counselor. DCP participants work with a retail pharmacist to learn about and control their diabetes. | The YMCA uses the DiPCA-Ware program management tool to manage the DPP classes. It allows the YMCA to schedule classes, manage coaches, enroll walk-ins, record session weight/activity data, report on program milestones, and actively engage participants via e-mail. |
| Payment | DPCA reimburses the YMCA and retail pharmacies for their intervention services. The experience is seamless for the program participants. They are not required to fill out a form or submit any payment. | Utilizing standard POS processing , the DPCA swipe card allows DPCA to pay retail pharmacies for their services through their normal credit card settlement process. YMCA payments also are enabled through DiPCA-Ware, which monitors all participant milestones, submits claims on behalf of the member, and creates YMCA payments. |

A1C indicates glycosylated hemoglobin; DCP, Diabetes Control Program; DPCA, Diabetes Prevention and Control Alliance; DPI, Health Impact: Diabetes Precursor Identification; DPP, Diabetes Prevention Program; POS, point of service.

card from our OptumHealth Financial Services company that is preloaded with funds that facilitate service reimbursement from pharmacies.

CONCLUSION

We have constructed an important intervention directed at the increasingly important spectrum of diabetes-related conditions. This intervention is consistent with the key recommendations for health system redesign outlined in *Crossing the Quality Chasm*.³

DPCA features customization based on patient needs and values. It anticipates and addresses individual needs based on data and analytics provided by an innovative HIT tool. It advances evidence-based decision making because it is

based on tested and peer-reviewed interventions such as the Diabetes Prevention Program and the Asheville Project. It fosters continuous healing relationships by coordinating and connecting a variety of interventions through HIT, including community-based services offered by YMCAs and local pharmacists.

The patients are the source of control because they have the necessary information and opportunities to exercise control over the healthcare decisions that affect them. In addition, needs are anticipated through the advanced predictive modeling DPI tool, which then facilitates access to early intervention.

The program continuously decreases waste by precisely targeting at-risk persons. It uses a cost-effective technology infrastructure that is built for economies of scale and aligns fi-

nancial incentives with demonstrated outcome performance. It facilitates cooperation among clinicians by establishing an infrastructure for the appropriate exchange of information and care coordination.

Finally, all of these interventions are facilitated by sharing knowledge and the free flow of information. DPCA provides appropriate access to care providers and individuals regarding the medical information that is required by the program's interventions.

Our initial experience in operating DPCA gives us confidence that large-scale prevention and disease control management programs make economic sense, are worthy of front-end capital investment, and can achieve cost-effective results. We already know the challenge of accounting for clinical service delivery by nontraditional providers using existing claims-based diagnostic and prevention codes. Others who desire to make use of our model will benefit from policymakers' efforts to prioritize future versions of transaction and coding standards that meet the needs of preventive healthcare as much as they do acute and chronic care.

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