

CASE STUDY**THE HEALTHY TRANSITIONS PROGRAM IN LATE STAGE KIDNEY DISEASE**

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Introduction

Improved coordination of care and effective management of chronic illness can contribute to significant improvements in patient outcomes. In this chapter, we will highlight a case study involving a kidney-disease-specific care coordination program at Northwell Health, a multihospital integrated healthcare delivery system in New York. With Northwell Health, we used an evidence-based management (EBMgmt) approach to design and implement the pilot program it launched in October 2012. Known as the Healthy Transitions (HT) Program in Late Stage Kidney Disease, the program focuses on appropriate interventions, prevention measures, and preparations for patients choosing an optimal renal replacement therapy (RRT) prior to kidney failure or end-stage renal disease (ESRD). Renal replacement therapies for ESRD may include hemodialysis, which may occur in the hospital, outpatient, or home setting; peritoneal dialysis, which occurs in the home setting; kidney transplantation; and nondialysis therapy or conservative medical management.

The outcomes of the program have exceeded national benchmarks as patients enter dialysis, and the findings have spurred subsequent demonstration projects. The purpose of this case study is to demonstrate how evidence-based management was applied in the design, development, and implementation of the HT Program.

Background

In January 2012, Northwell Health's Executive Administration had the foresight to recognize that dealing with healthcare reform required

Note: This chapter describes one specific program developed at Northwell Health. For information about Northwell's overall approach to evidence-based management, please see the interview with Northwell CEO Michael Dowling presented in chapter 21.

acceptance of responsibility for the clinical and financial outcomes for defined populations, the integration of the fragmented parts of the care continuum, and the development of new care models. The greatest opportunities to improve care exist when (1) the current care model is failing, (2) proven evidence-based interventions can rectify the problems, (3) the population is highly targeted, and (4) the expenditure per patient under the current care model is large enough to support a reallocation of resources for a redesigned care model.

The CEO of Northwell Health, Michael Dowling, asked the leadership from the Kidney and Pelvic Health Service Line to evaluate and address the complex needs of the kidney disease population. Our team, led by Steven Fishbane, MD, identified late-stage chronic kidney disease patients as the population with the greatest opportunity for improvement. We designed the HT Program in Late Stage Kidney Disease, a comprehensive care coordination model, both to better address the complex needs of this chronically ill population and to improve the way care is delivered to these patients as they progress to dialysis. In developing the program, we used both patient-centered medical home (PCMH) and population health management principles.

Chronic kidney disease (CKD) is a condition marked by the presence of kidney damage and the diminished level of kidney function over time. It is categorized into five stages, and the last two—CKD Stage 4 and CKD Stage 5—are the advanced stages prior to kidney failure. Estimated glomerular filtration rate (eGFR) levels are 30 to 15 for Stage 4 and 15 to 0 for Stage 5. The lower the eGFR level, the lower is the estimated kidney function. At zero, a patient is considered to have complete kidney failure.

Patients with CKD represent 7 percent of Medicare enrollees, yet they consume 22 percent of total expenditures (USRDS 2010). Almost half of all individuals with CKD also have diabetes or cardiovascular disease, or both. CKD incidence has grown as a result of population aging and the epidemics of obesity, diabetes, and hypertension. An estimated 51 million people—about 16 percent of the US population—have CKD, with 8.4 million progressing to late-stage CKD (stages 3–5). In late-stage CKD, patients have (1) double or triple the risk of mortality, (2) a higher risk of hospitalization in the first ten weeks of dialysis, and (3) a diminished quality of life and increased morbidity. Furthermore, an extraordinary surge in total cost of care occurs in the initial year because of poor transitions to dialysis.

A large majority of these dialysis patients—93 percent—begin renal replacement therapy with hemodialysis, compared to 6.1 percent for peritoneal dialysis and less than 1 percent for kidney transplant (USRDS 2011). Very few patients undergo conservative medical management or a nondialysis route.

Applying an Evidenced-Based Management Approach

Recognizing the opportunity to improve the care for this vulnerable and complex population, our team used an EBMgmt approach to design and implement the HT Program in Late Stage Kidney Disease.

Step 1: Formulating the Research Question

To obtain stakeholder support, we needed a researchable question that would enable us to supply the best available evidence to Executive Administration. The intervention we wanted to evaluate primarily involved using a patient-centered nurse care coordination model and information technology (IT) to improve outcomes.

Our research question asked whether using a nurse care coordination model would improve outcomes for CKD patients as they transitioned to ESRD. We wanted to reorganize the care model to be more comprehensive, to focus on transitions of care, to use informatics to track patient status, to enhance patient access to care, and to support patient-shared decision making. The increased communication and collaboration would allow providers and patients to take into account the best scientific evidence available, as well as the patient's values, in understanding the disease, knowing the treatment options available, and modifying behavior to reduce complications that may be preventable. The primary interventions center on improved patient education and timely preparation for renal replacement therapies, identifying hospitalization risk, intervening to reduce risk, and improving quality of life.

We considered conducting a pilot that would serve as a proof-of-concept study to assess feasibility, and we requested funding from Executive Administration for three care managers, a nurse manager, and an informatics specialist upon acquiring and assessing the evidence.

Steps 2 and 3: Acquiring and Appraising the Evidence

To best answer our research question, we needed to gather the best available evidence, including empirical evidence and qualitative research, and use information from case reports, scientific principles, and expert opinion. Abundant evidence indicates that the suboptimal outcomes in late-stage CKD are due to pervasive variations in care processes, failure to use evidence-based interventions or treatments, and general fragmentation of care.

Variations in care prior to the onset of dialysis include the following: hospitalizations specific to catheter infection rates, excess intradialytic fluid management, and medication errors; choice of home dialysis alternatives; preemptive transplantation; and inappropriate initiation of dialysis in a hospital setting, where hemodialysis is usually started urgently. These variations will be discussed later in the chapter, when we present the evidence for the

seven key clinical focus areas. For each of these variations, we realized that we needed to not only evaluate evidence-based clinical guidelines, but also address how we can support our physicians by using physician extenders to coordinate the complex needs of this population. By evaluating the barriers in the coordination of care for these patients, and by using the best available scientific and experiential evidence, we wanted to understand and expand on the PCMH model using a nephrologist as the primary caregiver and see how nurse care managers could play a key role in patient education and care coordination. To do this, we met weekly with a core design team over the course of six months. We aimed to evaluate and build upon the evidence-based medicine surrounding seven key clinical areas before we implemented the program in October 2012. These focus areas are shown in exhibit 9.1.

Upon the accumulation of the evidence, we understood that an effective program would have to incorporate the synthesis of compiled evidence for each barrier using our nurse care managers to execute key guidelines. This understanding is consistent with Barends's approach to evidence-based management, in which aggregate evidence is compiled in "systematic reviews, synopses, summaries, and evidence-based guidelines" (Barends, Have, and Huisman 2012). The aggregate synthesis of guidelines served as the foundation for our program addressing each of the key focus areas.

The Patient Centered Medical Home

The patient-centered medical home is an emerging healthcare delivery model that aims to improve patient outcomes and reduce costs, particularly for chronic disease management patients. The model is based on a set of principles approved jointly by the American College of Physicians (ACP), the American Academy of Family Physicians (AAFP), the American Academy of Pediatrics (AAP), and the American Osteopathic Association (AOA) in 2007 (AAFP 2007).

The PCMH model features a team-based delivery approach led by a healthcare provider, intended to provide continuous and comprehensive medical care to patients while maximizing health outcomes (ACP 2006). Focused on continuous quality improvement, the care teams use evidence-based medicine and clinical decision support tools to guide decision making while also ensuring that patients and their families have the education and support to actively participate in their own care. Services are physician directed; however, care coordination is vital to enhanced access to care and self-management support. Care is coordinated across medical specialties, hospitals, nursing home facilities, and also the patient's primary caregiver or family (Cassidy 2010). Care is facilitated by informatics and analytical tools to allow patient tracking, clinical monitoring, specialist follow-up, and population-based decision

EXHIBIT 9.1
Seven Key
Clinical Focus
Areas

1. Excessive use of dialysis catheters and related complications
2. Underuse of arteriovenous fistulas
3. Excessive hospitalizations due to fluid overload
4. Excessive medication errors
5. Inappropriate hemodialysis initiation in a hospital setting
6. Underuse of peritoneal dialysis
7. Preemptive kidney transplantation rate

making. Data sharing among providers allows maximized coordination and management. Access is facilitated by expanded or after-hours access to a physician or practice staff, by telephone or secure e-mail.

As of 2012, evaluations of PCMH models were limited (Williams et al. 2012), although early systemic reviews seemed promising (Peikes et al. 2012). In an Agency for Healthcare Research and Quality (AHRQ) report by Peikes and colleagues (2012), evidence ratings were provided by evaluation design and by outcomes for 14 quantitative analyses. The ratings gave us insight on proven strategies instead of “reinventing the wheel.” These programs were not specific to CKD. In our review of the literature and our surveys of CKD PCMH programs across the country, we found that some programs used nurses and ancillary support to assist in CKD patient education; however, scientific evaluations specific to CKD were not available. Multiple programs have used chronic care management models (CCM) instead. Although both PCMH and CCM improvement delivery models are comprehensive and patient-centric and provide continuous care, medical home models expand on access to care. Both use informatics to track patient care. We also found few CKD programs specifically using PCMH or medical home model terminology.

The most lauded medical home model, Geisinger’s ProvenHealth Navigator program (Norfolk and Hartle 2013), embeds a care coordinator in a clinic setting and also provides telephonic support (Paulus, Davis, and Steele 2008). Other largely deployed programs in the United States, including Fresenius, primarily include telephonic case management support. DaVita’s Village Health Program primarily incorporates telephonic support and some field support, with visits to some patient homes. We were not able to find much evidence in the literature that programs conducted home visits, either to provide education in the home or home care services. This gap in the literature has been validated by a systematic review by Aydede and colleagues (2014), in which 17 studies examined home care interventions among adult CKD patients and assessed the impact on outcomes.

Evidence for the Seven Key Clinical Focus Areas

As mentioned earlier, a multitude of clinical evidence does exist on how to improve many of the key focus areas we identified; however, national averages on quality outcomes remain lower than benchmarks. Our core design team met weekly to understand the key barriers and areas in need of improvement. The team consisted of (1) our medical director, a leading clinical researcher; (2) our administrative director, who had over ten years of executive management experience and multiple years of organizational experience; (3) our clinical director, a nurse practitioner who also had ten years of dialysis nursing experience; (4) and informatics specialist, who had multiple years of clinical database experience. The team systematically searched for clinical evidence using literature reviews from the latest journals and experience guided from our medical director and clinical director. Because of the team's research backgrounds, we could easily understand prioritization of the validity and reliability of the research. However, we did not systematically prioritize.

A brief description of the leading evidence collected and existing gaps in each of the key focus areas is provided in the list that follows:

- *Excessive use of dialysis catheters and related complications.* Dialysis catheters increase the risk of infections, hospitalizations, and death, particularly in the first few months of dialysis (Allon 2004). This risk is widely understood by the nephrology community, yet in the United States, 82 percent of new patients start dialysis with a catheter. National quality and utilization data is publicly reported through the United States Renal Data System (USRDS), the Centers for Medicare & Medicaid Services (CMS) renal data registry for all CKD and ESRDS Medicare patients. As alternatives to catheters, appropriate vascular access management and the placement of arteriovenous fistulas (AVFs) are recommended methods for providing long-lasting sites for blood to be removed and returned during hemodialysis.
- *Underuse of arteriovenous fistulas.* AVFs improve patients' experience of care, improve outcomes for the ESRD population, and decrease per capita cost of care. Although the early placement of AVFs in CKD stages 4 and 5 is optimal for patients starting hemodialysis, the procedure is underused. Poor coordination and preparation exist between the patient, the nephrologist, and the vascular surgery team before the onset of dialysis. The Kidney Disease Outcomes Quality Initiative (KDOQI), in collaboration with CMS, has published national guidelines for promoting AVFs, through the Fistula First program (Navuluri and Regalado 2009). KDOQI has also provided evidence-based clinical practice guidelines for all stages of CKD and related complications since 1997. The evidence supports the idea that

underuse of AVFs is a correctable problem. The appropriate care model can lead to improvements in communication, follow-up in-between doctor appointments, and coordination of a working AVF's maturation. Evidence supports the idea that optimal timing and referral to vascular surgery are dependent on the opinions and choices of patients and physicians (Hassan Murad et al. 2008). Our nurse director was able to recognize from her dialysis experience that the care managers not only assist with coordination but that they also need to assess the maturation of the AVF in defined evaluation periods.

- *Excessive hospitalizations due to fluid overload.* The combination in late CKD of reduced renal salt and water excretion, poor cardiac function, and highly fragmented and episodic medical care lead to frequent hospitalizations for fluid overload. Many times, poor dietary management and lack of symptom awareness limit the patient from proper self-management. Several professional organizations have issued evidence-based guidelines for reducing sodium intake. Potential barriers to patients' compliance with sodium intake guidelines include, but are not limited to, poor knowledge about the sodium content of food (among both patients and providers), complex labeling information, and patient preferences (Wright and Cavanaugh 2010).
- *Excessive medication errors.* Patients with chronic kidney disease on dialysis are prescribed an average of 10 to 12 medications (St. Peter 2010). Medication errors are common in late-stage CKD, as managing daily medications for patients with multiple co-morbidities can be complicated and overwhelming. Common causes contributing to medication errors include missed doses, underdoses, overdoses, therapeutic duplication, polypharmacy, and incomplete medication reconciliation. Past research has found that 20 to 67 percent of prescriptions for late-stage CKD patients contain errors and that 18 percent of all hospital admissions among this group are caused by medication errors, of which 60 percent are preventable (Harchowal 1997). Moreover, hospitalized patients with CKD are at higher risk for adverse consequences of medical care compared with those without the disease (Seliger et al 2008).
- *Inappropriate hemodialysis initiation in a hospital setting.* Most dialysis starts take place in acute care hospitals (adding costs and risk for nosocomial complications), even though the majority of patients are stable enough to receive their first dialysis treatments in outpatient dialysis centers. Appropriate selection of patients for outpatient dialysis initiation can reduce costs and morbidity.
- *Underuse of peritoneal dialysis.* Many countries outside the United States, particularly the United Kingdom and Canada, have shifted

their populations to more cost-effective modalities, such as peritoneal dialysis, which occurs in the home. Hemodialysis, used in outpatient settings three times a week, is still the dominant therapy in the United States. The use of home modalities in the United States, as indicated in USRDS data, is disproportionately low relative to the use of in-center modalities. The National Institute for Health and Clinical Excellence offers guidelines, based on systematic review and informal expert consensus, regarding options and support for peritoneal dialysis as a modality (Centre for Clinical Practice 2011). Although peritoneal dialysis is not the prevailing therapy, it is technically simpler than alternatives. It gives patients greater autonomy and independence, and it is lower in actual cost compared to hemodialysis in most countries. It has also been associated with a slower decline in residual kidney function, compared to hemodialysis. Survival rates are similar between peritoneal dialysis patients and hemodialysis patients. Although the peritoneal dialysis is considered a more favorable option, medical and social contraindications, in addition to issues with caregiver support, may affect whether peritoneal dialysis takes place; such factors need further evaluation (Liebman et al. 2011).

- *Barriers to preemptive kidney transplantation.* Preemptive transplantation requires patients to have a suitable, compatible, and prequalified living donor prior to dialysis. Because the series of preevaluation tests for both the recipient and the donor can take weeks or months, the patient will need time to navigate a complex healthcare delivery system. Kidney transplantation is the preferred treatment for end-stage renal disease because it not only triples the patient's life expectancy, compared with remaining on dialysis, but also improves quality of life. In a survey of nephrologists, preemptive transplantation was considered the optimal treatment modality for eligible patients. Late referral, patient health and insurance status, and delayed transplant center evaluation are perceived as major barriers to preemptive transplantation (Pradel et al. 2008). Our organizational experience included living donor availability as an additional factor.

Step 4: Aggregating the Evidence

The Medical Advisory Board (MAB), a committee of nephrologists participating in the HT Program, was established to contribute insight, scientific direction, and expert opinion on medical conditions and clinical developments. This group was initially responsible for “aggregating” the evidence in our EBMgmt approach, serving as a peer-review expert governance structure to apply programmatic decision making and review the quality data. The MAB includes medical representation from each nephrology practice site

involved in the HT Program. The formal infrastructure is vital; it gives value to the physician group as stakeholders, which reinforces their compliance and adherence to program guidelines.

Our initial presentations explained the goals, target, and justification of the program, which were based on our core team work and evaluation of the evidence. The goals, targets, and justifications are shown in exhibit 9.2. The overall program objective is to rectify fragmented care in late-stage CKD through a nurse care coordination model. The program aims to improve clinical outcomes by reducing risk for mortality and hospitalizations, increase quality of life, and reduce the surge in total cost of care by avoiding unnecessary utilizations (i.e., hospitalizations) in the peridialysis period.

Step 5: Applying the Evidence to the Decision

The HT Program uses an integrated care delivery model to coordinate complex care processes for patients with late-stage CKD. The nephrologist, the nurse care manager, the patient, and other providers use a team-based approach, based on a PCMH model. The care manager tracks and measures outcomes and provides progress updates and additional information, with the aim of achieving broad quality-driven targets.

Six key component areas of the care delivery model were developed based on the evidence compiled. Clinical protocols for workflows related to each program component help reduce variability among providers and care managers. Patient education materials also address each of the key focus areas. A CKD database registry was designed to monitor patient outcomes, with decision support capabilities to evaluate program impact and an ongoing quality management program. Components of the IT system are closely integrated with the electronic medical record and incorporate computerized prompts, population management capabilities (including reports and feedback), specialized decision support, electronic scheduling, and personal health records. All prompts include the metrics related to the seven clinical focus areas. These efforts improve timeliness of care, reduce late-stage disease complications, and decrease unnecessary utilization of services.

The HT nurse care managers work in a hands-on manner with patients and maintain close working relationships with physicians. Enrollment of patients takes place in the clinic setting after the nurse care manager has been initially introduced by the nephrologist. The nurse care manager conducts an initial intake visit in the patient's home (preferably with key caregivers present), focusing on education about kidney disease and dialysis options and creating the patient profile in the HT database management system. The visit includes discussion of advance directives, screening for depression and anxiety, and assessment of the home environment for food quality and safety. After the initial visit, telephone contact with the patient—at least once

EXHIBIT 9.2
Program Goals,
Targets, and
Justifications

Goal	Description/Target	Justification
1. Reduce hospitalizations in late-stage kidney disease.	Reduce mean hospitalization rate compared to national baseline.	Cost of care in late-stage CKD is excessive in large part because of increased and preventable hospitalizations. Such hospitalizations can be related to (1) poor planning for patients initiating dialysis in the hospital rather than in outpatient dialysis settings and (2) complications associated with use of catheter placement rather than timely vascular access placement. Hospitalizations for catheter-related infections cost an average of \$23,000 (Ramathan et al. 2007). Hospitalization reduction efforts can be based on education, dietary support, daily weight management, system management, and infection prevention.
2. Improve education about RRT options (i.e., dialysis, transplantation, or nondialytic conservative therapy).	Provide comprehensive education and management/facilitation services to 100 percent of patients enrolled.	Education is grossly inadequate, resulting in poor patient preparation and excessive and often inappropriate reliance on hemodialysis.
3. Increase RRT modality selection rate prior to ESRD.	Increase rate of enrolled patients who have made RRT modality selection choices to 90 percent.	Inadequate education leads to patients failing to make RRT modality/options selections, which usually results in the urgent start of hemodialysis without an access (i.e., AVF) and the need for catheter placement in a hospital setting.
4. Increase the percentage of patients choosing and preparing for home dialysis modalities and preemptive kidney transplantation.	Increase selection of home modalities and preemptive kidney transplantation from less than 1 percent nationally.	Inadequate education, planning, and facilitation have contributed to underuse of home dialysis and kidney transplantation.

5. Increase timely AVF placement prior to ESRD for patients choosing hemodialysis.	Increase percentage of patients starting hemodialysis with AVFs from 20 percent nationally to 60 percent.	The underuse of AVFs is a correctable problem, as evidenced by the Fistula First program. Through the implementation of our Countdown to Fistula guideline, we would be able to improve poor communication resulting from fragmented care and ensure coordination of a working AVF.
6. Improve patient quality of life.	Improve patient quality of life, as measured by the Kidney Disease Quality of Life (KDQOL) score, by 25 percent within one year.	Late-stage CKD is a period of confusion and anxiety. Our program aims to create order and improve patient quality of life by supporting the patient.

per month—addresses all aspects of care, including medication reconciliation, reinforcement of education, updating of the risk profile, and answering any questions. Each patient has an individualized plan of care based on the patient’s risk profile and needs. The nurse interacts with the patient’s physicians and coordinates information between them, helping to facilitate transitions in care.

The program components within the nurse care coordination model build upon the evidence in each of the seven clinical focus areas. The care manager also addresses a variety of other care issues related to this chronically ill population—for instance, management of mental health problems, nutrition, advanced directives, and safety of the home environment. A two-week intensive curriculum trains the care managers on these evidenced-based concepts, and scripts, guidelines, checklists, and decision support tools are provided. The curriculum was based on the key clinical focus areas and the evidence used to support the program decisions. All the program components aim to improve the healthcare patients receive, support the health of the population, and reduce costs. The standardized evidenced-based training materials and pathways were approved by the MAB and have been implemented since October 2012.

The program components are as follows:

1. *Modality selection.* Upon consulting with the nephrologist and determining that a patient is a candidate for renal replacement therapy, the nurse care manager conducts an initial home visit with the patient

and a caregiver. The nurse care manager provides comprehensive education about the RRT treatment options available to all CKD patients (i.e., hemodialysis, peritoneal dialysis, transplantation, nondialysis). Patients and their providers make decisions together about the RRT options, taking into account the best clinical evidence available, as well as the patients' values and preferences.

2. *Low salt every day and Phonelink.* The nurse is able to review and discuss the patient's diet and inspect the patient's refrigerator and cabinets. She teaches the idea of low salt every day (reflecting the need in late-stage CKD for a low-sodium diet) and stresses the importance of dietary consistency. The nurse provides a scale to the patient and teaches the patient about how and when to respond to a change in weight or symptoms. The nurse also teaches the patient how to use the HT Phonelink system to relay daily weights and health status information to the database registry. The patient dials in daily weights, which are captured through an automated daily report and then trended over time for the nurse. Prompts are provided on a report to the nurse care manager if significant changes in weight occur over time. If the nurse sees any significant changes, she calls the patient for an update in his status.
3. *Countdown to Fistula.* The HT Program has developed an intensive, coordinated management intervention: the HT Countdown to Fistula, which builds upon the KDOQI Fistula First program. Countdown to Fistula is a comprehensive stepwise program to ensure AVF placement in all appropriate patients, with coordinated follow-up and failure-recovery processes by the HT nurse care manager. The informatics system also has the ability to prompt the user and generate reports based on the parameters of the Countdown to Fistula program.
4. *Steps to reduce hospitalizations from catheter infections.* The primary cause of excess infections in CKD patients is use of dialysis catheters, so the Countdown to Fistula guideline is critically important. In addition, because staphylococcal skin colonization is common in this population, hygiene, including hand hygiene, will be heavily emphasized for patients who do have catheters. Adult vaccinations are also tracked and actively managed for all patients as a mechanism to reduce hospitalizations.
5. *Hemodialysis safe start.* Working closely with the patient's nephrologist, the HT care manager facilitates education and the timing of having a working AVF in place. The monitoring of patient status over time allows for timely planning in initiating dialysis in an outpatient facility setting. Recent data may indicate that outpatient starts may be as low as 25 percent nationally (Wong et al. 2016).

6. *Medication reconciliation.* All medications are ascertained by direct inspection of actual medication containers in the patient's home. The actual medications taken are reconciled with those on the physician's list in the electronic health record. Medications are also verified monthly over the phone with the patient. Furthermore, nurse care managers have been comprehensively educated on the medications that may be harmful to the patient's renal function.

Step 6: Evaluating the Results

As part of its governance role, the MAB conducts monthly assessments of the program based on the data presented. The core design team, with approvals by the MAB, developed a set of variables for each patient that allow for program operations, clinical quality, processes, and outcomes to be rigorously assessed and managed. These variables are consistent with the data fields identified in the proposed program's clinical and workflow guidelines and are captured in the informatics system. Furthermore, the IT system can aggregate the key demographic and performance indicators onto a program dashboard relating to process, outcomes, intervention effectiveness, provider, and patient satisfaction. The dashboard is evaluated weekly by the core team and monthly by the MAB.

By October 2014, one year after implementation, 161 patients had been enrolled in the program. Modality selection occurred in 88 percent of patients enrolled. Among patients who reached ESRD, through October 31, 2015, 63 percent started ESRD with hemodialysis, 20 percent started with peritoneal dialysis, and 7 percent had a preemptive transplant. Exhibit 9.3 displays our key outcomes from the HT Program, with national averages available for comparison.

Conclusion

Traditional quality improvement efforts have been anchored in lengthy planning that attempts to account for all contingencies at the time of implementation—usually resulting in failed or partial implementation. The HT Program demonstrates not only how an EBMgmt approach was applied to achieve the most effective outcomes, but also how it was instrumental in expanding upon the evidence that currently exists. Through an EBMgmt approach, we were able to (1) prioritize the quality of the research available, (2) more systematically and efficiently understand where gaps in the research exist, and (3) make decisions depending on the availability of the evidence.

In our example, systematic reviews had already been conducted for some of the key clinical focus areas. But despite the abundance of evidence

EXHIBIT 9.3
Healthy
Transition
Program Metrics

Healthy Transition in Late-Stage CKD Metrics (n= 161 patients, CKD Stage 4 and Stage 5) October 15, 2012–October 31, 2015	HT Pilot Oct 2012–Oct 2015	USRDS Data 2011
Hospitalizations (all causes, CKD 4–5, per thousand patient years)	800	1100
Fistula rate at initiation of hemodialysis	63%	18%
Catheter rate at initiation of hemodialysis	37%	82%
Outpatient initiation of hemodialysis	63%	Less than 37% (Crews et al. 2010)
Transplant rate	7%	0.70%
Peritoneal dialysis rate	20%	6%

in some areas, national performance in the related outcomes was poor. We understood that the current care model, with the nephrologist providing sole education and preparation, is limited (consider, for example, the under-utilization of AVFs). This issue was brought to the forefront because of our clinical director's dialysis experience and understanding that the care team needs a structured framework for evaluation. Our framework was known and followed by the care manager, the nephrologist, the vascular surgeon, and the patient. Because of our evaluations and our ability to make the best possible decisions, we achieved a mature fistula rate for patients of 63 percent—compared to the US average of 18 percent—over three years. Furthermore, the majority of these patients had a safe dialysis start in the outpatient dialysis center, rather than one begun in a hospitalization.

Although little prior research had been published specific to CKD, our research question—about using the patient-centered medical home as a mechanism for providing high-quality care across the full range of individuals' health needs—proved effective in our pilot. The innovation in our program stemmed from integrating the synthesis of compiled evidence for nurse care managers to use and tying it to an IT system that would help care managers be more efficient and focus on the identified outcomes.

After three years, our pilot performance metrics demonstrate how the HT Program improves the healthcare that patients receive, supports the health of the population, and reduces unnecessary utilization. They show that our intervention helps patients overcome barriers and facilitates timely treatment options. Aware that we need stronger empirical evidence to validate the findings of our program, we have begun a formal randomized control study that is currently in progress. In May 2014, the program was

awarded a Center for Medicare & Medicaid Innovation grant of \$2.45 million for further development, multiple-site expansion, and testing.

Case Study Questions

1. What are the key aspects of the CKD care coordination program at Northwell Health?
2. Why did top management adopt these changes?
3. How was an evidence-based process used in designing the intervention?
4. What are the strengths and weaknesses of the approach that the managers used to evaluate the results of the intervention?
5. What are the constraints and opportunities that other large hospitals might encounter in adapting the approach used at Northwell?

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