Microsystem Series

Microsystems in Health Care:

Part 3. Planning Patient-Centered Services

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On the basis of James Brian Quinn's original work,[1] Batalden and Nelson and their colleagues have made health care adaptations to the smallest replicable unit concept. This concept, which we know as the *clinical microsystem*—"the small, functional, front-line units that provide most health care to most people"[2(p 474)]—has become the focus for improvement of health care. Based on a study of 20 high-performing clinical microsystems—and on extensive development and testing in the United States and Europe—a collection of helpful principles, frameworks, and tools have been created to help clinical units take advantage of microsystems thinking.

The first article in this series[2] introduced the concept of clinical microsystems as the essential building blocks in all health systems and summarized research results on what factors contribute most to high performance in quality and value. The second article[3] discussed the use of data and measures to support the work of clinical microsystems. This article shows how microsystems can plan services to best meet the needs of the subpopulations of patients that they serve.

In this article we explore the challenge of gaining deeper knowledge of the "four P's"—the patients, people, processes, and patterns—of clinical microsystems. We identify specific activities, information, and knowledge that is needed to design and plan patient care and patient-centered services that meet patient expectations while improving the work environment for staff.

The phrase *planning patient-centered services* refers to the analysis of the inner workings, the architecture and flow—or the "anatomy" and "physiology"—of the

Article-at-a-Glance

Background: Strategic focus on the clinical microsystems—the small, functional, frontline units that provide most health care to most people—is essential to designing the most efficient, population-based services. The starting place for designing or redesigning of clinical microsystems is to evaluate the four P's: the *patient* subpopulations that are served by the microsystem, the *people* who work together in the microsystem, the *processes* the microsystem uses to provide services, and the *patterns* that characterize the microsystem's functioning.

Getting started: Diagnosing and treating a clinical microsystem: Methods and tools have been developed for microsystem leaders and staff to use to evaluate the four P's—to assess their microsystem and design tests of change for improvement and innovation.

Putting it all together: Based on its assessment—or diagnosis—a microsystem can help itself improve the things that need to be done better. Planning services is designed to decrease unnecessary variation, facilitate informed decision making, promote efficiency by continuously removing waste and rework, create processes and systems that support staff, and design smooth, effective, and safe patient care services that lead to measurably improved patient outcomes.

Conclusion: The design of services leads to critical analysis of the resources needed for the right person to deliver the right care, in the right way, at the right time.

microsystem for the purpose of making services available to best meet the needs of the distinct subpopulations served by the practice. In contrast, the phrase *planning patient-centered care* refers to the individualization of those services (offered by the microsystem itself or by other microsystems in the organization or the community) to best meet the changing needs of individual patients as these people's conditions, self-management skills, and desires change over time. By way of analogy, to plan services is to plan the menu for prospective guests whereas, to plan care is to combine and deliver the menu offerings in a manner that meets the unique tastes and needs of each individual guest that requires service. This article focuses on planning patient-centered services, and the next article will focus on planning patient-centered care.

Planning Patient-Centered Services

The planning of patient-centered services is based on knowledge of (1) the needs of the major subpopulations of patients served by a clinical microsystem and (2) how the people in the microsystem interact with one another and (3) with their processes to produce critical outcomes. This knowledge comes from both formal analysis and from tacit knowledge of the practice structure, its patients and its processes, and its daily patterns of work and interaction.

To plan services for their patients, members of the microsystem benefit by mastering the four P's:

- ***Know your patients.*** Who are we caring for? Are there subpopulations we could plan services for differently? What are the common patient diagnoses and conditions? What other microsystems support what we do to meet patients' needs? How satisfied are patients with our microsystem?
- ***Know your people.*** Who provides patient care, and who are the people supporting the caregivers? What skills and talents do the members need to provide the right service and care at the right time? What is the morale of our team? What is the role of information technology as a "team member"?
- ***Know your processes.*** How do we deliver care and services to meet our patients' needs? Who does what in our microsystem? Do our hours of operation match the needs of our patients? What are our core and supporting processes? How does technology support processes? How do we learn from failure or near misses?
- ***Know your patterns.*** What are the health outcomes of our patients? What are the costs of care? How do we interact within our microsystem? What does it feel like to work here? What are the costs of our microsystem? Do information systems provide data and information in a timely way to inform us about the impact of our services? How do we stay mindful of the possibility of our efforts failing?

When members of a clinical microsystem work together to gain information about their patients, people, processes, and patterns, they acquire knowledge that can be used to make long-lasting improvements for the clinical microsystem.

Case Study: Planning Services for Subpopulations of Patients to Best Provide Care for Individual Patients

One clinical microsystem, Evergreen Woods, a primary care practice that is part of Norumbega Medical in Bangor, Maine, has been evolving for more than a decade to plan services (in advance) that will be there on demand to provide outstanding care for individual patients.

A Typical Visit

When a patient calls the office with a medical problem, a patient representative triages him or her using the Triage Coupler®.* This program is driven by protocols that can handle a broad spectrum of problems, from the common cold to complex chest pain, and services, such as standardized protocols for overseas travel and prescription refills. If the patient needs to be seen, prompts are provided for questions to ask, and diagnostic tests that might be required before the patient comes to the office are suggested. Sometimes, the patient is provided with a standard treatment and does not need an office visit. This information tool supports highly trained individuals who do not have medical degrees to safely and competently make direct decisions about patient care at the point of contact with the patient. If a patient ever questions the advice being given, an appointment is booked.

* Adapted from Problem-Knowledge Couplers® (PKCs®), available at www.PKC.com (last accessed Jan 21, 2003).

The patient is asked to arrive at the office 30 minutes before the appointment to complete a health status survey of his or her physical and mental health status, medical history, presenting problems, and current functioning. Medical assistants escort the patient to the exam room, where they use Problem-Knowledge Couplers® (PKC®)* to verify patient history, to enter current assessment data and, when available, to enter test results. This information allows the physician or nurse practitioner to spend more time with the patient on unique issues, shared medical decision making, and patient education. The provider reviews the findings for possible diagnoses and potential care options. After the appointment's conclusion, the patient is given printed information about his or her condition, as well as a copy of the visit note that is stored in the patient's electronic medical record.

Evergreen Woods collects extensive data on patient demand for office visits. These data, which include trend charts by session, day of week, and month of year, allow the staff to deploy the practice's resources to match demand. Evergreen Woods uses continuous feed forward information and planned feed back systems,[3] as well as extensive databases, to aid planning and improvement. The practice staff use a "data wall," which reports performance measures, to monitor progress for the clinical team and to identify improvement ideas and actions.[4]

Evergreen Woods's pattern of staff interaction includes weekly team meetings, frequent e-mail communications, and many off-hour get-togethers. Continuous training is conducted to train every member on effective interpersonal communication skills. Additional facts that are key elements in the success of Evergreen Woods, along with their relationship to the four P's, are shown in Table 1 (p 162).

Comments

Evergreen Woods is an exemplary model of office efficiency and advanced design. Although the practice is heavily invested in technology, most clinical settings—be they rural, urban, academic, inpatient, or outpatient—can learn and adapt the following tips:

- ***Integrate data into the flow of work to support the work.*** Data collection is integrated into the design of patient care and operations. There are methods and ways to achieve similar results and tracking without advanced information technology. Decision making without data is not acceptable in this clinical environment.
- ***Enable all staff to make the most of their talent, training, and skills.*** Optimization of staff roles, through detailed training and education of each individual, leads to increased abilities to cross-cover for one another, engage in improvement work, and feel a sense of accomplishment and self-worth on a daily basis.
- ***Provide strong leadership.*** The leader's example and vision guide the common goals and values of the group.

The next section builds on this case study and explores methods and tools that can be used to promote "guided discovery" for staff to gain knowledge about the population they serve, the processes for providing services, and the patterns that (1) spin off the good or bad outcomes for patients and (2) engender a generative or toxic work environment for staff.

A Developmental Journey: How Might We Begin to Assess, Understand, and Improve a Clinical Microsystem?

Build knowledge of the core processes and outcomes of your microsystem to foster the continual improvement and innovation necessary to meet and exceed patient needs.[5]

Getting Started: Diagnosing and Treating a Clinical Microsystem

Methods and tools have been developed for microsystem leaders and staff to use (or adapt to local circumstances) to assess their microsystems and design tests of change for improvement and innovation. The aim is to increase each microsystem's capacity to better realize its potential and to better relate to other critical microsystems that come together to form the service continuum.

Every person and microsystem is unique. The tools and questions found in the *Clinical Microsystem Action Guide*[6] and *Assessing Your Practice Workbook*[7] and at www.clinicalmicrosystem.org are intended to provide guidance and to provoke thinking about essential information that can help to improve a microsystem. The workbook provides a framework to diagnose the four P's of a microsystem, which are now described.

† Problem-Knowledge Couplers® (PKC®) are available at www.PKC.com (last accessed Jan 21, 2003).

Table 1. Evergreen Woods Facts and Links to the Four P's

	Know your patients	Know your practice	Know your process	Know your patterns
Computer terminals are in every room to support scheduling, record keeping, telephone triage, shared decision making, and patient education.	X	X	X	X
Staff use e-mail to communicate with each other. There is open discussion about their shared work life, including improvement opportunities, difficult communications, conflicts, and celebrations of the group successes.				X
Patients and providers use e-mail to communicate about medical problems, medication refills, referrals, test results, and other matters.	X		X	X
Patients complete health status surveys.	X			X
Specially trained patient service representatives triage patients using the Triage Coupler® to support decision making.		X	X	
Staff training is ongoing and rigorously based on performance and competency. The computer tools, coupled with this training, allow all staff to function at an advanced level, with high morale and low turnover.		X	X	
After 6 to 12 months with the practice, employees enroll in a total quality management course at the local community college.		X	X	X
All staff are encouraged to utilize a standardized method to suggest improvements in the practice. This form is based on the Plan-Do-Study-Act (PDSA) format and designed to help create a disciplined community of scientists. The form is circulated to all staff for input prior to the weekly staff meeting where final revisions and decisions are made.			X	X
The staff meet on a weekly basis to evaluate the practice performance. The staff also hold regular yearly offsite meetings for the purpose of team building.		X	X	X
Staff hold daily "huddles" to evaluate the prior day, the current day, and the future.			X	X
The PKC®*"couples" patient-specific data with current biomedical knowledge to support evidence-based practice in routine care. The couplers are updated at 6-month intervals.		X	X	
The practice has an extensive "data wall" that is used daily to track numerous indicators such as Health Plan Employer Data and Information Set (HEDIS) technical quality metrics.†	X		X	X
The "data wall" also displays statistical process control charts and measures of process and clinical outcomes as essential key measures to manage and improve the practice.‡			X	X
The electronic medical record alerts staff to unique needs of patient subpopulations, such as the diabetic population, and tracks essential interventions that benefit the population.	X	X	X	X

* Problem-Knowledge Couplers®
† Nelson EC, et al: Building measurement and data collection into medical practice. *Ann Intern Med* 128:460–466, 1998.
‡ Langley G, et al: *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance.* San Francisco: Jossey-Bass, 1996.

Know your patients. For 100 years, from Ernest A. Codman to John E. Wennberg, we have known that most practitioners have lacked access to data on the vital details of the patient populations they cared for.[8,9] Further, they knew even less about distinct subpopulations of patients whose care could be planned proactively. Key to planning services is knowledge of the subpopulations served. Table 2 (p 164) offers examples of some of the variables that clinical microsystems should know about the patients they serve.

Gaining this information has been one of the most powerful tools for practice members exploring ways to improve their current delivery system. Thedacare, based in Kimberly, Wisconsin, learned that approximately 3% of the patients in its health plan were diabetic. In partnership with the health plan, Thedacare created a registry to track evidence-based interventions. Group visits evolved through a primary care practice exploring innovative care models. The outcomes for patients in the group visits improved significantly. For example, glycosolated hemoglobin (HgA1C) levels ≤8 improved 4%, low-density-lipoprotein (LDL) levels ≤130 mg/dl improved 32%, and the overall quality of care being rated by patients as "excellent" improved 14%.[10] The reason for these improvements is that the clinical microsystem made an innovation in service delivery; it moved from sole reliance on one type of service (one-on-one visits with a physician) to offering a second type of service (group visits with standardized tracking and interventions that are customized to the individual patient's needs and wishes) to complement the traditional one-on-one visit.

Clinical microsystems need to be acutely aware of how patients perceive the care they receive. When patient satisfaction surveys are conducted, the results are often sent back to microsystems many months after a particular set of patients has been seen, which makes it difficult to take timely action to improve services. A brief, point-of-service patient satisfaction survey, such as that found in *Assessing Your Practice Workbook*,[7] can be used to provide timely patient-based feedback.

Know your people. Many members of clinical microsystems do not see their own roles and the roles and functions of others as interdependent, as part of a group of professionals with an aim and a system to provide care to subpopulations of patients. What are the morale and level of stress within your clinical setting? What is the turnover rate? Is the right person doing the right thing at the right time for patient care? Is there an appropriate match between function and roles based on talent, education, training, and licensure? What are the roles in nonvisit care? The staff in the clinical microsystem make or break the processes of service delivery. Without them, good functionality of the clinical microsystem cannot exist. Managing staff as a vital resource, based on detailed data on patient needs and demand for services, is essential.

Know your processes. Many health professionals are "process illiterate."[11] The best way to eliminate process illiteracy is flowcharting or process mapping. How much time does it take for patients to receive services? How much undesirable variation in processes exists? How much waste and rework make the day more frustrating? How do core and supporting processes get accomplished? Are they done in the same way by every member of the team? Are patients assessed in a standard way? Do clinical support staff perform activities that anticipate the arrival of patients? How does technology support work flow and care delivery?

Variation in clinical services is often based on how the physician wishes to have things done rather than on what is the best process for the patient. Table 3 (p 165) provides an assessment tool to help clinical microsystems evaluate the services they provide. All staff members (1) complete the assessment tool, (2) determine which process to improve based on the highest-ranked problem process, and (3) begin to test changes by modifying the flowchart of the current process to represent a hoped-for improvement (see Sidebar, p 166).

Know your patterns. The combination of patients, staff, and processes in a particular microsystem results in the creation of patterns that reflect routine ways of thinking, feeling, and behaving on the part of both patients and staff. The patterns are also related to the typical results and outcomes—and variations thereof—that are associated with the microsystem's mission. Some patterns will be well known and talked about (for example, hours of service, busy times of the day or week, common hassles, and bottlenecks). Some patterns may be well known and never discussed (sacred cows), whereas some may be unrecognized by staff and patients but nevertheless have powerful

Table 2. The Four P's for Clinical Microsystems Across the Health Care Continuum*

Patients	People (Staff)	Processes	Patterns
Primary Care			
• Age distribution and % female • Patient population, with seasonal fluctuations • Most frequent diagnoses • Frequent users of services • How satisfied are our patients with our services?	• Who are the people in our clinical microsystem? • What roles and functions do we currently have, and how do they relate to our main aim/purpose? • What information technology do we depend on to support care? • Where do our staff spend their time? (eg, teaching, outreach) • What resources do we have available daily to provide patient care? • What is the morale of our staff? • Are health profession students part of our team?	• Who are our supporting departments? • What are our key supporting processes? • What is our interdependence on other microsystems? (linkages) • What is our dependence on our macrosystem? • What is our cycle time? • Are the staff knowledgeable of our key processes? • What is our demand? • What are our indirect patient pulls?	• Disease-specific health outcomes • Out-of-practice visits • Margin after cost • Encounters per year
Inpatient Care			
• Age distribution and % female • Patient population, with seasonal fluctuations • Most frequent diagnoses • Frequent users of services • How satisfied are our patients with our services?	• Who are the people in our clinical microsystem? • What roles and functions do we currently have, and how do they relate to our main aim/purpose? • What information technology do we depend on to support care? • Where do our staff spend their time? • What resources are available daily to provide patient care? • What is the morale of our staff? • Are health profession students part of our team?	• Who are our supporting departments? • What are our core processes? • What are our key supporting processes? • What is our interdependence on other microsystems? (linkages) • What is our dependence on our macrosystem?	• Census numbers by hour/day/week and variation • Number of discharges per day/week/month and variation • Average length of stay • Readmission rates
Home Health Care			
• Age distribution and % female • Patient population, with seasonal fluctuations • Most frequent diagnoses • Frequent users of services • How satisfied are our patients with our services?	• Who are the people in our clinical microsystem? • Where do our staff spend their time? (eg, homes, driving, public transportation) • What is the morale of our staff? • What information technology do we depend on to support care? • Are health profession students part of our team?	• Who are our supporting departments? • What are our core processes? • What are our key supporting processes? • What is our interdependence on other microsystems? (linkages) • What is our dependence on our macrosystem?	• Census numbers by hour/day/week and variation • Number of discharges per day/week/month and variation • Average cycle of care
Nursing Home Care			
• Age distribution and % female • Patient population, with seasonal fluctuations • Most frequent diagnoses • Frequent users of services • How satisfied are our patients with our services?	• Who are the people in our clinical microsystem? • What roles and functions do we currently have, and how do they relate to our main aim/purpose? • What information technology do we depend on to support care? • Where do our staff spend their time? • What resources are available daily to provide patient care? • What is the morale of our staff? • Are health profession students part of our team?	• Who are our supporting departments? • What are our core processes? • What are our key supporting processes? • What is our interdependence on other microsystems? (linkages) • What is our dependence on our macrosystem?	• Census numbers by hour/day/week and variation • Number of discharges per day/week/month and variation • Average length of stay • Readmission rates
Specialty Care			
• What are our most frequently referred patient types? • What % of patients referred require the special skills and knowledge of our specialty? • Number of patients returned to referring providers per week? • Who are our frequent referrals?	• Who are the people in our clinical microsystem? • What roles and functions do we have, and how do they relate to our main purpose? • What information technology do we depend on to support care? • Where do staff spend their time? (clinic, OR, procedures) • What resources do we have available daily to provide patient care? • Are health profession students part of our team?	• What is the cycle time for usual episodes of care? • What are our core processes? • Who are our supporting departments? • What are our key supporting processes? • What is our interdependence on other microsystems? (linkages) • What is our dependence on the macrosystem?	• Who are the most frequently referring providers? • What is the satisfaction rating of our referring providers? • What are the services of satisfaction and dissatisfaction for our referring providers? • Number of patients returned to referring providers per week? • Who are our frequent referrals?

* Note that the variables in the four P's are similar across the continuum; OR, operating room.

Table 3. Practice Core and Supporting Processes Assessment*

- Process
- Answering phones
- Appointment system
- Messaging
- Scheduling procedures
- Reporting diagnostic test results
- Prescription renewals
- Making referrals
- Pre-authorization for services
- Billing/coding
- Phone advice
- Assignment of patients to your practice
- Orientation of patients to your practice
- New patient workups
- Education for patients/families
- Prevention assessment/activities
- Chronic disease management

* Each of the processes is rated by each staff member on a scale of "works well," "not a problem," "small problem," "big problem," "totally broken," "cannot rate," "we're working on it," and "source of patient complaint." If the process is a source of patient complaint, that is noted.

effects (mistrust stemming from a local culture dominated by historical divides that separate staff with different educational backgrounds, such as nurses, receptionists, physicians, and technicians). The following questions reveal important underlying patterns:

- Who is the leader?
- What is the leadership style?
- How do we "act out" the mission of our clinical microsystem every day?
- What are the cultural patterns of norms, sentiments, and beliefs in our practice setting?
- What barriers tend to separate health professionals and administrative support staff?
- How easy is it to ask a question about patient care?
- How often does the entire staff meet for the purpose of planning services that are patient centered?
- How satisfied are patients with their access to services?
- How do patients feel about the goodness of their outcomes and costs of receiving care?
- How do we respond to disruptions of our routines?
- How do we "notice" the failure of our systems that we depend on to prevent accidents and harm to our patients?

Putting It All Together: Planning Services

Based on its assessment—or diagnosis—a microsystem can now help itself improve the things that need to be done better. Based on knowledge of the four P's, what can we proactively plan for in our daily work to enhance the functioning of our microsystem? Planning services is designed to

- decrease unnecessary variation,
- build feed forward and feed back mechanisms for informed decision making;
- promote efficiency by continuously removing waste and rework;
- create processes and systems that support staff to be the best they can be; and
- design smooth, effective, and safe patient care services that lead to measurably improved patient outcomes.

Core Processes, Supporting Processes, and "Playbooks"

Figure 1 (p 167) offers a panoramic view of a primary care clinical microsystem. It suggests the interplay of patients with practice staff and with processes, which in turn produces patterns that characterize its performance. Typical supporting processes in a primary care practice include activities such as renewing prescriptions, reporting to patients diagnostic test results, and making referrals.

Flowcharts can be used to diagram and diagnose each process to learn how to redesign it to maximize efficiency. This is particularly valuable for core or supporting processes whose pattern is to be full of hassles, bottlenecks, or mistakes. Many clinical microsystems have used *Assessing Your Practice Workbook*[7] for guided discovery and for taking actions to redesign their own services; examples of their work are provided in Table 4 (p 168).

A review of the microsystem improvement efforts to which we have contributed has uncovered many sources of waste that commonly occur. Table 5 (p 169) summarizes some of these common sources and provides recommendations to reduce waste and improve efficiency.

A clinical microsystem might ultimately build its own playbook—an organized collection of agreed-on flowcharted processes that is used for training, performance management, and improvement. The playbook can be used for educating new staff, cross-training staff, managing performance, and troubleshooting by providing a reference on how processes should work.

Discussion

Intentional Planning of Services and the Value of Meeting for Service Planning

Our study of microsystems in health care revealed that high-performing units intentionally designed patient-centered services to support patients and families and the staff providing care. As shown in the Evergreen Woods case study, planning services is intentional and well orchestrated. Moreover, it is supported by a continuous flow of data (for example, running data throughout the day on unfilled slots) to inform every member of the microsystem, drive corrective actions (any staff person can schedule patients into unfilled slots anytime during the day), and spawn improvements (monthly all-staff meetings and annual retreats).

The service sector has many examples of people coming together to plan the services they deliver. In good restaurants, waiters, cooks, and hostesses preview the menus for the day and cover strategies to ensure that the meal service is flawless. Plans are made to cover breaks and "what if" scenarios are rehearsed. Flight crews routinely preview the flight plan, use checklists to prepare for takeoff, and review flights after their completion because they know all of this contributes to a culture of trust and safety.

Similarly, high-performing clinical microsystems have learned to reap the benefits of daily meetings or huddles to plan the day and weekly or monthly meetings to strategize and manage improvement. Holding regular sessions to advance patient-centered care and services has several benefits; it can

- promote collegiality and create an environment of equality,
- improve communications,
- demonstrate the team of providers to patients and families, and
- help to keep staff members "patient focused."

Sidebar. Analysis and Improvement of Processes

A general internal medicine practice analyzed current processes and identified improvements that could lead to better efficiencies and reductions in waste. Every member of the practice, including the physicians, nurse practitioners, nurses, and secretaries, completed the Practice Core and Supporting Processes Assessment (Table 3, p 165). The assessment revealed that the diagnostic test reporting process needed to be improved through shortening of time until reporting to providers and patients. After flowcharting the process, which revealed rework, waste, delay, and long cycle times, the group brainstormed and then rank ordered improvement ideas. It decided to test the idea of holding a "huddle" at the beginning of each day to review diagnostic test results to determine actions to be taken. The aim was to eliminate extra phone calls by the patients and delays in action due to waiting for the provider response. All the group members would know the plan of action after huddling with the provider.

Using the Plan-Do-Study-Act (PDSA)[1,2] format, the group conducted its small test of change. Within 2 weeks, patient phone calls for laboratory results had decreased, reflecting the fact that staff were now calling patients in a timely manner about their results.

References

1. Nelson EC, et al: Building measurement and data collection into medical practice. *Ann Intern Med* 128:460–466, 1998.

2. Langley G, et al: *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance.* San Francisco: Jossey-Bass, 1996.

Inside-Out Planning

Microsystems' overt attention is often focused more on market-driven service lines or traditional departments, which reflect the strategic plan or budgets and the organization chart, than on meeting patients' needs through an array of superlative services. Yet focusing attention first and foremost on the patient and family and how they present their health needs to the system makes it relatively easy to identify the microsystems that provide services and to determine how the best services

Core and Supporting Process Diagram for a Primary Care Clinical Microsystem

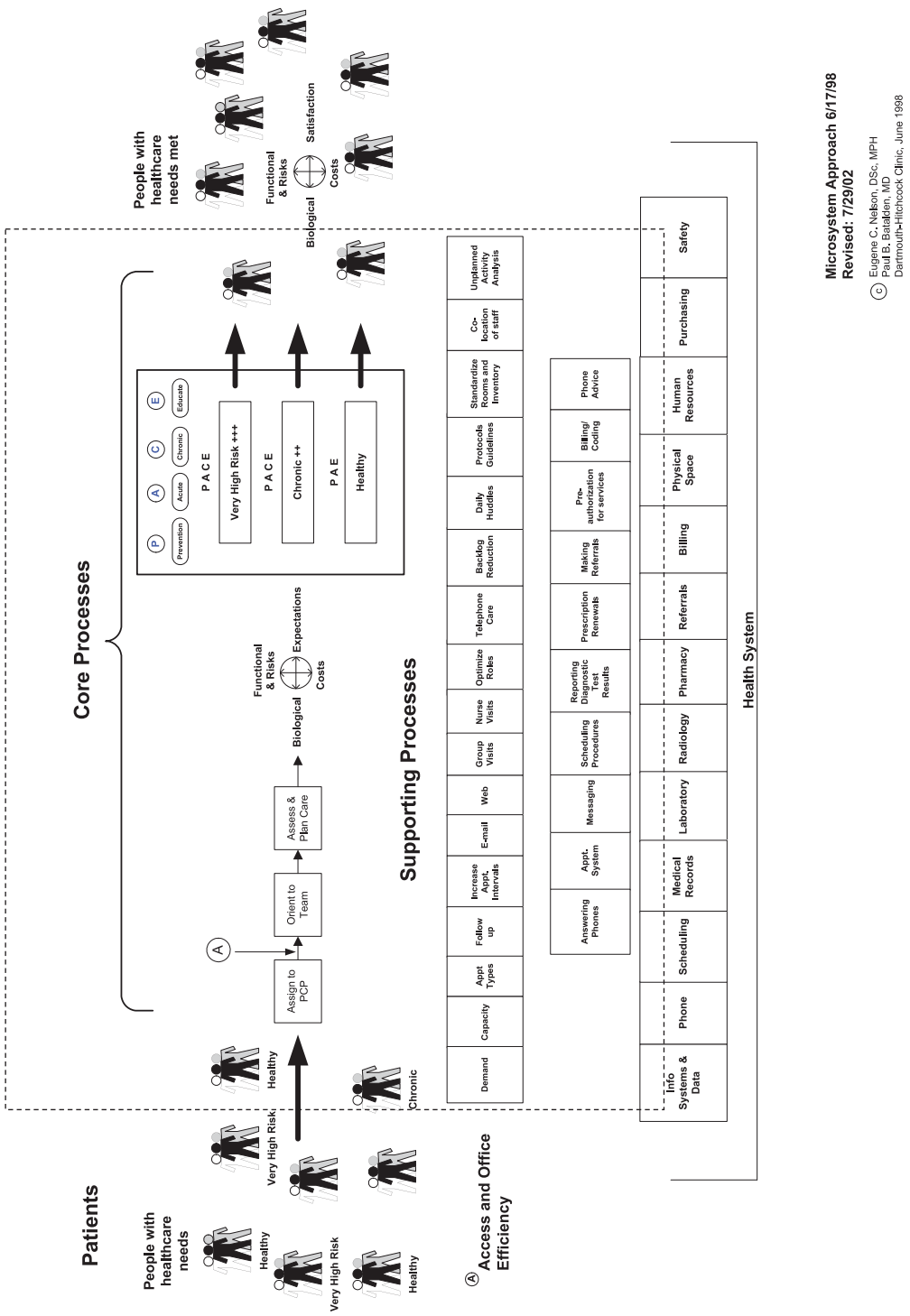

Figure 1. *The interplay of patients, people, and processes can result in the best health care for patients and the staff of the practice.*

Table 4. Assessing a Practice's Discoveries and Actions*

Know Your Patients	Discoveries	Actions Taken
1. Age distribution	1. 30% of our patients are > 65 years old.	1. Designed special group visits to review specific needs of this age group, including physical limitations, dietary considerations.
2. Disease identification	2. We do not know what percentage of our patients have diabetes.	2. Team reviewed coding/billing data to determine approximate numbers of patients with diabetes.
3. Health outcomes	3. We do not know what the range of HgA1C is for our patients with diabetes or if they are receiving appropriate ADA-recommended care in a timely fashion.	3. Team conducted a chart audit with 50 charts during a lunch hour. Using a tool designed to track outcomes, each member of the team reviewed 5 charts and noted their findings on the audit tool.
4. Most frequent diagnosis	4. We learned we had a large number of patients with stable hypertension and diabetes seeing the physician frequently. We also learned that during certain seasons we had huge volumes of acute diseases such as URI, pharyngitis, and poison ivy.	4. Designed and tested a new model of care delivery for stable hypertension and diabetes, optimizing the RN role in the practice using agreed upon guidelines, protocols, and tools.
5. Patient satisfaction	5. We don't know what patients think unless they complain to us.	5. Implemented the "point of service" patient survey that patients completed and left in a box before leaving the practice.
Know Your Practice	**Discoveries**	**Actions Taken**
1. Provider FTE	1. We were making assumptions about provider time in the clinic without really understanding how much time providers are OUT of the clinic with hospital rounds, nursing home rounds, etc.	1. Changed our scheduling process, utilized RNs to provide care for certain subpopulations.
2. Schedules	2. Several providers are gone at the same time every week, so one provider is often left and the entire staff work overtime that day.	2. Evaluated the scheduling template to even out each provider's time to provide consistent coverage of the clinic.
3. Regular meetings	3. The doctors meet together every other week. The secretaries meet once a month.	3. Entire practice meeting every other week on Wednesdays to help the practice become a team.
4. Hours of operation	4. The beginning and the end of the day are always chaotic. We realized we are on the route for patients between home and work and want to be seen when we are not open.	4. Opened one hour earlier and stayed open one hour later each day. The heavy demand was managed better, and overtime was dropped.
5. Activity Surveys	5. All roles are not being used to their maximum. RNs only room patients and take vital signs; medical assistants do a great deal of secretarial paperwork, and some secretaries are giving out medical advice.	5. Roles have been redesigned and matched to individual education, training and licensure.
Know Your Processes	**Discoveries**	**Actions Taken**
1. Cycle time	1. Patient lengths of visits vary a great deal. There are many delays.	1. The team identified actions to eliminate and steps to combine, and it learned to prepare the charts for the patient visit before the patient arrives. The team also holds daily "huddles" to inform everyone on the plan of the day and any issues to consider throughout the day.
2. Key supporting processes	2. None of us could agree on how things get done in our practice.	2. Detailed flowcharting of our practice to determine how to streamline and do in a consistent manner.
3. Indirect patient pulls	3. The providers are interrupted in their patient care process frequently. The number one reason is to retrieve missing equipment and supplies from the exam room.	3. The team agreed on standardization of exam rooms and minimum inventory lists that were posted in the inside cabinet doors. A process was also determined on WHO and HOW the exam rooms would be stocked regularly, and through the use of an assignment sheet, a person was identified and held accountable.
Know Your Patterns	**Discoveries**	**Actions Taken**
1. Demand on the practice	1. There are peaks and lows of the practice depending on day of the week, session of the day, or season of the year.	1. Resources and roles are matched to demand volumes. Schedules are created that match resources to variation
2. Communication	2. We do not communicate in a timely way, nor do we have a standard forum to communicate	2. Every-other-week practice meetings to help communication and e-mail use of all staff to promote timely communication.
3. Cultural	3. The doctors don't really spend time with nondoctors.	3. The team meetings heightened awareness of behaviors that have helped to improve this.
4. Outcomes	4. We really have not paid attention to our practice outcomes.	4. Began tracking and posting on a data wall to keep us alert to outcomes.
5. Finances	5. Only the doctors and the practice manager know about the practice money.	5. Finances are discussed at the team meetings and everyone is learning how we make a difference in our financial performance.

* HgA1C, glycosolated hemoglobin; ADA, American Diabetes Association; URI, upper respiratory infection; RN, registered nurse.

Table 5. Common Oversights and Wastes to Consider When Engaging in Improvement Activities*

Common High-Yield Wastes	Recommended Method to Reduce Waste	Traps to Avoid
1. Exam rooms not stocked or standardized — missing equipment or supplies	➢ Create standard inventory supplies for all exam rooms ➢ Design process for regular stocking of exam rooms with accountable person ➢ Standardize and utilize all exam rooms	➢ Don't assume rooms are being stocked regularly—track and measure ➢ Providers will only use "their own" rooms ➢ Providers cannot agree on standard supplies; suggest "testing"
2. Too many appointment types, which creates chaos in scheduling	➢ Reduce appointment types to 2-4 ➢ Utilize standard building blocks to create flexibility in schedule	➢ Frozen schedules of certain types ➢ Use one time (eg 10–15 minute "building blocks")
3. Poor communication among the providers and support staff about clinical sessions and patient needs	➢ Conduct daily morning "huddles" to provide a forum to review the schedule, anticipate needs of patients, plan supplies/information needed for a highly productive interaction between patient and provider	➢ People not showing up for scheduled huddles. Gain support of providers who are interested, test idea and measure results ➢ Huddle lasts longer than 15"; use worksheet to guide huddle ➢ Don't sit down
4. Missing information or chart for patient visit	➢ Review patient charts BEFORE the patient arrives—recommended the day before to ensure information, test results are available to support the patient visit	➢ Avoid doing chart review when patient is present ➢ If you have computerized test results, don't print the results
5. Confusing messaging system	➢ Standardize messaging process for all providers ➢ Educate/train messaging content ➢ Utilize a process with prioritization methods such as a "bin" system in each provider office.	➢ Providers want their "own" way—adding to confusion to support staff and decreasing ability for cross-coverage ➢ Content of message can't be agreed upon—test something
6. High prescription renewal requests via phone	➢ Anticipate patient needs ➢ Create "reminder" systems in office, eg, posters, screensavers ➢ Standardize information that support staff obtain from patients before the provider visit—include prescription information and needs	➢ Doesn't need to to be the RN—Medical assistants can obtain this information
7. Staff frustrated in roles and unable to see new ways to function	➢ Review current roles and functions using activity survey sheets ➢ Match talent, education, training, licensure to function ➢ Optimize every role ➢ Eliminate functions	➢ Be sure to focus on talent, training, and scope of practice, not on individual people
8. Appointment schedules have limited same-day appointment slots	➢ Evaluate follow-up appointments and return visit necessity ➢ Extend intervals of standard follow-up visits ➢ Consider RN visits ➢ Evaluate the use of protocols and guidelines to provide advice for home care—www.icsi.org ➢ Consider phone care	➢ Do not set a certain number of same-day appointments without match to variations throughout the year
9. Missed disease-specific/preventive interventions and tracking	➢ Utilize flow sheets to track preventive activities and disease-specific interventions ➢ Utilize "stickers" on charts to alert staff to preventive/disease specific needs ➢ Review charts before patient visit ➢ Create registries to track subpopulation needs	➢ Be alert to creating a system for multiple diseases and do not have many stickers and many registries
10. Poor communication and interactions between members	➢ Hold weekly team meetings to review practice outcomes, staff concerns, improvement opportunities ➢ Education and development	➢ Hold weekly meetings on a regular day, time, and place. ➢ Do not cancel—make the meeting a new habit
11. High no-show rate	➢ Consider improving same-day access ➢ Reminder systems	➢ Automated reminder telephone calls are not always well received by patients
12. Patient expectations of visit not met, resulting in phone calls and repeat visits	➢ CARE vital signs sheet (www.howsyourhealth.com) ➢ Evaluating patient at time of visit if their needs were met	➢ Use reminders to question patient about needs being met ➢ New habits not easily made

* RN, registered nurse.

can be designed within each microsystem and how these services can be best linked together.

The staff in many microsystems work in a complex environment characterized by competing interests, inefficiencies, hassles, and frustrations due to poorly operating processes. They may feel helpless, that they cannot make the system work right because the system is run by outsiders. This feeling can be counteracted by working from the inside out, so that staff learn about their patients and the microsystem—and make improvements—from the inside out rather than being told what to do from the outside in.

Interdependency and Involvement

It is rare for staff to realize that they are part of a microsystem that renders identifiable care to subpopulations of patients and are fully interdependent with one another and patients. The whole of the practice can only be as good as the individual components. Staff are often so busy trying to do "the job" that they have no time to reflect on the work they do, how they do it, or what the outcomes of their efforts are. Involvement of all members of the microsystem is essential to render services.

Conclusion

Knowledge of the patients, the people, the processes, and the patterns of a clinical microsystem drives the design, redesign, and creation of patient-centered services. The design of services leads to critical analysis of the resources needed for the right person to deliver the right care, in the right way, at the right time. Tools and methods to support the transformation of clinical microsystems to yield better results for patients and staff have been described and offered for widespread use and adaptation.

The next article in this series will show how a microsystem can blend together the services it offers to plan care to best meet the needs of each individual patient. J

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