

BRANCHES



Data Tracking

What are the outcomes of our interventions?

Details on pages 6–7



Knowledge Building

What care processes produce the best outcomes?

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Shared Learning

How do we apply what we've learned in the care of every patient?

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How can care teams learn to deliver perfect patient care every time?

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Help Chains

How do health systems support teams in solving problems at the point of patient care?

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THE PITTSBURGH PERFECTING PATIENT CARE SYSTEM

A NEW DESIGN FOR DELIVERING HEALTH

Despite phenomenal medical research and discovery in the United States, our health systems chronically underperform when it comes to applying this knowledge to practice. Inefficiency and error are built-in features of our system, and with them, built-in frustration for workers and danger for patients. Fundamental change is an impossible dream.

Three years ago, leaders of the Jewish Healthcare Foundation met with Alcoa CEO Paul O'Neill (now Secretary of the Treasury) to discover how his company was addressing safety, cost and quality simultaneously—and achieving remarkable results. From that encounter sprang the Pittsburgh Regional Healthcare Initiative (PRHI), a coalition that has grown to include 30 area hospitals, four

major insurers, dozens of corporate and civic leaders—and even Pennsylvania's attorney general. Together we set the audacious goal of delivering perfect patient care throughout Southwestern Pennsylvania. In just three years, we have collectively discovered a design for change that is stunning in its potential.

First, designing change required envisioning the destination: *perfect patient care*. To achieve it, PRHI began applying its energy to (1) improving patient safety by reducing medication errors and hospital-acquired infections to ZERO and (2) achieving the world's best patient outcomes in six clinical areas: cardiac surgery; orthopedic surgery; obstetrics and gynecology; depression; diabetes; and radiation oncology.

CONTINUED ON PAGE 2

A BROKEN SYSTEM: DEDICATION AMID FRUSTRATION

"Hospitals are filled with contradictions.

You come to them because you're sick

and need care, but hospitals are places

where infections, uncertainty and

errors might actually worsen your

condition. Yet miracles happen so

routinely that we've come to expect

them. Broken bodies are fixed, illnesses

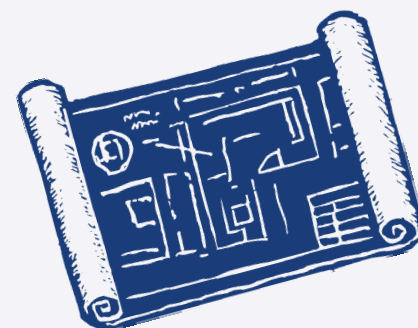
are cured and spirits are repaired

because of the hospitals' caregivers."

Treasury Secretary Paul O'Neill

Former CEO, Alcoa

Co-Founder, Pittsburgh Regional Healthcare Initiative



Visit our website at
www.PRHI.org

PERFECTING PATIENT CARE: A DESIGN FOR CHANGE

Attaining the best possible performance in our health delivery system can only be done when all concerned acknowledge the cause of our problem: *failure to focus on the patient at the point of care*. The solution is to use a framework that will help care teams deliver the right care every time for every patient. Clinical units performing at high levels are microsystems that contain the critical elements for performance improvement—elements that PRHI is building into a community-wide learning network. These clinical units of excellence:

1. Are organized and managed according to *patient need*, rather than the needs of stakeholders (hospitals, clinicians, insurers, providers).
2. View errors and poor outcomes as opportunities for *learning and improvement*, not blame and punishment. When blame and ridicule drive mistakes underground, no learning takes place.
3. Acknowledge that *faulty processes* set the stage for problems, not *faulty people*.
4. Systematically track whether the different interventions given to a patient (*care processes*) result in the best possible recovery for that patient (*patient outcomes*).
5. Are staffed by clinical professionals who form learning teams, working in *collaborative working environments*. These learning teams use their collective skills and knowledge as the foundation for scientific problem solving and improvement.

A NEW DESIGN FOR DELIVERING HEALTH

CONTINUED FROM PAGE 1

With the destination established, we needed a snapshot of the current state of medical care. Using data collected from throughout our region, PRHI began to map *patient outcomes*—how well patients recover—and correlate them to the *processes of care*—what care patients received while they were under medical supervision. Guided by the vision of where we are and where we want to be, PRHI is designing a way to get from here to there.

The design is adapted from one of the most successful business improvement models in the world—the Toyota Production System (TPS) and its Pittsburgh offshoot, the Alcoa Business System. This design helps systems operate something like the human body, with their parts connected, yet with each area adjusting continuously to problems and changes. Groups of people actually doing the work experiment with ways to solve problems on the spot, down to the cause, using scientific methods, measuring results and sharing what they learn. Instead of ordering changes from the top down, managers become partners in solving problems “from the ground up.” Simple in concept, challenging in execution, this design has proven powerfully effective for Toyota and Alcoa.

Could this industrial design be adapted for health delivery systems? Could we address simultaneously the problems of quality and cost in health care by taking everything we know about the best way to deliver care and applying it at the point of patient care, in every encounter, efficiently and without error? Could this system actually benefit patients, physicians, health professionals, plans and purchasers all at once? To find answers, PRHI formulated Perfecting Patient Care, a system based on TPS.

This degree of change requires many “firsts.” The healthcare stakeholders of an entire region must come together, form a vast learning laboratory and draw insights from one another. They must create a non-punitive working environment in which mistakes are viewed as opportunities to learn. They must collaborate to learn together with other regions that have structured their hospitals and units similarly. Eventually, if successful, they must share their design with government policymakers to help guide healthcare reforms “from the ground up.” ■

The Pittsburgh Perfecting Patient Care System

Why did we choose this name?

- We are adapting to health care the framework of the Toyota Business System and its Pittsburgh spin-off, the Alcoa Business System.
- The **patient** is the focus — the organizing principle for healthcare delivery and the focus of problem solving.
- We are working to make health care in this region part of a **system** of shared knowledge and learning applied regularly in the everyday course of work.
- Our shared goal is **perfection**, as defined by ideal **patient** care.

What is the outcome of our care?

A BLUEPRINT FOR CHANGE

How do we draw upon the collective wisdom of a broad network of stakeholders to advance best practices and remove obstacles to improvement?

Help Chain

How do we apply what we've learned in caring for each patient?

Shared Learning

How can care teams learn to deliver perfect patient care every time?

Perfecting Patient Care



ata
acking

What care processes produce best and worst outcomes?

Knowledge Building

EXISTING DESIGN = ERROR PRONE SYSTEMS

National

Annual fatalities due to preventable medical error	40,000–98,000
Hospital patients acquiring a preventable infection	7%
Medication errors actually reaching the patient	1%

IOM report, TO ERR IS HUMAN, 1999

Local: Pittsburgh Region

Cardiac bypass surgery: Readmissions within 30 days of surgery	17%
Complications	7.5%
Hip replacement surgery: complications	14.4%
Knee replacement surgery: complications	11%
Depression: readmission of hospitalized patients within 30 days	12.7%

PA Health Care Cost Containment Council

Existing Design: A Recipe for Inefficiency

Cost of developing a drug	\$3 million to \$500 million
Time in scientific development of a drug	10+ years
Chance of a drug being administered in the right dose, at the right time, to someone who would actually benefit	30%

Existing Design: A Healthcare Workforce Shortage

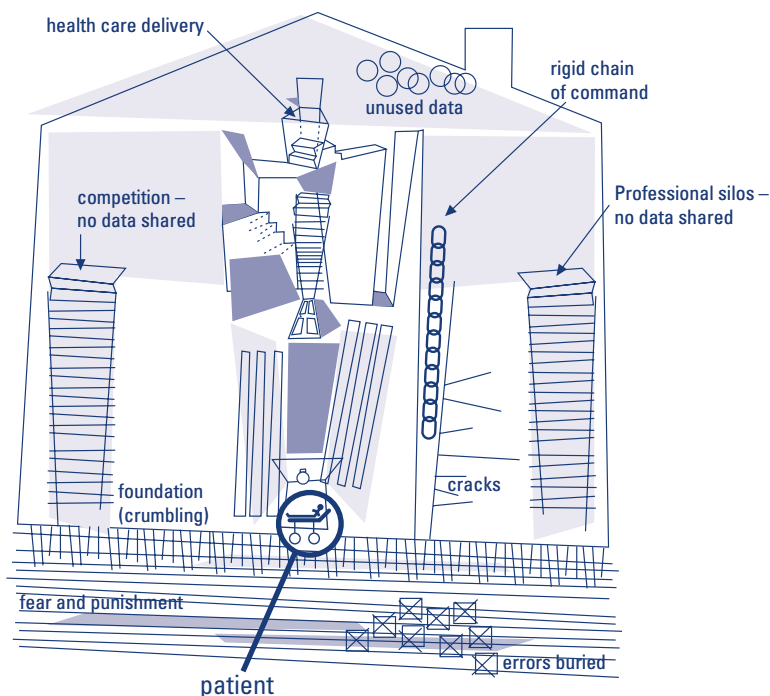
Turnover for nurses' aides, 1999	
Pennsylvania	28–39%
Nationally	40–100%
Nursing vacancies, 2000	16–18%
Pennsylvania Nursing Schools Enrollment decline, 1995–2000	40%

EXISTING STRUCTURE

One of the more startling stories to emerge in 1999 came out of the National Academy of Science's Institute of Medicine. Their report "To Err is Human" announced that medical errors in hospitals killed as many as 100,000 people a year – more people than AIDS, breast cancer or even highway accidents.

The report also showed that one of every 100 hospital patients experiences a medication error, and seven percent contract a preventable infection in the hospital. Reported errors may be punished in many healthcare institutions, a practice that results in fewer and fewer reports. Where errors are viewed with criticism and punishment, no learning takes place. And while the emphasis focuses on cost cutting, few have been tracking patients to see if they actually get better as a result of their care.

No physician or nurse gets up in the morning and says, "I'm going to injure a patient today." Healthcare providers are among the most well trained and highly motivated work forces in any industry. Yet employees are embedded in systems that accommodate error. Is it possible to change a culture that inadvertently accepts error and waste, blaming individuals when systems are at fault? Can an entire region come together to create a design for change? ■■



Cloaked in darkness, secrecy and fear of reprisal, medical mistakes are not used for learning, so they are repeated. Like Sisyphus – condemned to roll a boulder up a hillside, only to have it roll down again – we err and err again because we do not fix our systems after each error to prevent future ones.

from THE SISYPHUS DILEMMA
by Karen Wolk Feinstein, PhD

Architects

The following organizations are signatories to the 1999 PRHI Corporate Statement, pledging their support in exchange for progress toward improvement in healthcare delivery. CEOs include:

Esther L. Barazzone, Chatham College
Alain J. P. Belda, Alcoa
James S. Broadhurst, Eat 'n Park
Ellsworth Brown, Carnegie Museums of Pittsburgh
Jared Cohon, Carnegie Mellon University
William S. Dietrich II, Dietrich Industries
J. Christopher Donahue, Federated Investors
Karen Wolk Feinstein, Jewish Healthcare Foundation
Murry S. Gerber, Equitable Resources
Thomas W. Golonski, National City Bank
Roy Haley, WESCO International
Stephen C. Hansen, Dollar Bank
Fred Ishii, Sony Electronics
William R. Johnson, H. J. Heinz Company
Peter J. Kalis, Kirkpatrick & Lockhart
Maxwell King, The Heinz Endowments
Raymond W. LeBoeuf, PPG
Richard Lunak, McKesson HBOC
David D. Marshall, Duquesne Light Company
Martin G. McGuinn, Mellon Financial Corporation*

George E. Miles, WQED
James L. Murdy, Allegheny Technologies
John E. Murray, Jr., Duquesne University
Edward A. Nicholson, Robert Morris College
Mark A. Nordenberg, University of Pittsburgh
Paul O'Neill, Secretary of the Treasury,
Founding Co-Chair; Former CEO, Alcoa
Edgar Roach, Jr., Dominion Resources
James E. Rohr, PNC*
John Ryan III, Mine Safety Appliances Company
David S. Shapira, Giant Eagle
William Strickland, Bidwell Training Center
Daniel J. Sullivan, FedEx Ground
Thomas J. Usher, United States Steel Corporation
Lenora M. Vesio, AT&T
Sunil Wadhvani, iGate Capital Corporation
Lawrence M. Wagner, The Hillman Company
Milton A. Washington, AHRCO
Michael Watson, Richard King Mellon Foundation
Helge H. Wehmeier, Bayer Corporation

The following hospitals and health plans have signed the PRHI Charter. CEOs and executives include:

Butler Memorial Hospital**
Joseph A. Stewart
Children's Hospital of Pittsburgh
Ronald L. Violi
Fay-West Health System
Rodney L. Gunderson
Healthsouth Rehabilitation Hospital
of Greater Pittsburgh
Faith A. Deigan
Healthsouth Rehabilitation Hospital of Sewickley
Ken Anthony
Heritage Valley Health System**
Norman Mitry
Latrobe Area Hospital**
Douglas A. Clark
Lifecare Hospitals of Pittsburgh, Inc.
Cliff Orm
Monongahela Valley Hospital
Anthony M. Lombardi
Ohio Valley General Hospital
William F. Provenzano
Pittsburgh Mercy Health System
Gregg G. Zoller
St. Clair Memorial Hospital**
Benjamin E. Snead
St. Francis Health System
Sister Florence Brandt
South Hills Health System
William R. Jennings
Bruce Payton

The Uniontown Hospital**
Paul Bacharach
UPMC Health System
Jeffrey A. Romoff
John W. Paul
VHA of Pennsylvania**
Renée S. Frazier
The Washington Hospital
Teleford W. Thomas
West Penn Allegheny Health System
Charles M. O'Brien
West Penn Hospital
James M. Collins
Allegheny General Hospital
Connie M. Cibrone
Canonsburg General Hospital
Barbara A. Bensaia
Forbes Regional Hospital
Thomas J. Senker
Westmoreland Hospital
Joseph J. Peluso
Aetna US Healthcare
Craig Domeracki
HealthAmerica
Francis S. Soistman, Jr.
Highmark Blue Cross Blue Shield
David M. O'Brien
UPMC Health Plan
Patricia Liebman

* Co-Chairs, PRHI Leadership Obligation Group

** Under structured collaboration with VHA Hospitals and National VHA Patient Safety Initiatives

CASE IN POINT— THE FAULTS IN OUR CURRENT DESIGN

✓ Orthopedic surgery

✓ Infection

Your arthroscopic knee surgery seemed routine enough. Once admitted, the care team prepared your knee. You were scheduled to receive an antibiotic at least three hours before surgery: it arrived just moments before you were wheeled in. (The nurse called the pharmacy repeatedly and finally went down to retrieve the medication herself. Neither the pharmacy nor nursing staff reported this delay. To do so would risk both red tape and reprimand.)

An orthopedic surgeon with many years of experience and an excellent reputation performs the surgery diligently. However, she cannot know for certain that her techniques lead to the best possible outcomes for her patients because this hospital doesn't track these kind of data.

By the fifth day, a staph infection sets in at the incision site. Staph bacteria are ever-present in hospital settings, and healthcare workers have procedures to keep these organisms away from patients. Whether infection was the result of delayed surgical antibiotic or a simple lapse in hand washing by medical personnel, you will not know. But you have just become one of the 7% of hospital patients who acquires a preventable hospital infection.

With the help of potent antibiotics the painful infection improves, although the whole episode lengthens your recovery period and causes you to miss an extra week of work.

Due to the infection, the price (and discomfort) of your procedure doubled. After adding up the additional lost pay and productivity, the cost was considerable. ■



DATA TRACKING

WHAT IS THE OUTCOME OF OUR CARE?

“For years we’ve collected data only to transport it to the Great Data Graveyard. At last, as a region, we’re exhuming the data and using it to share, to learn and to continually measure how well patients do as a result of our care.”

Jon Lloyd, MD, PRHI
Medical Advisor

Traditionally, medical data have been collected and analyzed in seclusion from the day-to-day workings of the healthcare setting. Segregated from the living, breathing human beings they document, these data have seemed anything but alive. PRHI partners have set about to change the role of data, from a grudging requirement to a continuous measurement cycle used to learn how well real patients are doing and to drive constant improvement. As with any new design, the engineers must first “do the math.”

Pennsylvania’s data mine. The key measurement of quality in a patient-focused system is whether the patient improved as a result of medical care. For 15 years Pennsylvania has kept a statewide database of patient outcomes, collected by the Pennsylvania Health Care Cost Containment Council (PHC4). The state is one of a handful that requires such data from every hospital. In the past, PHC4 outcome data have generated comparison, competition and controversy—but not enough measurable improvement in outcomes.

Physicians in the PRHI coalition decided to look at PHC4 outcome data for specific clinical conditions at each of its 30 member hospitals. They viewed the data as a map of the region’s current condition and as an opportunity to create a larger framework for learning and improvement. Many findings shocked them (see *Existing Condition*, page 4).

BLUEPRINT DETAIL
FOCUS ON THE
PATIENT AND
MEASURE CAREFULLY
THE OUTCOMES
OF THEIR CARE.

Some hospitals and physicians made improvements based solely on PHC4 data. However, PRHI physicians used the data to build a regional learning network, forming the basis for detailed

patient outcome registries (see *Knowledge Building*, page 8). Periodic review of PHC4 data will help perpetuate the learning cycle.

Infection control partnership. Having set a goal of zero hospital-acquired infections, PRHI established a partnership with the Centers for Disease Control and Prevention (CDC) in Atlanta to track infection rates. The CDC and PRHI teamed up to create a form of the respected National Nosocomial Infection Surveillance (NNIS) system for all PRHI hospitals, so that consistent information can be gathered and shared across the region. The CDC also selected PRHI to measure rates of MRSA, an antibiotic-resistant infection.

BLUEPRINT DETAIL
USE SCIENTIFIC
EVIDENCE TO
IDENTIFY BEST
PRACTICES.

The new design for delivering health-care challenges an entire region to report and share data as part of a learning network. When learning is applied at the point of patient care and the outcomes measured, a sustainable cycle of improvement begins. ■

CASE IN POINT – THE NEW DESIGN

✓ Diabetes

As a diabetic, you know the importance of keeping your blood sugar under strict control. You watch your diet, test your blood and take your medications religiously.

Suddenly you find yourself in the hospital for an emergency appendectomy. The surgery is successful, and you are soon back home, recovering well.

But something new happened to speed your recovery.

Because your physician kept an eye on the region's annual PHC4 reports issued through the PRHI coalition, he noticed that a cross-town hospital had fewer complications and readmissions for diabetic patients undergoing surgery. On conferring with his colleagues from that hospital, your doctor noted that they were managing blood glucose levels very aggressively. He and his team decided to follow suit, and soon his hospital – *your* hospital – began noticing a slight but definite decline in diabetic complications as well.

Because of shared data your healthcare team made sure to help you maintain healthy blood glucose levels. Their care helped you return to health sooner, without complication. ■

Completed:

Established a variant of Centers for Disease Control's infection tracking system (NNIS) in 30 partner hospitals

Measured baseline central line catheter-associated bloodstream infection rates at all PRHI hospital Intensive Care Units

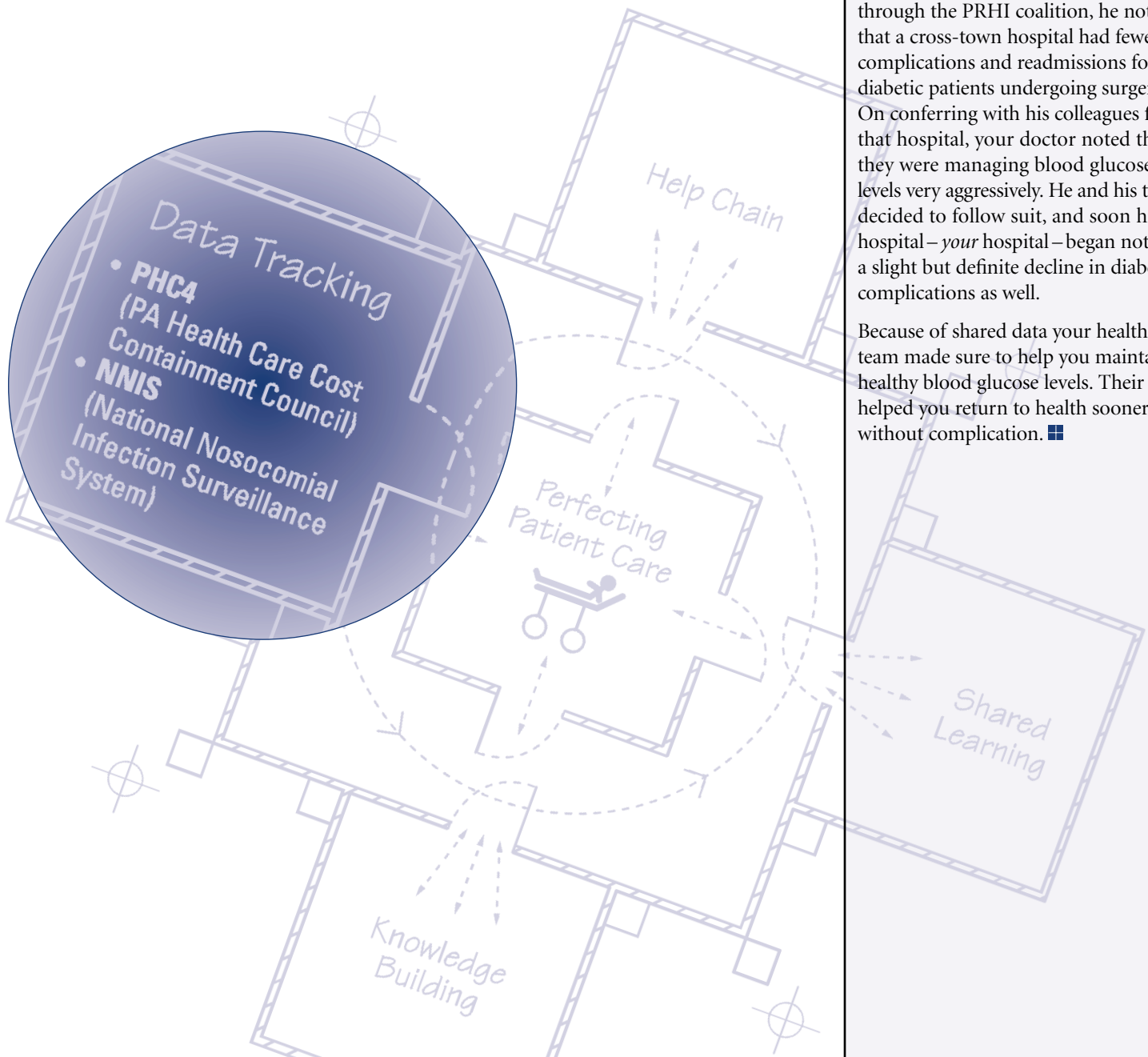
Collected and shared first round of outcomes data in six clinical areas: cardiac surgery; orthopedic surgery; obstetrics and gynecology; diabetes; depression; and radiation oncology

Under construction:

Target 20% reduction in central line catheter-associated bloodstream infections in region's Intensive Care Units

Measure baseline rates for antibiotic-resistant bacteria; design and share interventions to control it

Collect and share second round of patient outcomes data to judge progress and locate areas for improvement





CASE IN POINT – THE NEW DESIGN

- ✓ Cardiac surgery
- ✓ Medication error

In consultation with your physicians you decided that cardiac bypass surgery would be the best way to restore your health. Two small, unheralded changes in healthcare delivery helped to ensure that it happened that way.

Your cardiac surgeon kept abreast of the latest information from the regional cardiac data registry, to which he regularly contributes. The data recently showed that two simple steps could lower the rates of complications and death: administering aspirin pre-operatively and beta-blockers in adequate dosages.

Thanks in part to a learning tool recently installed in the pharmacy, you received the correct drug in the correct dose without incident.

Recently, this hospital established a blame-free medication error “hotline.” Now, encouraged to report errors, employees boosted the number of such reports by 50% the first month. During that month, the MedMARx system traced over 200 times hospital pharmacists had to call physicians to clarify an order. The same four drugs were causing most of this confusion—one of them yours. MedMARx data revealed some contributing factors: similar-sounding drug names and confusion among temporary nursing staff. Once physicians and temporary nurses were alerted, errors dropped quickly and measurably.

You didn’t even realize it, but you recovered just a little sooner and more completely from one of medicine’s most complex surgeries because hospitals and clinicians in your region designed their own learning network. And information about your surgery and recovery entered into the regional cardiac data registry has helped area physicians perpetuate the learning cycle. ■

KNOWLEDGE BUILDING

WHAT CARE PROCESSES PRODUCE THE BEST OUTCOMES?

Tracking and sharing patient outcomes are important steps in designing a regional learning network. But where the community’s goal is *perfect patient care*, another design element is needed—discovering which processes of care produce the best outcomes for patients and continually sharing that knowledge.

Data registries. To understand the link between patients’ outcomes and the care they received, all major cardiac surgery groups across Southwestern Pennsylvania are forming a common data registry. Cardiac surgeons collaborated to create the registry, agreed-upon data collected consistently on each patient undergoing cardiac bypass surgery in the region. The Northern New England Cardiovascular Disease Study Group (NNE) assisted PRHI in this effort (see *Help Chain*, page 4).

BLUEPRINT DETAIL

DO ONLY WHAT
IS PROVEN TO BE
MOST EFFECTIVE.

Beyond traditional “benchmarking,” the data registry is designed to reveal factors in the processes of care that contribute to the most common complications—and conversely, to the best outcomes. Registries are planned among the region’s orthopedic surgeons, psychiatrists, radiation oncologists and those who care for patients with diabetes.

MedMARx medication error tracking system. All PRHI hospitals have agreed to use the MedMARx system to track and learn from medication errors. Managed by the respected U.S. Pharmacopeia, MedMARx is a data registry based on a new national classification system for medication errors. Not only does MedMARx track incidents, but the events, decisions and other factors that contribute to them.

BLUEPRINT DETAIL

DELIVER BEST
TREATMENT
EFFICIENTLY,
WITHOUT ERROR.

Current estimates suggest that only 5-10% of medication errors are reported. One of PRHI’s goals is to increase the number of errors *reported*. The new design must be based on a non-punitive environment. Punishment discourages error reporting, stifling learning and improvement.

PRHI hospitals have become the first in the nation to begin sharing information on medication errors regionally. This data-sharing leverages learning throughout the region, thus accelerating error reduction. This network will broaden further when PRHI begins sharing data with the more than 400 hospitals using MedMARx nationally. ■





Completed:

Regional cardiac registry design

First Cardiac Forum, bringing cardiac registry experts from Northern New England to share best practices for reducing mortality and complications in cardiac bypass surgery

Completed:

MedMARx agreed upon and purchased by all regional hospitals

System in use in 13 hospitals

Data-sharing begun

In progress:

Cardiac registry in use in all regional cardiac centers

Regionwide reduction in atrial fibrillation and mortality following cardiac bypass surgery

Orthopedic and radiation oncology registries in use at regional centers

Depression and diabetes outpatient registries completed and in use

In progress:

MedMARx in use at 30 hospitals

Medication error reporting increases 50%

Medication error incidence decreases by 25% in one target area

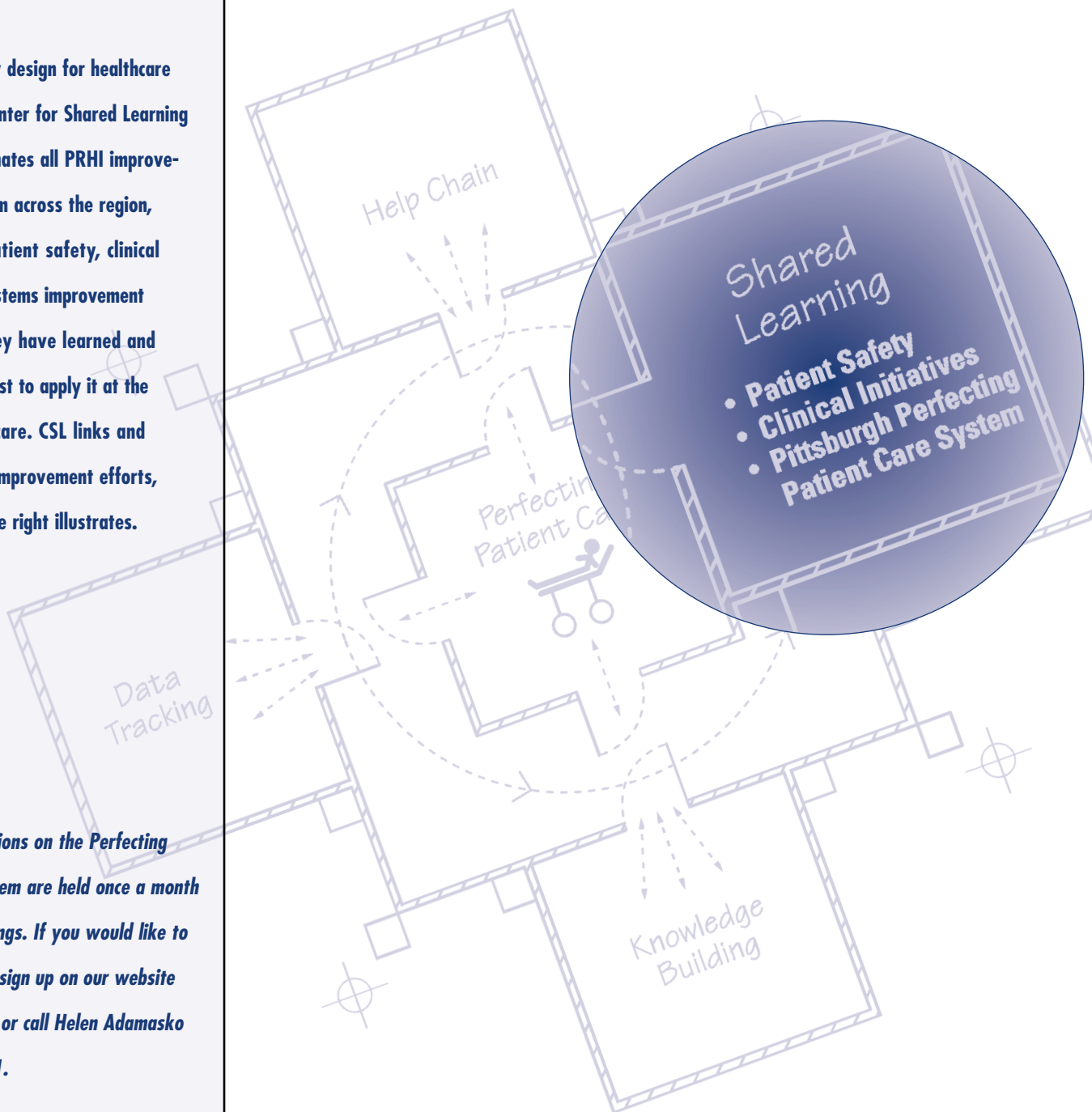


SHARED LEARNING

HOW DO WE APPLY WHAT WE'VE LEARNED IN THE CARE OF EVERY PATIENT?

Crucial in the new design for healthcare delivery is the Center for Shared Learning (CSL). CSL coordinates all PRHI improvement efforts. From across the region, participants in patient safety, clinical initiatives and systems improvement marshal what they have learned and determine how best to apply it at the point of patient care. CSL links and supports PRHI's improvement efforts, as the table to the right illustrates.

Introductory sessions on the Perfecting Patient Care System are held once a month on Tuesday evenings. If you would like to attend a session, sign up on our website at www.prhi.org, or call Helen Adamasko at 412-594-2581.



Perfecting Patient Care System: Shared Learning

Area of inquiry	Learning unit	Applying knowledge derived from:
Patient Safety		
	Hospital-acquired Infection Work Group ¹	National Nosocomial Infection Surveillance (NNIS) system, in partnership with the CDC
	Medication Error Work Group	National and regional MedMARx system
Clinical Initiatives		
	Cardiac Surgery Work Group	PHC4 ² , Cardiac registry ³
	Orthopedic Surgery Work Group	PHC4, Orthopedic registry ³
	Obstetrics/Gynecology Work Group	PHC4
	Diabetes Work Group	PHC4, Diabetes outpatient registry ³
	Depression Work Group	PHC4, Depression outpatient registry ³
	Radiation Oncology Work Group	Highmark radiation oncology registry
Shared Learning Network		
	Learning Lines	Perfecting Patient Care principles to solve problems at the point of patient care
	Public Information Sessions	Introduce Perfecting Patient Care principles to all in the community who are interested in learning
	University	Share deeper knowledge of Perfecting Patient Care across the community
	Teachers	Train teachers to spread knowledge among practitioners and develop learning lines

¹ Work group members are drawn from numerous healthcare disciplines and from hospitals and health plans across the region. These practitioners meet monthly to discuss what they are learning and how to apply it in the course of their work for the benefit of patients.

² PHC4 = Pennsylvania Health Care Cost Containment Council (see Data Tracking)

³ Registries in development

CASE IN POINT – THE NEW DESIGN

✓ Medication error

One evening you are admitted to a hospital with an irregular heartbeat. Your physician orders Rhythmol for you to receive at 9 a.m. the next morning. It doesn't arrive.

The consequences can be serious. A late or missed dose of medication could send you into atrial fibrillation, a potentially fatal heart arrhythmia.

Instead of interrupting her work to call the pharmacy, the nurse calls her Team Leader for immediate assistance. It's safe to report this error: no one is punished, but the problem is traced to its cause.

The Team Leader retrieves the medication, allowing the nurse to continue her work. By first determining *what happened*, then asking *why* five times, the Team Leader arrives at the root cause of the problem. This disciplined, scientific approach to problem solving is based on the Toyota Production System (TPS), an industrial model now called the Pittsburgh Perfecting Patient Care System.

In tracking this one error the Team Leader discovers that the medication cart never leaves the pharmacy before 9:15 a.m. on any day. In other words, *no patient ever receives 9 a.m. medications on time*.

The Delivery Technician designs two small changes in how he delivers medications and tests them to be sure they work. No supervisor tells the Delivery Tech what to do. He redesigns his own work logically and systematically.

CONTINUED ON PAGE 12



CASE IN POINT – THE NEW DESIGN

CONTINUED FROM PAGE 11

Likewise, the pharmacy workers come up with three very small changes in how they prepare 9 a.m. medications. Yet within four days, *all of the 9 a.m. medications throughout the hospital are being delivered on time with 100% accuracy.*

The problem with your Rhythmol is solved, and with it, a systemwide problem and the cascade of errors and patient harm that could follow. Fixing this one problem quietly leads to a hospital-wide revolution in the accuracy and delivery of medications.

Perfecting Patient Care lets people who do the work solve small problems individually at the point of patient care. Where the cycle of continuous learning is embedded in the system, changes and improvements occur naturally in the course of work without meetings, imposed solutions or delay. ■

LEARNING LINES

HOW CAN CARE TEAMS LEARN TO DELIVER PERFECT PATIENT CARE EVERY TIME?

Is it possible to improve an incredibly complex system—health care—using a design from other industries? One Pittsburgh company, Alcoa, offered to share its framework to do this. Now PRHI is busy adapting that successful industrial model to health care as the Perfecting Patient Care System.

BLUEPRINT DETAIL

FOCUS ON EVERY
PATIENT ENCOUNTER
AS AN OPPORTUNITY
TO APPLY PRINCIPLES
OF PERFECTING
PATIENT CARE.

Alcoa experimented with this model in the area of worker safety. The result was America's safest industrial workplace. The lost-day injury rate for Alcoa workers is one eighth that of healthcare workers. As Alcoa became more skilled in problem solving, the organization began to apply principles of the Toyota Production System (TPS)* to its manufacturing processes. In addition, since 1998, Alcoa's costs have plummeted by \$1.1 billion.

Perfecting Patient Care, PRHI's adaptation of the TPS principles to health care, begins by focusing on each patient's needs. This sets PRHI apart from other health-care reinvention efforts. Everyone in the care continuum works toward the ideal: *delivering patient care on demand, defect free, one by one, immediately, without waste or error, in an environment that is physically, emotionally and professionally safe.*

Here's how it works in a "learning line," a unit organized around the principles of Perfecting Patient Care. At the point of patient care, the experts—the people doing the work—focus on the goal of meeting patient needs, one patient at a time. When a problem hinders work, the team, using a set of pre-defined design principles, designs solutions immediately, using scientific methods. With this approach, every worker becomes a scientist who knows how to contribute to the cycle of rapid, frequent and low-cost improvements.

BLUEPRINT DETAIL

LEARNING BY DOING
IN THE COURSE OF
WORK EVERY DAY.

Completed 2001:

Learning lines operating at
two sites

Monthly TPS information sessions
reaching 200 people/year

Four community leaders trained
in TPS model

Under construction 2002:

Learning lines operating at
five sites

Monthly TPS information sessions
reaching 275 people/year

10 community leaders trained
in TPS model

Under the guidance of coaches, workers increase scientific knowledge of problem-solving and share knowledge with others. Learning lines serve as classrooms where others are taught – particularly future team leaders in training to teach Perfecting Patient Care at their own hospitals.

The principles of Perfecting Patient Care are being piloted in the pharmacy departments at UPMC Presbyterian and Southside Hospitals, with additional learning lines beginning at the West Penn Allegheny Health System, UPMC Shadyside, the Veterans Administration Hospital and others. Existing learning lines have already improved patient care processes, reducing missing and delayed medication doses and intercepting potential medication errors.

This model has beneficial “side effects.” It enables healthcare professionals to spend more time doing the frontline care giving to which they are dedicated and may help alleviate the national crisis in worker turnover. It also reduces waste and inefficiency in the system – estimated to consume from 33 to 50 cents of every healthcare dollar.

PRHI’s initial forays into adapting the highly successful principles of TPS to healthcare (Perfecting Patient Care) have demonstrated some promising gains. Sharing the findings with all healthcare stakeholders will be an important component of the regional learning network. ■

*As described in “Decoding the DNA of the Toyota Production System” by Kent Bowen, PhD and Steve Spear, PhD at the Harvard Business School.

The encircled diagram below describes how we want healthcare delivery to work in our region’s institutions – starting with patients’ needs. In this revised healthcare system, the care team allocates its resources based on each patient’s need. In effect, the patient “pulls” the resources he or she needs. Professionals collect information about the care they provide, using it in a cycle that increases scientific knowledge of patient need and the ways to meet it.

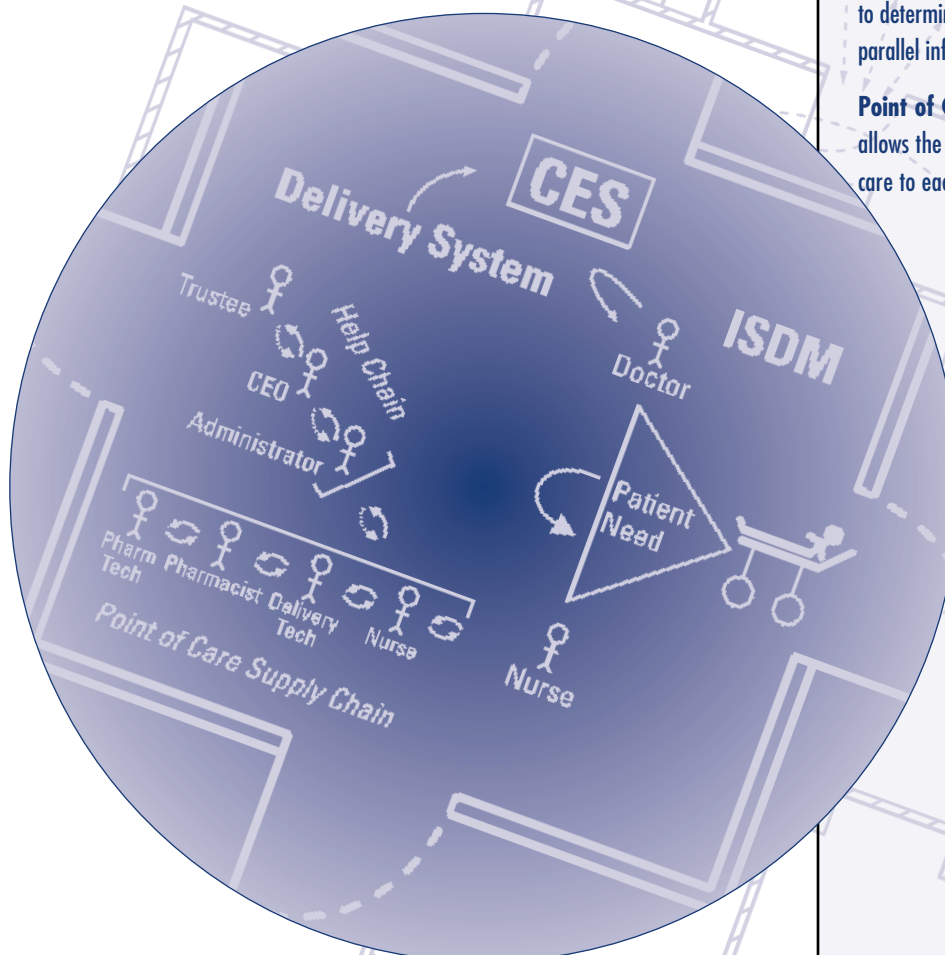
CES = Clinical Evaluative Sciences

This term refers to “evidence-based medicine” in day-to-day patient care. That is, healthcare providers continue to evaluate the treatment and care they give, with an eye toward continuous improvement.

ISDM = Informed Shared Decision Making

A prerequisite for patient-focused care in which patients and physicians work together to determine the patient’s needs, sharing parallel information.

Point of Care Supply Chain A system that allows the healthcare team to deliver optimal care to each patient.





PROBLEM SOLVING: IT TAKES A COMMUNITY

The hierarchical concept of the *Chain of Command* has yielded to the idea of the *Help Chain*, where managers and executives are partners in problem solving. Ultimately, the *Help Chain* extends into our community, answering the question, “What if...”

- *What if* the workers on the learning line, closest to the patient, need additional information or authority to get to the root of a problem and solve it?
- *What if* the problem cannot be solved in the hospital but takes assistance from health plans, purchasers or others in the community?
- *What if* reimbursement systems discourage quality performance?
- *What if* a clinical work group discovers other units and other professionals in other regions from whom they can learn?

One of PRHI’s unique strengths lies in its ability to tap into the community’s collective wisdom to come up with better, more useful solutions to these and other challenges in the healthcare system.

HELP CHAIN

HOW DO HEALTH SYSTEMS SUPPORT TEAMS IN SOLVING PROBLEMS AT THE POINT OF PATIENT CARE?

In-house Help Chain. The Help Chain begins at the learning line, with people providing direct care. Team leaders engaged in problem solving are free to pull assistance as needed to the point of patient care from the manager, the director, the CEO, even the trustees.

Regional Help Chain. Some problems cannot be solved at the hospital level. Therefore, the Help Chain extends out into the community to plan administrators, purchasers, regulators, policymakers and legislators. Problem-solving partners in the community help remove barriers to care that inadvertently discourage performance excellence—such as lack of data or flawed reimbursement systems. The goal is to connect everyone in the healthcare chain, enabling them to learn together in a cycle of continuous improvement.

National Help Chain. PRHI’s Help Chain extends from experts at the Harvard Business School and Toyota Motor Corporation to thriving healthcare knowledge centers in other communities, to national—and even international—policymakers.

- **The Northern New England (NNE) Cardiovascular Disease Study Group.** NNE helped shape PRHI’s cardiac registry and also sent experts to speak at its first Cardiac Forum. Using their collaborative data registry to determine the patterns of care that led to the best outcomes, NNE’s eight hospitals reduced mortality for cardiac bypass patients by 24% within two years.
- **Intermountain Healthcare, Latter-Day Saints (LDS) Hospital Intensive Care Unit (ICU), Salt Lake City.** This multi-hospital system is the acknowledged pioneer of linking processes of care to patient outcomes by collecting and applying data. Patients enjoy faster recoveries. This ICU has documented savings of more than \$2.5 million in the last five years or \$4,500 to \$5,000 saved per patient. Terry Clemmer, MD, who pioneered this effort, has shared his knowledge with PRHI.

BLUEPRINT DETAIL

ACTIVATE A HELP
CHAIN TO ENSURE
THAT EVERY
PROBLEM GETS
SOLVED.

- **Harvard Business School.** Professors H. Kent Bowen, PhD, and Steven Spear, PhD, are considered the United States experts on the Toyota Production System. The two authors of “The DNA of the Toyota Production System” have freely given their time and expertise in support of PRHI’s learning lines.

- **Centers for Disease Control and Prevention.** PRHI is proud to have established a formal partnership with the CDC to jointly pursue our pilot project: the elimination of central line catheter-associated blood stream infections in PRHI hospitals. CDC also selected PRHI to pilot a project to track antibiotic-resistant infections in the hospital. Our joint efforts to eliminate these infections are regarded by the CDC as a potential model for the nation.
- **The Toyota Motor Corporation.** Toyota Motor Manufacturing, North America, has graciously offered to help PRHI apply the principles of the Toyota Production System in the healthcare setting. Specifically, the Toyota Supplier Support Center (TSSC) led by Mr. Haijme Ohba is providing PRHI with resources to assist our current learning lines.
- **National Health Policymakers.** On May 31, some of Washington's most influential health policymakers paid a site visit to PRHI. PRHI hosted Treasury

CONTINUED ON PAGE 16



L-R: Secretary of Health and Human Services, Tommy Thompson; Secretary of the Treasury, Paul O'Neill; and Senator Edward M. Kennedy (D-MA) discuss PRHI in a press conference during their Pittsburgh visit.



Sen. Bill Frist, MD (R-TN), the Senate's only physician, discusses hospital-acquired infection during his visit to Pittsburgh hospitals.

Under construction 2002:

Regional Help Chain through quarterly Leadership Obligation Group meetings

National Learning Network with HBS, TSSC and healthcare improvement pioneers from other regions

Advance PPC curriculum with nine scheduled university sessions to reach 150 community leaders



HELP CHAIN

CONTINUED FROM PAGE 15

Secretary Paul O'Neill, Health and Human Services Secretary Tommy Thompson, Senator Edward M. Kennedy, Senator Bill Frist and White House advisor Mark McClellan, among others.

The distinguished visitors attended presentations at Mercy Hospital and UPMC Presbyterian, observing learning lines and discussing PRHI's promising design for healthcare improvement.

Accompanying them was *Washington Post* political columnist David Broder, who on June 10, 2001 wrote PRHI (is) "a different and hopeful way of thinking about one of the major challenges this nation faces."

PRHI Chair Karen Wolk Feinstein, PhD and Director Ken Segel have also attended meetings in Washington briefing policy advisors on PRHI's challenges and progress. ■



Karen Wolk Feinstein, PhD, PRHI Chair and President of the Jewish Healthcare Foundation, elaborates on the initiative with Senator Kennedy.



L-R: Listening to a description of Perfecting Patient Care System in use in Pittsburgh hospitals are Secretary Thompson; Mark McClellan, MD, White House Consultant, Council of Economic Advisors; Senator Frist; Senator Kennedy; and Secretary O'Neill.

*For more information about PRHI,
see Branches, April 2000 and
visit our website at www.PRHI.org*

The Building Fund

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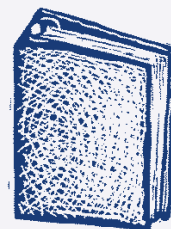
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