June 2005

PRHI Executive Summary

Pittsburgh Regional Healthcare Initiative

Glycemic control: it isn't just for diabetics any more

Can controlling blood glucose reduce post-surgical infections?

Despite vigorous attempts to control the bacterial 'seed' of infection by asepsis and antibiotics, infection is still the greatest enemy of surgeons. Hence, more attention is now being focused on the 'soil' or host factors and their contribution to postoperative infection. Numerous works have confirmed hyperglycemia as a metabolic response to operative stress.

Kowli SS, Parikh SK, Shirahatti RG, Relekar RR, Bhalerao RA. Insulin and sepsis. J Postgrad Med 1985;31:11-5

It has recently been recognized that hyperglycemia is a significant risk factor for postoperative infectious complications. Hyperglycemia in the postoperative patient occurs on the basis of postoperative insulin resistance, a transient state of reduced sensitivity to the anabolic effects of insulin. This state, similar to type 2 diabetes mellitus, is not traditionally treated in routine perioperative care. Development of methods to attenuate postoperative insulin resistance may improve outcome of surgical care.

Soop, Mattias, Effects of perioperative nutrition on insulin action in postoperative metabolism. Fredagen den 16 maj 2003, kl. 9.00, Ersta Sköndals aula, Stigbergsgatan 30, Stockholm. ISBN: 91-7349-529-8

The majority of hospitalizations for patients with diabetes are due to co-morbid conditions, and diabetes management is not a focus during inpatient stays. However ,inpatient hyperglycemia has been associated with nosocomial infections, increased mortality and increased length of stay.

Baldwin D, McNutt R, Villanueva G, Bhatnagar S. Diabetes Care 2005; 28:1008-1011

In his April 18 presentation to the region's cardiac surgery teams, Harsha Rao, M.D., Professsor of Medicine and Chief of Endocrinology at the VA, discussed how to achieve tight control of insulin in post-operative cardiac surgery patients. The objective is to control blood glucose (BG) between 80 and 110 mg/unit in an effort to eliminate post-surgical infections. Of particular interest is preventing the deep sternal wound infection known as mediastinitis. Clinicians in the Surgical Intensive Care Unit (SICU) at the Veterans Administration Pittsburgh Healthcare System (VAPHS) have tested a dynamic, easy-to-use program to administer the post-surgical insulin protocol with encouraging results.

Dr. Rao outlined the problem. For decades, a single formula or "sliding scale" has been used to determine the insulin drip rate for every patient in every situation in an attempt to achieve the target BG of 80-110. The simple formula often takes the current BG number, minus 80, times 0.03-.05.

Sliding scale limitations

"This formula is completely empirical, based on a

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St. Clair tackles ED "Boarders"

The nation's crowded Emergency Departments (EDs) are again garnering national concern as observers note:

- ED visits increased from an estimated 95 million in 1997 to 108 million in 2000.[1]
- The number of ED visits increased by 23% from 1992-2002, while the number of EDs decreased 15%. [2]
- In the United States in 2000, 1.8 million patients walked out of EDs without being seen. [3]
- 62% of hospitals reporting operating over capacity, with Northeast and West Coast reporting the highest percentages. [4]
- In 2003, 1 out of 10 hospitals was on diversion greater than 20% of the time. Diversion is associated with poorer patient outcomes in cases such as myocardial infarction. [5]
- Delay in treatment is the most common type of sentinel event (46.2%) listed for hospital emergency departments. [6]

In an ED, what distinguishes "crowded" from "busy?" Common definitions include: patients in hallways, all ED beds occupied, waiting rooms full more than 6 hours per day, and acutely ill patients waiting longer

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Inside

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Can controlling blood glucose reduce post-surgical infections?

regression line drawn years ago. The target is rarely, if ever, achieved," said Dr. Rao, "because it doesn't take into account changes in the glucose reading over time." Figure 1 shows an example of the formula's shortcomings: each patient in the example has had different spikes in prior BG readings and should receive different doses of insulin, yet the formula dictates the same amount.

Asked Dr. Rao, "This formula applies to every patient, but in reality does it apply to even one?"

Complex formula-easy to use

Peter Perreiah, Managing Director of PRHI, developed an Excel-based user interface which enables a nurse to use a sophisticated algorithm developed by Dr Rao and his team at the VA to determine exactly how much insulin each patient needs at any given time.. This allows constant, precise alteration of the insulin drip to enable tight BG control.

The goals of the VAPHS' insulin protocol are to:

1. Prevent hypoglycemia. Although clinically, hyperglycemia is a much bigger threat to patients' health, nurses' training generally leads to a bigger fear of hypoglycemia. The emphasis on preventing hypoglycemia is a way to overcome nurses' discomfort, addressing a cultural barrier in a clinical way.
2. Bring BG into the 80-110 mg/dL range within four hours of protocol use.
3. Maintain glucose in the 80-110 mg/dL range, avoiding swings in BG often seen in ICU patients.

The wizard then displays the recommended drip rate, when to check again, and any other alerts.

Heeding the voice of the nurse

The nurses, who are responsible for implementing the protocol, give constant feedback about the utility of the software and how to improve it based on floor use. The VAPHS is on the 17th version of the software, with ever-improving results. Of the 93 patients placed on the protocol post-surgically, only one developed an infection—traced to a deviation in the protocol.

Says Candace Cunningham, RN, SICU Team Leader, "In the beginning, the nurses thought that constant attention to the protocol would be frustrating. Now, they are expressing frustration when they can't get the patient's blood glucose to stay in the target range. The protocol lets them concentrate on the patient."

Cunningham adds, "When we say we want blood glucose between 80 and 110, we mean 80 to 110. Before, we would have felt good about 150; now that's unacceptable."

Problems arose when, once BG readings were within the target range, physicians would stop the insulin drip, assuming the hyperglycemia to be "resolved." However, BG readings often rose again and began flutuating wildly once the insulin was stopped. Now, termination of the drip protocol is not left to the physician, unless the patient has uncontrolled hyper- or hypoglycemia.

Step-down challenges

When a patient moves to the Step-Down Unit, a transitional insulin protocol is needed that takes into account the increased patient-nurse ratio. (In the SICU the ratio is one-to-one for the first 12 hours, then two patients per nurse thereafter until transfer to the Step-Down unit, where the ratio is four patients to one nurse). When a patient in the Step-Down Unit begins to eat, monitoring insulin levels can become more complicated. Actually, food consumption posed two new considerations:

1. The post-op cardiac diet specified no caffeine or salt, but did not specify the carbohydrate count. Once alerted, VAPHS dieticians quickly ensured a standardized carbohydrate count for each cardiac post-op tray.
2. Busy nurses needed to assess how much each patient consumed after each meal so that insulin could be administered after meal consumption. Giving insulin after the meal allows them to base the dose on a straightforward formula per 15 grams of carbohydrates consumed.

"I was delighted to realize that asking nurses to estimate food consumption did not add to their work loads," said Dr. Rao. "They are already trained from nursing school to assess how much the patient has eaten." Now that bit of data they already collect increases in importance.

Again, the dynamic transitional protocol is capable of sophisticated calculations needed to meet each patient's need and is easy to use. The

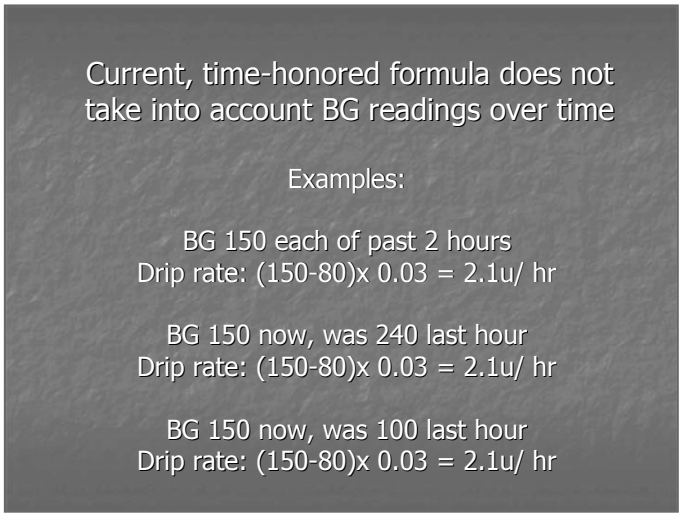

Figure 1. "Sliding Scale" formula has shortcomings.

result shows exactly how much insulin and in what form to give, as well as other necessary information. Like the SICU protocol, the transitional protocol is under continuous development and improvement.

New frontiers

The next frontier in glucose control is further upstream, in the operating room (OR). There, yet another version of the insulin protocol software is being developed and refined. The hope is that preventing swings in patients' BG levels from the start of surgery may further help reduce post-surgical infections.

The final frontier is for the patient to carry the concept of tight glycemic control home when he or she is discharged from the hospital. The wound is only partially healed when this happens, so that the potential for complications is still very real, particularly because patients often have little or no support for aggressive diabetes management at a time when they are struggling to adapt to post-operative life outside the hospital following such a major surgical procedure. Conquering this problem will require a different approach, involving the provision of adequate resources to enable far more frequent contact between the diabetes care team and the patient.

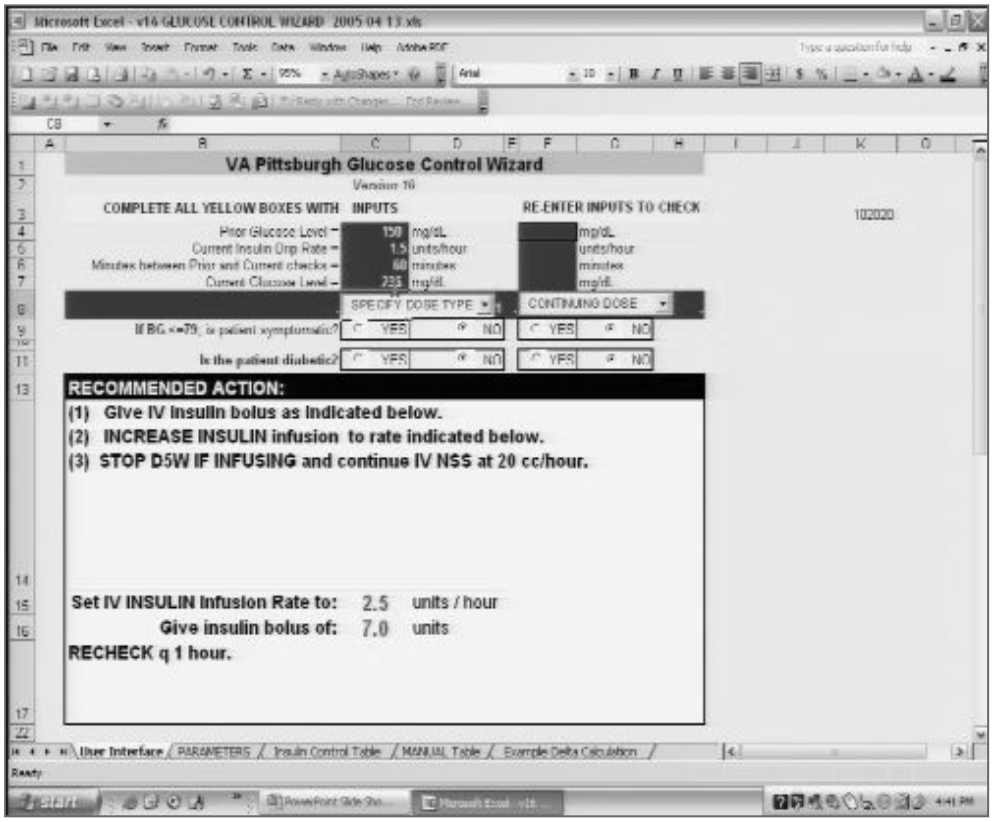

Figure 2. Ease of administration on the "front end."

PRHI announces a regional forum

Excellence in chronic care:

Successes in the primary care setting

Join our audience of office primary care physicians, office managers, physicians' assistants and nurses interested in overcoming barriers to excellence in the delivery of chronic care. The dynamic keynote speaker will be Joel Ettinger, Healthcare Examiner for Malcolm Baldrige National Quality Award. Mr. Ettinger is the most tenured and experienced Examiner on the Baldrige Board from the health care industry. He served 11 years as the first President and CEO of VHA Pennsylvania, and is an adjunct Associate Professor at the School of Public Health, University of Pittsburgh.

Participants from across the region will discuss ways to move our current, fragmented system toward a much-needed continuum of care. In addition, small-group discussions will focus on successes, and discover ways to work together across the region to excel in chronic care. (CMEs applied for.)

Tuesday, September 20, 2005

5:30 – 9:00 p.m.
UPMC St. Margaret
815 Freeport Road
Pittsburgh, PA 15215-3399

To register, e-mail PRHI's Betsy Milliron, bmilliron@prhi.org

From page 1:

Critical Care Working Group to look at ER crowding

Emergency room visits rise, even as ERs close: report

From Modern Healthcare, May 31, 2005

- *Emergency department visits rose to an all-time high in 2003, 113.9 million annually, up 26% from the number recorded in 1993, the Centers for Disease Control and Prevention said in a new report.*
- *The number of emergency departments in the U.S. decreased 12.3% over the same period.*
- *Adults, especially seniors, drove the trend, with emergency rooms reporting a 26% increase in patients 65 years and older.*
- *Approximately 14% of ER visits resulted in a hospital admission in 2003.*
- *On average, patients spent 3.2 hours in the emergency department and waited 46.5 minutes to see a doctor.*

The CDC report National Hospital Ambulatory Medical Care Survey issued May 26, 2005, may be found at:

http://www.cdc.gov/nchs/data/ad/ad358.pdf

than 60 minutes to see a physician.[2] The American College of Emergency Physicians describes ED crowding as "A situation in which the identified need for emergency services outstrips available resources in that ED… Crowding typically involves patients being monitored in non-treatment areas and awaiting ED treatment beds or inpatient beds." [7]

Consistently, above all other causes, surveys cite "lack of inpatient beds" as a primary reason for ED crowding. Patients may have been triaged, seen by a physician, stabilized and admitted…only to be stuck in the ED for hours awaiting a bed in Intensive Care or other hospital unit. Trying to care for these waiting inpatients—called "boarders"—taxes the resources of the busy ED.

National concern

Urgent Matters, a Robert Wood Johnson Foundation-funded initiative, provided $25,000 grants to 10 hospitals in 2002 to improve ED patient flow. Program Director, Bruce Siegel, MD, notes numerous, inexpensive innovations at participating hospital EDs. "Grady Health System (Atlanta) has discharge orders written before the day of discharge. University of California San Diego Hospital put in a bonus payment for departments achieving early discharge. Some hospitals created bed czars who track when beds opened up and which rooms required housecleaning to improve patient flow coordination. Inova Fairfax in Northern Virginia had an "adopt-a-boarder" demonstration where patients board on inpatient floors, not in the ER. Patients prefer it rather than being in a more chaotic ER environment."[2]

Local innovations

Among several local hospitals examining the ED crowding problem, St. Clair Hospital provides an example of several of these innovations. Notes Kathy Baumgarten, RN, St. Clair's Director of Med/Surg/Et/Hemo Services, the problem with the ED became apparent one unusually busy day just over a year ago. That fateful day, the ED had 24 patients awaiting beds, frustrating the nurses in the ED and leaving everyone asking whether they could find a better way. Did they really need more beds in the busiest units, including the ED, or could improved efficiency fix the problem?

They asked a simple, patient-centered question to begin the problem-solving: When the patient is ready and a bed is ready, why can't people admitted from the ED be placed in a patient unit within 30 minutes?

"We took the team approach to moving 'boarders' out of the ED," says Patient Placement Manager Sharon Escajeda, RN, who is in charge of tracking the status of every bed in the hospital. Several experiments are going on at once. Solving one aspect of the problem causes other, hidden problems to surface.

For example, in the past, a bed request could be processed by any one of a number of personnel. This often led to confusion and waste. Sometimes, one unit secretary would be interrupted many times by people looking for beds. Sometimes more than one bed was prepared for a single patient due to multiple requests.

"Now we have one way to request a bed," says Escajeda. "When a bed is needed, or when a bed becomes available, there's only one person to call: me." Having information centralized and standardized created less confusion and improved efficiency.

Yet St. Clair discovered what hospitals across the country are seeing: the number of inpatient days is declining, while the number of ED visits is rising. Patients generally seek emergency care, unscheduled urgent care, or 'safety net' care in their EDs, but the rise in emergent cases has led to

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1 GAO-03-460, a report to the Ranking Minority Member,Committee on Finance, U.S. Senate, March 2003

2 Bursting at the Seams: Improving Patient Flow to Help America's Emergency Departments. Urgent Matters, September 2004, RWJF.

3 Triage Time Bomb; AHRQ Web M&M. http://www.webmm.ahrq.gov/case.aspx?caseID=44, January 2004

4 American Hospital Association (AHA) Survey of emergency department and hospital capacity (The Lewin Group, 2002)

5 GAO, 2003

6 JCAHO, 2003

7 Journal of American College of Emergency Physicians, *Crowding Resources*, 2002, p.10

increased admissions. In this case, St. Clair determined that adding 10 telemetry beds would help reduce 'boarding.' They are also looking at redesigning and expanding the ED.

How to add beds

But there's another way to add more beds: make sure every bed is actually used. Doing so brings up another hospital challenge: staffing. During times of increased census, beds might remain empty for lack of nursing staff. To ensure that the new telemetry beds were always adequately staffed, St. Clair created an on-call system, which allows any nurse to pick up on-call time after meeting his or her obligation to their own unit. They are paid extra to be on call, then paid double-time if they are called.

"The telemetry unit increased its size by one-third, without chaos," notes Escajeda. "Credit goes to the nurse manager and the entire staff, and the planning process. It is working well. Patients who would otherwise have 'boarded' now have a place to go; ED nurses have more support; and staff appreciate the on-call system."

ED expansion means listening

As plans for the ED expansion get under way, all staff are involved—aides, secretaries, physicians, nurses, lab, x-ray, pharmacy, even IT. Every team member contributes crucial information: for example, it was a mental health aide who suggested having mental health rooms located closer to the elevators leading to the mental health unit.

Examining the *whole process*

In tracking the many causes of ED crowding, the staff at St. Clair found themselves focusing on the opposite end of a patient's hospital stay: discharge. Here, Escajeda has found plenty of opportunity for improvement. A process for expediting patients through the ER, done on nights and weekends, was expanded around the clock. It involves a designated nurse making rounds to all units, finding discharges scheduled throughout the day, making sure they are in the hospital computer system, and coordinating staff response. Case managers meet each day in each unit to coordinate discharge needs of patients known to be ready for discharge—from social services to insurance.

A second, unexpected reason for discharge delay were the families themselves. Often, a family member may not be available to pick up the patient until the end of the work day—sometimes hours after discharge was complete. St. Clair has used several innovations to remind community members that beds of discharged patients are needed. In times of high census, the hospital has even offered grocery certificates to families who arrive on time. However, the most effective method returns to the admission: staff members admitting patients remind them and their families that timely pickup at discharge creates less backlog for their friends and neighbors who may be waiting in the ED for a bed.

More improvements are being made as more problems are being uncovered. Standardizing report forms has aided the flow of information, and a new fax report system is being tried. These innovations seem to have "staying power" because they are based on the needs of individual patients.

Hospital of the future? Boarding patients in the hallways of Emergency Departments is a hallmark of overcrowding. Increasing efficiency involves improving systems throughout the whole hospital.

Photo from presentation by Brent Asplin MD, MPH, Dept. of Emergency Medicine, Regions Hospital & HealthPartners Research Foundation, Mpls/StPaul, MN

Before	After
Time for a ready patient to a ready bed varies from minutes to hours	Target stated: ready patient to ready bed in 30 minutes
Unit nurses interrupted multiple times by other units looking for free beds	Unit nurses report bed availability to Patient Placement Manager
Multiple requests lead to more than one bed being prepared	Coordinating through Patient Placement Manager eliminates duplication of effort
Many ED patients need to be admitted to telemetry unit	10 telemetry beds added; "on-call" system implemented to ensure adequate staffing
Beds unavailable because patients not discharged on time	Patient Placement Manager helps coordinate information among staff (MDs, RNs, pharmacists, unit secretaries, social services, housekeepers, etc.)
Patients not ready for discharge on time	With coordinated information, staff get information and medication to patients faster
Patients' families late in picking up at discharge	Let families know on admission that timely pickup is crucial.

Critical Care/Emergency Medicine Working Group Meetings Mondays

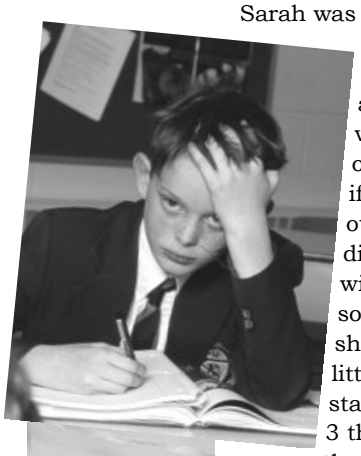
July 11 and September 26
5:30–7 pm
Allegheny County Medical Society
713 Ridge Avenue
Pittsburgh, PA 15212

Online discussion group at:
http://health.groups.yahoo.com/group/CCMEM/

To participate, contact a moderator:
Chris Hughes, M.D., cmh@cmhughesmd.com
Or Carla Zema, PhD, czema@prhi.org

Child Development Unit: keeping up with demand

Sarah's parents first became concerned when she did not start to talk when expected. Family, friends, and the pediatrician told them not to worry: kids develop at their own rate. Later, Sarah's parents started to notice other differences. When she turned 2, her parents noticed that when Sarah was at the playground, other children chased each other, laughed, and played together while Sarah was off on her own. It was as if she didn't notice the other children. It was difficult to connect with Sarah, and it sometimes seemed like she was in her own little world. When Sarah started preschool at age 3 the teachers noticed these same behaviors and expressed their concern to Sarah's parents. After a visit to the pediatrician's office, the doctor told Sarah's mom that it would be a good idea to have an evaluation, and referred the family to the Child Development Unit (CDU) at Children's Hospital of Pittsburgh of UPMC. This unit specializes in evaluating developmental delays and autistic spectrum disorders. With ambivalence and anxiety, Sarah's mother picks up the phone.



Before

A few months ago, the encounter might have gone like this: the mother's call goes to voicemail where she shares a few words about Sarah's condition and a callback number. The following day a person calls her back. If the mother is out, phone tag can go on for days.

When they finally meet by phone, the sympathetic intake coordinator asks a series of questions to determine, among other things, if the family's concerns can be addressed by the CDU specialists. It sounds like Sarah would be a candidate for CDU evaluation, so the intake coordinator sends the parents two questionnaires: one for them, one for Sarah's teacher. When these forms are completed and sent back, the process will continue.

Weeks pass before the parents send the forms back. Sarah's outbursts have grown more frequent and intense. Once the intake coordinator reviews the information, she recommends the best type of CDU appointment and sends a letter to the parents letting them know they can now call to schedule Sarah's appointment. It will be a two-hour appointment, thorough in every way. They will get answers.

At last the mother calls to schedule, only to discover that the first available appointment is 10 weeks away—almost five months from the day Sarah's mother summoned her courage to place the first call. The desperate mother bursts into tears. The CDU staff shares her frustration. They want to see the child more quickly.

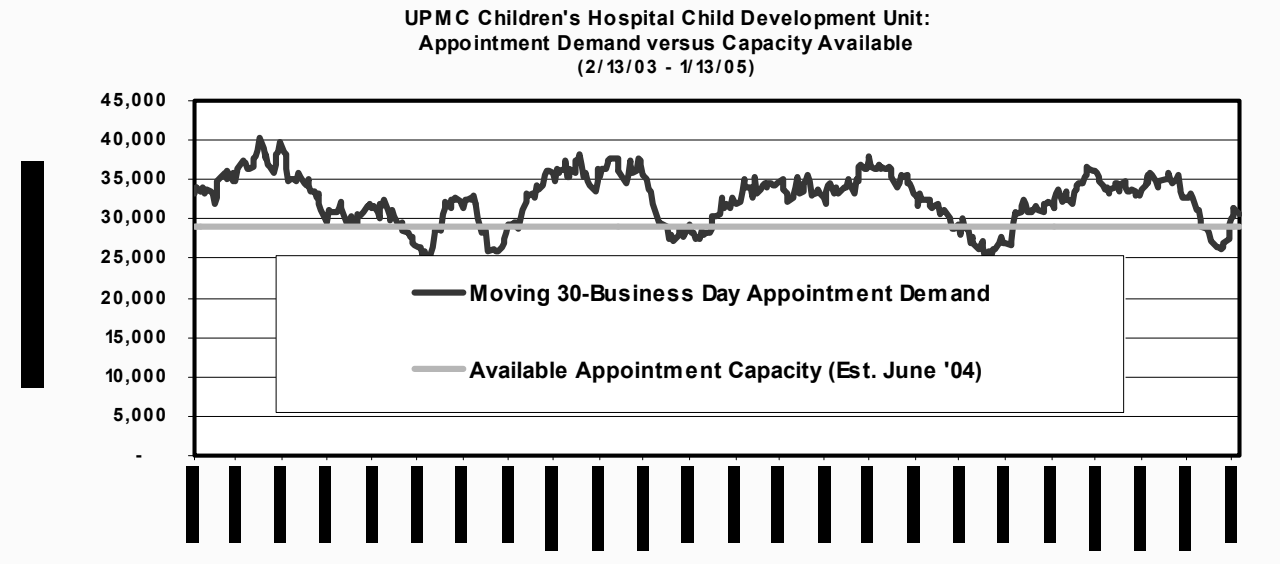
After

What started as an attempt to address a leader's goal has begun to transform the way appointments are made at the CDU. Leadership of Children's Hospital challenged all units to answer all phone calls live, and to schedule appointments at the time of the parent's first call.

In 2004, the unit's Medical Director, Dr. Robert Noll, along with Project Specialist Tina Hahn and Manager Iris Harlan attended the week-long Perfecting Patient Care™ University offered by PRHI. The classes illuminated certain techniques for these unit leaders—not so much the "what" but the "how" of improvement. By focusing solely on the needs of each individual patient, they were told, they could streamline their processes and make improvements they hadn't thought possible. PRHI Chief Nursing Officer Debra Thompson coached the team as they began experimenting with process improvements.

"The first question we asked was, 'Why can't we answer all calls live? And how can we move closer to that ideal?'" says Thompson. "We didn't start by asking, 'How can we get appointments to happen faster?' Instead, we patiently untangled the problem and started with a manageable chunk at the front end of the whole process."

The "Current Condition"			
Before February 2005		**After February 2005**	
Process	**Time elapsed**	**Improving processes**	**Results**
Parent calls intake	1.3 days	Live answering eliminates	✓
Intake connects with parent via return call	1.8 days	Live answering eliminates	✓
Mail and return forms	18 days	Schedule appointment for up to 3 year olds at time of intake call. Forms sent & returned during wait for appointment.	✓
Mail letter inviting parents to call for appointment	2 days		✓
Parents call for appointment	11 days		✓
Wait for appointment	69+ days	Actual wait may increase with staff shortages; yet overall wait time will still be less because of process improvements.	x



Understanding demand: Once "in the system," parents report a high degree of satisfaction with the services their children receive. The problem is that, since this is the only program of its kind in the region, more demand exists than capacity.

Problems: The lag in capacity was not the only factor that led to waits of 4 to 6 months for a first appointment.

Constructing solutions: Continually addressing small, manageable problems, one by one, guided solely by what was in the best interest of the patient, led to breakthroughs over time.

"We had been starting off every morning a full day behind on phone calls," said Helen McElheny, an intake coordinator. "Each morning we faced playing back a day's-worth of voicemail and calling each person. It never occurred that it could work any other way, since the volume of calls was so great."

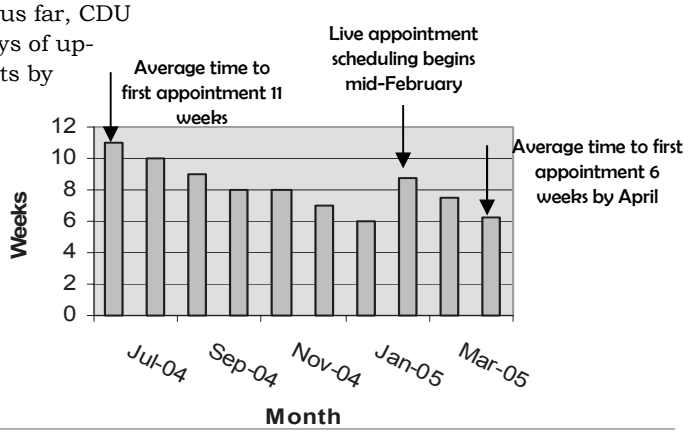
Tina in her role as Team Leader, assisted Helen and Intake Coordinator Sharon DiBridge in catching up the backlog of phone calls to ensure the intake coordinators started with a clean slate. Within 24 hours, the phones were being answered in real time, with very few landing in voicemail. Not only did this new process eliminate up to 3 days in wait time for patients, the intake coordinators discovered that it greatly reduced their stress. The time they'd spent listening to voicemails was put to more productive purposes—answering calls live and reviewing charts. Suddenly, they discovered, the hours in their work day went a lot farther.

Unanticipated results

One unanticipated result of taking the calls live: the volume of intakes completed rose from 294 to 379 revealing additional facets of the community need for the types of services provided by the CDU (see chart). It also caused more problems to surface. For example, staff knew that only 60% of the people who made the initial call for help actually returned the paperwork and received appointments. Would this percentage improve if staff scheduled the appointment at the time of the call, and then exchanged paperwork? Or would doing so increase the amount of incomplete paperwork or missed appointments? CDU staff is phasing in the zero-paperwork appointment, currently with patients up to age three.

"Tackling the whole problem of 'wait time' is too overwhelming," says Team Leader Tina Hahn. "It works better to break it into smaller pieces, like scheduling 2-year-olds at time of intake, seeing how that goes, fixing as we go, then expanding that offering. By approaching change in this way, work becomes more manageable. Working this way, and relying on the training we received in the PPC University, has already allowed us to get better results than we ever thought possible."

With the steps taken thus far, CDU staff has eliminated 3 days of up-front wait time for patients by taking calls live. Also, children up the age of three are being scheduled at the time of intake, eliminating another component of the wait time for an appointment. The plan is to move ahead with small frequent improvements to ensure children with special needs get exactly what they need when they need it. According to Dr. Noll, "our goal for intakes is to have families make one call and get scheduled. Additionally, we believe it is extremely important to see children and their families in a timely manner. One phone call and a timely appointment is our goal for quality family centered care." CDU staff continue to look at ways to streamline not only appointment scheduling, but creating the ideal appointment to thoroughly assess patient needs and work with the families to design an intervention plan for their children. Future articles will describe how doctors, nurse practitioners, psychologists and others on the clinical team begin to work together to eliminate waste and create the most efficient possible appointment for clients.



Pittsburgh Regional Healthcare Initiative

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Calendar, Summer 2005

Day	Date	Time	Event	Place	Contact
Mon	July 11	5:30-7 p	Critical Care Medicine/Emergency Medicine Working Group meeting	ACMS 713 Ridge Ave. Pittsburgh, PA	Chris Hughes, *cmh@cmhughesmd.com* or Carla Zema, *czema@prhi.org*
Mon	Sept 26				
Tues	August 2	4-7 p	Perfecting Patient Care Information Session	PRHI Learning Center PRHI Offices Centre City Tower, 24th floor 650 Smithfield Street, Pittsburgh	***CME credits offered*** ***Registration required*** *Betsy Milliron* *bmilliron@prhi.org* *412-586-6714*
Tues	Sept 6				
Weds	August 3	8a-5p	PPC 101		
Weds	Sept 7				
Mon-Fri	July 25-29	8a-5p	Perfecting Patient Care™ University		
Tues	Sept 20	5:30-9p	Excellence in chronic care: Successes in the primary care setting	UPMC St. Margaret 815 Freeport Road Pittsburgh, PA 15215	To register, contact Betsy Milliron at: *bmilliron@prhi.org* (CMEs applied for)

PRHI Executive Summary **is also posted monthly at www.prhi.org**
Please direct newsletter inquiries to: Naida Grunden, Director of Communications,412-586-6706, ngrunden@prhi.org