# LESSONS LEARNED FROM TEACHING CLINICAL PATHWAYS AT A PEDIATRIC HOSPITAL

*Michael Seid, PhD, Erin R. Stucky, MD, FAAP, Patricia J. Richardson, BSBA, RCP, and Paul S. Kurtin, MD*

Clinical pathways are standardized protocols for the treatment of specific diseases or conditions [1] and represent the synthesis of evidence-based health care decision making. With growing use of clinical pathways in health care delivery, house staff will increasingly be exposed to these tools. It is important for residents to understand how pathways are developed in order to appreciate their value and to use them properly. This paper describes the approach used to teach clinical pathways to house staff at a pediatric hospital, as well as some lessons learned from this experience over the past 5 years.

## The Setting

Children's Hospital and Health Center (CHHC) in San Diego, CA, incorporates multiple modes and sites of health care delivery. Children's Hospital-San Diego (CHSD), a component of CHHC, is a 220-bed tertiary care pediatric medical center with 33 neonatal intensive care unit beds and 24 pediatric intensive care unit beds. The hospital is the only free-standing pediatric tertiary care facility and the sole designated pediatric trauma center in San Diego County, and it contains the only pediatric emergency department in San Diego and Imperial Counties. Each year, CHSD serves nearly 10,000 inpatients, for a total of 48,000 inpatient days. Also, in the fiscal year ending 1998 there were 37,000 emergency and urgent care visits. In addition to CHSD, CHHC has 38 outpatient clinics with over 100 physicians in 35 subspecialties, generating over 80,000 outpatient visits annually.

The health care market in San Diego County is one of the most highly penetrated by managed care in the United States, with 40% of the total population (66% of the commercial population) enrolled in a health maintenance organization [2]. By July 1999, all 190,000 Medicaid-enrolled children in the county are expected to be enrolled in a managed care plan. Commercial payments to providers in San Diego County have declined steadily in recent years, and Medicaid reimbursements are among the lowest in the country [3]. Compared to Hennipen County, Minnesota, another highly managed county in the United States, which spends 43% of its budget on health care, San Diego spends only 10% [3]. These budgetary pressures on CHHC have led to a quest for high quality, effective, and efficient care and reduced lengths of stay for most pediatric diagnoses.

*Michael Seid, PhD, Research Scientist, Center for Child Health Outcomes, Children's Hospital and Health Center, San Diego, CA; Erin R. Stucky, MD, FAAP, Director of Education, Pediatric Hospitalist, Children's Hospital-San Diego, San Diego, CA; Patricia J. Richardson, BSBA, RCP, Clinical Analyst, Center for Child Health Outcomes, Children's Hospital and Health Center; and Paul S. Kurtin, MD, Director, Center for Child Health Outcomes, Children's Hospital and Health Center, Vice President, Children's Hospital-San Diego.*

## Clinical Pathway Development at CHSD

### Background

Clinical pathways were first implemented at CHSD in 1993, in the neonatal intensive care unit and orthopedic and cardiac care areas. Pathways were introduced due to increasing pressure from external competitors, decreasing reimbursement from payers, and the need to manage cost while maintaining or enhancing quality of care. To date, 39 pathways have been implemented or are in development in 7 clinical areas.

Early pathways at CHSD described expected treatment day by day. Most clinical pathways at CHSD now take the form of algorithms—decision trees that describe recommended interventions based on patient condition. A decision-tree style mirrors more closely the way physicians are trained to think about patients and their treatment. As an example, the CHSD bronchiolitis pathway is presented in Figure 1.

### Selection of Pathway Topic

The first step in developing pathways is to select a clinical process to improve. Of the many potential pathways within acute care pediatrics at CHSD, candidate diagnoses are selected because they are high volume, associated with high medical and/or financial risk, of interest to a specific physician or care area, or associated with wide variations in clinical practice.

### Multidisciplinary Pathway Development Team

Pathway design is multidisciplinary, including any health care provider with a stake in the particular condition. For example, in the case of asthma, the team

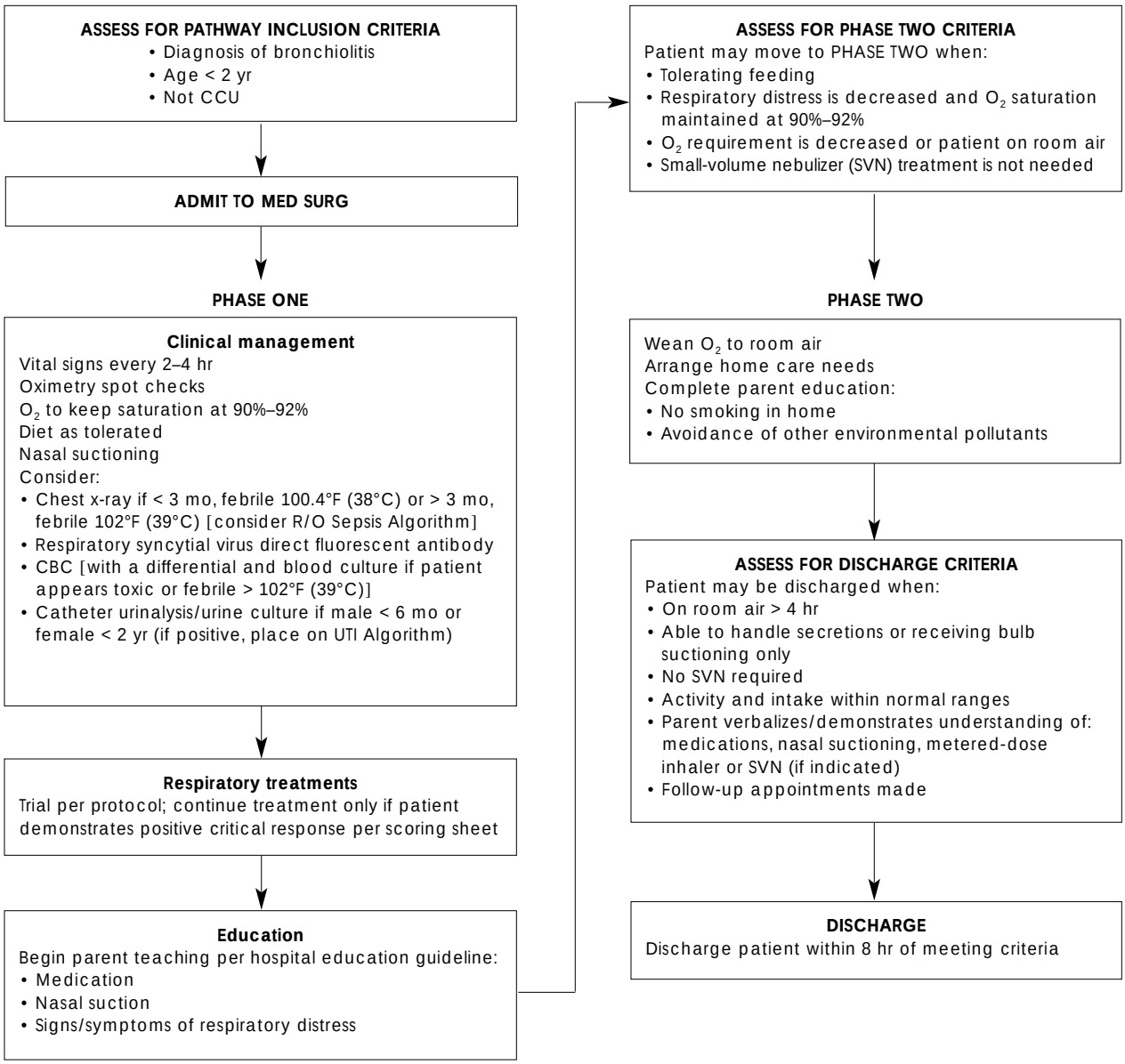


**Figure 1.** Bronchiolitis pathway developed at Children's Hospital-San Diego. (Copyright 1998 Children's Hospital-San Diego. Adapted with permission.)

includes nursing, respiratory therapy, emergency department personnel, pharmacy, and community pediatricians who have high volumes of admissions. Key team members crucial to the success of the pathway are the physician "champion" and the nurse leaders. Other essential members depend on the particular clinical skills needed to provide care on a given pathway.

The physician champion is an opinion leader whose role is, in part, to influence physician practice and stimulate change in physician behavior. It is critical that the champion be recognized as having specific clinical expertise in the pathway area and be willing to be an active leader in developing, implementing, and maintaining the pathway. Experience at CHSD indicates that a visible, active, recognized physician content expert is essential for changing the opinions and practices of other physicians. Similarly, nurse leaders serve as champions for the pathway among nursing staff. Without the support of nurses, who provide the bulk of patient care, pathways are difficult if not impossible to implement and maintain.

Community pediatricians with high-volume admissions for the diagnosis of interest are invited to participate

on the pathway development team at CHSD. All pediatricians with admitting privileges and whose patients are admitted to the particular care area are sent a draft of the pathway and asked to provide feedback.

### Plan, Do, Check, Act

Pathways employ a continuous quality improvement process and are developed based on the PDCA performance improvement methodology *(see page 11)* [1].

The first phase involves choosing the topic, performing a comprehensive literature review as well as internal and external practice reviews, and identifying a physician champion, nurse leaders, and other essential team members.

The second phase involves reviewing the synthesis of the literature, designing a template algorithm, determining key process and outcome indicators, and reaching agreement about treatment steps and sequencing. Each team member is responsible for obtaining feedback and agreement from professional colleagues. Implementation of the algorithm, which begins during this phase, is the responsibility of all team members and includes education regarding the pathway components, related protocols, standardized admission orders, and supporting literature. Finally, all staff members with responsibility for care within the pathway are educated, including house staff, ancillary departments, business personnel, attending physicians, and nurses.

The third phase involves reviewing the effectiveness of the pathway. The team reviews data from implementation, including quality indicators and financial reports, and the results are shared with the various care areas. The algorithm may be revised based on results.

The objectives of the final phase are to keep the pathway on track, to continue data feedback to care areas and the team, to measure improvements in quality and financial indicators, and to make revisions as indicated. Pathways are reviewed every 6 months to maintain consistency with new medical knowledge. The ability to report clinical and financial outcomes to all stakeholders on a regular basis is central to success with pathways at CHSD. Clinicians are justifiably cautious about changing patterns of care. Sharing the results of these changes reassures physicians that the new procedures have improved the services that they provide.

## Approach to Teaching Pathways at CHSD

In the inpatient and emergency department settings, CHSD works with residents in five different specialties (family practice, pediatrics, transitional program, emergency medicine, and anesthesia) and from four different institutions. From 18 to 20 residents are at CHSD at any one time, for a 3-week to 2-month rotation, totaling 80 to 90 interns (more than 200 rotations) per academic year. CHSD is affiliated with a group of pediatric hospitalists who account for about 50% of pediatric admissions and whose presence lends consistency to the roster of attending physicians. In addition to these 5 pediatric attending physicians, approximately 70 pediatric specialists in an affiliated medical group participate in teaching house staff through presentations at noon conferences and grand rounds.

The experience of teaching clinical pathways to house staff at CHSD suggests that residents progress through three stages in their understanding, acceptance, and use of pathways. An appreciation for these stages may help those involved in house staff education at other institutions. Institutions differ in the number and type of house staff and attendings, the structure of the educational program, and the acceptance of pathways within the institution. Therefore, the following discussion does not include a detailed methodology for how pathways are taught at CHSD. Rather, the discussion highlights some lessons learned from this experience.

### Stage One: Learning Pathways

Faced with upheaval in the way health care is organized, financed, and practiced, pediatrics is under pressure to justify its very survival. Increasing cost pressures have meant that in competitive markets, nonpediatric providers bid against pediatric providers for a share of the increasingly smaller health care dollar. New pediatric residents enter the health care arena unprepared for this threat to their future practice. In this stage, residents begin to see evidence-based medicine as a way to be proactive in assuring high quality care to their patients in an age of constraints.

**Introduction to pathways.** Residents are introduced to information about the form, function, and development of specific pathways during discussions at morning report and noon conferences. Key to residents' acceptance of clinical pathways is acceptance of the academic and clinical legitimacy of the pathways. Informing residents of the pathway development process is the first step. Residents are shown that multiple sources inform each pathway, such as literature searches for documented best practices, American Academy of Pediatrics guidelines, community pediatrician input, and expert opinion. Furthermore, all CHSD pathways are developed with the guidance and leadership of the appropriate attending physician (the physician champion). This local credibility is important for residents to see, especially when attendings whom the house staff trust to be patient advocates have developed the pathways. Residents are assured

that the attending physician is intimately familiar with the pathway, accountable for its quality, and able to answer any questions they may have.

Because it is a resident's job to question, pathways are presented with intellectual honesty. Any controversies encountered in a pathway's development are identified, and residents are guided through the reasoning and evidence by which the pathway team arrived at its ultimate decisions. Residents are shown that some aspects of the pathway derive from empirical results and some from expert opinion or consensus. For example, in developing a particular pathway, the literature review may have resulted in six key issues, of which three have been empirically resolved. The remaining three become points of discussion and consensus for the pathway development team, and the reasons behind the outcome of that discussion are presented to residents. A proactive approach is taken when discussing controversial components of pathways, as house staff will reliably detect any controversies. Feedback and questions are elicited during this process, so that house staff can assess the soundness of the pathway to their own satisfaction. Additionally, the journal articles and research reviews on which the pathways are based are made available on an ongoing basis.

Using pathways in writing orders. Junior residents' enthusiasm at this stage is mixed with fear and uncertainty about learning new roles and handling new tools. Clinical pathways represent territory that is not yet well understood, and strivings for independence may give rise to rebellion. House staff, especially junior residents who need to learn to write orders on their own, are sometimes concerned that guidelines will limit autonomy. Residents allowed to explore and experience their new world will flourish if this freedom is coupled with consistent education and guidance.

At CHSD, new residents are encouraged to write their own orders for the first 3 months, provided they admit each patient to a pathway. Senior residents review these orders as part of routine teaching; they also review the preprinted pathway orders with junior residents and compare them with those written by the junior residents. This exercise serves several purposes. It provides junior residents an opportunity to digest the details of the case and to learn the process of writing orders. Moreover, by the end of the 3 months, most residents realize that they have duplicated the pathway orders. Residents thus discover for themselves that the pathway order set represents best practices, which is a powerful lesson. This 3-month period also serves as a learning evaluation tool. At the end of the 3 months, residents are expected to be using the pathways. Inability to do so may indicate difficulty mastering algorithmic thinking and may require further education. Thus, using pathways can help to identify basic education needs in junior residents earlier in the first year than may otherwise have been noticed.

### Stage Two: Using Pathways

Having grasped the basics of clinical pathways, residents settle down to learning and may become concerned that pathways limit critical thinking. Indeed, pathways have often been criticized as "cookbook medicine." It has also been said that by using pathways physicians give up the practice of medicine and become nothing more than technicians.

In response to this concern, we emphasize that clinical pathways are designed to be best practice protocols for the most common pediatric diagnoses. The decision to put a child on a pathway represents what a physician would determine in her mind to be the standard of care for that child. Physicians must decide, based on their knowledge and on clinical information gathered on history and physical examination, what the diagnosis is and hence what the treatment for a particular child should be. The decision is made by the physician, not by the pathway. Pathways are tools to use after the physician has decided to place the child on a pathway. The way that pathways are written at CHSD further emphasizes this point. Pathways are presented in the form of algorithms, with "if, then" branches much like the decision trees in pediatric textbooks. This format presents choices; rather than forcing a given choice, it forces the resident to think through available choices.

Using pathways to do discharge planning. As residents master pathway particulars at this stage, supervision can be eased. Residents have the tools to teach themselves and to delve further into evidence-based medicine and ways to maximize the use of pathways. For example, beginning discharge planning on the day of admission has been thought to be more typical of nurses than of house staff. However, in our experience, residents respond to the planning embedded in pathways by doing just that. Thus, because the bronchiolitis pathway advocates two to three treatments and then reassessment, residents familiar with the pathway write fewer discharge orders that include home nebulizer machines. Conversely, house staff using the asthma pathway start planning on day 1 for the home nebulizer machine.

Using pathways for reassessments. Residents at this stage can revisit early issues to challenge the notion of a pathway. The resident who has mastered the mechanics of clinical pathways turns to innovation. Continued support allows residents to explore the

bounds of pathway implementation and to apply the concepts of evidence-based medicine and best practices to other diagnoses and procedures.

At this stage, residents may be concerned that using clinical pathways will lead to complacency. Residents fear that because there is a pathway in place, they will rely on it, cease to think critically, and miss the atypical patient. We call this the fear of "missing the zebra." In response to this concern, we emphasize that the role of the physician in every case is to respond to the patient's condition. A physician must continually reassess and reexamine the patient to determine the appropriate course of treatment. Pathways do not interfere with this process; in fact, many pathways incorporate reassessments. As house staff become more comfortable and experienced with pathways, they are able to use them to spot atypical cases. An illustrative example follows:

> A 3-month-old boy with tachypnea, oxygen requirement, acute respiratory distress, and perihilar markings on chest radiograph does not improve with nebulizer treatment. Suctioning only helps minimally. Oxygen supplementation does not help. A soft murmur is heard on chest examination. When attempting to wean the infant from oxygen, his oxygen saturation plummets. Because he is not responding as he should per the bronchiolitis pathway, an echocardiogram (not on the pathway) is performed. This reveals a ventricular septal defect with moderate pulmonary hypertension.

When residents are experienced enough to recognize patients whose clinical course does not follow a pathway, they may be more comfortable calling the attending with their suspicions, given that the physician will see their call as a reasonable course of action.

### Stage Three: Teaching Pathways

Residents at this stage understand and are experienced with the theory and mechanics of clinical pathways. Pathways are regarded as one type of tool for patient care, and residents are able to be consistent, responsive, and responsible in their use of pathways. Residents appreciate that pathways are a means by which a physician can learn to work with and appreciate other members of the clinical team.

Senior residents have the experience and perspective to draw wisdom from their knowledge and are sages for junior residents. Memory of personal experiences is used to guide junior residents toward maturity. Additionally, community pediatricians have offered feedback that CHSD house staff are an asset to work with because they help them to stay abreast of the literature and to understand and appreciate the value of pathways.

## Evaluating Pathways at CHSD

The acceptance of clinical pathways at CHSD has grown to the extent that patients with pathway diagnoses are placed on the pathways by default. A traditional evaluation approach such as tracking the percent of eligible patients on a pathway is not meaningful at CHSD. Pathways are evaluated regularly by comparing prepathway patients to patients on pathways; the information regarding clinical and financial outcomes is disseminated internally. Pathways are reviewed every 6 months and on an ad hoc basis to assure that they are current with the medical literature. Planned additions to pathway evaluation at CHSD include studying house staff's attitudes toward pathways at the beginning and end of their rotations and surveying former house staff 1 year postinternship to determine whether learning about pathways helped in securing a first job out of residency.

## Conclusion

Because at CHSD pathways have been internally documented to decrease the costs while improving the quality of care, pathways have become a way of life at the hospital. This, combined with regular house staff turnover at CHSD, has presented a challenge and an opportunity to learn what does and does not work when teaching clinical pathways to new residents. Many factors have contributed to the success of this endeavor at CHSD, including the fact that San Diego has a highly penetrated managed care market, the consistency lent to the educational program by participating hospitalist pediatricians, the full commitment given by administrators and physicians, and the involvement of dedicated educators. Further, we have found it helpful to consider a developmental framework when teaching clinical pathways so as to anticipate pitfalls as residents progress through stages of their maturity in accepting and using clinical pathways.

## References

1. Institute of Medicine (US). Clinical practice guidelines: directions for a new program. Field MJ, Lohr KN, editors. Washington (DC): National Academy Press; 1990.
2. The InterStudy competitive edge part III: regional market analysis. St. Paul (MN): InterStudy Publications; 1997.
3. Integrated Health Strategies. Health care in San Diego: a fragile balance. San Diego: Hospital Council of San Diego and Imperial Counties; 1997.