

## The Development and Implementation of Normal Vaginal Delivery Clinical Pathways in a Large Multihospital Health System

Scott B. Ransom, DO, MBA; S. Gene McNeeley, MD; Ardis Yono, RN; John Ettlie, PhD; and Mitchell P. Dombrowski, MD

### **Abstract**

The entire country has become more concerned with healthcare costs due to managed care, capitation risk-based contracts, and the near elimination of the cost-plus reimbursement system. Clinical pathways have become one way to reduce unnecessary resource consumption by reducing provider variance, improving clinical outcomes, and reducing cost. We present here our rationale and process for developing a common clinical pathway for normal vaginal delivery in a large and varied multihospital system. We also discuss how this new pathway is expected to improve quality of care and reduce costs.

(*Am J Man Care* 1998;4:723-727)

An increasingly cost conscious American public has dramatically changed the expectations of healthcare providers. The current healthcare climate is characterized by such concepts as managed care, capitation, reduced fee-for-service arrangements, and competition. Process efficiency must be of paramount concern, and this has led healthcare executives to implement traditional manufacturing process improvement efforts. The result has been the development and implementation of clinical pathways for large health systems—some of which are based on these traditional manufacturing models.

Detailed discussions of such clinical pathways are not frequently in the literature. This manuscript out-

lines one method for developing and implementing clinical pathways in a large multihospital system for normal vaginal delivery and may provide a basis for future clinical pathway efforts for large health systems.

### **Clinical Pathway Development and Implementation**

The management team of a \$1.8-billion health system, in which approximately 16,000 babies are delivered annually in four obstetrical hospitals, determined a need to standardize and implement a clinical pathway for normal vaginal delivery. The health system, known as the Detroit Medical Center (DMC), is composed of 14 integrated healthcare subsidiaries. The Hutzel, Grace, Huron Valley, and Sinai Hospitals comprise the active obstetric hospitals for the clinical pathway project. Hutzel Hospital is the system's 394-bed women's hospital and provides care to a high proportion of indigent patients. Grace Hospital is a 551-bed, community-based teaching hospital, Huron Valley Hospital is a 150-bed facility in an affluent suburb of Detroit, and Sinai Hospital of Detroit is a 335-bed teaching hospital.

The need for a clinical pathway arose due to significant competitive pressures to improve quality and reduce costs, as DMC's largest competitor had implemented a process that substantially reduced costs and provided outcome data on obstetric patients. The primary goal of the entire clinical pathway project was to improve quality by reducing clinical variation and standardizing evidence-based processes. A secondary goal included eliminating consumption of resources that did not add value.

The DMC management team selected a physician leader and pathway administrative facilitator to develop common clinical pathways for the system's four hospitals. The management defined "clinical pathway" as: "A timeline for management of a specific disease process, diagnosis, or treatment that includes expected interventions, procedures, and outcomes. The pathway can reference or include a protocol to provide

---

From the Department of Obstetrics and Gynecology, Detroit Medical Center, Wayne State University School of Medicine, Detroit, MI (S.R., S.M., A.Y., M.D.), and the University of Michigan Business School, Ann Arbor, MI (J.E.).

Address correspondence to: Scott B. Ransom, DO, MBA, Division of Community Programs & Health Effectiveness, Department of Obstetrics and Gynecology, Wayne State University School of Medicine/Hutzel Hospital, 4707 St. Antoine Blvd., Detroit, MI 48201.

a timeline for treatment of symptoms and diagnosis of condition." The pathway provided a tool for communication, education, decreasing variation, increasing accountability and increasing efficiency based on best internal and external practice.

The clinical pathway physician leader, facilitator, clinical service chiefs, and management representatives then selected key leading physicians, clinical nurse managers, pharmacists, dietary personnel, and home healthcare representatives from the four hospitals to participate in the clinical pathway project. The clinical pathway team included equal, interdisciplinary representation from each hospital to facilitate acceptance by the medical staff. Two physician representatives were selected from each hospital, and nonphysician members were also equitably distributed among the four hospitals. The selection and recruitment process took 1 month; the final clinical pathway team consisted of 20 individuals from the four obstetric hospitals.

The facilitator, physician leader, and nurse representative recorded DMC hospital current clinical pathways and completed a detailed literature review to collect all available practice guidelines and clinical pathways, outcome measures, benchmarks, and data about normal vaginal delivery. In addition, the team gathered all information on best practices, evidence-based information, and clinical effectiveness for normal vaginal delivery from the literature. Through an analysis of a sample of 100 patients, the physician leader determined key variables within the DMC clinical pathways that warranted review and discussion and determined their cost implications.

Following this research phase, the work group developed the pathway drafts and identified key outcome variables over five weekly sessions lasting 4 hours each. The pathway team presented all opinions, as all members were equally important in the decision-making process. The multidisciplinary group used a consensus approach to remedy any conflicts not clearly answered from the literature. The pathway facilitator and physician leader then presented the initial draft to a separate advisory group consisting of clinical service chiefs at each of the four hospitals, the director of maternal fetal medicine, and administration representatives. It took 2 months of 4-hour weekly meetings to finalize the clinical pathway.

Once the work group and advisor group approved the pathway, the optimal pathway pilot site was determined. Sinai Hospital was chosen because it included a combination of patient and physician populations representative of all four obstetric hospitals. Sinai Hospital has a mix of private practice deliveries, res-

ident involvement, paid faculty, and indigent patients. The 3-week pilot utilized the clinical pathway and standardized physician order sets, and nursing personnel collected outcome data. The pathway was not introduced as part of the permanent medical record during the pilot. Following the pilot, the pathway team reviewed the pilot experience and outcome data and found that the pathway and order sets required only minor modifications. However, the team found some problems (eg, a highly variable care plan) associated with the home healthcare portion of the care process.

The improved clinical pathway is shown in Table 1. These documents were presented to the women's health management team, which consisted of clinical and administrative leaders throughout the DMC system, for final approval for system-wide implementation. Following approval, the pathway representatives at each of the four hospitals conducted 3 weeks of educational seminars on the pathway process for all resident physicians, attending physicians, data collection personnel, and administration. The educational process was very lengthy but needed to provide consistent utilization of the pathways as well as the most accurate data collection processes possible. The pathways were subsequently introduced at all four obstetric hospitals.

The pilot, reevaluation of the clinical pathway and order sets, management approval, and education prior to the final implementation of the clinical pathways took 3 months to complete. The pathway team then reconvened 3 months following system-wide implementation for reevaluation and improvement of the clinical pathway process.

Once the new pathway was in place, we compared pre- and postpathway lengths of hospital stays. We did so by determining all outcomes that would require additional time in the hospital and compared actual hospital stays to hospital stays expected under the new clinical pathway. These expected lengths of stays were calculated based on past patient encounters, and we used gap analysis to account for actual patient variances from the pathway. Thus, while the postpathway lengths of stay were estimated, they were based on real experiences at DMC.

The average length of stay for normal vaginal delivery in 1996 was 1.6 days, or 1.6, 1.5, 1.8 and 1.9 days, respectively, for Sinai, Grace, Huron Valley, and Hutzell Hospitals. Under the new clinical pathway, the expected length of stay was 1.1 days. The goal was 1 day.

The financial implications of the clinical pathway were estimated and compared with 1996 actual data.

**Table 1.** Clinical Pathway Normal Vaginal Birth at Detroit Medical Center

	Prenatal Care		Day of Admission
Goals/Outcomes	Prenatal records - completed and available in labor and delivery department		Admission criteria complete
Clinical Assessment	Initial history and physical exam Pelvic exam - VS height, weight Completion of records/documents with risk assessment	Schedule follow-up at 4 wks till 28 wks, then q 2 wks till 36 wks, then q 1 wk till birth, include B/P, urine protein test, FHT, Wt, and fundal height q visit	Completion of prenatal records HPE/VS; demographic and psychological profile; review existing records; assess fetal viability
Consults	As indicted by patients' status, especially social history: Nutritionist Genetics Social worker	Women/Infant/Children Lactation Services Social Services Childbirth Education classes MSSP	Social Service Education, if problems suspected; Notification of Health Care Provider Care Management
Labs	Type and screen hemoglobin UA and micro HBSAg HIV w/consent RPR Pap smear Assess GC Assess Chlamydia	Rubella Sickle cell, if indicated PPD, if indicated Subsequent Visits: 15-20 Wk Maternal serum- AFP, HCG + E3 24-28 Wks: Hgb 1-HR PP glucose blood sugar, 35-37 Wks; Assess Group B Strep	<i>If no previous lab values, then:</i> Urine drug screen Assess GC; Assess Chlamydia; Assess Group B Strep status; Offer HIV testing
Diagnostic Tests	Ultrasound indications are: pregnancy complications medical complications	Needed for dating w/size discrepancy Poor obstetrical history	As indicated
Treatments			Labor support/comfort measures
Medications	Prenatal vitamins, as indicated Folic acid (preconceptional to 1st trimester)		IV LR if clinically indicated and document reason in chart Antibiotics for Group B Strep if indicated
Activity	Ad lib		Discretion of Provider
Nutrition	Regular		Clear liquids (if other, specify)
Education	Warning signs/symptom Discuss pain control options for labor; VBAC education Parenting Family planning Infant feeding	Preterm labor precautions; Over the counter medication use Substance abuse Nutrition/diet Domestic violence Hospitalization process, length of stay	Patient and family labor education; Orient to room, procedures, plan of care Discuss pain control opts for labor Hospitalization process/length of stay Family planning Nursing treatment plan
Discharge Planning	Newborn care needs/supplies Community resources	Postpartum care needs Infant car seat	Newborn care needs/supplies Postpartum care needs Infant car seat Transportation needs addressed
Variance	Y/N - Records available in labor and delivery	Y/N - Labs complete	Y/N - HIV testing offered

\*Reasons for Pathway Variance: 1. Not applicable/approp variance; 2. Patient condition; 3. Patient/family avail./decision; 4. No physician order/physician decision; 5. Delay in response time; 6. Weekend/holiday; 7. Social Services process pending; 8. No Peds order; 9. Circumcision not done; 10. No transportation available; 11. Pre-dawn birth; 12. Unknown  
Expected length of stay is 24 hours

(Table continued on following page)

Table 1. Continued

	Labor to Birth	Postpartum
Goals/Outcomes	Normal uncomplicated vaginal delivery	Discharge healthy mother
Clinical Assessment	Active labor: Maternal/fetal q 1/2 hr Second Stage: Maternal/fetal status q 15 min. BP q 1 hr.	Nursing assessment and: VS q 15 min. x 4 VS q 30 min. x 2 VS q 8 hrs
Consults	None	Baby: ISS eligibility assessed
Labs	None	Baby: Cord blood for Coombs test; Blood type, as indicated Cord gas, as indicated Placenta to pathology, as indicated
Diagnostic Tests	None	None
Treatments	Comfort measures	Baby to breast immediately with patient consent; Rhogam/Rubella, if indicated Comfort measures
Medications	Pain management as indicated	
Activity	Ad lib	Up with assistance x 1.
Nutrition	Maintain hydration	Regular diet
Education	Patient/family education	Patient/family education
Discharge Planning		Circumcision consent Complete labor forms Family planning Arrange for home nurse visits Physician consults patient to determine readiness for discharge within 24 hrs
Variance	Y/N - Labs ordered other than listed on pathway - Day of Admission to Birth	Y/N - Home health visit initiated; Patient discharged within 24 hrs*

The average variable cost per day for normal vaginal delivery postpartum care was \$607. We calculated the average cost savings through reduced variable costs to be \$3,884,800 for our expected 12,800 vaginal births, or \$303.50 per normal vaginal delivery. While the majority of our patients are covered on a DRG basis, a proportion of our deliveries are reimbursed on a per diem basis. We calculated the financial loss from reduced per diem income and increased cost of home health visits and determined our net benefit (ie, decreased variable cost minus loss of per diem revenue and home visits) to be approximately \$1,994,000 system-wide.

Home health visits substantially impacted the cost savings, due to an average reduction in hospital length of stay from 1.7 days to 1.2 days. In addition, most external insurance companies reimbursed for home nursing visits, which reduced the actual system cost for this service. The pathway team felt the faster return to home would have the potential of reducing nosocomial infections and iatrogenic problems while improving the social dynamics of the typical family and improve mother-baby education in the families' own homes. Thus, the home health visits were felt to actually improve the quality of care while still providing a reduction in the length of stay. Since the home health

visits were felt to improve patient and neonatal follow-up, they would also be expected to improve patient satisfaction.

### Conclusions

The development and implementation of a clinical pathway for normal vaginal delivery for a large multi-hospital system was difficult. The differences in existing clinical systems at the four hospitals posed challenges. For example, our study hospitals included a large inner city teaching hospital with a large proportion of indigent patients and a small hospital in an affluent suburb. Patients at the former hospital often presented with problems such as teenage pregnancy, drug abuse, and neglect, while patients at the latter hospital presented with problems such as advanced maternal age and two working parents. We found it important to remedy these conflicts through considerate discussion with the interdisciplinary, multihospital clinical pathway team.

The rapid adoption of clinical pathways is due to the hospital administration's desire for more cost-efficient healthcare systems. The entire country has become more concerned with cost due to managed care, capitation risk-based contracts, and the near elimination of the cost-plus reimbursement system. Clinical pathways have become one way to reduce unnecessary resource consumption by reducing provider variance, improving clinical outcomes, and reducing cost.

In addition, the introduction of contemporary clinical pathways should provide a significant educational benefit to providers. By offering a mechanism for clinical feedback to providers, the pathways should help improve clinical practice. The pathways also allow providers access to data directing them to the most cost-effective treatment regimens and should thereby

reduce unnecessary resource consumption without reducing quality. The clinical pathways can also be continually updated as new data become available, keeping providers knowledgeable about the current literature and "best practices."

When developing a clinical pathway, a careful analysis of reduced variable costs through reduced hospital length of stay and decreased per diem revenue should be considered. While great financial savings can be expected through elimination of excess hospital days, the hospital system must consider the negative financial impact of reduced per diem income and increased home healthcare costs. Our clinical pathway project, which focused on decreasing clinical variation and improving clinical care, is expected to result in significant financial savings for the health system even though our pathway created an additional cost of home health nursing care.

Our multidisciplinary team believes that significant benefit arose from early discharge with home healthcare visits as well as decreased nosocomial infections and other iatrogenic problems associated with increased hospital stay. Home education should improve quality of care by allowing for education in the mother's normal environment. The home often includes special challenges that are unexpected in the hospital setting.

As legislation places increased restrictions and limitations on the practice of medicine, physicians must band together to present clinically efficient mechanisms that both improve quality and reduce cost. The recent legislation mandating insurance to pay for hospital stays of 48 hours for normal vaginal deliveries and 96 hours for cesarean sections should encourage physicians to develop better care mechanisms. This manuscript illustrates one method of developing and introducing clinical pathways in a large health system. In addition, the clinical pathway for normal vaginal delivery provides a possible care pathway for obstetricians to consider.