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Post-Test

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Over the past 25 years neonatal medicine has witnessed dramatic improvements in infant morbidity and mortality. From the very start of the sub-specialty's existence, neonatologists have readily embraced sophisticated new approaches. Taking the lead in such areas as development of surfactants, nitric oxide administration, high frequency ventilation and exotic technologies such as partial liquid ventilation, neonatology continues at the cutting edge of applied medical science.

As a result of this technologically-driven approach together with demonstrative gains in the care of the premature infant, neonatal divisions in academic medical centers have traditionally enjoyed significant financial returns usually reserved for their adult critical care counterparts. However, the advent of managed care, together with diminished federal dollars for both clinical and research programs place many programs in severe financial distress and a growing number into outright fiscal insolvency.

In these times of financial stress, neonatology physician and nursing leaders should become equally proficient at the fiscal examination of their programs as they are at the physical examination of their patients. Fortunately, the study of the corporate financial body is amenable to many of the same physiologic strategies and statistical tools that have contributed to the dramatic gains in neonatal medicine.

The series of papers reviewed in this issue establish the early basis of medical education and then develop a new concept of managing costs in order to achieve financial stability. These papers demonstrate the application of hypothesis-driven research into developing solutions for even the business aspects of our profession. By embracing these new business technologies and strategies with this same pioneering spirit, the modern neonatologist will increase the likelihood of practicing and teaching sustainable medicine for years to come.

Reviews & Commentary:
David T. Tanaka, MD

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Our guest editor opinion

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→ **THE COST OF NEONATAL CARE**

→ **STRATEGIES TO REDUCE COSTS AND IMPROVE MARGINS**

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Guest Faculty Disclosure

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COMMENTARY

The future of neonatal medicine has never been brighter. Often at the cutting edge of technology and science, the field has achieved dramatic reductions in infant mortality and morbidity. But these advances come with a very high cost, and even a small reduction in revenues can result in million dollar losses with alarming quickness.

In view of these high costs, hospital administrators have been reluctant to place additional resources into neonatal intensive care units (NICU) despite their proven health benefit to the local community. When faced with decreasing clinical revenues coupled with escalating costs, hospital administrators turn to health care consulting groups to control expenses and to bring a voice to the unspeakable: the cutting of clinical programs. In considering NICU cost drivers, health care consultants are quick to point out that the single largest contributor is personnel. Not surprisingly, consultants often conclude that fewer unit personnel can work more efficiently (i.e., work harder with fewer care providers). The economic benefit of such a 'reductio ad absurdum' staffing strategy cannot be denied: short-term gains with often immediate improvements in the corporate 'bottom-line'. The long term consequences staff reduction on staff morale/retention, NICU performance, and clinical revenues to support pediatric academic medical programs are often placed aside for future 'administrative study' in lieu of meeting the 'bottom line.'

It is in this rather bleak financial structure that pediatric chairmen in general and neonatal division chiefs in particular, find themselves. Faced with a 'lose-lose' prospect, some pediatric departments have used endowments to cover operational losses; whereas others, having exhausted these latter resources, have disbanded altogether. Many academic programs place their hopes on 'research dollars' to balance their budgets, only to re-discover that the opiate of the scientist (i.e., NIH funding), rarely covers the true cost of the research and cash-poor Schools of Medicine (SOM) cannot or will not bail them out.

Although a complete solution to this perennial problem may never be achieved, the literature is not devoid of hope. Reports of reducing costs and even eliminating significant amounts of operating debt have been achieved with relatively modest means through development of closer alliances between hospital and academic administrations, detailed analyses of financial and operational data at the transactional level, and a requirement that improvement strategies be monitored for both their direct and indirect consequences. As influential as these factors appear to be, what appears to be of seminal importance is the presence of physician leadership committed to the premise that: without positive margins there can be no sustainable mission.

The studies present herein have demonstrated that significant cost reductions can be achieved

when the medical processes are identifiable and specific data made available. The heterogeneity of neonatal care would seem to preclude some of the focused strategies employed in these studies. The use of summary financial data provided by governmental databanks has provided valuable insight into the magnitude of the problem, but little insight into the mechanics of solving a particular unit's fiscal problems.

Virtually all of the studies to date have examined the cost of care and its components. Little has been published with respect to those processes involved with revenue generation. Rogowski's observation that accommodations represent 70% or more of the total cost-of-care for neonatal inpatient care carries with it important reimbursement considerations. Bed charges in many hospitals are often established by the dominant services (e.g., surgery and adult medicine). The inpatient experiences of these clinical services are procedure-driven with high ancillary costs and relatively short in-patient stays. Pricing strategies that increase ancillary charges while minimizing bed charges increase revenues for these procedure-driven services. In contrast, neonatal units, with their long hospital stays and relatively low procedure usage are placed at a distinct disadvantage under these pricing strategies. A commonly held view that 'charges don't matter for a population that is comprised of Medicaid patients' is only partly true, for valuable revenues are lost when outlier patient stays are not appropriately supported by reasonable daily charges.

Finally, in a series of development trials currently underway at Duke, the barriers between the managers of financial data and the clinical leadership responsible for the program consequences stemming from those datasets are beginning to fall. The advent of sophisticated personal computers, together with advanced statistical software packages permits the analyses of datasets that were previously unassailable except by main frame computers. Although the development of 'forensic' financial analysis is still in its early phases, initial successes have been measured by the recovery of millions of dollars for both the hospital and professional organizations. These achievements in turn have generated new financial resources that have been re-invested in the department's academic and clinical missions. Preliminary results using financial data from other hospitals have been equally encouraging. Taken together, these reports and present experiences support the view that while financial failure remains a danger for most NICUs, the path to fiscal solvency, as most health care consultants know, already lies within the unit's own financial data base.

WHEN WORLDS COLLIDE: MARGINS VERSUS MISSIONS

Flexner, A.: Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching: Bulletin No. 4. New York 1910: Carnegie Foundation for the Advancement of Teaching.

Wilwnsky, G.R., Chair, Newhouse, J.P., Vice Chair: Rethinking Medicare's Payment Policies for Graduate Medical Education and Teaching Hospitals. Medicare Payment Advisory Commission (MedPAC) 1999; Washington, DC: August.

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Phillips, R.L., Fryer, G.E., Chen, F.M., Morgan, S.E., Green, L.A., Valente, E., Miyoshi, T. J.: The Balanced Budget Act of 1997 and the Financial Health of Teaching Hospitals. Ann Fam Med 2004; 2(1): 71-78.

Tracing the history of payment systems

As the 20th century dawned, concern grew over the educational potpourri that was the American Academic Medical system. The training of the nation's young physicians was erratic and lacked scientific rigor. It was into this swirl of "proprietary training of MDs" that Abraham Flexner submitted his report on the status of American medical education.

The Flexner Report as it came to be known had a profound impact on academic medical training. Eschewing the training of young physicians (some of whom had not attained even their baccalaureate degrees) by local practitioners skilled in the art but not science of medicine,

Flexner recommended sweeping changes in the medical educational system. He envisioned medical faculty 100% supported by their Universities to provide education, training and research skills unfettered by the entrepreneurial demands of clinical practice. Only in this way, he reasoned, would American Medicine become competitive with the accepted leaders of medical science, the Western Europeans.

The importance of this seminal work is still evident to this day, but by the middle of the 20th century, despite the unquestioned advances in medical care and science, the high price associated with these improvements came under close scrutiny. In 1983, the rules under which a significant proportion of the U.S. population was to be reimbursed for medical care changed. From a 'paying for costs incurred', Medicare moved to a prospective payment system based on Diagnosis-Related Groups (DRGs). This prospective payment system was heralded as a means by which escalating costs could be controlled by paying a relatively fixed amount per case. However, by the mid-nineties, medical costs again threatened to spiral out of control and rekindled interest in Medicare reform.

In 1997 the largest cuts in Medicare history were proposed through the enactment of the Balanced Budget Act (BBA). Perhaps due to the reductions for Medicare patients, the impact on Children's Services in general and on Neonatal Medicine in particular was not widely recognized at the time. This perception was reinforced by projections from the Medicare Payment Advisory Commission (MedPAC) that estimated inpatient revenues would fall, whereas overall margins would be relatively unaffected or even rise. The Association of American Medical Colleges (AAMC) took a significantly less sanguine position projecting significant losses due to the BBA. In the first few years following the passage of the BBA, reports were mixed with some studies indicating only small negative impacts and others suggesting localized improvements in hospital margins.

Three years later MedPAC re-examined the issue and concluded that overall hospital margins had significantly eroded under the BBA of 1997. Using somewhat different methodology to examine the impact of the BBA, Phillips and his co-workers also noted that total margins for teaching hospitals had declined since the inception of the BBA. However, they concluded that these losses were "not entirely attributable to the BBA97" and that other factors had as much or more impact on the negative margins experienced by the teaching hospitals. In his report on 'The Plight of Academic Medical Centers', Aaron noted the deleterious impact of the BBA but noted that bad business decisions were also to blame. For example, efforts to diversify their 'health portfolio' and perhaps to develop oligopoly position in their local medical market, Allegheny Health, Education and Research Foundation embarked on a spectacular rise in hospital acquisitions only to have an equally dramatic crash in 1998. This event, he noted, was closely followed by reduction in the bond ratings (which increases the cost of borrowed money) for many medical centers already hard pressed by the BBA.

The reduction in revenues associated with the BBA, while not directly reducing most pediatric reimbursements, has undoubtedly had a negative financial impact on nation's Children's services. Many private insurance programs, and even some Medicaid programs, have either directly or indirectly tied their reimbursements to the Medicare payment schedule. Moreover, Medicare's reduction in Graduate Medical Education, together with the decrease in resident work hours, has placed a tremendous burden on post-graduate medical educational programs at a time when all of the traditional funding mechanisms (practice plans, SOM, and hospitals) are struggling. It is in this context of declining revenues and rising costs that many Pediatric Chairmen are increasingly given ultimatums to cut costs or lose clinical programs.

Flexner, A.: Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching: Bulletin No. 4. New York 1910: Carnegie Foundation for the Advancement of Teaching.

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THE COST OF NEONATAL CARE

Office of Technology Assessment, Neonatal Intensive Care for Low Birth Weight Infants: costs and effectiveness. Congress of the US, Washington, DC 1987

Rogowski, J.: Measuring the Cost of Neonatal and Perinatal Care. Pediatrics 1999; 103(1): 329-335.

Zupancic, J.A.F., Richardson, D.K., O'Brien, B.J., Schmidt, B., Weinstein, M.C.: Daily Cost Prediction Model in Neonatal Intensive Care. Intl J Tech Assess in Health Care 2003; 19(2): 330-338.

Richardson, D.F, Zupancic, J.A.F., Escobar, G.J., Ogino, M., Pursley, D.M., Mugford, M.: A Critical Review of Cost Reduction in neonatal Intensive Care I. The Structure of Costs. J Perinat 2001; 21:107-115.

Analyzing the available data on the cost of care

In 1987 the Office of Technology Assessment (OTA) released its report on the costs and effectiveness of neonatal intensive care for low birth weight infants. In that report the high costs associated with neonatal care were carefully examined and compared to the 'value' of the lives gained from the expenditure. The study concluded that the monies spent on neonatal intensive care, while high, were economically justifiable. This analysis came at a time when expensive medical advances in the areas of surfactant therapy, high frequency ventilation, and nitric oxide therapy were just emerging. These new advances, coupled with the significant increase in survival rates of the very low birth weight infant, drove the cost per neonatal discharge to even higher levels.

In 1999, Rogowski reported on her findings on estimated costs for very low birth weight infants (birth weights less than 1500 grams). Using publicly available data collected from 1/1/1993 to 9/30/1994, Rogowski estimated cost data by applying appropriate cost-to-charge ratios available on governmental reports. Her findings confirmed the earlier OTA report of the high costs associated with neonatal health care and extended these earlier findings by separating out ancillary (respiratory therapy, laboratory, radiology, pharmacy and other ancillary costs) from accommodation costs. Median total costs for infants with birth weights ranging from 501 to 750 grams were estimated at $89,546 (in 1994 dollars). When related to gestational age, median costs rose by $10,000 for every week under the gestational age of 31 weeks. Rogowski noted that the cost data were not normally distributed and a few patients could be expected to incur spectacular costs running into the hundreds of thousands of dollars.

More recently, Zupancic, et al (2003) reported on the non-personnel costs of 385 infants enrolled in the Canadian Trial of Indomethacin Prophylaxis for Preterms. In this report they examined in-patient costs stratified by day of stay. As noted in earlier reports, neonatal care was expensive with a large proportion of the non-personnel cost generated during the first week of the patient's hospital stay. As expected, the distribution of these costs was driven by a relatively few number of products and the authors were able to demonstrate that total ancillary costs could be reasonably predicted from a limited set of key resource variables.

In their review on the structure of costs in the neonatal intensive care setting, Richardson, et al, outlined important elements to be considered prior to embarking on a cost containment/cost reduction plan. In their report, the authors describe key linkage points between the bed costs and ancillary costs described earlier by Rogowski. Their discussion on the types of cost (e.g., direct vs. indirect costs) is extremely helpful, but the reader should be aware that small local changes in the definitions of these costs can significantly alter the consequences of their values. The authors go on to describe specific cost centers that are included in the total cost burden but are generally hidden to the casual observer, and conclude with a review of various prospective payment systems.

In this connection it should be noted that virtually all of the published reports have relied on secondary source materials gleaned from public records or from research protocols not designed for the specific task at hand, namely the accurate determination of costs. To the extent that primary data (exact transactional costs and charges) do exist, the paucity of published reports using these data almost certainly reflects prevailing working relationships between hospital

administrations and their medical directors and concern over the publication of private financial information. Fortunately, hospital administrators are more willing to provide unit-specific data when they are used only for local improvement of operations. Construction of future studies that can preserve proprietary and protect patient-sensitive (HIPAA) information prior to publication will be needed in order to gain a more general understanding of costs and the drivers of cost in the neonatal intensive care unit.

Rogowski, J.: Measuring the Cost of Neonatal and Perinatal Care. Pediatrics 1999; 103(1): 329-335.

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Strategies to Reduce Costs and Improve Margins

Richardson, D.F, Zupancic, J.A.F., Escobar, G.J., Ogino, M., Pursley, D.M., Mugford, M.: A Critical Review of Cost Reduction in neonatal Intensive Care II. Strategies for Reduction. J Perinat 2001; 21:121-127.

Meliones, J.N., Ballard, R., Burton, W.: No Mission ←→ No Margin: It's That Simple. J Health Care Finance 2001; 27(3): 21-29.

Weinberg, R.M., Vogenberg, R.: Improving Care and Reducing Costs Through Partnerships Between Clinical and Financial Leaders. Am J Health-Syst Pharm 2003; 60: 336-337.

Developing cost-management versus cost-avoidance approaches

In a subsequent report, Richardson, et al., presented various strategies to reduce the costs of neonatal intensive care. Many of their suggestions have been validated through formal studies, whereas others (e.g., reducing nursing and indirect care costs) remain to be proven. In this connection it has been noted that many, if not all, pediatric departments depend upon clinical revenues generated by their neonatology divisions. Concern had been raised that reducing the volume of neonatal care through either restrictive admission policies or early discharge programs would only further erode clinical margins. Although initiation of these strategies has had some impact, most intensive care units have seen their average daily census increase due to a number of factors such as improved survival, market re-alignments, and population growth. As a result, hospitals are turning towards other strategies that focus more on management of costs rather than cost avoidance per se.

In a report by Meliones, et al, the authors describe the results of a pilot trial using balanced scorecard methodology. Taken from the business world (for a review see Kaplan and Norton[1]) and adapted to the clinical arena, the balanced scorecard approach was used to track four primary outcomes: Financial; Customer Satisfaction; Learning and Growth; and Internal

Business. A major objective of the program is to link core business objectives with key performance indicators. This linkage is then continuously monitored and changes made to the program(s) as required. By providing a verifiable tool to measure and track changes, they were able to eliminate a multimillion dollar deficit at Duke Children's Hospital. In response to these improved financials, the Hospital and Pediatric Department found themselves in a win-win situation.

In another example of a successful partnership between hospital finance and clinical programs, Weinberg and Vogenberg presented their experience with developing a management strategy for the prevention and treatment of deep vein thrombosis. The hospital permitted access to their financial data and the researchers were able to identify a number of significant opportunities for improvement. These included standardizing the approaches used to identify at-risk patients; develop treatment protocols; and methodology to monitor and track improvements. In an approach similar to the balanced scorecard, the data can be used for benchmarking purposes as well.

References:

1. Kaplan, Robert S. and David P. Norton. Using the balanced scorecard as a strategic management system. Harvard Business Review 74, no.1 (January-February 1996)

Richardson, D.F, Zupancic, J.A.F., Escobar, G.J., Ogino, M., Pursley, D.M., Mugford, M.: A Critical Review of Cost Reduction in neonatal Intensive Care II. Strategies for Reduction. J Perinat 2001; 21:121-127.

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Contact your state licensing board to confirm that AMA PRA category 1 credits are accepted toward fulfillment of RT requirements.

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- Evaluate the information presented to develop a more complete understanding of the issues surrounding the costs of neonatal care.
- Demonstrate a more complete understanding of the advantages/disadvantages of cost management versus cost avoidance strategies.
- Use the information presented herein as a basis for decision making in developing effective cost management strategies in your clinical practice.

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- Dr. Nogee has indicated a financial relationship of grant/research support with Forest Laboratories and has received an honorarium from Forest Laboratories.
- Dr. Lawson has indicated a financial relationship of grant/research support from the NIH. He also receives financial/ material support from Nature Publishing Group as the Editor of the Journal of Perinatology.

All other faculty have indicated that they have not received financial support for consultation, research, or evaluation, nor have financial interests relevant to this e-Newsletter.

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