

AN ECONOMIC COST ANALYSIS OF BECOMING A BABY FRIENDLY HOSPITAL

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INTRODUCTION

The scope of this project is to provide an economic assessment of the incremental costs of obtaining the UNICEF/WHO Baby Friendly (BF) designation for a typical acute care hospital. The report is prepared for the University Health System (UHS) divisions of General Pediatrics and Neonatology. This analysis is part of the larger project entitled “Baby Steps; Progress in Promoting, Expanding & Sustaining Breastfeeding”, which was funded under a contract for the State of Texas Department of State Health Services.

The economic analysis of becoming baby friendly is necessary because there has not been any empirical research conducted in this area. The only evidence of costs in the literature is a brief case study of one hospital’s transition process, and other limited anecdotal evidence. Hospitals wishing to pursue BF designation do so with limited guidance of total incremental costs.

This project involved primary data collection (surveys and interviews) of a sample of the existing 82 baby-friendly sites, plus interviews at one large non baby-friendly hospital (UHS) . This qualitative information was augmented by a secondary economic analysis of the operational costs per delivery at a large sample of BF and non-BF hospitals in the United States. Finally, a micro cost study was used to estimate costs by aggregating the resource utilization perspective that a typical hospital would require, including discounted supply and formula costs, labor, and other resource factors. The economic perspective we took was from that of the “provider” or institution, and did not incorporate societal costs (i.e. we estimate the costs and benefits accrued to the hospital facility, not patients since data has not yet been collected at that level).

Findings suggest that becoming baby friendly requires a philosophical change in management to pursue and complete BF status. Our fieldwork indicates that BF hospitals however are pleased with their decision, and feel that the improved outcomes offset any incremental costs. Our costing analysis suggests that first year marginal costs will approximate \$110 per delivery (birth), but these sharply decrease over time as breast feeding rates improve. Overall, as a group, BF hospitals have around a 2% higher cost structure than non baby-friendly facilities, but this was not found to be statistically significant. Importantly however, if the decision to become baby-friendly improves the health outcomes of mothers and their babies (as most of our fieldwork suggests), these health benefits could outweigh the incremental expenses and result in an overall improvement in cost-effectiveness.

Our recommendations are to build on these findings by deploying a randomized controlled trial to collect quality of life preference measurements, resource costs, and clinical outcomes to compare cost-utility ratios for BF and non-BF facilities. This will allow for more accurate testing of this hypothesis.

ATTAINING BABY FRIENDLY STATUS

There are multiple reported clinical benefits of breast feeding (c.f., Horta et al, 2007; Declercq, 2009; Ip et al, 2007). This report does not attempt to review or discuss the clinical, medical, or societal benefits of this practice. Instead, we seek to provide evidence of the institutional costs involved in the choice to becoming committed to higher rates of breast feeding by pursuing baby friendly designation.

One significant aspect of becoming baby friendly is that hospitals should (or typically do) forgo the benefits derived from donated formula and supplies from manufacturers and other vendors. Most hospitals receive complimentary nutritional supplies (e.g. formula, fortified milk, bags, and nipples) from vendors as a way to help introduce recent mothers (patients) to their products to boost future sales. If these products are no longer free after achieving BF status, they will have to be procured at either retail or wholesale costs. These costs could be fairly substantial, which is typically seen as an obstacle to implementing BF. Exploring these costs is a focus of our micro cost analysis section later in this report.

In addition, a baby friendly designation requires multiple stages and activities, which consumes both time and resources (i.e., personnel, information, management systems, financial). These are all costs or expenses. Table 1 shows a summary of the stages and activities involved in achieving BF status (BF Hospital Initiative, 2009).

Table 1: Steps and Activities involved in BF Designation

Step	Action Items Required to Implement Steps
<i>Step 1: Written breastfeeding policy that is routinely communicated to all health care staff.</i>	
	Establish a multidisciplinary team to review current policy, practice, and complete self-appraisal tool
	Collect breastfeeding base-line data (initiation rates, supplementation rates, transfer rates of infants to special care, and duration rates
	Use the Self-Appraisal Tool to examine variances between current practices and those expected by the Ten Steps
	Consider a survey of mothers to examine their experience with breastfeeding practices and adjust policy accordingly
	Develop quality improvement projects related to each prioritized step and sub-step.
<i>Step 2. Train all health care staff in skills necessary to implement this policy.</i>	
	Assess prior education offered through in-services

	Develop in-house expertise for training
	Consider low-cost training modalities such as:
	integrate breastfeeding education into existing staff meetings
	sending key staff to “train the trainer” type programs and then offer training in-house
	self-study training modules acquired from outside vendors
	web-based training
	Staff with primary responsibility for caring for breastfeeding mothers/babies - 18 hours min training (3 hrs min competency verification)
	Implement a communication strategy throughout hospital (e.g. posters to update non-involved staff on progress of the Ten Steps)
<i>Step 3. Inform all pregnant women about the benefits and management of breastfeeding.</i>	
	Update prenatal materials used in hospital for prenatal education
	Revise/write prenatal booklets about breastfeeding to distribute to all affiliated prenatal care practitioners
	Develop a teaching checklist for obstetric care that provides talking points about breastfeeding at each prenatal visit
<i>Step 4. Help all mothers initiate breastfeeding within one hour of birth.</i>	
	In order to reduce traditional/routine practices of mother-baby separation in the first hour have priority over breastfeeding:
	Review recent research on the importance of early feeding on breastfeeding outcomes
	Examine guidance (AAP and ACO&G) on the importance of avoiding routine mother-baby separation in the first hour of life
	Undertake a small scale observational study to compare postpartum mother baby contact and breastfeeding rates
<i>Step 5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.</i>	
	Establish a working group to standardize methods of breastfeeding assessment and teaching
	Create a team of staff members who are competent and comfortable with breastfeeding assessment and teaching
	Consider creating a “feeding room” in a solarium or other open room where mothers can come together for feeding
	Train peer counselors (other women who have been successful with breastfeeding) to help educate/assess breastfeeding mothers
<i>Step 6. Give newborn infants no food or drink others than breast milk, unless medically indicated.</i>	
	Establish a medical review team to examine recent policy statements on supplementation of breastfed babies
	Educate staff on mother/baby contact and feeding in building an abundant milk supply
	Work with marketing to develop the facility’s own discharge gift pack for mothers

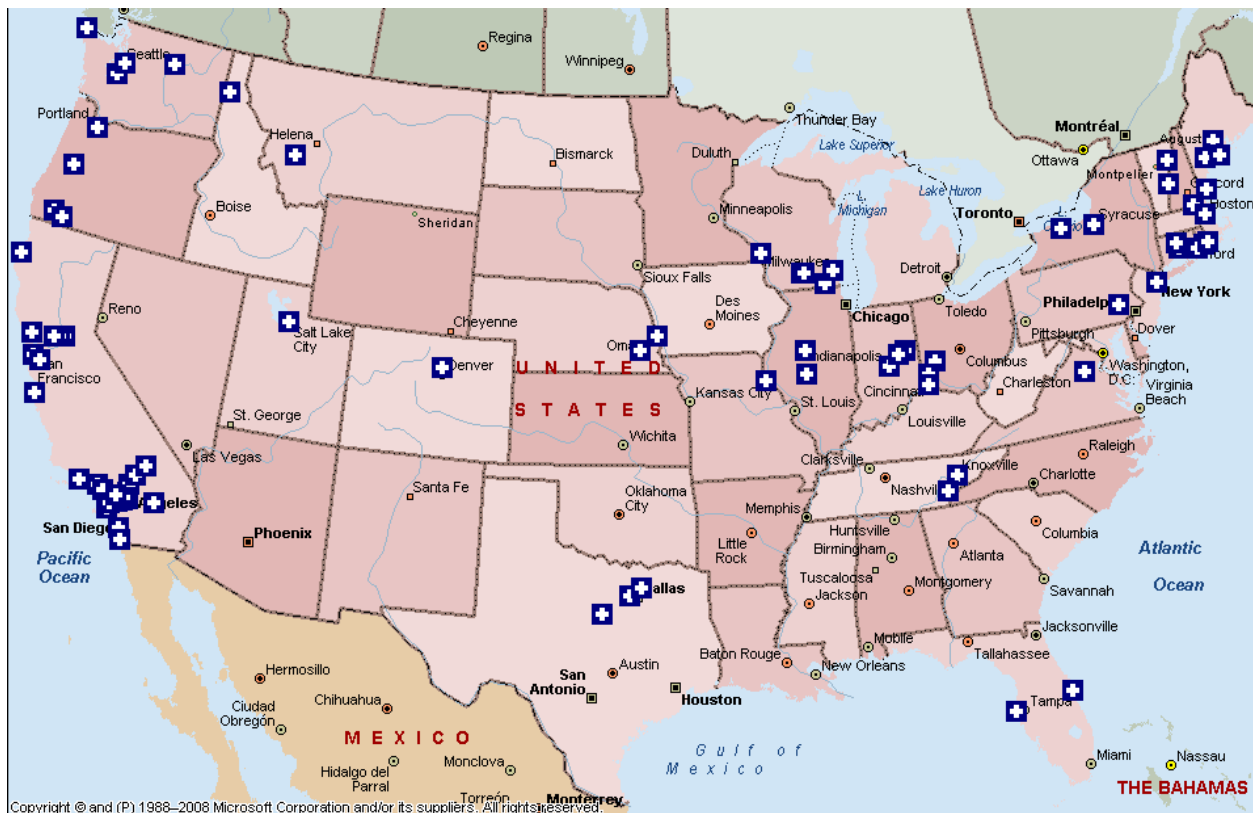
	Setup system to manage/track actual formula needed (versus what is stocked)
<i>Step 7. Practice rooming-in to allow mothers and infants to remain together – 24 hours a day.</i>	
	Review evidence regarding the sleep and mother/baby contact
	Examine routine procedures that “require” infant to be taken to nursery and define which procedures can be done in mother’s room
	Acquire equipment as necessary (portable scales, bath equipment, etc.) which will facilitate rooming-in
<i>Step 8. Encourage breastfeeding on demand.</i>	
	Educate mothers during both the prenatal and postpartum regarding typical infant feeding cues
<i>Step 9. Give no artificial teats or pacifiers.</i>	
	In order to reduce traditional/routine practices of using artificial teats or pacifiers:
	Examine recent research regarding the impact of bottle, cup and other alternative feeding methods on breastfeeding success rates
	Examine recent research regarding the association of pacifiers and reduced breastfeeding exclusivity and duration
	Implement skin-to-skin and rooming-in protocols
	Teach staff, and help staff to teach parents soothing techniques such as skin-to-skin, walking, and rocking babies
	Offer staff hands-on training regarding alternative supplementation methods
<i>Step 10. Foster the establishment of breast-feeding support groups and refer mothers to them on discharge from the hospital or clinic.</i>	
	Partner with community breastfeeding resources to create or strengthen regional breastfeeding coalitions
	Develop current breastfeeding resource lists and distribute them religiously to mothers
	Encourage coalitions to conduct needs assessments to identify un-served and under-served breastfeeding support needs

PENETRATION OF BABY FRIENDLY IN HEALTHCARE FACILITIES

Eighty-two hospitals and birthing centers have already achieved BF designation since the program was officially initiated in 1997. Of these, approximately 74 are hospitals and 8 are birthing centers. The total population of US community hospitals is approximately 4,800 (AHA, 2009) and the total number of licensed birthing centers is approximately 85 (American Association of Birth Centers, 2009). Therefore, less than 2% of the facility population is currently designated as baby friendly. Combined, these facilities were responsible for approximately 120,000 deliveries in 2007, of the 4.2 million births that year, which represents approximately 2.8% of all deliveries. Both of these figures suggest a fairly modest level of adoption of baby friendly during the last 12 years.

We calculate the average baby friendly hospital to be slightly larger than the typical community hospital, with 293 beds and 1,600 deliveries. Figure 1 shows a graphical map of the United States with the current position of the BF facilities. Note the fairly high East and West coast coverage.

Figure 1: Baby Friendly Hospitals/Centers in the U.S., 2009



RESEARCH METHODS OVERVIEW

Previous articles outlining BF implementation processes have significant weaknesses in that they are limited to only one organization's perspective. We chose to use an empirical methodology that incorporates multiple perspectives, which triangulates costs using these approaches to estimating costs of becoming baby-friendly:

1. *Macro cost analysis.* Macro analysis, sometimes called gross costing, is an abstraction of costs from a broader perspective using aggregate data. We used macro analysis to compare two groups of hospitals (those that are BF, relative to similar matched pairs of hospitals that are not BF), and then statistically compared the mean/median cost differences per delivery between the two groups. Data were obtained from a variety of secondary sources, such as the American Hospital Directory, American Hospital Association annual surveys, and Medicaid Cost Reports.
2. *Micro cost analysis.* We performed a micro cost analysis, or detailed analysis of individual resource utilization using formula and staffing profiles of University Health System (San Antonio, Texas) as our "index" case or benchmark hospital. This involves collecting materials usage (formula) and labor costs, and then converting the supply costs into both retail and average discounted hospital pricing (applying standard group purchasing organization discounts).
3. *Qualitative survey and interviews.* We designed and administered a brief, 10-question survey instrument to BF-designated hospitals to obtain their perspective on costs incurred and benefits achieved (See Appendix I for the survey instrument). In addition, we conducted brief interviews with over 10 nursing managers at BF hospitals.
4. *Triangulation.* We then compared the results of each of these combined methods to triangulate or approximate a more realistic cost estimate to form our conclusions.

Combined, these multiple methods provide a fairly comprehensive assessment of the incremental cost impact of pursuing BF designation. We input these variables into a financial model structure, outlined key assumptions, and projected the cost estimates in a variety of ways. The analysis details cost

implications from two perspectives: 1) Initial Implementation costs and 2) Ongoing, recurring maintenance costs. The focus is on *marginal costs*, or those costs which will be incremental to the provider as BF status is achieved. The approach used the “provider” perspective which entails total cost impact to the provider, and excludes impact to the patient or possible economic factors at the societal level.

“MACRO” COST ANALYSIS – ANALYSIS AND FINDINGS

Methods and Data

Our hypothesis is that facilities that are in the process of becoming baby-friendly would have higher cost structures, which will be reflected in the overall expense per delivery. To examine this across the population of hospitals, we performed multiple comparisons of costs. First, we identified 61 of the 82 BF sites listed (all those where data were available in our public data files) and matched them against similar size and type hospitals in the same city in a matched pair statistical analysis. For these matched pairs, we extracted demographic data (city, state, bed size, net income, etc.) from the American Hospital Directory. Using pair analysis, we are therefore able to control for the influence or effects of a) geographical differences, b) labor pricing deviations, and c) patient mix and acuity.

We extracted costing data from both the CMS Medicaid Cost Reports and the American Hospital Association annual survey databases, which collects both nursery and labor/delivery costs. We summed both nursery and labor/delivery expenses in each facility, and divided this by the numbers of births in 2007 to get a “departmental cost per delivery” estimate (note: using this method does not provide comparable costing data to those reported under DRG costing since it does not include administration and overhead not assigned to the department level). Second, we analyzed diagnosis related codes (DRG) 370-375 specifically for each of the BF sites, and compared these to the mean and median of the population of US hospitals in the AHA database (2,746 hospitals that reported complete data in 2007). DRG 373 is the most frequent of the 6 codes used for childbirth-related hospitalization in the US, representing nearly half of all deliveries. The DRG codes for childbirth are shown in Table 2.

Table 2: DRG Codes for Hospital Deliveries

DRG	Description
370	Cesarean Section with CC
371	Cesarean Section without CC
372	Vaginal Delivery with complicating diagnoses
373	Vaginal Delivery without complicating diagnoses
374	Vaginal Delivery with sterilization and OR D&C
375	Vaginal Delivery with OR Proc except sterilization and OR D&C

In both cases, we analyzed the differences in costs using analysis of variance tests. Taken together, these two analyses allow us to compare the cost differences and identify if becoming baby-friendly will have a noticeable (i.e. statistically significant) difference on total costs per delivery.

Analysis and Findings

In the first of the analyses, the total departmental costs (nursery plus labor and delivery) for the BF sites were \$2,205 per delivery, compared to \$2,170 for the matched pair (\$35 variance), reflecting a 1.6% higher cost for baby friendly facilities. The matched pairs are fairly comparable in most respects, although generally the BF facilities were smaller organizations (256 beds versus 293, average births per day of 4.75 versus 6.2). The various analyses of variance tests for differences found no significant differences in the groups:

- Student's t-tests, we found no statistically significant differences in mean costs ($t=.091$, $p=.928$).
- Mann-Whitney Wilcoxon tests found no significant difference in the medians ($W=74.0$, $p=.661$)
- F tests for standard deviations yielded no difference ($F=1.414$, $p=.208$).

In summary, although the costs were slightly higher, they are not statistically significantly greater than similarly matched non-baby friendly facilities.

In the second analyses, we used DRG costing, which are higher because they factor in hospital-wide costs plus departmental ones. We chose to average the costs across all of the six diagnosis related codes (DRG) for deliveries for the sample of BF facilities and compare that to the population of hospitals in our database (2,746 hospitals). The non-BF facilities' mean cost was \$3,510 which was fairly comparable to those reported for all deliveries in 2006 (AHRQ, 2009). The average cost for the same DRG in BF sites was \$3,688 representing a 5% higher cost. Statistical tests confirm however that this was also not significant ($t=.102$, $p=.839$).

In summary, the macro cost analysis does suggest that BF facilities have slightly higher costs than non-baby friendly facilities, somewhere between 1.6% and 5%. This cost difference however is not statistically significant, which implies that we cannot rule out the possibility that these cost differences are not just based on random variation or chance. Therefore, we cannot support the hypothesis that BF facilities are more costly at a structural level across the entire population of hospitals.

To further test if BF sites had higher costs, we performed a micro-cost analysis, focused on estimating the costs of a specific organization such as a large, urban teaching facility in a major metropolitan city (such as University Health System). The next section will detail the micro cost analysis.

“MICRO” COST ANALYSIS – ANALYSIS AND FINDINGS

Methods and Data

To perform a micro cost analysis, we collected a variety of data on resource factor utilization. Data were obtained from our index hospital as a proxy for similar sized hospitals (around 500 acute beds; 22,000 discharges; 2,800 births), with similar birthing profiles, in similar size city (large, urban). Several factors contribute to the cost of obtaining the Baby Friendly designation, some of which are one-time expenses, and others which are recurring annually. The estimated costs to transition to BF are described below, as well as any assumptions used in the forecast. For each of the costs described, three scenarios are presented: best case (A), moderate (B) and worst case (C). Initial costs of going BF are then summarized, and projected costs are presented.

We modeled cost at the institutional level, and also incorporated costs based on delivery type (e.g. term, Cesarean, etc.). The approach was considered necessary because it is a more detailed approach and this delivery type profile impacts costs significantly.

Analysis and Findings

There are six components of costs which we will outline below. These include

1. The programmatic costs of applying for and receiving baby friendly status
2. The cost of formula (and other materials)
3. Organizational training costs
4. Personnel and staffing changes
5. Organizational structuring and process changes

Each of these will be outlined here.

1. ***Programmatic Application and Start-up Charges*** – Direct initial expense include a one-time fixed fee of \$3,000 which is required to obtain BF status. Included also is an \$800 fee for a Certificate of Intent which allows a hospital to initiate the designation process and receive technical support from BF-USA. Lastly, there are expenses of \$3,825 related to travel, lodging and per diem for two site assessors, which is part of the designation assessment procedures. Once the designation is obtained, there will be a recurring fee of \$800 to maintain BF status every year thereafter. In addition, hospitals surveyed reported spending time to develop policies and procedures for the new BF program, as well

as develop a brochure for patients on the benefits of breast feeding. We estimated the direct cost at \$1,700 for brochures to print and distribute to patients. Estimated indirect cost of 40 hours to develop policies and procedures x \$25/hour is around \$1500. In total, we estimated initial expenses at \$9,000 and recurring charges of \$2,500.

2. **Materials and supplies** – this includes formula, nipples, and sterile water. This is by far the largest direct cost associated with going BF, and will be highly variable based on the breastfeeding rate, and the negotiated discount rate for supplies. Two approaches were considered when estimating formula costs. The first approach extrapolated costs associated with the overall supply/order list provided by our index hospital. The second approach used line item estimates based on projections of patient volume breakdown and represented items from the supply/order list. Both approaches provided an institutional cost estimate of formula (and related items such as nipples), which includes premature babies, and a term-specific cost, which excludes premature babies.

The key assumptions for the extrapolation method include the following.

- 2,800 deliveries/year, broken down with the following profile:
 - Term deliveries, 65% of all deliveries
 - Term delivery, with complications, 5%
 - Term delivery by C-section, 20%
 - Premature, 10%
- Year 0 is the base year, and a hospital would have 25% breast feeding rate (700 babies); Year 1 is the first year of full implementation of BF, and the hospital will have achieved 40% breast feeding rates; by year 5 the institution has achieved 80% breast feeding rates upon discharge.
- Broad mix of supply types, sizes, and stock-keeping units (SKUs). Using the institutional data provided by our hospital, nearly 2,600 cases of formula were consumed in twelve months, which was augmented by numerous other supplies. The estimated retail prices for each product was obtained using manufacturer price lists, and is calculated at \$367,311 for the entire institution. The component for premature babies was estimated at \$265,513 (or 72% of total costs consumed by 10% of the deliveries). We obtained these premature supply costs by aggregating consumption of specific product types that will only be used by premature babies (i.e. premie).

- Most large hospitals do not pay retail pricing because of large purchasing volume discounts. Typical wholesale or hospital discounts for hospital group purchasing organizations (GPO) are between 15-30% for this size organization. We modeled both discounts to reflect real cost structures.
- To obtain cost for delivery type, we aggregated supply usage by specific products from the hospital supply list as shown in the table below.

Table 3: Formula Needs and Supplies Delivery Type, Sample Only

Delivery Type	SKU/Item	Formula Needs	Retail Price per case	30% GPO Discounted
Term	Formula, Similac with Iron 20 Cal	Feeding 2 days before going home (8 feeds/day @2 oz/feed), each feed requires a nipple only	\$ 79.00	\$55.30
Term & Premature	Nipple term Disp		\$ 173.00	\$121.10
Premature	Formula Similac 24 cal premie	50% of premies (feeding 2 days (8 feeds/day @2 oz/premie formula), plus 28 days feeding (8 feeds/day @2 oz/HMF)), 50% of premies (feeding 30 days (8 feeds/day @2 oz/premie formula)), all feed requires nipple and volume feed disp.	\$ 79.00	\$55.40
	Formula Similac 24 cal premie Nursers volu feed disp.		\$ 75.00	\$52.50
	Similac Human Milk Fortifier		\$ 162.00	\$113.40

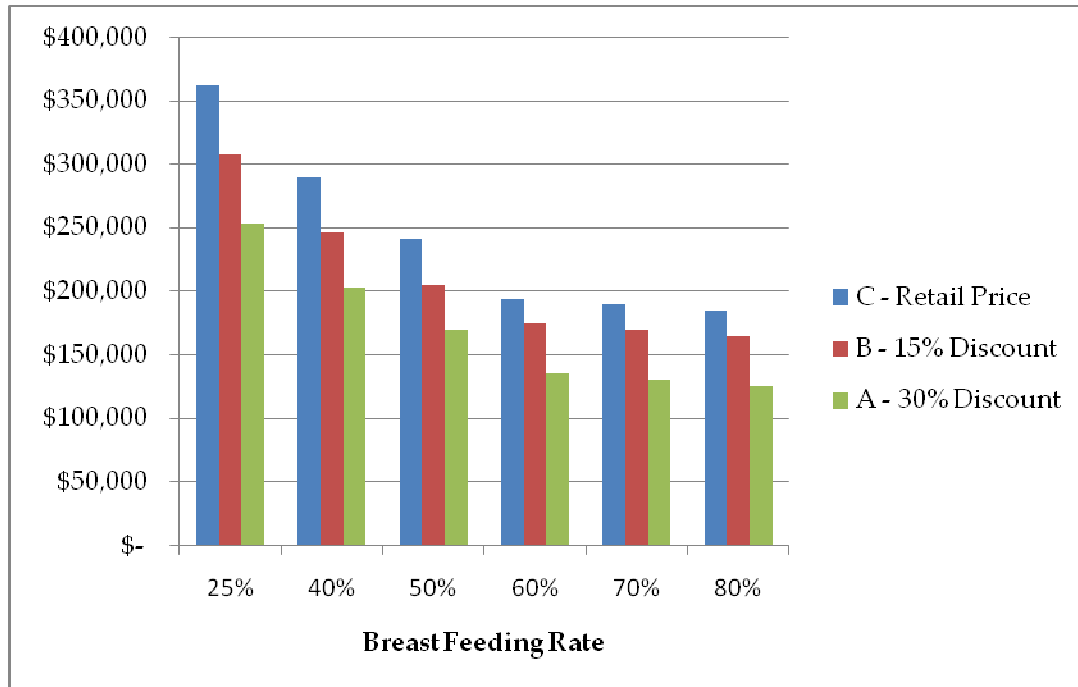
The following table presents the cost estimates for both the institutional level and for the term delivery unit only (a subset of all deliveries).

Table 4: Cost Scenarios for Supplies, Rounded, at 25% breast feeding rates

Scenario	Institutional Level (2,100 formula fed deliveries)	Term baby costs only (90% of formula fed deliveries, excludes premature)
At Retail Price (worst case)	\$ 367,000	\$103,000 (28% of \$367k)
Less 15% discount (likely case)	\$ 312,000	\$ 87,000
Less 30% discount (best case)	\$ 257,000	\$ 72,000
Most Likely (15% discount) supply cost per delivery	\$148.57	\$46.03

As breast-feeding rates increase as a hospital becomes baby friendly, the supply costs will also decrease over time. This is shown in Figure 2 below.

Figure 2: Average Cost of Formula and Supplies Declines as BF Increases



3. **Organizational Training Costs** – physicians and nursing staff must be provided with 18 hours of training on the advantages and management of breastfeeding, plus 3 initial hands-on hours for direct care workers. We surveyed several BF hospitals and found there are a variety of training options at

different costs. Most of the respondents reported that training was viewed as an indirect expense, since nurses are already required to complete 24 hours of CEUs per year, and several BF hospitals reported shifting their training to BF training, and requiring nurses to complete a free online BF training provided by the University of Virginia. Also, with the BF-USA Certificate of Intent, the hospital is entitled to receive technical support. However, we estimated in the most likely scenario that BF hospitals will purchase some training supplies and materials from Baby Friendly USA, and will require employees to be trained using these materials. In this scenario, a lactation consultant presents the materials at two training sessions (about 2- hours), but the bulk of the training is completed using the shared materials. In this scenario, the first year costs involves 18 hours of training, where one time direct costs are \$330 for purchase of Baby Friendly materials (2 DVDs, 4 books, 1 teaching pack). We estimated annual indirect cost as: $(\$25/\text{hr LC time} \times 36 \text{ hours training}) + (25 \text{ nurses} \times \$25/\text{hour nursing time} \times 18 \text{ hours training}) = \$12,150$.

4. ***Personnel/Staffing Capacity Increases*** -- Currently our index hospital has 1.5 lactation consultants for 2800 deliveries. The hospitals we surveyed were much smaller (1700 deliveries), but all had 1 LC. This equates to a staffing ratio of 1.22 hours of lactation consultant resources per delivery. Our index hospital has approximately 1.11 hours of LC resource per delivery. Given these standards, it does not appear that additional staffing will be necessary. However, we feel that due to the increase in training requirements, startup time, and number of deliveries, an additional .5 FTE LC should be added, at a cost of \$32,500 (\$25,000 salary plus 30% fringe benefits).
5. ***Organizational Process Change*** -- There are two source of costs here: a) structural facility or process changes; and b) organizational leadership resources invested to move the organization towards BF status.
 - a. From the facility perspective, all of the BF hospitals surveyed were already designed for 'rooming in'. Only one reported having to slightly reorganize current space. However, our index hospital is currently not optimally designed for 'rooming in', and is structured to create divisional lines between the nursery and labor and delivery. These two units are separated by a large space, as well as hierarchical authority structures. No other BF hospital was organized like our index hospital. To successfully implement a BF program, space will likely need to be reconfigured, facilities updated, and the hierarchical

reporting structure revised to create a more cohesive unit and patient-centered experience. Nonetheless, during our initial visit to the unit a quick assessment of the patient rooms provided an indication that both mother and child could be accommodated comfortably. This indicates that initially hospitals will not have to invest in modifying rooms.

- b. There is a cost, albeit indirect, of “sponsoring” or championing the BF effort during the multi-year process. Although it might not require new personnel, existing management will have to be committed to the project and will spend time convincing management of the benefits and potential, and shepherding the process. Survey results confirmed this was a significant indirect expense, although they could not estimate any costs. We chose to estimate this as follows: 10% effort for one senior manager, at \$75,000 annual salary and 30% benefits for 3 years. This equates to \$9,750 indirect expense for the first three years.

Summary of Estimated Costs

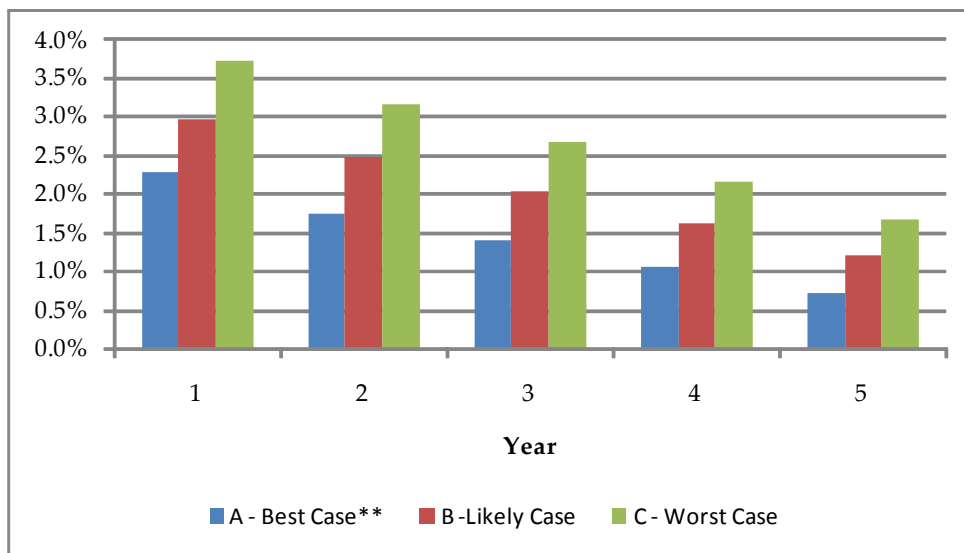
There are a variety of costs associated with becoming BF. Some are one-time costs, some are indirect, but the bulk of these costs are direct material expenses. However, as hospitals increases the breastfeeding rate of their patients, costs will decrease over time. A most likely case scenario is presented in Table 5.

Table 5: Cost Model, Most Likely Case

Cost Component	Cost Driver/Assumptions	Direct + Indirect	
		Recurring	One Time
1. Programmatic Application and Startup costs	Application fees, printing of educational brochures, policy development	\$2,500	\$9,000
2. Materials/Supplies	Direct, variable, based on number of deliveries who are formula fed; Based on 40% BF rates and 15% wholesale discount	\$245,000	\$-
3. Organizational training	Direct and Indirect, based on number of employees and hours needed	\$12,150	\$330
4. Personnel/Staffing capacity increase	Direct, variable, based on number of deliveries	\$32,500	\$-
5. Organizational/process changes	Variable based on current process; recurring costs for 3 years only, includes "sponsor" indirect time of 10%	\$9,750	\$-
Total Recurring or Initial		\$301,900	\$9,330
Total Initial Costs		\$311,230	

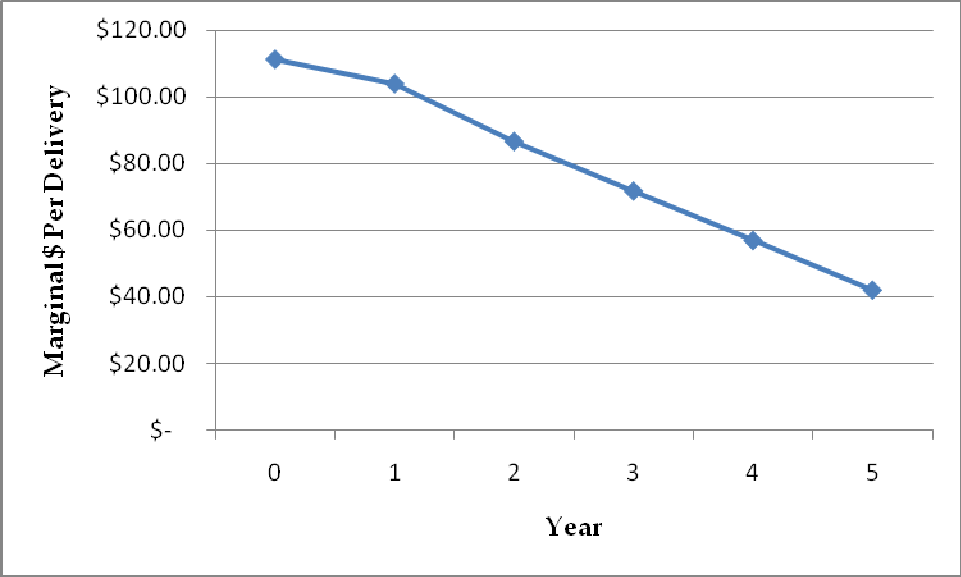
As discussed in the micro analysis, an average cost for a delivery in the U.S. is \$3,500 (average across all DRG's/delivery types). As the rate of breastfeeding increases over the years, the additional costs per delivery decreases, as well as the overall percentage increase in costs. In total, the incremental institutional impact on costs per delivery is somewhere between 2.3% and 3.7% in the initial year, but decreases to just over 1.2% (most likely case) in year 5. Using a typical cost structure, this equates to just over \$41 per delivery, as shown in Figure 3.

Figure 3: % Incremental Cost Declines over Time, as BF rates Increases



Finally, these costs translate to a little over \$110 in the baseline year (0) to around \$100 per delivery when the institution achieves 40% breastfeeding. Five years out, the marginal costs drops to just over \$40 per delivery, as shown in Figure 4.

Figure 4: Marginal Cost of Becoming BF, per institutional delivery



SURVEY AND INTERVIEWS – ANALYSIS AND FINDINGS

Methods and Data

A sample of 40 baby friendly hospitals were contacted by phone at random from the group of approximately 62 listed on the baby friendly USA website. We obtained email contact information for 20 of these, and we sent them a 10-item electronic survey instrument (shown in Appendix I). We received completed surveys from 10 of these hospitals. In addition, we were able to conduct phone interviews with another (separate) 12 nursing managers. The interview was designed to capture similar types of responses as the survey. The intent was to capture perceived benefits, challenges, and costs of implementing their BF programs. Below is a summary of the findings, as well as selected quotes from respondents.

Survey Findings

50% of the respondents reported “noticeable” increases in purchased volumes of supplies, although most could not quantify the exact dollar amount. 70% stated that they had experienced changes in staffing requirements. 90% said they no longer give mothers a courtesy “diaper bag”. 60% stated that they had organizational changes that resulted from the pursuit of BF.

In total, the average estimate of annual increase in costs was \$20,000, although this number is quite low and most respondents reported that they could not recall specific estimates of cost “before” BF implementation, so it is nearly impossible for them to document incremental costs.

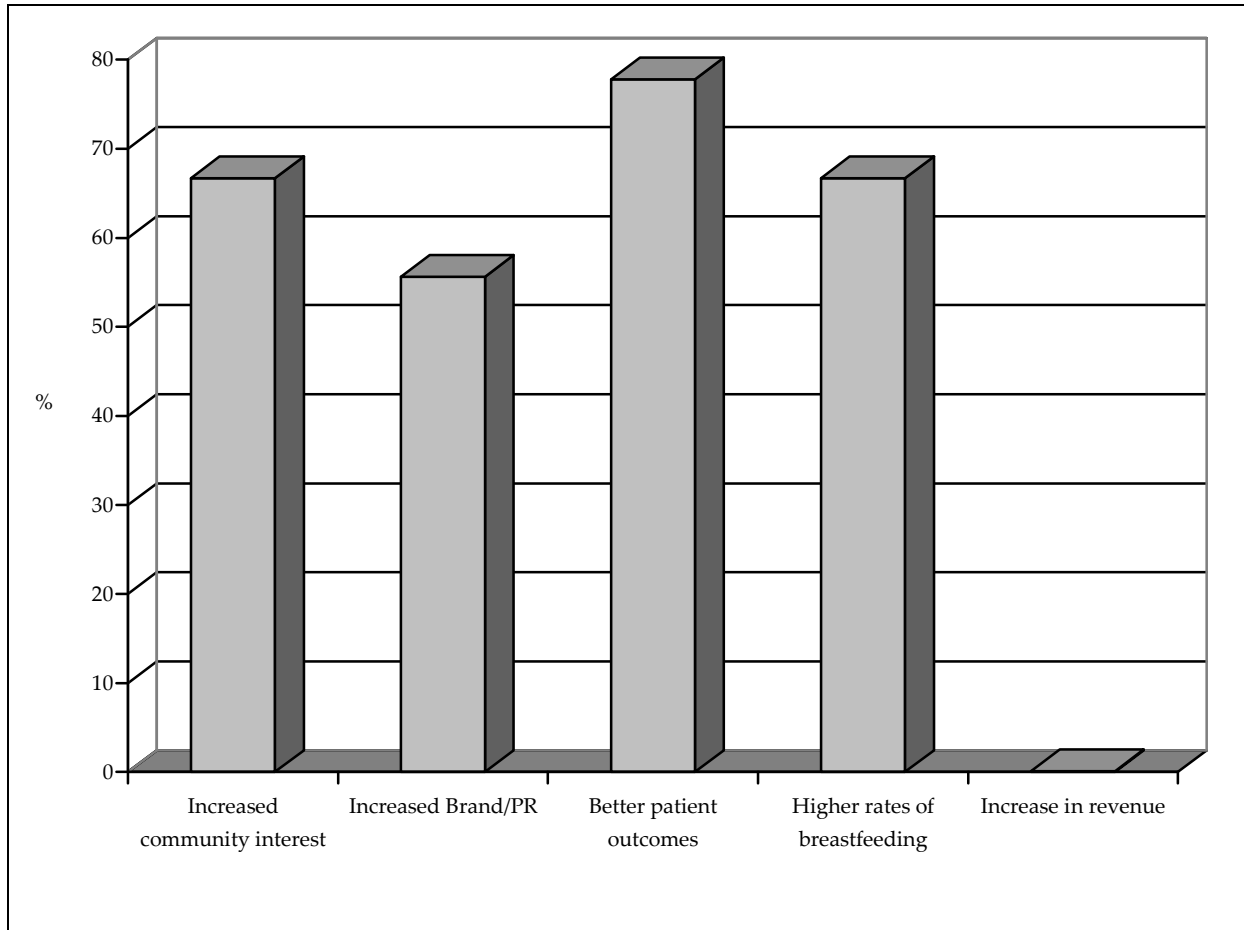
The greatest challenges for hospitals seeking the BF designation involved changes in organization and structure. However, survey responses do not report any direct or indirect costs of these organizational changes, although did most likely occur. Considering structural and organizational challenges, most hospitals reported issues such as:

- Expanding a culture which favors breastfeeding including the creation of appropriate policies.
- Educating family practice residents and training nursing staff.
- Creation of appropriate parent training materials at a low cost

The survey respondents reported an average annual increase of costs somewhere around \$20,000. The average hospital was significantly smaller than our index hospital however, with only 221 beds and 1,700 deliveries annually (about 37% smaller). Using this estimate, our benchmark hospital costs would be \$31,750 (<1% change, or \$15 per formula-fed baby)—significantly less than our estimates in the macro or micro analysis.

In spite of these significant challenges and costs, 100% of the respondents indicated they were satisfied with their decision to pursue the Baby Friendly designation (see Q1). A large proportion reported gains in patient outcomes and satisfaction in addition to expanded market brand and community awareness. Figure 5 summarizes the benefits stated by survey respondents.

Figure 5: Most Hospitals Report Positive Benefits of BF



Phone Interview Findings

There are a variety of unanticipated challenges or obstacles to becoming baby friendly. Interviewees reported a variety of challenges associated with becoming BF. In some cases, conversion to BF status took several years. Challenges included gaining the support of physicians, upper management, and nursing. One respondent stated:

“The most important aspect of the program is getting the commitment from the top/senior executives; this takes time.”

Cultural change among nurses was cited as the most common major obstacle, since nurses had to learn new routines and habits when caring for newborns. Also, many nurses did not want to give up the free items they received from the formula companies, such as pens, notepads and clips. In one instance, the nurse manager reported purchasing Baby Friendly pens and note pads to replace formula items. One organization reported having difficulty getting the formula company to send an invoice. No one reported any unanticipated costs however.

The financial costs of converting to BF status were not recalled by interviewees as being significant. Although many BF hospitals we talked with could not recall how much it cost to convert to BF and purchase supplies, several BF hospitals reported that the increase in cost of newborn care was not significant. Several hospitals stated that they were purchasing formula and supplies at a 10% discounted rate off of the retail price. Other hospitals could not remember the exact discount rate, but describe it as ‘slightly discounted’. Several respondents commented that the cost of purchasing formula was minimal because they were able to increase the breast feeding rate to above 80% (one respondent said the rate was as high as 91%).

The other major financial cost associated with going BF was costs associated with training. While some hospitals used online free training, others did extensive BF training in addition to CEUs, which took a significant amount of nursing and lactation consultant time, and required purchasing training materials and supplies. One respondent stated:

“The most expensive part of this is training; but all nurses need CNE anyway!”

Some respondents reported hiring additional lactation consultants as a result of converting to BF. However, in many no new personnel were hired. In these instances, hospitals already had a LC. No hospitals in our survey reported making any major structural changes. In most cases, rooms were already set up for rooming in. Minor changes in policy and documentation were reported.

Overall, interviewees were happy they converted to BF. Despite initial challenges, respondents reported community, organizational, staff, and patient benefits. All respondents were able to increase patient breast feeding rates upon discharge. They also reported positive feedback from the community through local press coverage, as well as positive feedback from patients. However, only one respondent attributed increased patient volume and revenue from newborn deliveries directly to the BF program. Another respondent reported lower bilirubin levels in newborns, stating that the babies spent less time in phototherapy due to breastfeeding.

Interviewees also reported higher staff satisfaction, once initial hurdles were overcome. Additionally, one respondent stated staff were happy not to distribute diaper bags from the formula companies anymore, because obtaining, storing, and distributing them created more work. Respondents stated the following about BF:

“It’s patient-centered and family centered care.”

“We feel like we’re ahead of the game because JCAHO is starting to look at breast feeding rates.”

“It’s the right thing to do.”

CONCLUSIONS

Triangulation of these various methods suggests that the range of marginal cost increase per institutional delivery for baby-friendly hospitals 1) declines over time as breast feeding rates improve, and 2) equates to an average of 2% in the initial years of implementation. Table 6 presents the triangulated cost findings.

Table 6: Triangulated Cost Model Findings

<i>Cost Method</i>	<i>% Marginal Increase</i>
Matched pair analysis	1.6%
Gross costing, DRG comparison	5.0%
Micro Costing of index hospital	1.2%-2.9%
Survey Research	<1%
<i>Averages</i>	2%

Several conclusions can be drawn from this analysis. First and most importantly, implementing BF in a typical hospital will increase costs per delivery, most likely in the range of 1-5% in the initial Year but falling to less than 1.5% five years out. This increase in costs is very minimal when viewed in terms of cost per delivery. Post implementation, the costs are very minimal (ranging from \$35 in our macro study to \$42 in our micro study at year 5) across all delivery types.

Second, it is important to get support from upper management, key physicians, and nurses before attempting to implement BF. Our costing model did not include any organizational or structural costs of gaining approval or re-organizing departments, but these costs are real they were just not recalled and thus we could not find evidence to document or estimate them in this study. Some facility redesign may also be necessary to accommodate single birthing rooms, rather than separate labor/delivery and nursing areas, and there will be costs associated with this. In addition, because of the costs of program implementation and the hurdles that will be faced, it is important to identify champions who will be able to push the program through and sell it to others.

Third, hospitals should recognize that implementation of this program will be most challenging for nurses, because of the cultural and behavior changes required of them when they care for newborns.

Special attention, education, and communication should be targeted for nurses both in the labor/delivery area as well as throughout other clinical units.

Finally, in the long run there are many reported benefits to becoming baby friendly. This includes better patient outcomes, higher patient satisfaction, higher staff satisfaction, and positive community support. There is also the potential for enhanced revenue to offset some of the increased costs. In this regard, it will be important to begin collecting detailed patient-level quality outcomes, value preferences, and costs in order to conduct randomized controlled trials that can demonstrate cost-effectiveness of BF over time. Data from this societal perspective, collected prospectively, is the only real way to demonstrate economic value in health.

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APPENDIX I: SURVEY OF BABY FRIENDLY HOSPITALS

Thank you for participating in this survey. We are attempting to analyze the total costs of becoming Baby-Friendly for your hospital. Thank you for responding.

1. Are you satisfied with your decision to pursue Baby-Friendly status?

Yes No

If no, why?

2. Since going Baby Friendly, have there been any noticeable increases in purchased volumes of materials and supplies (e.g., formula, nipples, feeders)?

Yes No

If yes, what is the estimated annualized cost of these supplies?

3. Have you experienced any changes in staffing/workforce requirements (e.g., greater need for specific resources)?

Yes

No

Which area/job function?

4. Did you have to make any process, organizational or structural changes to your hospital?

Yes No

If yes, what changes?

5. Do you still give to your patients a diaper bag with supplies (although now with items not donated by vendors)?

Yes

No

6. Were there any unexpected or unanticipated costs or surprises that you can share?

--

7. Are there any regrets or lessons learned that you can share from your experience?

--

8. Can you provide an estimate of the overall Baby-Friendly expenses for your hospital?

Initial Startup

Training

Process or Re-organization changes (from Q5)

Increased Labor (from Q4)

Increased Materials/Supplies (from Q3)

Other ongoing expenses

Estimate of TOTAL ANNUAL EXPENSES

9. What benefits have you seen from becoming baby-friendly?

Increased community interest

Increased marketing/brand/public relations

Better patient outcomes

Higher rates of breast feeding upon discharge

Increase in revenue

Other benefits

Other (please specify)

--

10. Can you please provide the following?

Estimated # of deliveries annually

--

Total # of L&D birthing rooms

--

Total # of beds (hospital-wide)

--