

CASE REPORT

The Social Value of Implementing the Ten Steps to Successful Breastfeeding in an Indonesian Hospital: A Case Study

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Background: Despite the known importance of breastfeeding for women's and children's health, global exclusive prevalence among infants under 6 months old is estimated at only 41%. In 2018, Indonesia had a lower exclusive breastfeeding rate of 37% at 6 months postpartum; ranging from 20% to 56%, showing unequal breastfeeding support throughout the country. The World Health Organization (WHO) launched the Ten Steps to Successful Breastfeeding (Ten Steps) in 1989, later embedded in UNICEF's Baby-Friendly Hospital Initiative (BFHI) program in 1991. The BFHI aims to encourage maternity facilities worldwide to ensure adequate education and support for breastfeeding mothers by adhering to the Ten Steps and complying with the International Code of Marketing of Breastmilk Substitutes. An Indonesian survey in 2011 found that less than one in 10 government hospitals implemented the Ten Steps. It has been common for Indonesian health services to collaborate with infant formula companies. While no Indonesian hospitals are currently BFHI-accredited, the WHO/UNICEF Ten Steps (updated in 2018) have been adopted in Indonesia's national regulation of maternity facilities since 2012. Internationally, implementation of the Ten Steps individually and as a package has been associated with benefits to breastfeeding rates and maternal and infant health. However, to date, few studies have examined the impact of implementing the Ten Steps in economic terms. This study aims to measure the economic benefit of Ten Steps implementation in an Indonesian hospital. **Methods:** The study was conducted in January 2020 in Airlangga University Hospital, Surabaya, Indonesia, which has implemented the Ten Steps since it was established in 2012. To understand and generate evidence on the social value of the Ten Steps, we conducted a "Social Return on Investment (SROI)" study of implementing the Ten Steps in this maternity facility. To estimate the costs relating to the Ten Steps we interviewed the financial and nursing managers, a senior pediatrician, and senior midwife due to their detailed understanding of the implementation of the Ten Steps in the hospital. The interview was guided by a questionnaire which we developed based on the 2018 WHO/UNICEF Ten Steps to Successful Breastfeeding. The analysis was supported with peer-reviewed literature on the benefits of Ten Steps breastfeeding outcomes. **Results:** The total per annum value of investment (cost) required to implement Ten Steps in Airlangga University Hospital was US\$ 972,303. The estimate yearly benefit was US\$ 22,642,661. The social return on the investment in implementing Ten Steps in this facility was calculated to be US\$ 49 (sensitivity analysis: US\$ 18-65). Thus, for every US\$ 1 invested in Ten Steps implementation by Airlangga Hospital could be expected to generate approximately US\$ 49 of benefit. **Conclusions:** Investment in the Ten Steps implementation in this Surabaya maternity facility produced a social value 49 times greater than the cost of investment. This provides novel evidence of breastfeeding as a public health tool, demonstrating the value of the investment, in terms of social impact for mothers, babies, families, communities, and countries. Breastfeeding has the potential to help address inequity throughout the lifetime by providing the equal best start to all infants regardless of their background. Indonesia's initial moves towards implementing the WHO/UNICEF Ten Steps can be strengthened by integrating all elements into the national regulation and health care system.

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Abbreviations: BFHI, Baby-Friendly Hospital Initiative; Ten Steps, Ten Steps to Successful Breastfeeding.

Keywords: baby-friendly hospital, BFHI, breastfeeding, implementation, Indonesia, social return on investment, SROI, Ten Steps to Successful Breastfeeding

BACKGROUND

Breastfeeding is well known to be important for women's and children's health. In children, breastfeeding has proven to reduce the risk of obesity, malocclusion and asthma, Sudden Infant Death Syndrome (SIDS), acute otitis media, type 1 and 2 diabetes, and lower intelligence quotients [1-5]; while in mothers, it reduces the risk of ovarian cancer, breast cancer, type 2 diabetes, and osteoporosis [2,6]. Breastfeeding has been shown to prevent half of all diarrhea episodes and a third of respiratory infections in low- and middle-income countries [7]. The WHO recommends breastfeeding exclusively for the first 6 months of an infant's life, with continued breastfeeding to 2 years and beyond [8].

Nevertheless, many women struggle to breastfeed due to lack of support with, and information regarding, breastfeeding. Global exclusive prevalence among infants under 6 months old is estimated at only 41% [9]. In 2018, Indonesia had a lower exclusive breastfeeding rate of 37% at 6 months postpartum [10]. This ranged from 20% to 56% throughout the country showing unequal breastfeeding support [10]. Low breastfeeding initiation and exclusive breastfeeding rates and continuation have been linked with low maternal and paternal education levels [11-13], partners' negative attitudes towards breastfeeding [14,15], mother/baby separation after birth [12,13] and lack of health professionals' knowledge of breastfeeding [16,17]. In Indonesia studies have highlighted lower exclusive and continued breastfeeding associated with more antenatal visits and among women who were assisted by health professionals rather than traditional birth attendants during childbirth [18,19].

The first few hours of life are critical to establish the infant and mother breastfeeding relationship [20,21]. Infants adapt to a new environment and learn how to suckle, while mothers learn to recognize their baby's feeding cues while recovering from the birthing process. Acknowledging the importance of maternity and newborn care facilities for breastfeeding, the WHO launched the Ten Steps to Successful Breastfeeding (Ten Steps) in 1989. This policy comprises 10 recommendations for services providing maternity and newborn care to support breastfeeding (see Box 1). The policy was embedded into the Baby-Friendly Hospital Initiative (BFHI) accreditation process which was launched by the WHO in 1991 to encourage and monitor maternity facilities' implementation, scale up and sustainability of the Ten Steps [22]. In 2018, the WHO and the United Nations International Children's Emergency Fund (UNICEF) revised the Ten Steps to facilitate system level implementation and sustainability [23]. The revised version aims to enable optimal infant feeding practice during and beyond a hospital stay and to facilitate its nationwide scale-up, and ensure

sustainability over time by encouraging integration more fully into the healthcare system.

A systematic review and meta-analysis study of breastfeeding interventions in 2015 [24] showed that BFHI had the highest impact on promoting any breastfeeding (RR 1.66, 95% CI 1.43-1.92). Later in 2017, the authors followed up the study in low- and middle-income countries and found that the baby-friendly support intervention significantly increased the likelihood of exclusive breastfeeding at 1 to 5 months (OR 2.89, 95% CI 1.73-4.80) [25]. In a large, cluster-randomized trial in Belarus, babies born in the baby-friendly hospital intervention arm were 53% more likely to be breastfed at 12 months old [26]. BFHI accreditation is one way to ensure that the WHO/UNICEF Ten Steps is supported and initiated, with its positive ongoing effects on child development. The Ten Steps can be applied in all maternity care settings and its positive impact is seen worldwide [27].

Global evidence consistently supports the conclusion that adherence to the Ten Steps has a positive impact in short-term, medium-term and longer-term breastfeeding outcomes across the world, and that there is a dose-response relationship between the number of Steps women are exposed to and the likelihood of improved BF outcomes [28]. This means that a health service does not need BFHI accreditation to implement the Ten Steps; each of the Ten Steps may be implemented as a policy initiative alone. For example, regarding Step 1 and Step 6, a study in Hong Kong showed that after implementing a policy of paying market price for infant formula in public hospitals, there was a significant decrease of in-hospital supplementation of breastfeeding babies (the mean number of in-hospital supplementation before the policy implemented was 2.7 (SD 3.11) and after was 1.17 (SD 1.94, $p < 0.001$)), a decrease in the overall rate of premature breastfeeding cessation (20% lower risk of breastfeeding cessation), and an increase in the median duration of breastfeeding from 8 to 12.5 weeks. The overall duration of breastfeeding was significantly longer after free supplies of infant formula ended [29]. Data from quasi-experimental studies from 12 different countries consistently found associations between the Ten Steps implementation and improved in-hospital and post-discharge breastfeeding outcomes, such as improved breastfeeding initiation, decreased use of pre-lacteal feeds, and higher rates of exclusive breastfeeding [30].

On its own, however, Ten Steps implementation is considered weak practice as no external validation/assurance is in place, whereas "BFHI coverage" is defined as the percentage of births occurring in facilities that are BFHI-accredited and hence designated as baby-friendly [31]. Based on data compiled from 168 countries, international coverage of the BFHI is estimated to be 10% as of 2016 [31], with wide regional variation, including 35%

coverage in the European region and less than 5% in Africa and Southeast Asia [31]. Among countries with high BFHI coverage were Cuba (100%), Sri Lanka (100%), New Zealand (99.6%), and Albania (80.4%) [31]. A large number of countries have not been able to designate any facilities in the past 5 years [31].

At the time of writing, Indonesia has adopted the 1989 WHO Ten Steps main wording verbatim, but without detailed requirement on how to implement each Step [31]. It has not yet adopted the 2018 Ten Steps in its legislation. Some of the WHO Ten Steps are integrated in the Indonesian National Hospital Accreditation, assessed every 3 years by the Indonesian Hospital Accreditation Committee [32]. This accreditation is one requirement of the operationalization license for all hospitals [33].

An international report in 2017 indicated that 5.4% of hospitals in Indonesia were baby-friendly accredited [31], even though there is no up-to-date information on the number and quality of the baby-friendly hospitals and health facilities in Indonesia [34]. However, in 2011, only 8% of Indonesian government hospitals were categorized as implementing the Ten Steps. West Nusa Tenggara

province had the highest proportion (33%) [35], whereas provinces in the main island (Java Island) ranged from 6 to 12%, while many other provinces had no hospitals implementing Ten Steps [35].

Moreover, the Indonesian Ministry of Health has a program called “Mother and Baby Friendly Hospital Initiative,” which is different from the WHO/UNICEF BFHI [34,36]. This policy initiative recommends exclusive breastfeeding, the provision of an antenatal service, and referral to breastfeeding support groups, as well as the conduct of periodical audits, and other maternity care requirements [36]. Even though some WHO Ten Steps are included in this policy, it has a slightly different aim, which is to reduce maternal and infant mortality rates. The connection between programs is described in Figure 1.

The Indonesian initiative rewards health facilities that refuse to collaborate with the baby food industry. However, it is still common for hospitals to violate the International Code of Marketing of Breastmilk Substitutes by giving free formula samples to mothers, organizing industry-sponsored seminars and events for doctors and

Ten Steps 1989	Ten Steps 2018
<ol style="list-style-type: none"> 1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff 2. Train all healthcare staff in skills necessary to implement this policy 3. Inform all pregnant women about the benefits and management of breastfeeding 4. Help mothers initiate breastfeeding within one half-hour of birth 5. Show mothers how to breastfeed and maintain lactation, even if they should be separated from their infants 6. Give newborn infants no food or drink other than breastmilk, unless medically indicated 7. Practice rooming in – that is allow mothers and infants to remain together 24 hours a day 8. Encourage breastfeeding on demand 9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic 	<p>Critical Management Procedures:</p> <ol style="list-style-type: none"> 1a. Comply fully with the <i>International Code of Marketing of Breastmilk Substitutes</i> and relevant World Health Assembly resolutions, b. Have a written infant feeding policy that is routinely communicated to staff and parents, c. Establish ongoing monitoring and data-management systems, <p>2. Ensure that staff has sufficient knowledge, competence and skills to support breastfeeding,</p> <p>Key Clinical Practices:</p> <ol style="list-style-type: none"> 3. Discuss the importance and management of breastfeeding with pregnant women and their families, 4. Facilitate immediate and uninterrupted skin-to-skin contact and support mothers to initiate breastfeeding as soon as possible after birth, 5. Support mothers to initiate and maintain breastfeeding and manage common difficulties, 6. Do not provide breastfed newborns any food or fluids other than breast milk, unless medically indicated, 7. Enable mothers and their infants to remain together and to practice rooming-in 24 hours a day, 8. Support mothers to recognize and respond to their infants' cues for feeding, 9. Counsel mothers on the use and risks of feeding bottles, teats and pacifiers, 10. Coordinate discharge so that parents and their infants have timely access to ongoing support and care.

Box 1. WHO/UNICEF Ten Steps.

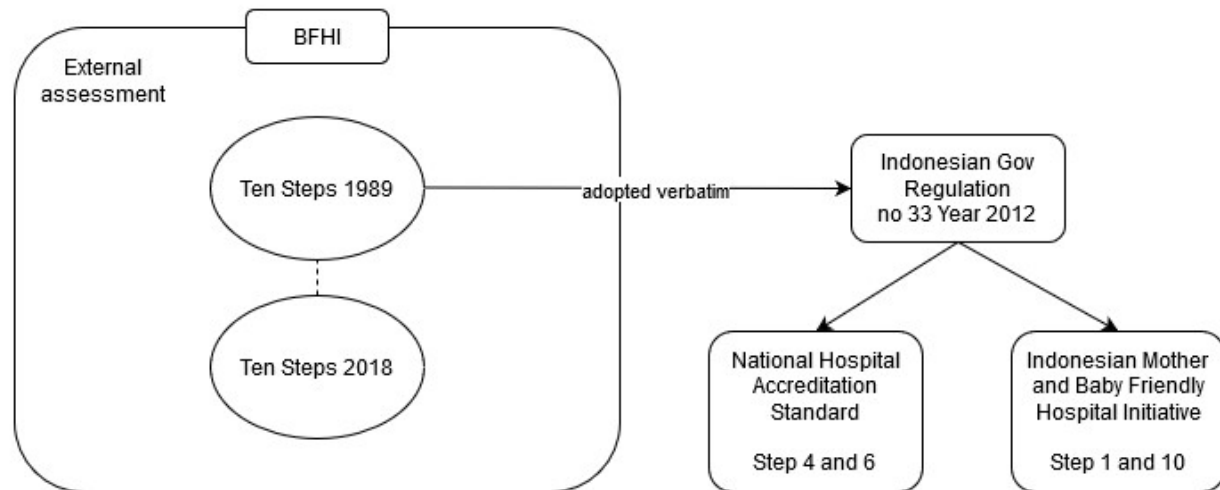


Figure 1. WHO/UNICEF BFHI/Ten Steps and its connection to Indonesian regulation.

other health workers, and providing free sponsored medical supplies [34].

In 2015-16, the cost to the Indonesian healthcare system associated with not breastfeeding in accordance with the WHO recommendations was estimated at US\$ 118 million annually by researchers using an online tool for country level estimates [37]. However, the global “Cost of Not Breastfeeding” tool does not address program costs and benefits.

Evaluation of a program in terms of the social return on investment (SROI) is a novel approach, with roots in the cost benefit analysis framework that enables one to measure social impacts by comparing investment and outcomes using monetary values. Measurement using monetary values has the potential to provide economic incentive for health services to implement the Ten Steps. One study examining a breastfeeding counseling and support program in Nairobi found US\$ 71 of benefit for every US\$ 1 invested [38]. A study describing the social value of breastfeeding support groups in Ireland found US\$ 13 of benefit was gained for every US\$ 1 (€ PPP = US\$ 0.82) [39]. A recent study examined the SROI of maintaining BFHI accreditation in an Australian public hospital and found for every US\$ 1 invested, there was US\$ 80 of benefit received by society [40]. While the health and economic benefits of breastfeeding are now well established, few studies have examined the social and economic benefits of implementing breastfeeding support programs at country level. No studies have applied this methodology to examine the social value of implementing the Ten Steps alone, and Indonesia provides the opportunity to do so for the first time in a developing country setting in Asia.

RESEARCH AIM

This study aimed to evaluate the monetary value of the social impact of implementing the WHO (1989) Ten Steps in an Indonesian maternity hospital using the Social Return on Investment (SROI) framework.

METHODS

This study was granted ethical approval from ANU Human Research Ethics Committees (Protocol 2019/227) and Ethical Committee of Research Airlangga University Hospital no 162/KEP/2019.

Sample and Location

This case study was conducted in Airlangga University Hospital Surabaya, a government hospital that has implemented the Ten Steps since 2012. We selected this hospital because it is a teaching and referral hospital, where the lead author had professional contacts who assisted in facilitating the study. Surabaya is the second largest city in Indonesia after Jakarta. It is the capital city of East Java province with 3.94% annual population growth rate [41,42]. Surabaya has total area of 330.45 km² and total population of more than 3 million people, consist of 53% Javanese, 25.5% Chinese, 7.5% Madurese, 7% Middle Eastern descent, and 10% from other tribes [41].

Data Collection and Storage

A structured questionnaire was completed through interviews with key stakeholders (n=4) at Airlangga University Hospital – the financial and nursing managers, one senior pediatrician, and one senior midwife. The

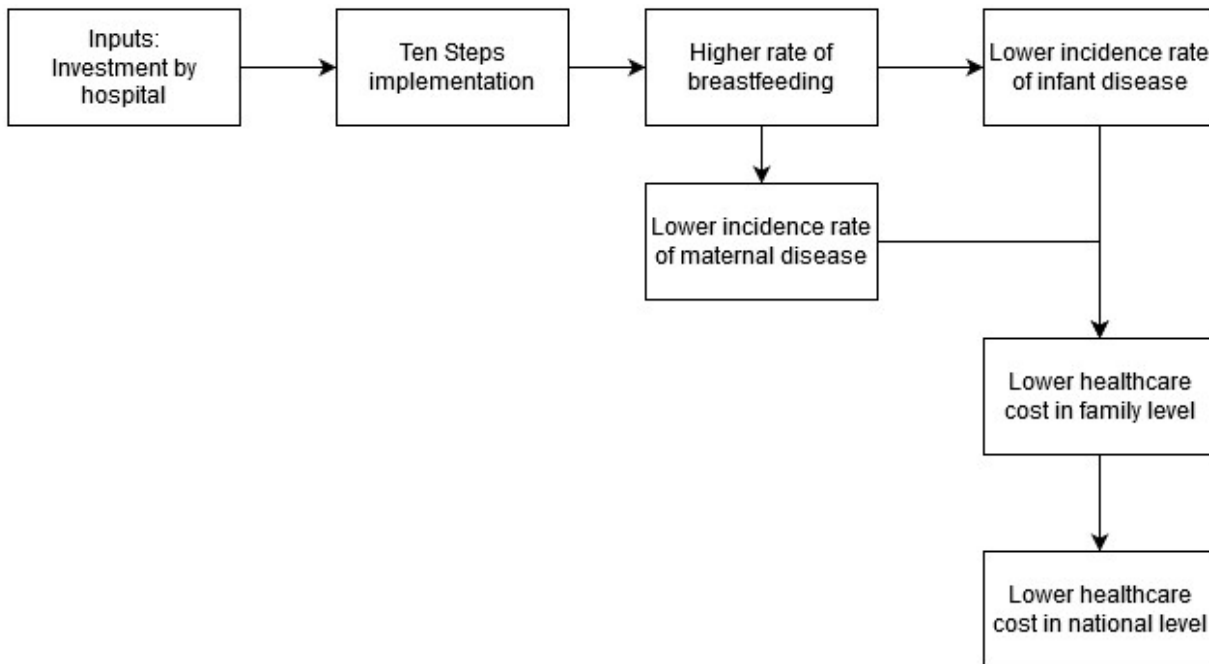


Figure 2. Theory of change used to evidence and value outcomes.

questionnaire (Appendix A: Supplementary Table 1) was developed to elicit key information required for the SROI analysis. It was developed in collaboration with senior midwifery staff for a previous, related study [40], and was based on the 2018 Revised WHO UNICEF Ten Steps [43]. Interviews of 1 to 2 hours duration took place in the hospital in January 2020. The nursing manager was only available to provide written responses to the questionnaire. Interviewees were approached through AP’s professional network and interviews were conducted in Indonesian language by AP for whom it is her first language. Three participants did not wish their interviews to be recorded, so notes were taken throughout these interviews. The fourth interview was audio recorded with the participant’s permission. Data extracted from the notes and audio recording were used by AP to complete the questionnaire. When this was complete, AP checked with the senior midwife to ensure the accuracy of the data. Data were stored on a password protected computer at the university and only accessible to the primary researcher.

Data Analysis

The SROI framework accounts for value in a broad sense, measuring change in terms of the social, environmental, and economic impact [44]. Through incorporating these measures, the SROI seeks to reduce environmental degradation and inequality, and improve social wellbeing. The disadvantage of using SROI includes challenges and subjectivity of putting a financial value on

criteria that do not have monetary value [45]. Due to the multiple and broad benefits associated with breastfeeding and the lack of direct comparator, the SROI framework was considered a relevant tool to evaluate the impact of the Ten Steps. The analysis was conducted using Microsoft Excel.

Phase 1 and 2: Establishing Scope and Involving Stakeholders

We identified the mother/baby dyad as the key stakeholder in this analysis, due to the largest benefits derived and availability of evidence to inform the analysis. We excluded health care staff from the calculation due to the limited timeframe for project and resource regarding healthcare worker benefit in implementing BFHI. Hospital stakeholder involvement has been described above and data collected through interviews with these people informed the SROI analysis.

Phase 3 and 4: Mapping, Evidencing, and Valuing Inputs and Outcomes

We used the theory of change (Figure 2), developed from the literature in a previous study [40], to map hospital investment and anticipated outcomes from implementing the Ten Steps. Hospital investment was calculated by analyzing questionnaire data (Appendix A: Supplementary Table 1). Anticipated outcomes consisted of maternal and infant health benefits. Maternal benefits included risk reduction of breast and ovarian cancer, cardiovascular

Table 1. Financial Proxy Used to Value the Outcomes

Mothers	Financial proxy	Cost (in USD)
Reduce risk of breast cancer	Cost of breast cancer treatment per case	5,573 [96]
Reduce risk of cardiovascular disease	Cost of cardiovascular disease treatment in hospital	190 [97]
Not buying formula	Formula supply for one year for full formula-fed baby (1 tins for a week for the first 6 months and 1 tin for a week for the next 6 months) *	3,121
Reduce risk of ovarian cancer	Cost of ovarian cancer treatment per person	21,983 [98]
Reduce risk of hypertension	Cost of hypertension treatment per diagnosed case	70 [97]
Babies		
Reduce risk of diarrhea	Cost of gastrointestinal	41 [37]
Reduce risk of respiratory infection	Cost of influenza-related disease	46 [37]
Reduce risk of acute otitis media	Cost of treating otitis media	31.62 (based on interview)
Reduce risk of necrotizing enterocolitis	Cost of NEC treatment	1,332.94 [99]
Higher IQ	Average lifetime earnings (average monthly income in Indonesia [100] x 12 months x 30 years)**	135,550
Reduce risk of obesity	Cost of obesity	5,074 [101]
Reduce risk of type 1 diabetes	Cost of diabetes	10,549 [102]
Reduce risk of type 2 diabetes		
Reduce risk of Sudden Infant Death Syndrome (SIDS)	Average lifetime earnings (average monthly income in Indonesia [100] x 12 months x 30 years)**	135,550

*assumption based on WHO guidance [103] and adapted it to Indonesian settings

** assumption based on average lifetime earnings in Indonesia for productive age

disease, hypertension, and reduced cost related to buying formula [6,46-50]. Benefits for babies included reduced risk of diarrhea, acute otitis media, respiratory infection, necrotizing enterocolitis, SIDS, obesity, diabetes, and higher IQ [1,3,4,51-58].

We then searched the literature to establish values for the outcomes (Table 1). For the calculation, we searched health and cost saving benefits of breastfeeding through online databases via Australian National University Library (Table 2). We used keywords “prevalence” or “incidence,” “rate,” “name of the disease,” and “Indonesia,” for example, “incidence rate of respiratory infection in Indonesia” to understand the proportion impact of each benefit. We also used “Odds ratio,” “name of the disease,” “Indonesia,” and “breastfeeding” to value the change that happened because of breastfeeding. For this study, we selected studies or reports that were conducted or collected in Indonesia or in a country comparable to Indonesia, such as Malaysia, Thailand, or the Philippines, otherwise we selected the latest and highest quality international studies using an accepted evidence hierarchy [59].

Phase 5: Establishing Impact

Consideration for what would have happened without the program (deadweight), change that happened because of other programs (attribution), and how much of the outcome displaced other outcomes (displacement) were used to elucidate the actual impact of Ten Steps implementation [44]. The literature reviewed on breastfeeding was used and then compared to our previous study in Australia [40] to decide the specific value. We assumed that 10% of breastfeeding benefits would have happened without the Ten Steps implementation; Ten Steps implementation would displace 15% of other activity; 35% of breastfeeding benefits were attributed to other activities (such as breastfeeding norm in the community, breastfeeding policy at the workplace, etc.) and 15% of the benefits would decline (drop off) over time (due to other unhealthy habit, eg, sedentary lifestyle, unhealthy diet, etc.).

Phase 6: Calculating the SROI and Sensitivity Analysis

Some of the costs of implementing the Ten Steps

Table 2. Evidence-based Estimation to Measure the Benefits of Breastfeeding

Benefits of breastfeeding	Proportion impact	Change due to breastfeeding
Mothers		
Risk reduction in breast cancer	17% [104]	4% [105]
Risk reduction in cardiovascular disease	37% [106]	9% [51]
Risk reduction in ovarian cancer	4% [107]	24% [48]
Risk reduction in hypertension	21% [108]	12% [51]
Formula purchase cost saving	80% *exclusive breastfeeding rate at discharge (based on interview)	37% [109]
Babies		
Risk reduction in diarrhea	100%	26% [53]
Risk reduction in respiratory infection	4% [110]	18% [4]
Risk reduction in acute otitis media	5% [111]	43% [5]
Risk reduction of Necrotizing Enterocolitis (NEC)	0.45% [112]	38% [113]
Higher IQ	0.08% [39]	0.21% [39]
Risk reduction in obesity	9% [108]	26% [114]
Risk reduction in type 1 diabetes	5.7% [102]	25% [115]
Risk reduction in type 2 diabetes	7% [116]	35% [117]
Risk reduction in Sudden Death Infant Syndrome (SIDS)	26% [118]	40% [3]

were derived from information obtained at interview (eg, cost for catering and discharge bag) (Table 3). We used Purchasing Power Parity to convert the Indonesian Rupiah to American Dollar (1 IDR PPP = US\$ 4743).

We calculated staff time for developing material for policy socialization (Step 1b), monitoring (Step 1c), informal sharing session (Step 2), education material development (Step 3 and 8), and skin to skin assistance (Step 4) at an hourly rate, plus staff time for patient counseling and education (Step 5, 7, 8, and 9) were calculated as a percentage of monthly workload multiplied by monthly salary, as we could not estimate the exact hours for these activities.

For Step 2, we also included the time that five out of six breastfeeding counselors (consists of one nurse, two midwives, one obstetrician/gynecologist, and two pediatricians) took to do the 40 hours training. One OB/GYN took the training before he worked at the hospital, therefore only five were taken into calculation. The training cost was not included as they used their own money to fund.

For the last stage, estimation on how long the outcomes would last was obtained from the literature and applied to the analysis. We assumed the benefit included formula purchase cost for 2 years, the risk reduction of diarrhea, acute otitis media, respiratory infection, and necrotizing enterocolitis lasted for 3 years; higher IQ, risk

reduction of type 1 and 2 diabetes, SIDS and obesity for 30 years; risk reduction of breast and ovarian cancer, hypertension, and cardiovascular disease for 15 years.

The costs and benefits were discounted to calculate the net present value, to ensure that the costs and benefits in different time periods were comparable. To acknowledge that today’s cash is more valuable than cash in the future, we calculated the net present value (NPV) by using the recommended rate of 4% [60]. After the NPV was calculated, we deducted the investment and then divided it by the total input, that being the total monetary investment in the Ten Steps implementation.

$$SROI =$$

$$\frac{\text{Net present value of Ten Steps implementation (NPV)} - \text{Value of investment}}{\text{Value of investment}}$$

Sensitivity analysis was conducted to estimate the greatest impact on the SROI ratio, and to test how sensitive the ratio is to changes in these estimates including in the deadweight, displacement and attrition, and specific breastfeeding rate estimates.

The average number of births in Airlangga public hospital was 3600 annually, with exclusive breastfeeding rate on discharge of 80% in 2019. The value of benefits and costs is summarized in Table 4.

Table 3. Estimated Costs Associated with Ten Steps Implementation in Airlangga University Hospital, USD (Indonesia PPP factor in 2019 ~ US\$ 4,743)

Ten Steps	Category	Amount USD	Unit	US\$ per year
Step 1b	Policy development	74	Per hour per team	148
	Policy review	74	Per hour per team	74
	Policy communication to parents (poster)	11	Per pc	88
	Policy communication to parents (roll-up banner)	44.27	Per pc	44
	Policy socialization to hospital staff			
	a. Catering	3,373	Per session/year	3,373
	b. Staff time to develop material	8	Per hour	3
Step 1c	Staff time	8	Per hour	1,423
Step 2	Staff time to 40 hours of breastfeeding counseling training	1,581	Per three year	527
	Shift handover (informal sharing session)	8	Per hour	8,538
Step 3	Educator fee for antenatal class	8	Per hour	380
	Staff time for material development	8	Per hour	5
	Catering for the participant	6	Per person	5,692
	Printing cost for educational material (fact sheets)*	32	Per 500 pcs per topic	569
Step 4	Staff time to assist skin to skin	8	Per hour	28,461
Step 5	Medicine feeder*	1	Each	152
	Electric breastpump*	491	Each (last for 3 years)	164
	Manual breastpump*	105	Each	105
	Staff time to educate re common challenge (improper latch on and perception of low-milk supply)	63	Per mother-baby dyad per nurse/ midwife	227,688
Step 6	Neocate 0-12 months 400gr*	96	Per tin	13,752
	Medicine feeder*	1	Each	759
Step 7	Bed-side cot*	738	Per box	25,088
	Sofa for father	283	Per pc	3,211
	Staff time to educate re patient safety (baby fall)	6	Per mother-baby dyad per nurse/ midwife	22,769
Step 8	Early feeding cues poster*	11	Per pc	53
	Staff time to develop the material	8	Per hour	3
	Staff time to educate re feeding cues	25	Per mother-baby dyad per nurse/ midwife	91,075
Step 9	Counsel on the risk and use of pacifier and teat bottle	63	Per mother-baby dyad per nurse/ midwife	455,376
Step 10	Discharge bag include leaflet	21	Per pc	75,896
	Lactation clinic (with pediatrician)	13	Per hour	5,929
	Coaching Public Health Center and collaborate with Local Health Department in provide training for health cadre:			
	a. Catering for 20 participants (IDR 15,000/box)	63	Per month	759
	b. Staff time	8	Per hour	95
				962,078

*Based on commercial price

All Indonesian Rupiah currency was converted into US Dollar using Purchasing Power Parities (PPP) [119].

Table 4. Net Social Return on Ten Steps Implementation at Airlangga University Hospital

Benefits	Annual amount in USD
Mothers	
Reduce risk of breast cancer	57,315
Reduce risk of cardiovascular disease	9,061
Not buying formula	1,323,125
Reduce risk of ovarian cancer	287,113
Reduce risk of hypertension	2,526
Babies	
Reduce risk of diarrhea	15,389
Reduce risk of respiratory infection	470
Reduce risk of acute otitis media	896
Reduce risk of necrotizing enterocolitis	3,264
Higher IQ	33
Reduce risk of obesity	170,034
Reduce risk of type 1 diabetes	215,286
Reduce risk of type 2 diabetes	370,141
Reduce risk of Sudden Infant Death Syndrome (SIDS)	20,188,339
Total value of benefits	22,642,991
Total cost of investment in Ten Steps	972,303
Net Yield (benefits less investments)	47,182,026
Social Return on Investment (SROI)	48.53

RESULTS

The result showed that the benefit gained from Ten Steps implementation at Airlangga hospital outweighed the investment cost. The total per annum value of investment to implement the Ten Steps was estimated at US\$ 972,303 and the total per annum value of expected benefit was US\$ 22,642,661. Therefore, the ratio was USD\$ 49:1, which meant that every USD\$ 1 invested in the Ten Steps implementation, would bring USD\$ 49 benefit for Indonesian economy, based on the experience of this hospital. The payback period was 0.52 months, which meant that the investment would be returned in around 1 month.

We used a conservative calculation, by using the median value for each indicator for our baseline estimation as we were being cautious not to over claim the benefit of the policy. Sensitivity analysis was conducted by testing different assumptions on benefits and costs (Supplementary Table 2 and 3). The SROI calculation was dominated by the high value of risk reduction of SIDS and type 2 diabetes risk for babies, as well as formula cost-saving and risk reduction of ovarian cancer for mother.

We also tested two other scenarios which resulted in a social value of US\$ 60 for best-case scenario where the hospital pursues BFHI accreditation (standardized implementation) and US\$ 31 for worst-case scenario when

the hospital does not implement the Ten Steps. The latter reflects the current situation in Indonesia, as a result of poor adherence to WHO guidance for maternity care and breastfeeding support during COVID-19 pandemic [61,62]. Worst-case scenario entailed healthy babies placed in nursery rooms instead of rooming-in (which means human resource and baby cot in the nursery room) as well as 65% of babies given formula (which means hospital needs to provide baby bottle, bottle sterilizer, and water heater). Both scenarios showed positive results. Nevertheless, achieving BFHI accreditation is considered to have the highest social value.

DISCUSSION

Our results indicate that every US\$ 1 invested in implementing the Ten Steps at Airlangga Hospital Surabaya could be expected to bring a social return of US\$ 49. These results align with our previous research [40] which demonstrates the positive social value AUD\$ 55 or USD\$ 80.8 for every AUD\$ 1 invested (AU\$ PPP = US\$ 1.46) of maintaining the BFHI accreditation in an Australian public hospital. Direct comparison between these two countries is not feasible due to a number of reasons including cultural and health system funding and organization. Nevertheless, the lesser social return on in-

vestment found in this study of implementation of the Ten Steps in Indonesia may in itself emphasize the additional value that may be achieved through BFHI-accreditation, as mother and baby will have higher benefits as showed by our best-case scenario.

Staff time to educate and counsel mothers was the major additional cost of implementing Ten Steps interventions in this facility. For example, the major costs of staff time were estimated to be US\$ 227,688 for educating in relation to common challenges, such as baby latching and perceptions of milk-supply (Step 5), and US\$ 455,376 for counseling on the risk and use of pacifiers and bottle teats (Step 9). This is consistent with a recent evidence review which found that in-service staff training costs are an important impediment to wider implementation of BFHI [63,64].

The results of our study are important, as while few studies of the cost of implementing the Ten Steps are available [65,66], none are in the Indonesian context and none examine this in terms of social value. Of the few that examine social value, US\$ 13 of benefit was gained for every US\$ 1 invested in breastfeeding group programs facilitated by Public Health Nurses in Ireland (€ PPP = US\$ 0.82) [39] and US\$ 71 for every US\$ 1 invested in a nutritional counseling and breastfeeding support program in Nairobi, Kenya [38]. The higher value reported in the Nairobi study might be due to implementation in a community setting where there are fewer infrastructure costs. Also, the scope of calculated benefits was broader, including not only for mothers and babies, but also siblings, fathers, grandmothers, health care providers, community health volunteers, data collectors, and day-care centers. While the Irish study, also in a community setting, calculated a lower ratio, this might be because the calculated benefits were limited to mothers and babies.

In our study, six healthcare staff (one nurse, two midwives, one obstetrician/gynecologist, and two pediatricians) were supported to obtain training as breastfeeding counselors, which was reflective of the hospital's commitment to implement the Ten Steps. Evidence demonstrates that many healthcare professionals, including undergraduate students, lack breastfeeding knowledge [17], which influences their ability and confidence in supporting breastfeeding mothers. If they want to gain more knowledge, they often have to self-fund their attendance at training and workshops, experience replicated by maternity facility staff in other countries [67]. Availability of training that is free from commercial interests is challenging in Indonesia [68], particularly for poorly funded hospitals, which may be more amenable to accept sponsorship from formula companies to fund training. As such, mothers and babies attending poorly funded hospitals are more likely to be exposed to the promotion of breastmilk substitutes. In relation to this, increased costs

may be borne by parents and families for the purchase of breastmilk substitutes and additional healthcare costs that may arise from not breastfeeding, increasing inequality for those with lower income.

Contributing to the above is the fact that many healthcare professionals are not familiar with, or aware of the International Code of Marketing of Breastmilk Substitute (The Code) that regulates the marketing practice of breastmilk substitutes (BMS) [68]. The Code includes guidance that prohibits the receipt of funding by commercial infant formula companies to attend training, workshops, or seminars; the organization of health seminars for the public; or development of new hospital facilities; or even just accepting small gifts [68,69]. The Code also proscribes free or low-cost formula supplies. Adherence to the Ten Steps incurs costs because training and education can no longer be received from companies, and free and subsidized supplies are not allowed to be accepted to lower costs.

When maternity facilities do not invest sufficiently in Ten Steps implementation, the costs are borne by other parties, such as midwives, nurses, and mother-support groups (eg, Indonesian Breastfeeding Mothers Association) who invest more time and money into supporting mothers to breastfeed [70,71]. Hence, we also attempted to calculate the SROI for the scenario where the Airlangga hospital achieved BFHI accreditation according to WHO/UNICEF criteria for Ten Steps implementation. This showed that if the hospital funded the cost for staff training and additional costs of policy adherence, the ratio remained positive (assuming the increase in breastfeeding rates) and beneficial. If such costs were borne by the government, this would support policies to require hospitals to implement the Ten Steps or even to achieve BFHI accreditation, as there would be significant cost saving incentives for government.

Lack of policymakers' interest at the national level may be due to a low prioritization of breastfeeding programs in combination with influence from formula industries, meaning this program has progressed slowly [31]. Furthermore, hospital administrators' lack of motivation in implementing the Ten Steps might be due to a lack of visible benefits at the hospital level [72]. We examined the benefits in terms of the mother/baby dyad. Future research examining benefits extending to the hospital level may provide greater incentives for hospitals to embrace these initiatives.

Additional factors influencing hospitals' decision to prioritize implementation of the Ten Steps are related to other income sources. For example, the practice of formula companies offering to fund or develop new facilities and sponsor healthcare training and workshops may provide a disincentive for hospitals considering implementing the Ten Steps. Private hospitals that receive income

from treating disease may have little incentive to prevent disease through supporting breastfeeding.

Barriers to implementation of the Ten Steps and the BFHI include resistance to change from hospital staff and lack of funding [30]. There is need for government incentives to overcome these barriers; for example, integrating BFHI-accreditation into the national accreditation standards. Linking better preventative care to hospitals' operational license would encourage policymakers to fund and ensure sustainability of programs like the BFHI and would help reduce inequity from the very start of life.

Indonesia has published several regulations to protect and support breastfeeding [73] and made some progress and implemented some Ten Steps measurement to the national hospital accreditation standards, such as breastfeeding initiation rate (Step 4), exclusive breastfeeding rate at discharge (Step 6), and rooming-in (Step 7) [32]. Nevertheless, no information is currently available on how the integration in the national standard has influenced hospital practice for Ten Steps implementation nation-wide.

Some Indonesian hospitals still separate mothers and babies after birth, even if both are healthy [68]. In other cases, some hospitals only allow rooming-in if the mother pays out-of-pocket expenses for their inpatient stay or pays with private insurance. They do not allow rooming-in if the mother pays with social insurance from Social Insurance Administration Organization or Badan Penyelenggara Jaminan Sosial (BPJS), which is obligatory for all Indonesians; however, people from higher socioeconomic backgrounds mostly have double insurance - BPJS and private insurance. As a consequence, people who cannot afford private insurance are at a disadvantage in terms of having access to rooming-in, which is an essential component of the Ten Steps and critical for breastfeeding on demand. This common practice undermines the basic human right for women to be with their babies after birth and to breastfeed on demand [74,75].

The BFHI is an initiative to ensure that every mother and baby receives an equal start in achieving the best nutrition, regardless of wealth or social standing. Some studies in Indonesia showed that poorly educated mothers were more likely to have shorter breastfeeding duration than their counterparts [76]. Mothers in urban settings and slum areas in Indonesia are more likely to formula-feed their babies than mothers living in more affluent areas. This could increase the risk of other health issues such as diarrhea, respiratory infection, and otitis media, especially in areas where sources of clean water and electricity are sparse [77,78].

Implementation of the Ten Steps and BFHI-accreditation can be perceived as a quality assurance procedure in the same way as national hospital accreditation. By having external assessment, maternity practices may be

standardized to ensure the highest quality of care. Research demonstrates that implementation of the Ten Steps and the BFHI framework have a significantly positive impact in reducing infant morbidity and mortality in the short and long term [79-82].

Limitations

We used the SROI framework to measure the expected social benefits in relation to the actual investments by the hospital. Our study did not analyze the benefits for hospital staff in implementing the Ten Steps, due to an unavailability of literature relevant to the Indonesian health system. Additionally, we only examined one hospital due to the limited timeframe.

We did not include training costs for hospital maternity staff, which are usually included to ensure all staff's competence, knowledge and skills as required in Step 2 of the Ten Steps (Table 3). Based on interviews, the Airlangga University Hospital did not provide regular breastfeeding training for all staff due to not being BFHI-accredited; however, it did support six staff members to obtain training as breastfeeding counselors. We did not include the cost of this training into the SROI calculation, as it is not a requirement in Indonesia's Ten Steps regulation. Nevertheless, the facility implemented other Ten Steps practices, including breastfeeding policy development, abiding by the International Code of Marketing of Breastmilk Substitutes, no formula supplementation unless medically indicated, early initiation of breastfeeding, rooming in, counseling regarding pacifier use and infant feeding cues.

The beneficial impact of breastfeeding support programs on mothers is well documented [83-85]; however, we were unable to collect data reporting actual breastfeeding rate increases attributable to the intervention at the facility. We relied on Kramer and colleagues' study [26] modeled on BFHI implementation, which found that exclusive breastfeeding at 3 months increased from 7% to 44% when active breastfeeding support measures were implemented. Furthermore, elucidation of the SROI from mothers' perspectives would be of great value in further clarifying the social impact of implementing Ten Steps. Mothers' time and effort to breastfeed were not included in the calculation, with only limited data on this important investment available in the current literature [86-88]. Our examination of the SROI of implementation of the Ten Steps in one public hospital in Surabaya, Indonesia provides the foundation for future research in other hospitals and community settings with more comprehensive stakeholder involvement, such as other healthcare staff, family members, workplace, and community settings.

Implications

Our study quantifies the social value of Ten Steps implementation, providing critical data to incentivize governments internationally to prioritize this program as an intervention to support public health and wellbeing for all members of society. This applies equally, if not more pertinently during the coronavirus pandemic [89]. It highlights that Indonesia has much to gain from widening its implementation of the Ten Steps, and by integrating this comprehensive and highly effective intervention more fully into the health system in line with the recently revised BFHI [90]. It also emphasizes that priority should be given to funding in-service staff training costs; it is a false economy to cost-shift this to staff, or to permit the formula industry to fill the health professional training and education gap. The Revised BFHI embeds requirements for full compliance with the WHO International Code of Marketing of Breastmilk Substitutes and relevant World Health Assembly resolutions as a critical management procedure for all maternity facilities, including for health workers [91].

The current low breastfeeding rates in Indonesia cost the country between US\$ 1.5–9.4 billion annually in health treatment costs, income loss due to lower cognitive development, and maternal and child mortality, the highest in South East Asia [92]. Increasing public health spending on protecting, promoting and supporting breastfeeding in maternity facilities in Indonesia is an investment that will substantially increase breastfeeding and generate substantial offsetting public health savings, as well as social benefits extending well beyond individual mothers and babies. The economic benefits of breastfeeding associated with potential improvements in cognition alone, through higher IQ and earnings, have been estimated at US\$ 1.6 billion annually [93], and are available to all children equitably [94]. The evidence provides sound economic and social equity rationale for policy makers internationally to invest heavily in strategies that empower and enable women to breastfeed so all children can have an equal best start [43,95]. Implementation of the Ten Steps and achieving BFHI accreditation will result in health, social, and economic benefits for individuals, communities, and countries.

CONCLUSION

While the Indonesian government supports breastfeeding and has published several regulations to protect it, our research provides evidence of the greater value that can be derived for the Indonesian community of taking this commitment to the next step, through implementing the BFHI in all Indonesian health services.

Providing the highest standard of care for breastfeeding through Ten Steps implementation and BFHI-ac-

creditation, is essential for health equity, especially in a densely populated country such as Indonesia. It addresses inequities throughout the lifetime by providing the equal best start to all infants regardless of wealth or social background. Indonesia's initial moves towards implementing the WHO/UNICEF Ten Steps can be strengthened by integrating all elements into the health care system.

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Appendix A: Supplementary Table 1

Thank you for agreeing filling this form. I am interested in Baby-Friendly Hospital Initiative and planning to do research on the cost of implementing it.

I will not take your name and will not repeat anything you say to anyone else. The information that you provide will be anonymous. The time you share with me and information that you provide is very valuable and will assist to improving maternal and child health.

Informant's position/role : _____

Collection Date : _____

[For Australian hospital only]

1. How much is the application fee for BFHI designation process? _____
2. Is there any maintenance fee that should be paid regularly? Y/N
If yes, how much? _____
3. Is there any more cost spent on the assessment? Y/N

If yes, please explain.

No.	Cost	Amount (AUD)	Unit
1.			

[For Australian and Indonesian hospitals]

Step 1a. Comply fully with the *International Code of Marketing of Breastmilk Substitutes* and relevant World Health Assembly resolutions.

Questions:

1. Have any personnel from companies that sell baby foods, bottles or teats reached out to you or other staff in your facility in the past 6 months?

<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	If no or don't know go to question 6. If yes continue
--	--

		Company 1	Company 2	Company 3	
2. Which company?					
3. How did (COMPANY NAME) contact you or others? (CHECK ALL THAT APPLY)	Telephone	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e-mail	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Direct facility visit	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mail	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Other (Please specify)	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Why did (COMPANY NAME) contact you or others? (CHECK ALL THAT APPLY)	Provide for distribution to mothers and other care-givers	1) Promotional materials of specific products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		2) Other informational/ educational materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		3) Samples of baby milks/other baby food products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		4) Gifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		5) Coupons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Provide for use of health facilities/ staff	6) Promotional materials of specific products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		7) Other informational/educational materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		8) Gifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		9) Display and other promotional activities in the facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Seek direct contact with	10) Mothers (and other caregivers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		11) Facility staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Make offers for	12) Free supplies of baby milks/other baby food products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2

	13) Donations of equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	14) Sponsored events or workshops for health facility/staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15) Invitation and/or support for staff to attend events/workshops outside the health facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	16) Other (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	17) Don't know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How many times were you or others contacted by this company in the past 6 months?		--	--	--

6. What % of discount on the retail price of infant formula did you receive (or do you receive) from formula companies before you achieved baby-friendly hospital accreditation?

--

7. Is there any cost barrier for this facility regarding compliance with the WHO Code? How did you overcome that barrier?

--

8. Is there any loss of marketing benefit from formula company? Y/N
If yes, please fill the box below.

Cost	Amount (AUD)
Loss of marketing benefit from formula company	

Step 1b. Have a written infant feeding policy that is routinely communicated to staff and parents

Questions:

1. How do you establish the policy? i.e. did you create a taskforce, who was in this taskforce (job roles), was there meetings to discuss the policy, did they undertake any courses or attend conferences to develop the written infant feeding policy. Please indicate an estimate of the amount of time needed to develop this policy.

Is there any working group?	Y/N
How many people?	
Who are these people? (e.g. Nurse, Paediatrician, etc)	
Job roles	
Did they undertake any courses or attend conferences to develop the written infant feeding? Please explain	
Estimated time	

2. Do you revise the written infant feeding policy? Y/N
 If yes, who revises the policy? (Please only state the job title)

Job Role/Classification	Estimated time for revising the policy

3. How do you communicate the infant feeding policy in this hospital to the staff?

4. How do you communicate infant feeding policy in this hospital to parents?

Step 1c. Establish ongoing monitoring and data-management systems

Questions:

1. How do you do monitoring and data management system?

2. Please state the average time spent monitoring the BHFI? _____

Cost	Amount (AUD)	Unit
Human resources cost		
Equipment cost (if any including software)		

Cost	Amount (AUD)	Unit
Others, please explain		

Step 2. Ensure that staff has sufficient knowledge, competence and skills to support breastfeeding

Question:

1. How do you conduct trainings related to staff education?
(based on BFHI Guideline from Australian College of Midwives, there are 3 categories of hospital staffs)
 - a. Group 1 (those who assist mothers with breastfeeding, or provide education in relation to breastfeeding, in any part of the maternity unit, antenatal clinic and/or neonatal nurseries): 20 hours
 - b. Group 2 (those who may provide general breastfeeding advice but do not assist mothers with breastfeeding): 2 hours
 - c. Group 3 (those who have contact with pregnant women and mothers but do not assist mothers with breastfeeding and do not provide infant feeding advice as part of their role): 1 hour

Initial training of staff	Group 1 (nurse, midwives, lactation consultants)	Group 2 (paediatrician, obstetricians, speech pathologist, physiotherapist, dieticians and other medical personnel)	Group 3 (ward clerks, domestic personnel and auxiliary volunteers)
Number of staffs trained			
Cost of educational materials			
Trainer fees			
Supervision (if applicable)			
Staff time off			
Meals (if applicable)			
Administration i.e. photocopying			

2. Is there any regular evaluation or supervision? What kind of evaluation/ supervision is given?

--

Step 3. Discuss the importance and management of breastfeeding with pregnant women and their families

Questions:

1. Do you provide antenatal classes? Y/N
 - a. If yes, is there any fee charged to the patients? Y/N
 - b. How long is the duration of each class? _____
 - c. Who teach the antenatal class? _____

No.	Cost	Amount (AUD)	Unit
1.	Human resource cost		
	a. Educator fee		
	b. Assistant fee		
2.	Educational materials		
3.	Staff time off		
4.	Room hire		
5.	Meals		
	Equipment (laptop, etc)		

2. If no, how do you educate the pregnant women and their families about the importance and management of breastfeeding? How long does the discussion take place in average during pregnancy?

Delivery cost	
Staff (time/ staff level)	
Length of time	

Step 4. Facilitate immediate and uninterrupted skin-to-skin contact and support mothers to initiate breastfeeding as soon as possible after birth

Questions:

1. How long after birth do nurses stay with patients to do the skin-to-skin contact and early initiation of breastfeeding? _____
2. Do you need other equipment to do this procedure? Y/N
3. Does the father able to stay in the birthing room during this procedure? Y/N
If yes, do you need to provide anything for the father? E.g. operating gown?

No.	Cost	Amount (AUD)	Unit
1.	Change of procedure		

Step 5. Support mothers to initiate and maintain breastfeeding and manage common difficulties

Questions:

1. How do you support mothers to initiate and maintain breastfeeding?

2. What are the common difficulties related to breastfeeding in this hospital? How do you manage it? Is there any breastfeeding tool that you usually use (e.g. nipple shield, spoon, cup feeder, breast pump)?

3. Is there any new facilities that is built for managing this difficulties (e.g. breastfeeding or breast pumping room)? Y/N

No.	Cost	Amount (AUD)	Unit
1.	Education and counselling staff time in wards		
2.	Breast milk expression and storage		
	a. Breast pump		
	b. Nipple shield		
	c. Storage bottle		
	d. Cup feeder or spoon		
3.	Build breastfeeding or breast pumping room for sick babies who are separated from the mother		
4	Duration of the class		

Step 6. Do not provide breastfed newborns any food or fluids other than breast milk, unless medically indicated

Questions:

1. Do you use formula or human milk donor to medically indicated babies?
 - a. formula milk (continue to question 2)
 - b. Human milk donor (continue to question 3)
2. How much is the price for formula per tin? _____
 - a. How many tin do you use for one baby per day on average? _____
3. Is there any cost to get human milk donor? Y/N
If yes, how much? _____
4. What equipment do you use to feed the baby? _____

No.	Cost	Amount (AUD)	Unit
1.	Purchase of formula		
2.	Fee of human donor milk use, including the equipment		
3.	Other, please explain		

Step 7. Enable mothers and their infants to remain together and to practise rooming-in 24 hours a day

Questions:

1. How do you manage the rooming-in policy, especially in wards?

2. Do you need to alter the existing building to achieve this procedure? Y/N
If yes, please explain.

3. Does the baby sleep in the same bed with the mother, or in bassinet next to mother's bed?
- In the same bed with the mother
 - In bassinet next to mother's bed

4. How do you support fathers who accompany birthing mother?

5. Is there any new procedure regarding baby's safety during rooming-in? Y/N.
If yes, please explain.

6. For baby in the NICU, how do you manage for practising rooming-in? Do you need a special room and/or furniture to enable this?

No.	Cost	Amount (AUD)	Unit
1.	Make smaller wards		
2.	Bigger room and/or additional furniture for supporting fathers		
3.	Baby bassinet (if applicable)		
4.	New procedure		
5.	Bigger space at the NICU		
6.	Add furniture (sofa) for mother doing skin-to-skin contact		
7.	Other equipment used in the NICU		

Step 8. Support mothers to recognize and respond to their infants' cues for feeding

Questions:

1. How do you support mothers to recognize and respond to their infants' cues for feeding?
2. Do you need other equipment and/or audio-visual aid to do this? Y/N
If yes, please explain.

Step 9. Counsel mothers on the use and risks of feeding bottles, teats and pacifiers

Questions:

1. How do you counsel mothers on the use and risks of feeding bottles, teats and pacifiers?
2. Do you need other equipment and/or audio-visual aid to do this? Y/N
If yes, please explain.

Step 10. Coordinate discharge so that parents and their infants have timely access to ongoing support and care

Questions:

1. What kind of follow-up supports do you provide? (e.g. lactation clinic, postnatal visit, home visit, telephone call consultation and/or mother support groups)

Lactation clinic	
Delivery cost	
Staff (time/ staff level)	
Number of visits/ sessions	
Travel time (mileage cost/ distance if applicable)	

Administration (including organisation of the visit, any printing costs for information etc)	
Discharge pack	
Production cost	
Home visit	
Delivery cost	
Staff (time/ staff level)	
Number of visits/ sessions	
Travel time (mileage cost/ distance, if applicable)	
Administration (including organisation of the visit, any printing costs for information etc.)	
Telephone time (parent calls if applicable length of time/ number of calls)	
Mother support groups	
Delivery cost	
Staff (time/ staff level)	
Number of visits/ sessions	
Administration (including organisation of the visit, any printing costs for information, including room rental etc.)	
Time taken to prepare for the support group	

Supplementary Table 2

Sensitivity analysis	Base case	New case	New ratio
Attribution	35%	50%	USD 37.10
Deadweight	10%	50%	USD 26.51
Displacement	15%	0%	USD 57.27
Drop off	15%	50%	USD 18.21
Discount rate	3.8%	6%	USD 46.28
Value of SIDS risk reduction	40%	56%	USD 65.47
		18%	USD 25.22
Value of Type 2 Diabetes risk reduction	35%	51%	USD 49.31
		14%	USD 47.49
Value of ovarian cancer risk reduction	24%	29%	USD 48.79
		20%	USD 48.31
Birth type	Single birth (N mother=3600)	Twins and triplet (N mother=2000)	USD 26.51

Supplementary Table 3

Sensitivity analysis	Changes made	New Ratio
Best case	Baseline scenario plus: <ul style="list-style-type: none"> • BFHI application fee US\$ 5,270 per three year (this was an assumption because Indonesia do not have BFHI accreditation program in place. Indonesian national hospital accreditation cost was used in this calculation as proxy) • 20 hours staff training • Exclusive breastfeeding rate at discharge 97% (based on Calvary Hospital Canberra) 	US\$ 59.79
Worst case	Baseline scenario minus policy development and communications, 20 hours staff training, infant feeding cues and common challenge counselling, skin-to-skin contact, rooming in, lactation clinic and antenatal breastfeeding education. Plus: <ul style="list-style-type: none"> • Infant formula preparation and equipment (e.g. bottle, sterilizer, water heater) • Staffing of the nursery room • Baby cot in the nursery room (not implementing rooming-in for healthy baby and mother) • Exclusive breastfeeding rate at discharge 30% (this was based on interview with an expert who was a medical doctor and lactation consultant in Surabaya, Indonesia). • Drop off rate increased to 20% with assumption that if mother does not receive adequate support in the beginning, it'd be more difficult for her to maintain breastfeeding. 	US\$ 31