

A Short History of Helping Babies Breathe: Why and How, Then and Now

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abstract

Helping Babies Breathe (HBB) changed global education in neonatal resuscitation. Although rooted in the technical and educational expertise underpinning the American Academy of Pediatrics' Neonatal Resuscitation Program, a series of global collaborations and pivotal encounters shaped the program differently. An innovative neonatal simulator, graphic learning materials, and content tailored to address the major causes of neonatal death in low- and middle-income countries empowered providers to take action to help infants in their facilities. Strategic dissemination and implementation through a Global Development Alliance spread the program rapidly, but perhaps the greatest factor in its success was the enthusiasm of participants who experienced the power of being able to improve the outcome of babies. Collaboration continued with frontline users, implementing organizations, researchers, and global health leaders to improve the effectiveness of the program. The second edition of HBB not only incorporated new science but also the accumulated understanding of how to help providers retain and build skills and use quality improvement techniques. Although the implementation of HBB has resulted in significant decreases in fresh stillbirth and early neonatal mortality, the goal of having a skilled and equipped provider at every birth remains to be achieved. Continued collaboration and the leadership of empowered health care providers within their own countries will bring the world closer to this goal.

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THE CHALLENGE: WHY FOCUS ON RESUSCITATION AT BIRTH?

What happens in the first minutes after birth can influence an entire life. Supporting a safe birth for each individual protects the health of families and communities, and attention to women and infants around birth signifies a highly developed social compact and mature health system.

THE GAP IN CARE AND OUTCOMES: WHY FOCUS ON EDUCATION?

Despite the importance of care at birth, promoting attention to the infant has proven to be a persistent challenge through history. For centuries, medical intervention focused on the mother, without whom an infant had little to no chance of survival.¹ In the modern era of obstetrics and pediatrics, the advent of the Apgar score in 1953 signaled a need to focus on the physiologic transitions of the newly born infant and the beginning of systematic investigation around support for transition and recovery from intrapartum hypoxic-ischemic events.² Despite physiologic research done in the 1960s and the emergence of neonatal-perinatal medicine and resuscitation science in the 1970s, birth asphyxia continued to be a leading cause of neonatal mortality in the United States and other medically advanced countries as well as most of the rest of the world.³

Recognition of birth asphyxia as a public health problem prompted leaders in medical research and public health at the United States Children's Bureau to begin an agenda to improve the science and practice of care of the newly born infant. The National Institutes of Health (NIH) issued a call for research in the area, resulting not only in basic-science proposals but also educational approaches, most notably, one that developed a systematized educational program on neonatal resuscitation for

health professionals. Concerted advocacy efforts by Dr William Keenan forged agreement in principle on the value of professional education around neonatal resuscitation and brought support from the American Academy of Pediatrics (AAP), American Academy of Family Physicians, American Nurses Association, American Society of Anesthesiologists, and American College of Obstetricians and Gynecologists. The educational program developed at Charles R. Drew Postgraduate Medical School by Ronald Bloom, MD, and Cathy Cropley, RN, MSN, with the award from the NIH was revolutionary in its emphasis on hands-on practice for the development of psychomotor skills and deliberate learning strategies that repeated consistent key messages. Using this template as the foundation, leaders of the AAP and the American Heart Association joined in to create and disseminate what became the Neonatal Resuscitation Program (NRP).⁴

Beginning in 1986, the NRP incorporated the available science into a standardized educational program and disseminated it rapidly and widely across hospitals in the United States and around the world. Although the approach contributed to effective management of newborn infants, creating an educational program also revealed the gaps in evidence and the need to include the most widely used practices when evidence did not exist. The NRP progressively incorporated results of scientific evidence evaluation by the International Liaison Committee on Resuscitation. Putting emphasis on knowledge and skills rather than professional discipline as the necessary qualification to perform resuscitation enabled the NRP to change behavior effectively and gain wide uptake.^{4,5} The goal of the program, to have a person at every birth who was trained and equipped to initiate resuscitation, elevated the

role of nurses as an integral part of the perinatal team. Perhaps the most unexpected aspect was the global demand for an effective educational program in neonatal resuscitation. The AAP did not set out to create a global program but did try to meet the requests for faculty support, and the program eventually was introduced in over 130 countries and translated into 24 languages.⁶ Implementation outside the United States continued to emphasize the involvement of both nurses and physicians; the NRP gave a voice and opportunities for leadership to nurses in low- and middle-income countries (LMIC). Successful implementation at large scale usually involved the Ministry of Health, together with a pediatric or neonatal professional society and a university or nongovernmental organization.⁷ One such program was *Freedom of Breath, Fountain of Life*, an effort begun in 2004 by the Chinese Ministry of Health with the Chinese Center for Disease Control and Prevention in collaboration with the AAP, Chinese Societies of Perinatal Medicine, Pediatrics and Nursing, and Johnson & Johnson Pediatric Institute.^{8,9} The steering committee quickly expanded to include midwives, who provide most of the immediate care at birth in China but whose scope of practice had not included neonatal resuscitation before the initiative. Implementation of the program targeted provinces where maternal and neonatal mortality were the highest, and thus revealed the vast range of facility types and capabilities where deliveries occurred. The general doctors, midwives, and nurses in small rural facilities made it clear that an educational program in neonatal resuscitation needed to be practical, short, and approachable (not based on a textbook or hours of slide lecture).

As systematic provider education and better management of pregnant women and newborns were reflected

in improved health statistics for North America, the huge burden of asphyxial mortality among infants in much of the rest of the world became evident. In the United States, asphyxia as a cause of neonatal death fell by >72% from 1979 to 1996.¹⁰ At the same time, in global data collection, asphyxia was identified as 1 of the 3 major causes of neonatal death, together with infection and prematurity or small size at birth.¹¹ The burden of mortality weighed the heaviest in LMIC, where 99% of an estimated 4 million global neonatal deaths occurred and where stillbirth accounted for ~1 million lives lost per year.^{12,13} In the year 2000, deaths in the first 28 days accounted for ~37% of total <5 child deaths, but this proportion was rising steadily because deaths in childhood were declining much faster than those during the neonatal period, due largely to effective efforts against diarrhea and pneumonia. Lagging progress for neonates meant many countries were not on track to meet the 2015 Millennium Development Goals of reducing the <5 child mortality rate by two-thirds from 1990 levels.^{12,14}

In the early 2000s, some evidence-based interventions had been identified to combat neonatal mortality: support for exclusive breastfeeding, kangaroo care for low birth weight infants, and treatment of perinatal infections with antibiotics; however, interventions for intrapartum hypoxic-ischemic events had been largely regarded as requiring intensive care and, so, were felt to be impractical or inaccessible in most settings. Better clinical algorithms, educational methods, and technology for neonatal resuscitation were recognized as global priorities for research to reduce deaths from birth asphyxia.¹⁵ Experience with the more structured algorithm of NRP demonstrated the great value of the initial, basic steps of resuscitation: drying, stimulation, and positive-

pressure ventilation. Concurrently, evidence evaluation was focused on the potential effectiveness of initiating ventilation with room air, removing another barrier to the widespread implementation of neonatal resuscitation guidelines. Other lines of evidence evaluation relating to management of the umbilical cord after birth and maintenance of normothermia in the delivery setting had a clear relationship to survival and to resource-limited settings.¹⁶ It was becoming apparent that basic resuscitation not requiring extensive resources could have a huge impact.

UNDERSTANDING THE GLOBAL NEED: HOW MUST THIS BE DIFFERENT?

Although the needs of infants are universal, a global educational program would have to be adaptable and nimble to meet the needs of health care providers. The new program could leverage several features that had promoted effectiveness and uptake of NRP (Fig 1), but to be accessible to a global audience, high-priority concepts would have to be communicated efficiently to many different cadres of birth attendants without relying on text-heavy

materials or electricity. The curriculum must target practical skills, but equipment to provide care did not exist in many facilities.¹⁷ The educational program should empower a frontline birth attendant, often caring for both mother and infant, to help a newborn who did not breathe at birth.

To better understand and meet the needs of the target audience, the AAP formed a Global Implementation Task Force (GITF) in 2006 and invited a broad range of stakeholders to join. AAP volunteer members and fellows brought extensive teaching experience in LMIC, and several brought a personal perspective from living and working in Latin America, Asia, or Africa. Physician leaders from Latter-day Saint Charities and the NIH Global Network for Women's and Children's Health Research had already worked with the AAP to adapt NRP to a simplified format for teaching in their international sites. Save the Children's Saving Newborn Lives had explored simple mouth-to-tube resuscitation devices with midwives in Indonesia.¹⁸ Representatives from the World Health Organization (WHO) in Geneva and the Hesperian Foundation, publishers of *Donde No Hay Doctor* (translated as *Where There Is No*

Educational Content and Design	Program Implementation	Global Dissemination
<ul style="list-style-type: none"> Evaluation-decision-action cycles focused on the baby's responses Graphic algorithm with clear decision-making logic Translation of available consensus on science and treatment into operational steps Hands-on practice with neonatal simulator to develop psychomotor skills Acknowledgement of self-efficacy and competence as educational goals Use of video for clinical scenarios and educational patterning Incorporation of behavioral skills and communication with procedural skills and technique 	<ul style="list-style-type: none"> Emphasis on training the resuscitation team: all health care providers attending births (midwives, nurses, physicians, community midwives or health workers, and emergency responders) Train-the-trainer cascade Creation of an interprofessional user community: newsletter, conferences, community of practice, cards, and pins Integration into health systems through hospital-based facilitators Regular periodic updates based on evidence evaluation of new resuscitation science Basis for demonstrating age-specific competencies in resuscitation as a requirement for medical and nursing staff privileges Foundation for quality improvement and outcomes research 	<ul style="list-style-type: none"> Demand from host countries and local ownership Adherence to involvement of nurses and midwives as a condition of implementation Tripartite implementation with professional societies, the Ministry of Health, and development and/or funding partner

FIGURE 1

Features of HBB that promoted effectiveness and uptake as a result of lessons learned in the development of the NRP.

Doctor), brought their insights into key elements for educational materials. Leadership from the United States Agency for International Development (USAID) offered perspectives on implementation. Laerdal Medical, which had supported NRP with purpose-built mannequins and simulators, expressed interest in designing a low-cost neonatal simulator based on one produced for Simply NRP. With a philosophy of inclusivity, the AAP led this group of collaborators with deep expertise and expressed commitment to helping create a solution.

The International Pediatric Association congress in Athens in August 2007 proved pivotal in articulating the need for a rapid response and radically different educational approach. Several global leaders of academic and clinical pediatrics attended a session in which Dr George Little presented the GITF proposal. As educators and clinicians, they spoke unanimously about the need to make the materials less complex, accessible to all, and relevant to the realities of care. In the words of Dr Vinod Paul, from the All India Institute of Medical Sciences (V.K. Paul, MD, PhD, personal communication, 2020), “The current system of teaching neonatal resuscitation is overly complex, and at the same time misses meeting the needs of many babies born around the world. A program that targets providers in the low-resource settings and focuses on core neonatal resuscitation skills should be developed and scaled up. This will transform our approach to reduce neonatal mortality worldwide.” With a challenge issued to produce a curriculum for field testing within a year, the task force literally threw away early drafts and began to hone guiding principles for innovative educational materials. The mission became “to develop and implement an evidence-based curriculum,

adaptable to clinical and training use wherever babies are born.”

From the beginning, collaboration with participants from the target audience of health care providers in LMIC helped shape program development around hands-on activity and pictorial communication. An early prototype created to train site coordinators for the NIH Global Network’s First Breath trial used cut-up and rearranged line drawings from the Textbook of Neonatal Resuscitation as a useful tool to guide skills practices for birth attendants in India, Pakistan, Zambia, the Democratic Republic of the Congo, Guatemala, and Argentina.¹⁹ Practice exercises had incorporated consideration of on-the-ground concerns, such as availability of adequate light, clean equipment, communication with the mother, and help for a single birth attendant caring for both mother and infant. For Helping Babies Breathe (HBB), a pictorial Action Plan replaced the words of the traditional resuscitation algorithm, and it became clear from observations in the field that an element of time must propel successful resuscitation. Rapid assessment and action in The Golden Minute became an organizing principle: by one minute, an infant should be breathing spontaneously or receiving ventilation with bag and mask.

The 20th anniversary celebration of the NRP in the United States in 2006 proved to be a springboard for the development of the global program. Many people, gathered to celebrate the impact of NRP on professional education, neonatal outcomes, and quality of care, shared the thought expressed by Wally Carlo, “When we started the NRP, no one thought that there could be a person trained and equipped to provide resuscitation at every birth in the United States. Now that is the standard, and it can be the same for the rest of the world.” Progress quickly accelerated when

Laerdal Medical introduced to the GITF a low-cost, high-fidelity neonatal simulator that showed the primary evaluation signs of cry (squeaker bulb), breathing (pneumatic bulb for spontaneous breaths and chest rise with positive-pressure ventilation), and heart rate (another pneumatic bulb for palpable umbilical pulse). The water-filled simulator had the weight and the tone of an infant who needed resuscitation; every health care provider who was handed the simulator felt a shiver. This was a simulator that elicited a visceral, emotional response that could be harnessed to engage learners. Laerdal also offered the in-kind support of their graphic and educational designers, Anne Jorunn Svalastog Johnsen and Harald Eikland, who made subtle points of technique, become visible and helped fashion a spare but impactful text supporting practice change. The GITF set about turning a curriculum into an educational program with repeated testing of the logic, feasibility, and usability of new materials.

DEVELOPMENT AND VALIDATION OF EDUCATIONAL DESIGN: HOW TO TEACH AND LEARN?

Shifting the educational paradigm required refining the techniques for active learning with simulation and producing more sophisticated graphic materials. HBB relies on the same science as NRP. However, the Action Plan used a series of icons or symbolic illustrations to stand for well-defined sets of evaluations, decisions, and actions that create a shared mental model for the care of a newly born infant regardless of language (Fig 2: HBB Action Plan). The words used on the Action Plan were few, chosen to be simple, and consistent to facilitate translation and use by low-literacy providers. Each icon on the Action Plan corresponded to an explanatory page in both a Provider Guide and Facilitator Flip Chart. Simple but lifelike drawings

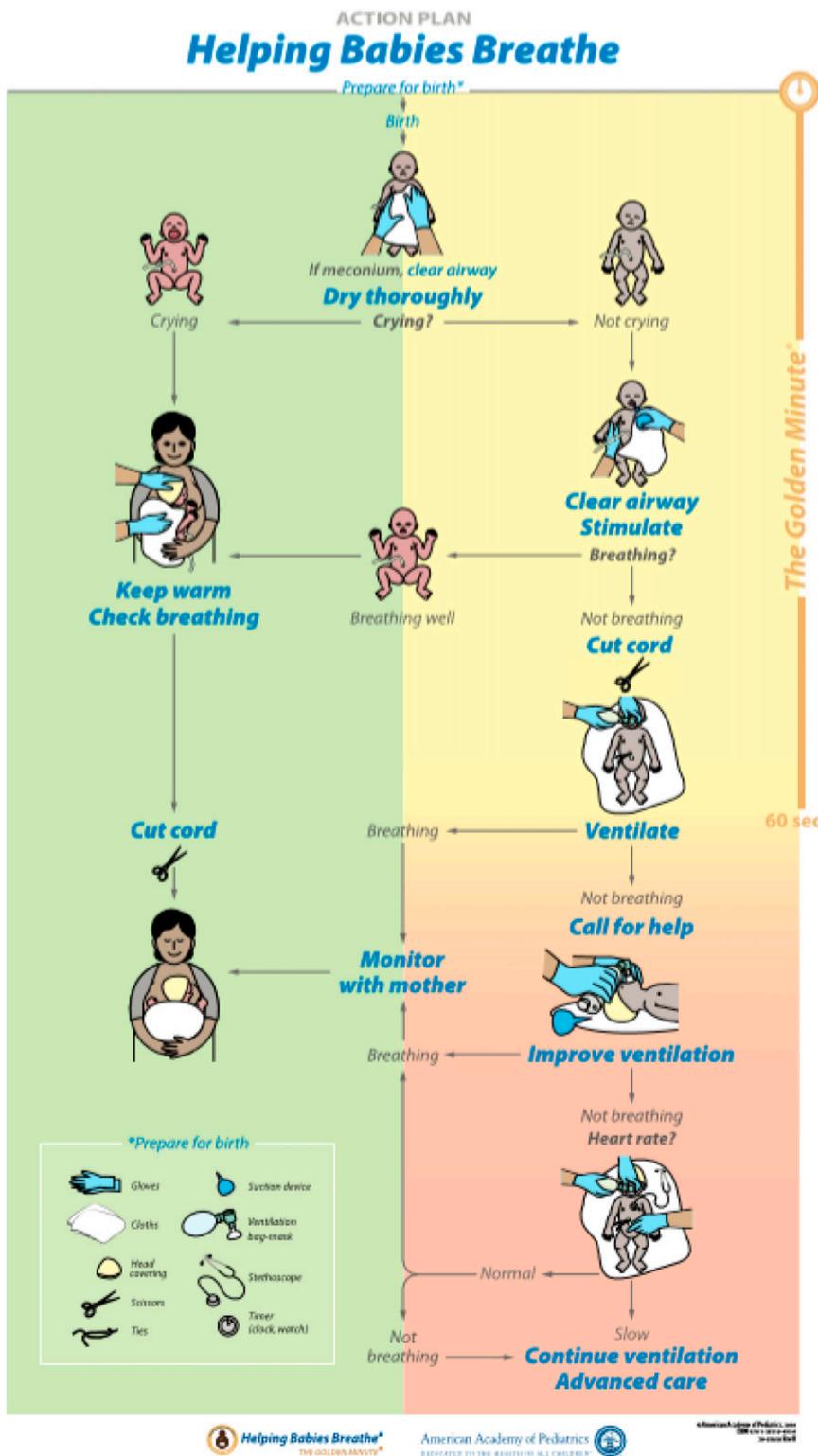


FIGURE 2 Helping Babies Breathe Action Plan, First Edition (reproduced with the permission of the AAP).

created from photographs with computer-aided design brought emotion to interaction with providers

and illustrated actions step-by-step. Text was kept to a minimum, and efforts were made to use short

sentences and language at a middle school level. The Facilitator Flip Chart not only displayed the illustrations in large format for learners but also provided, on the reverse side, a script for the facilitator to explain, demonstrate, lead practice, check understanding, and explore barriers and solutions with participants. With every action step, hands-on practice took place with the simulator and equipment as well as practice of communication with other providers, the mother, and her companion. Reinforcing the principle of hands-on learning, the decision was made to deliver a simulator with a complete set of equipment and learning materials for each pair of participants trained. In order that equipment used for training could also be used for clinical care, a new reusable bulb suction device, the Penguin suction, was developed so that both suction and bag-and-mask devices could be reprocessed and highly disinfected.

SHIFTING KEY BEHAVIORS AND ACTIONS: HOW TO MAKE CHANGE HAPPEN?

As important as the pedagogical techniques was the analysis of the social and behavioral change necessary to create a change in outcomes. Extensive systematic reviews of newborn care practices pointed to several key interventions that were basic but had the potential to save lives.²⁰ Traditionally, these were not part of neonatal resuscitation education, but experience with the combined delivery of the WHO Essential Newborn Care Course content and neonatal resuscitation in the First Breath trial had revealed the clear advantage of combining concepts of hygiene and infection prevention, thermal support, and immediate and exclusive breastfeeding into immediate care at birth. In clinical and research experience in global sites, researchers repeatedly documented the consequences of

unavailable equipment, long delays in attending to an infant who was not breathing, and administration of chest compressions, medications, or other interventions without first providing adequate ventilation. A number of behavioral constructs and educational devices were incorporated to address these shortcomings.

- Preparation for birth: identifying a helper, reviewing the emergency plan, and preparing the area for delivery and area for ventilation (testing equipment).
- Thorough drying for all infants as a first action step before and during the initial evaluation.
- Initial evaluation for crying or not crying as a rapid, objective indicator, followed immediately by a more detailed evaluation of breathing.
- Routine care as systematic use of lifesaving interventions: hand hygiene for all present at birth, skin-to-skin care in the first hour, delayed umbilical cord clamping, and support for immediate breastfeeding.
- The Golden Minute: prioritizing a quick response for an infant who does not cry immediately with drying, with the goal of breathing spontaneously or being ventilated by 1 minute after birth; initiation of ventilation presumptively in all except obviously macerated stillborn infants.
- Emphasis on the key interventions: ventilation and improvement of ventilation with omission of chest compressions, supplemental oxygen, and medications (but with the option to segue into a full NRP algorithm when available for extensive resuscitation).
- Empowerment of the health care workers: providing equipment and education simultaneously to achieve basic mastery of skills with peer-to-peer learning in pairs and exploring existing norms and

barriers to create positive change (Fig 3).

DATA TO GUIDE EDUCATIONAL DEVELOPMENT: HOW TO KNOW WHAT WORKS AND WHAT DOES NOT?

Collaboration broadened as formative evaluation shaped the development of the educational program at every step. Beginning in 2008, members of the GITF provided feedback and beta testing as new elements were introduced. Digital materials were distributed to global stakeholders, including those present at the Athens International Pediatric Association congress, for input in 2 rounds of electronic Delphi review. WHO technical consultation with headquarters staff and global regional representatives assured important harmonization with the Guidelines on Basic Newborn Resuscitation then under revision.²¹ WHO midwifery advisors and representatives of the United Nations Population Fund suggested key changes, such as putting thorough drying “front and center” in the Action Plan as the first action step after birth for all infants, with evaluation of crying during and after that. This change reconfigured the Action Plan and balanced care for

infants who were not breathing with essential care interventions for all infants to avoid hypothermia, hypoglycemia, and infection.

In 2009, formal educational testing with frontline providers in Kenya and Pakistan examined not only educational outcomes of knowledge and skills but the replicability of the program through a train-the-trainer cascade.^{22,23} Modifications based on the results of field testing were incorporated into the program, and implementation testing began in Tanzania to more fully examine the training cascade and clinical outcomes.²⁴ Always there was awareness of the balance between further testing to perfect the educational program and the urgency to release a program that could potentially save lives. Because of the positive feedback and mounting excitement among stakeholders and frontline providers, the decision was made to launch HBB in mid-2010 and continue additional implementation testing after release.

DISSEMINATION: HOW TO SCALE UP EDUCATION?

Dissemination and implementation on a large scale were made possible



FIGURE 3

A HBB workshop in Belgaum, India, during implementation trials (reproduced with the permission of the AAP).

through a Global Development Alliance (GDA) and the partnerships forged in the process of program development. Concurrent with the first workshop in HBB held in Washington, DC, in June 2010, a public-private partnership was formed with the goal of reducing mortality and morbidity from birth asphyxia through rapid dissemination and implementation of HBB. The USAID organized 5 founding partners: USAID and its implementing agencies provided connection with in-country maternal-newborn programming, Save the Children's Saving Newborn Lives brought strong advocacy as well as in-country programming, the National Institute of Child Health and Human Development contributed ongoing implementation evaluation through the Global Network for Women's and Children's Health, the AAP supported creation of a global faculty and network of facilitators, and Laerdal Global Health, a newly formed nonprofit corporation, produced and distributed educational materials at cost to Millennium Development Goals target countries.^{25,26}

IMPLEMENTATION: HOW TO CHANGE CLINICAL OUTCOMES?

From the outset, the AAP and other partners in the GDA had as their goal demonstrating the impact on clinical outcomes at scale. Through USAID and Save the Children, implementing partners trained in-country cadres of facilitators and sought to support the integration of neonatal resuscitation, and more broadly newborn care, into national policy and newborn plans. The AAP and Save the Children produced an online Guide for Implementation of HBB as a tool for facilitators, program managers, policy makers, and planners and made it available through the Healthy Newborn Network site (<https://healthynewbornnetwork.org>). Many other nongovernmental organizations, apart from the GDA,

recognized the value of HBB not only as an educational program but as a ready-made framework for evaluation and monitoring. Early implementation trials demonstrated that an educational workshop by itself may change skills but not behavior in the clinical setting.²⁷ Both educational and implementation research identified the need for continued practice to maintain infrequently used skills, such as bag-and-mask ventilation.^{22,28,29} However, with routines for low-dose, high-frequency practice in the facility, local resuscitation champions, and use of data for quality improvement, the first implementation of HBB in Tanzania (Fig 4) showed a sustained 47% reduction in early neonatal mortality (24 hours) and 24% reduction in fresh stillbirths.²⁴

The first 5 years after the launch of HBB focused on scaling up education and yielded numerous studies that demonstrated the effectiveness of HBB in reducing fresh stillbirth and early neonatal mortality. These effects were replicated with a high degree of consistency across different provider groups (midwives, physicians, and

traditional birth attendants) and different settings, from single-site studies to multicenter, population-based trials. A meta-analysis of studies in Tanzania, India, Kenya, and Nepal demonstrated a 34% reduction in fresh stillbirth rate (odds ratio: 0.66; 95% confidence interval: 0.52–0.85) and 30% reduction in first-day mortality rate (odds ratio: 0.70; 95% confidence interval: 0.51–0.98).³⁰ The National Institute for Child Health and Human Development Global Network used population-based perinatal registries in 3 sites in India and Kenya to examine perinatal mortality.³¹ Although perinatal mortality did not change in the overall registry areas (in-facility and home births), fresh stillbirths were significantly reduced in facilities in which staff were trained in HBB. The consistent reduction of fresh stillbirths with HBB training demonstrated that timely, universal initiation of basic resuscitation interventions addressed misclassification of infants who are simply not breathing as stillborn.^{32,33}

As experience grew with HBB, the focus shifted to understanding better



FIGURE 4 Participants and faculty at the train-the-trainer workshop for the Tanzanian implementation trial (reproduced with the permission of the AAP).

how to help providers retain skills and reliably improve outcomes. Many independent groups used their implementation sites in Latin America, Asia, and Africa to investigate the role of low-dose, high-frequency practice and quality improvement initiatives.^{34–37} Low-dose, high-frequency practice (short bursts of practice at intervals from daily to monthly) proved to be more efficient than longer refresher courses after longer intervals.³⁸ Both traditional quality improvement committee structures and mentoring approaches have proven effective in improving newborn outcomes.^{34,38,39} Studies revealed improvement in aspects of essential newborn care at birth as well as resuscitation interventions, such as initiation of ventilation within one minute after birth.^{40,41} However, challenges remain because a large proportion of infants do not receive ventilation until after one minute, there is persistent overuse of suctioning, and interruptions in ventilation occur even when an infant is not breathing.^{28,42}

In 2015, stakeholders and frontline users of HBB, Helping Babies Survive, and Helping Mothers Survive programs participated in an Utstein consensus process to synthesize their accumulated experience into 10 action steps to improve maternal and newborn survival and inform the second edition of HBB.⁴³ Revision of the materials again involved listening to global leaders, frontline providers, program managers, and researchers through opportunities for online comment and structured Delphi reviews.⁴⁴ New International Liaison Committee on Resuscitation evidence evaluation on the management of meconium-stained amniotic fluid and umbilical cord clamping also was incorporated into the second edition of HBB, in 2016, consistent with the promise to help bring the most current resuscitation science to all newborns in a timely way. The second

edition also incorporated enhanced support for skills practice, emphasis on debriefing after resuscitation, and integration of deliberate quality improvement efforts continue to maximize the product of the formula for survival: resuscitation science x educational efficiency x local implementation = survival (Fig 5).

LESSONS LEARNED AND PATHWAY FORWARD: THEN AND NOW

A decade of experience with HBB has made a lasting impact on families whose infants' lives were saved, on providers and facilitators who have new skills and pride in the improvements they have made, and on health systems that have realized the value of investing in the newborn. Professional associations and partners in implementation have also been changed by recognizing how they can make valuable contributions to global child health. Indeed, the resuscitation programs of the AAP deliver much of their unique value because practicing professionals who are actually responsible for clinical care of newborns, training of health care providers, and evaluation of scientific evidence dedicate their time and talents as volunteers working toward a shared goal. The mission of the AAP itself, the health of all children, cannot be overestimated in its importance in providing direction, authority, and a community that allows members to achieve what they could not as individuals.

HBB has taught a number of lessons that have broad applicability to many interventions aimed at improving the survival of mothers and newborns.

- Simplicity and clarity open the door for change.
- Facility-based education in knowledge and skills initiates change.
- Mentoring and empowerment of health workers solidify change.

- Monitoring, data collection, and use of data to improve care supports continued change.
- The catalytic role of HBB spreads change by
 - focusing not only on infants but also their mothers during antepartum, intrapartum, and postnatal care;
 - demystifying interventions (eg, resuscitation and postpartum hemorrhage prevention); and
 - demystifying processes (eg, data collection and quality improvement).
- Articulating a goal on behalf of all the world's children can drive change.

Perhaps the greatest success of HBB has been its role as a catalyst to bring people together to focus on newborns, realize what they can do, and say to one another “we can save newborn infants.” When frontline health providers realize that, they then ask, “What can we do next?” In that way, norms and standards change.

Nevertheless, the goals of having a skilled person at every birth and ending preventable deaths of newborns are far from being achieved, and, again, another global target approaches for the Sustainable Development Goals.⁴⁵ Extending the scope of education beyond resuscitation to comprehensive essential newborn care as well as care for small and sick newborns and redoubling the effort to increase coverage are more important than ever.^{46,47} HBB is a living program with the capacity for change, and the lessons learned can be applied to new science and new modalities for learning.^{48,49} There is fresh potential to collaborate more widely, more often, and more meaningfully among countries and among professional disciplines to improve HBB and strengthen in-country ownership of newborn survival programs.

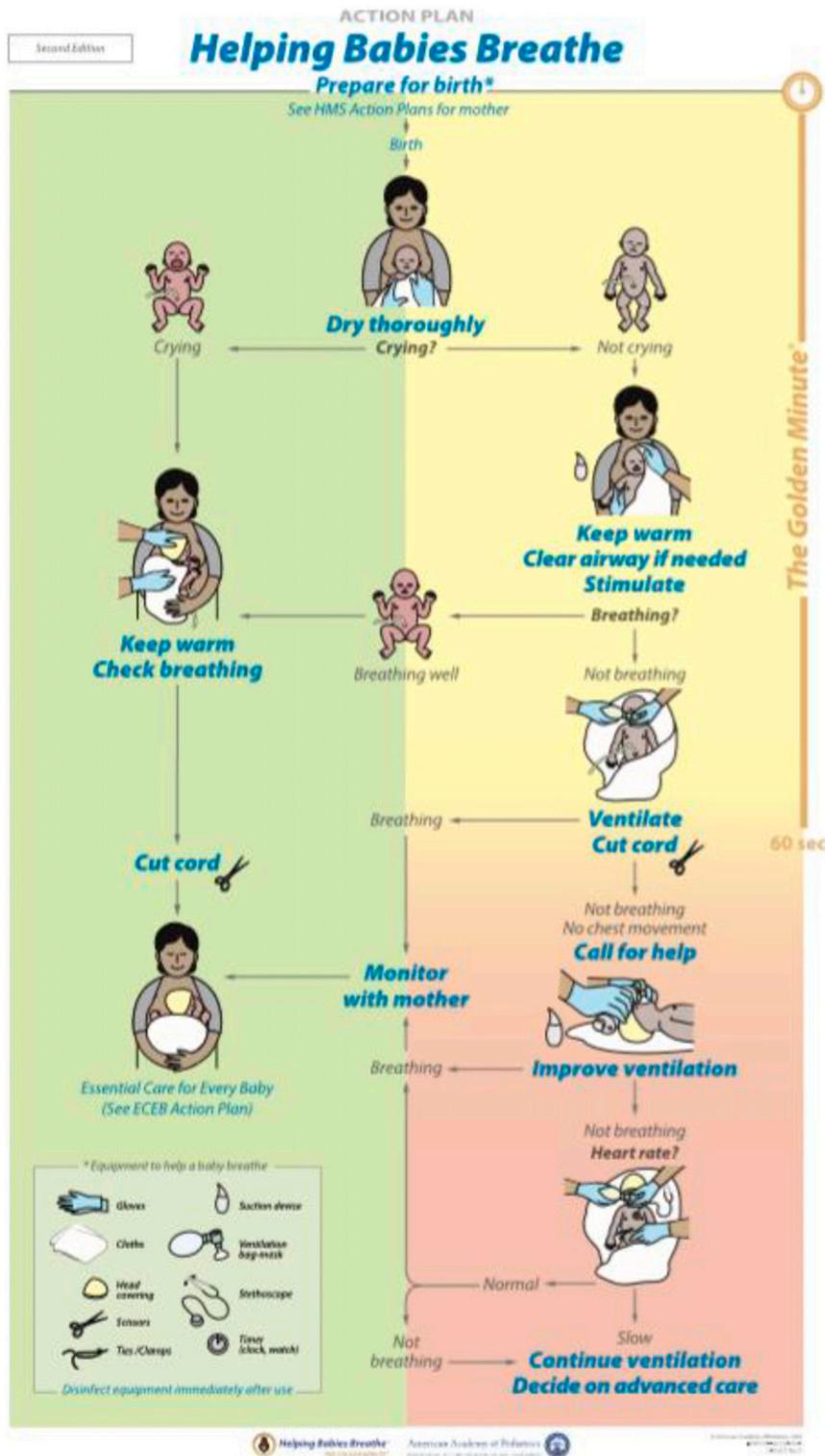


FIGURE 5 Helping Babies Breathe Action Plan, Second Edition (reproduced with the permission of the AAP).

Ultimately, the vision would be transformation from an educational program to an integral part of the operational structure of health

systems, in which, clinical standards, professional expectations, and an approach to continued learning and improvement of quality of care all

elevate the survival and outcome of newborns.

ABBREVIATIONS

- AAP: American Academy of Pediatrics
- GDA: Global Development Alliance
- GITF: Global Implementation Task Force
- HBB: Helping Babies Breathe
- LMIC: low- and middle-income countries
- NIH: National Institutes of Health
- NRP: Neonatal Resuscitation Program
- USAID: United States Agency for International Development
- WHO: World Health Organization

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