



THE ARIADNE LABS STORY

YEAR ONE | JANUARY 2014



BRIGHAM AND
WOMEN'S HOSPITAL



HARVARD
SCHOOL OF PUBLIC HEALTH

A JOINT CENTER FOR HEALTH SYSTEMS INNOVATION

Tackling one of the greatest challenges of our generation—making healthcare work.



In October 2012, we launched Ariadne Labs with an ambitious goal: to produce research and discovery that actually makes healthcare better—everywhere. Our healthcare systems are broken. They routinely make errors that cause tremendous suffering and loss of life. Founded as a joint center of two world-class institutions—the Brigham and Women’s Hospital and the Harvard School of Public Health—we are growing a community of researchers who are generating practical systems innovations proven to reduce harm. The innovations may be a simple checklist for clinicians, a performance tracking system, a coaching intervention, or a new technology. But whatever we create, we are finding ways to change the experience, outcome, and costs of healthcare at large scale.

From the outset, we have understood that carrying out research to make entire systems of healthcare better is a tall order. It has required bringing people together from clinical medicine, public health, systems engineering, information technology, implementation science, and other fields. And it has required a constant focus on finding practical solutions. However, we’ve made a tremendous start. We have drawn twenty-five remarkable new faculty as associate members. We have also produced dramatic progress in formulating new solutions for some of healthcare’s most pressing areas of failure: remedying unsafe childbirth, unsafe surgery, and the suffering of patients with serious illness.

In its very first year, Ariadne Labs has emerged as what may be the globe’s leading research center for fostering people and solutions that will drive better outcomes, greater value, and more caring across the world. I invite you to join us and learn more.

*Yours,
Atul Gawande*



LEFT The Serious Illness Care Program supports patients' personal values, like receiving care in the home.

BOTTOM The BetterBirth Program strengthens essential child delivery practices, such as providing warmth and nutrients within one hour of birth.



RIGHT A team collaborates on the Safe Childbirth Checklist in India.

OPPOSITE The Serious Illness Care Program helps guide clinicians to converse with patients about their life goals.



What is Ariadne Labs?

Ariadne Labs is a joint center for health systems innovation at Brigham and Women's Hospital and Harvard School of Public Health. Our mission is to build and support a community of researchers who create and drive scalable solutions that produce better care at the most critical moments in people's lives everywhere.

We are named for Ariadne, the Greek goddess who showed the way out of the Minotaur's labyrinth with a simple thread—for we are trying to provide simple solutions to navigating the maze of healthcare complexity.

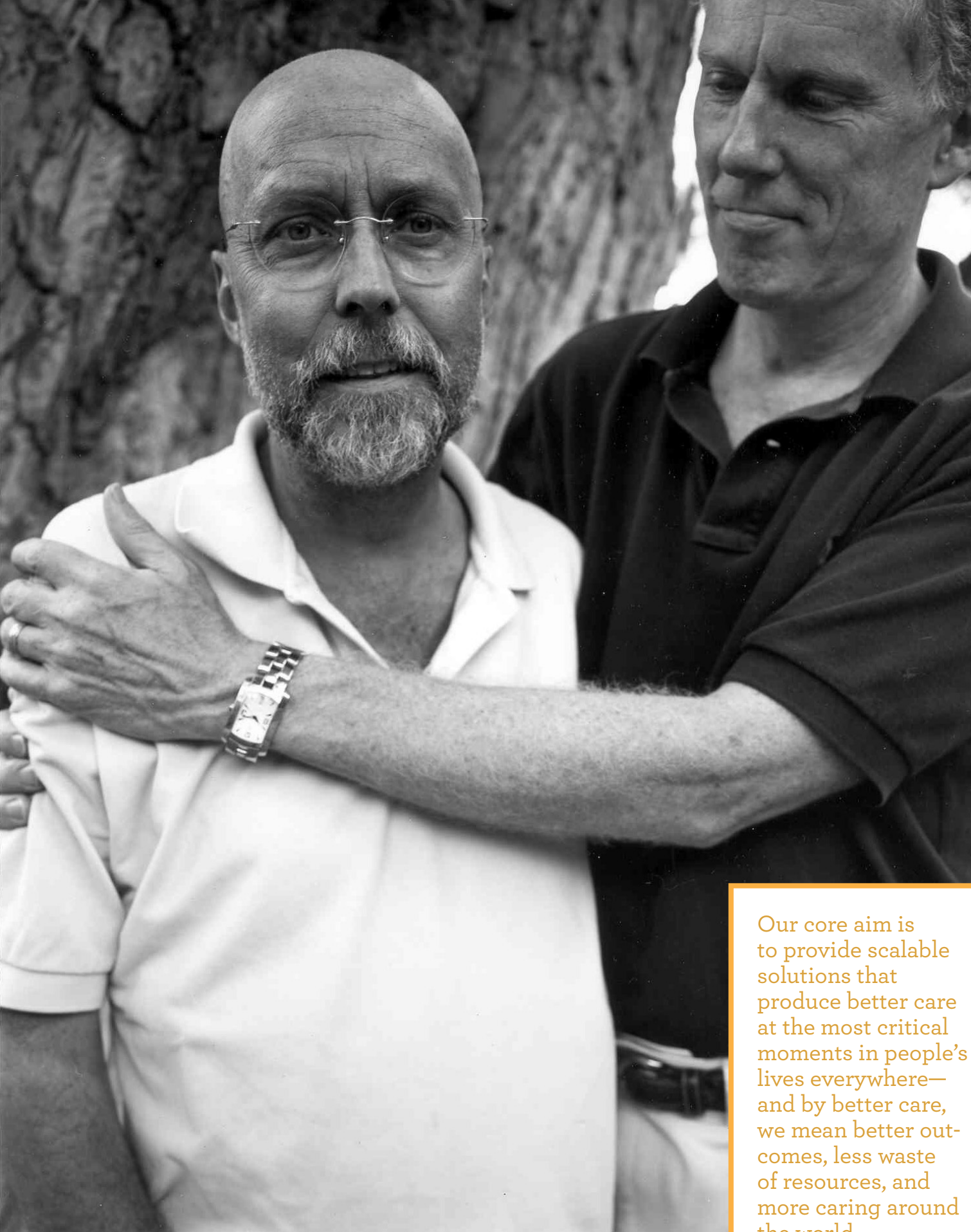
THE BIG

3

1. A community of innovators
2. Fundamental ideas that change the healthcare system
3. Essential tools that change practices

Ariadne Labs mission

Health systems, here and abroad, are in urgent need of imaginative, far-reaching solutions that improve healthcare quality and reduce cost. We intend our center to become the global leader in fostering the research and discovery required to produce these innovations and accelerate their implementation. We are focusing on accelerating discovery to transform the effectiveness and appropriateness of care at the most dangerous and costly moments in people's lives—from childbirth (with five million lives needlessly lost every year globally) to serious illness care (which absorbs a quarter of healthcare spending for the elderly in the developed world, while routinely failing to serve the priorities of the dying). We also hope to expand our existing work and add research to transform care in other critical, complex, and high-cost domains—such as cancer care, primary care and beyond.



Our core aim is to provide scalable solutions that produce better care at the most critical moments in people's lives everywhere—and by better care, we mean better outcomes, less waste of resources, and more caring around the world.

RIGHT Ariadne Labs
faculty and staff.



The people of Ariadne Labs

Located in the heart of Boston, Ariadne Labs is a diverse group of individuals including: academic faculty, physicians, nurses and other clinicians, researchers, graduate students, postdoctoral fellows and innovative business professionals.

Creating a community of innovators

The Ariadne Labs community empowers researchers to foster the sharing and development of cutting edge ideas and real-time results. Our goal is to aid practitioners in handling the complexity of increasing specialization and technology to consistently provide effective, humane, and affordable care for all. Producing this knowledge and innovation in and of itself is complex. It requires talented people with different skills. These people exist, but they are isolated. We will bring them together and foster a community of innovators committed to working together to produce ideas and impact.

In supporting our community, Ariadne Labs has hosted over 30 Health-Systems Innovation Research Meetings and will continue to host on a bi-monthly basis.

The work presented by members includes updates on large-scale clinical trials and implementation studies in surgery, childbirth, and serious illness decision-making; data analyses of the patterns of care for high-cost patients; and projects just beginning in areas of cancer care, addiction screening and treatment, and emergency care.

“Everybody is here because they believe that they can make a difference.”

—Robyn Churchill, M.S. Research Director of the BetterBirth Program

“I have high hopes—I really think that we might be at least one piece of the answer to this puzzle of healthcare right now.”

—Rachelle Bernacki, M.D., M.S. Research Director of the Serious Illness Care Program
Director of Quality Initiatives, Psychosocial Oncology and Palliative Care at the Dana-Farber Cancer Institute

Fostering ideas that change the healthcare system

Ariadne Labs is generating critical and influential ideas that are already beginning to transform the processes of care in surgery, childbirth and serious illness decision-making.

These include:

- Global measures of system success and failure
- Patterns of frontline practice that result in better care
- Important methods of data collection and analysis
- A better understanding of organizational and structural factors that make healthcare organizations effective in adopting better systems of care

“It is possible to overcome complexities through the design and implementation of new systems of care that either reduce the complexity or enable teams to manage it better.”

—Atul Gawande, M.D.,
M.P.H. Director

Tools that change practices

At Ariadne Labs, we believe that a few well-designed tools for changing practices at just a few critical moments in people’s lives could transform entire systems of care. Our past work with checklists, information technology, and coaching has already demonstrated high-levels of impact.

What are our Programs?

Ariadne Labs Programs are teams of scientists who prioritize their work around shared health-systems innovation. All members of each Program meet regularly to share ideas, initiate collaborations that extend beyond our labs, and launch projects that support our mission.

SAFE SURGERY

In the United States, half a million patients are left dead or disabled following surgical complications each year. Worldwide, this number approaches seven million. A single complication adds thousands of dollars to the cost of care in the United States. We launched a team under the direction of Dr. Bill Berry, a former cardiac surgeon who now acts as the Deputy Director and Chief Medical Officer of Ariadne Labs as well as the Program Director of the Safe Surgery Program. The goal of Safe Surgery is to improve the safety of patients who undergo surgery by developing, testing, and meaningfully implementing simple tools at critical times in care. The Safe Surgery Program has multiple projects in Boston, nationally and internationally with the aim of improving surgical care. Some of these projects include: the Emergency Manuals Implementation Collaborative, the Operating Room Crisis Checklist, the 360-Degree Review Program, Safe Surgery 2015, and the Safe Ambulatory Surgery Program.

One of our most noteworthy projects was completed in collaboration with the World Health Organization. In working with the WHO and researchers across multiple disciplines, we designed a three-stage, nineteen-item checklist for surgical teams to reduce the most dangerous performance failures. We tested the checklist with 8,000 patients in hospitals located in eight cities around the world, ranging from Seattle to London to Delhi to rural Tanzania. The results were extraordinary and became a landmark publication in the *New England Journal of Medicine*. Every hospital experienced reduction in complications by 35% on average. The reduction in deaths was 47% on average. The dramatic effectiveness of the checklist-approach has since been confirmed independently, and the checklist has become recognized as the global standard of care, entering use in more than 4,000 hospitals worldwide.

“Any patient who is harmed is one patient too many.”

—Bill Berry, M.D., M.P.A., M.P.H. Deputy Director and Chief Medical Officer
Program Director of the Safe Surgery Program



ABOVE A Brigham and Women's Hospital medical team practices safe surgery techniques.

“Across the world, birth is one of the times of highest risk for women, both in terms of morbidity but also in terms of mortality. Even more striking is the rate at which death occurs in newborns. We know this can be better, and we know that we can do it better.”

—Steve Ringer, M.D., Ph.D. Senior Advisor of the BetterBirth Program
Former Chief of Newborn Medicine at Brigham and Women’s Hospital

BETTER BIRTH

Around the globe, three to four million children die each year during childbirth or shortly thereafter. In 2007, we launched our childbirth research team to develop scalable solutions for this problem. A year later, we secured funding for initial pilot innovation work.

Working with the World Health Organization and experts across different fields, we designed a four-stage, twenty-nine item checklist for safe childbirth. After eighteen months of development, this checklist underwent initial usability testing in nineteen sites, in ten countries. A pilot study was then conducted in a south India childbirth center, during which the checklist program resulted in remarkable improvements in health worker adherence to essential clinical practices. Health workers provided on average 10 out of 29 (34%) essential practices at baseline and 25 out of 29 (86%) after introduction of the checklist ($p < 0.001$). There was significant improvement in the delivery of 28 out of the 29 individual practices measured. Rates of appropriate hand hygiene during the first vaginal exam, for example, increased from 1% to 98%; the rate of oxytocin administration within one minute after childbirth rose from 8% to 69%; the rate of use of a sterile blade to cut the umbilical cord increased from 12% to 99%; and the rate of breast-feeding within one hour after birth increased from 50% to 95%.

The Bill & Melinda Gates Foundation provided us with a multi-million dollar grant for a randomized trial in 172,000 childbirths in India to test the impact of the program at large scale, which is now under way. In addition, at least four countries have already begun collaboration to fund and launch population-wide implementation and evaluation programs using the checklist program we devised.



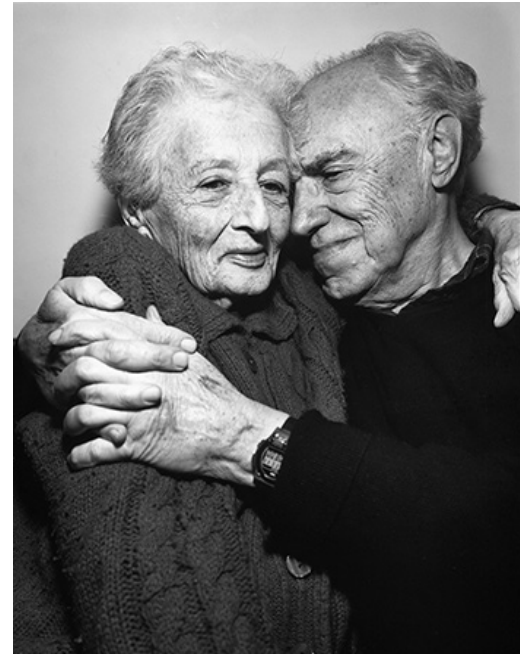
ABOVE A woman and her newborn receive care with support from the Safe Childbirth Checklist.

OPPOSITE An elderly couple reviews personal goals and values with their clinician's support of the Serious Illness Communication Care Program.

SERIOUS ILLNESS CARE

Many clinicians agree that it is incredibly hard to conduct an effective and compassionate conversation with patients about their goals in the setting of a serious and advancing illness, though it has been shown that these conversations with patients will help them feel more supported in getting the kind of care that they want. As such in 2011, we launched a team under the direction of Dr. Susan Block, Chair of the Department of Psychosocial Oncology and Palliative Care at the Dana-Farber Cancer Institute and Brigham and Women's Hospital, focusing on the improvement of care for patients with serious and life-threatening illness.

With initial grants from a private foundation and Partners Healthcare, Ariadne Labs has developed a Serious Illness Care Program, including a process for identifying patients at high risk of dying, a training program for clinicians, a system for triggering conversations at the appropriate time, and a conversation guide and coaching program to support clinicians caring for patients with a serious illness. This Serious Illness Care Program is designed to bring the best practices of palliative care experts to general physicians—primary care physicians, oncologists, cardiologists, etc.—to help them address patients' and families' most important healthcare needs and goals in a personalized manner. Implementation of this program assures that the questions that are of most importance to patients and families are addressed at the right time (in the outpatient setting, before a crisis), with the right people included (family, key clinicians), guided by the right clinician (the person who knows the patient and his/her medical situation best). These structured conversations give patients the opportunity to understand where they stand in their illness trajectory, to articulate concerns about the future, to express their goals, and to share their wishes about medical care and family involvement.



The goal of this program is to assure that every patient who has advancing illness will have a personalized end-of-life treatment plan that meets his or her unique goals. This program has undergone an extensive development process, and is now being rigorously tested in multiple sites.

“Our program is trying to solve several problems in healthcare for patients with serious illness. Patients often do not get the kind of care that they truly want at the end of their lives. Family members often feel unsupported in helping their loved one through this end stage of an illness.”

—Susan Block, M.D. Director of the Serious Illness Care Program

ARIADNE LABS: OUR GLOBAL IMPACT

● ● ● Participating Facilities

75%
clinicians
enrolled

SERIOUS ILLNESS CARE

- 75% of clinicians at the Dana-Farber Cancer Institute have enrolled in the pilot study.
- A joint project is launching with Partners and Atrius to deploy this Program in primary care.
- A proposal to enlarge the project to a national collaborative has been accepted and funded.
- Methods are being developed and deployed for identifying cancer patients appropriate for the trial. Preliminary data is showing acceptability of the Serious Illness Care System by patients and clinicians.
- At the Dana-Farber Cancer Institute, the pilot study for the Serious Illness Care System has achieved 1/2 of the target patient accrual.
- A spark grant is underway to examine approaches to serious illness decision-making in emergency healthcare.

Boston, MA

The Serious Illness Care pilot study launched at the Dana-Farber Cancer Institute

Seattle, WA
San Francisco, CA

Toronto, Canada
Richmond, VA
Columbia, SC

Boston, MA
Charlotte, NC

London, UK

Honduras

Nigeria

SAFE SURGERY

Our first and best-recognized research work has been in surgery—a field of high complexity, high risks, and cost. Despite technological advances, at least seven million patients are left dead or disabled following surgery worldwide.

EMERGENCY MANUALS IMPLEMENTATION COLLABORATIVE

This project involves a partnership with a number of institutions to facilitate the spread and adoption of tools for use in operating room emergencies.

35% reduction in complications



47% reduction in deaths



OPERATING ROOM CRISIS CHECKLIST

This is a federally funded project with a goal of improving care during 12 of the most common operating room crises. Thus far, over 1,000 checklists have been adopted.

“Imagine a world where surgery-related deaths and complications are reduced, where mothers and infants who die in childbirth are saved, where serious illness care involves planning with patients and families for their priorities.”

— Atul Gawande, M.D., M.P.H, Director

7

pilot sites for
BetterBirth
RCT

Uttar Pradesh, India

The BetterBirth implementation package has been developed and the pilot launched in seven rural birth centers.

Rwanda

Our partnership with Lifebox rolled out nationwide

Moldova

Amman,
Jordan

Delhi,
India

Uttar Pradesh, India

Manila, Philippines

Belgaum,
India

Rwanda

Tanzania

Zambia

Auckland, NZ

BETTERBIRTH

The first seven India pilot sites of BetterBirth RCT launched. Ariadne Labs faculty and staff met in Lucknow with Scientific Advisory Committee and government.

BEFORE AND AFTER

ESSENTIAL PRACTICES

provided at baseline before and after checklist introduction



HAND HYGIENE

during the first vaginal exam



OXYTOCIN USE RATE

one minute after birth



STERILE BLADE USE

in cutting umbilical cord



RATE OF BREAST-FEEDING

within one hour after birth



LIFEBOX

This not-for-profit organization was created in collaboration with The World Federation of Societies of Anesthesiologists and the Association of Anesthetists of Great Britain and Ireland to improve the safety and quality of surgical care in low-resource countries.

360-DEGREE REVIEW PROGRAM

Funded by CRICO, this collaboration with the Harvard Medical Institutions evaluates the use of 360-degree reviews to improve surgeon performance.

SAFE SURGERY 2015

The goal of the Safe Surgery 2015 initiative is to meaningfully put a customized version of the WHO Surgical Safety Checklist into use across an entire healthcare system and to measure the impacts at a population level. This initiative was launched in the state of South Carolina and has since expanded to North Carolina and Virginia.

Over 4,000 hospitals have downloaded the Safe Surgery Checklist materials from the WHO website.

SAFE AMBULATORY SURGERY PROGRAM

This is a federally funded project with the goal of reducing surgical infections and other complications in Ambulatory Surgery Centers across the United States through meaningful use of a customized version of the Surgical Safety Checklist and other proven interventions.

OPERATING ROOM TEAM TRAINING PROGRAM

In partnership with CRICO, this program's goal is to bring operating room team training to 600 surgical teams across the Harvard Medical Institutions.

The Evolution of Ariadne Lab Programs

New programs develop at Ariadne Labs and grow through various stages:

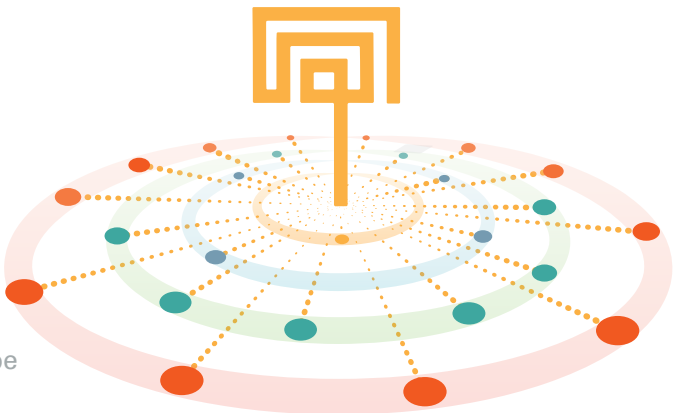
STAGES:

PILOT: Starts small at a single center

MULTICENTER TRIAL: Advances to trials at multiple sites

COLLABORATION: Begin working with multiple partners to implement and test at a large scale

GLOBAL DISTRIBUTION: Widespread information campaign and adoption by institutions around the globe



“Ariadne Labs’ commitment to pair operational and scientific expertise represents the greatest opportunity I’m aware of to improve healthcare at a global level.”

—Leonard D’Avolio, Ph.D.
Director of the Informatics and Measurement Platform

What are our platforms?

Platform and program members collaborate together (in a matrix structure) to tackle the challenging task of producing better systems in healthcare and public health.

Our platforms are designed to aid in systems design, informatics, implementation, program management and scaling expertise necessary to support the innovation of our programs. Platforms are directed by leaders in the field who have the skills to develop and advance high-impact discovery.

To date our current platforms are:

■ **INFORMATICS & MEASUREMENT**

This platform supports all programs with design and infrastructure to capture data about patient care and turn it into actionable knowledge. This includes helping a program team capture data at international sites and developing software capable of detecting novel relationships across heterogeneous data sources.

■ **IMPLEMENTATION SCIENCE**

This platform is designed to support all of the Ariadne Labs projects in effective implementation from early stages through broader replication. This work includes advancing the science of implementation to help drive effective adoption of our interventions in other settings.

■ **PROGRAM MANAGEMENT**

This platform provides appropriate management for all programs at Ariadne Labs. The program managers are skilled at bringing together multi-functional teams to deliver projects effectively and efficiently.

Ariadne Labs Advisory Board

Members of the Ariadne Labs Advisory Board embody world-class leaders in science, education and business. These individuals support the mission and goals of Ariadne Labs by contributing their expertise on: research priorities, scientific plan, implementation approach and collaborations.

DR. DON BERWICK
Former Director
Centers for Medicare and Medicaid

MR. ANDREW DREYFUS
President and Chief Executive Officer
Blue Cross Blue Shield of Massachusetts

MR. DAVID EBERSMAN
Chief Financial Officer
Facebook, Inc.

DR. JULIO FRENK
Dean
Harvard School of Public Health

MS. MALA GAONKAR HAARMAN
Managing Director
Lone Pine Capital (UK) Limited

DR. ERIC LANDER
Founding Director
The Broad Institute

DR. ELIZABETH NABEL
President
Brigham and Women's Health Care

MR. JASON YEUNG
Managing Director and Portfolio Manager
Morgan Stanley

Ariadne Labs Founder's Circle

We are especially grateful to our foundations and supporters who have helped us create better care, everywhere. The following organizations and individuals have been recognized as members of the Founder's Circle at Ariadne Labs for their dedication to the mission, values, and goals of the Center. Their contributions have enabled the development of scientific work and programmatic impact, fostering progress in Safe Surgery, BetterBirth, and Serious Illness Care.

BILL & MELINDA GATES FOUNDATION

BLUE CROSS BLUE SHIELD OF MASSACHUSETTS

THE BRANTA FOUNDATION

EMC CORPORATION

THE KLARMAN FAMILY FOUNDATION

MALA GAONKAR HAARMAN, AB '91, MBA '96
AND OLIVER HAARMAN, MBA '96

RONAY AND RICHARD MENSCHER, MBA '59
AND THE CHARINA ENDOWMENT FUND

Ariadne Labs Pro-Bono Supporters

We would also like to thank these firms for their generous pro-bono support:

HILL HOLLIDAY

ghSMART CONSULTING

PHOTOGRAPHY p. 2, Aubrey Calo; p. 3, Nicholas Nixon (top); Grace Galvin (bottom); p. 4, Grace Galvin (right); p. 5, Nicholas Nixon (opposite); p. 6, Steve Gilbert; p. 9, J. Kiely Jr., Light Chaser; Photography; p. 11, Nicholas Nixon

DESIGN & INFOGRAPHICS Complex Stories



Please visit our website for more information at www.ariadnelabs.org
We also welcome your comments and questions. To contact our team, please forward your inquiry to info@ariadnelabs.org