




# OUR STORY AT YEAR 8

FISCAL YEAR 2020

Ariadne Labs is a joint center  
for health systems innovation  
at Brigham & Women's Hospital  
and the Harvard T.H. Chan  
School of Public Health.

A decorative graphic on the left side of the slide, consisting of several overlapping squares of varying shades of gray, creating a stepped or architectural effect.

*Our vision* is that health  
systems equitably deliver  
the best possible care for every  
patient, everywhere, every time.

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*On the cover: Rebecca Weintraub, MD (right), head of the Better Evidence and Vaccine Delivery work at Ariadne Labs, administers a COVID-19 vaccine to Marlene Cilius, a phlebotomist at Brigham & Women's Hospital.*

# LETTER FROM THE EXECUTIVE DIRECTOR



It is impossible to look back on 2020 without acknowledging the local and global devastation caused by the COVID-19 pandemic. Ariadne Labs was founded on the belief that the failure to equitably provide high-quality, dignified care is health care's biggest cause of suffering and death. The pandemic has only magnified systemic failures across health care locally and globally—from depleted public health infrastructures, fragmented delivery systems, and unacceptable outcome disparities.

As we look toward the future of the health system in a post-pandemic world (or even a future where COVID-19 is endemic and manageable through vaccines and therapeutics), our work developing scalable systems-level solutions that equitably improve health care delivery has never been more important.

Positioned at the intersection of clinical medicine and public health, COVID-19 has been a deeply personal experience for our organization. Many of our faculty and staff have battled the pandemic on the frontlines—from primary care offices, to surgical wards, emergency rooms, labor and delivery wards, cancer centers, and most recently, vaccination centers. Many have lost patients, some have lost loved ones, and as of the publication of this report, we've been separated physically from each other for more than a year.

Despite the upheaval, we had numerous significant milestones. We launched new programs, catalyzed policy change nationally and globally, and continued to drive positive outcomes for patients around the globe. This report tells that story of adaptation, agility, and perseverance.



We remained true to our methodology, using our Ariadne Arc to design and rigorously test scalable systems-level solutions. We relentlessly focused on our core work: identifying and closing know-do gaps—the gaps between what we know should or could be done in theory, and what actually takes place in frontline care and public health systems.

Our impact was both locally relevant and global in reach, touching more than 65.2 million patient lives in 2020—approximately three people for every dollar invested in Ariadne Labs.

In 2020, we converged our efforts on three crucial gaps that are disrupting health care delivery—safety, communication, and integration. We innovated around solutions that improved processes, enhanced purpose for patients and their providers, and impacted populations at scale. To that end, we launched a home hospital program and were one of several organizations that advised the Center for Medicare and Medicaid Services on how to scale—and pay for—this promising new model of care. We continue to drive improvements in primary health care through better measurement and, despite the pandemic challenges, we collaborated with ministries of health in countries around the world to develop snapshots of their primary health care systems that helped drive multimillion-dollar global investments in better PHC systems. Our landmark BetterBirth study of more than 300,000 women and newborns in Uttar Pradesh, India, drove new analyses and insights about the effectiveness of the WHO Safe Childbirth Checklist, and how best to adapt it to new settings. We doubled the number of health care institutions enrolled in our Better Evidence

Training Program and are now providing access to digital clinical and training tools to more than 22,000 medical students, residents, and faculty.

Over the past year, we also focused on addressing the immediate threat of COVID-19, innovating solutions across eight priority areas where we knew we could have immediate impact: community mitigation strategies, global best practice learnings, supporting seniors and vulnerable populations, developing protocols for safe surgeries, redesigning obstetrics, telehealth in ambulatory care, scaling COVID-19 testing, and improving equitable vaccine delivery. By leveraging our expertise in health systems, data science, and frontline clinical delivery, our resources and ideas reached more than 7.8M people across 166 countries in 2020, and had tangible policy impact locally and nationally.

The pandemic has revealed the catastrophic consequences of an inefficient, inequitable, unprepared health care system. But it has also revealed the system's capacity and demand for innovation and ingenuity, as well as health care workers' quiet, heroic pragmatism in the face of incredible challenge and tragedy. We are redoubling our efforts to build a more dignified and effective health system for all in the wake of the pandemic. For life's most critical moments and the stages between, we are committed to innovating solutions that reduce suffering and save lives for everyone, everywhere.

Be well,



Asaf Bitton  
Executive Director, Ariadne Labs

# HOW WE APPROACH OUR WORK

With a mission to save lives and reduce suffering for people everywhere, we are creating scalable systems-level solutions that improve health care for the most critical moments and the stages in between.

Our work begins with identifying Know-Do Gaps—gaps between what we know should be done in theory, and what actually takes place in clinical practice. We use human-centered design, health systems implementation science, public health expertise, and frontline clinical experience to produce transformative, globally scalable solutions to some of health care's biggest problems.

To ensure that our solutions meet the highest standards of science, we utilize our Ariadne Labs Arc, the three-stage innovation pathway to design, test, and spread scalable systems-level solutions. As our solutions pass through the stages of the Arc, we collaborate with partners worldwide to spread the work, iterate as new knowledge is discovered, and refine our approaches.

Our work this year focused on closing three gaps in health care—communications, integration, and safety. We developed scalable systems-level solutions that **enhanced purpose** for patients and their providers, **impacted populations** at scale, and **improved processes**.

## PURPOSEFUL SOLUTIONS



FOR COMMUNICATIONS GAPS

## POPULATION-LEVEL SOLUTIONS



FOR INTEGRATION GAPS

## PROCESS-DRIVEN SOLUTIONS



FOR SAFETY GAPS

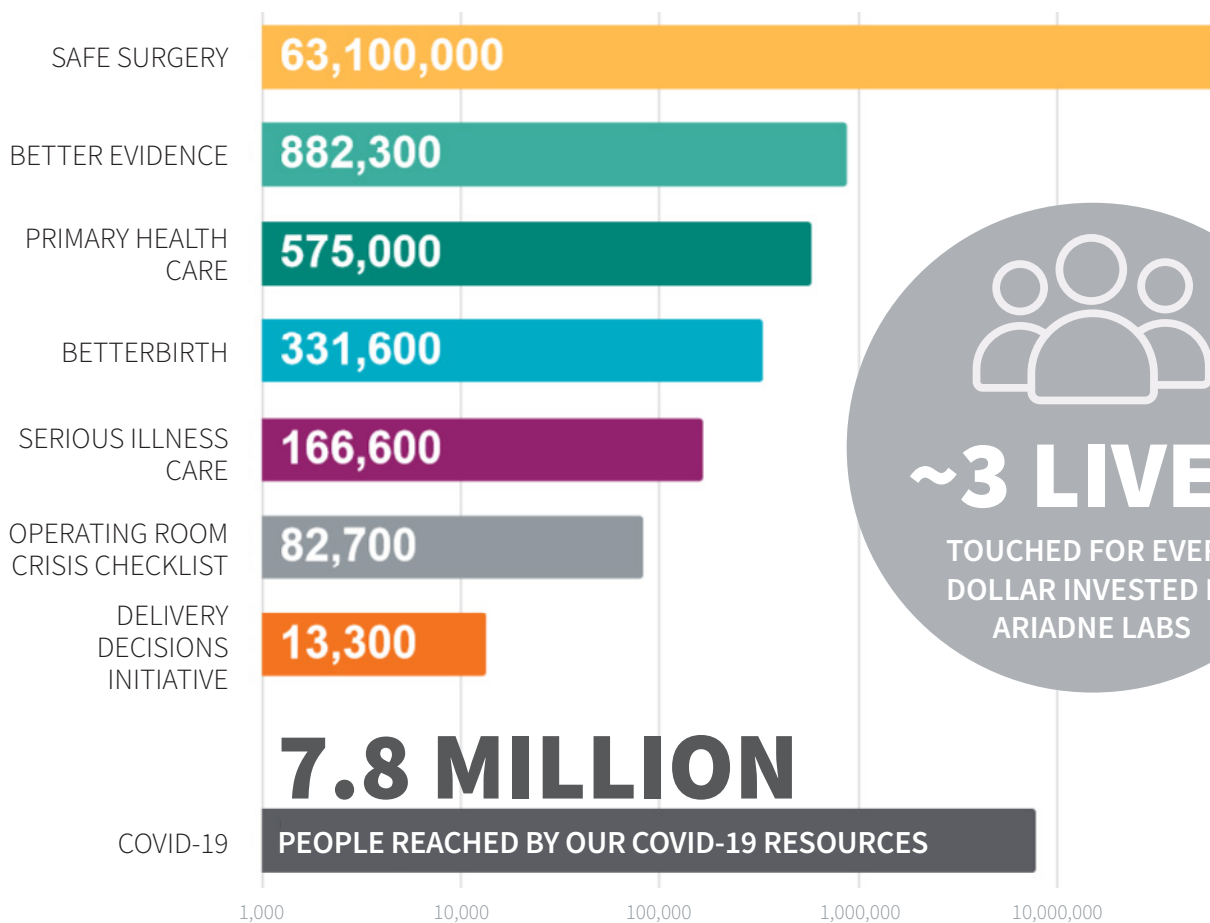
# OUR 2020 IMPACT AND HIGHLIGHTS

In an unprecedented year, our faculty and staff remained focused on designing, testing, and spreading scalable systems-level solutions to close the know-do gaps. Across the board, our outputs, reach, and cultivation of community increased.



## 65.2 MILLION

PATIENT LIVES TOUCHED IN 2020



## ~3 LIVES

TOUCHED FOR EVERY  
DOLLAR INVESTED IN  
ARIADNE LABS

**166** COUNTRIES ACCESSED OUR TOOLS



**49**

NEW TOOLS  
DEVELOPED



**55**

PEER-REVIEWED  
PUBLICATIONS



**2.9K**

TRAINING  
PARTICIPANTS



**20K**

TOOL DOWNLOADS



**77**

OP-EDS BY FACULTY  
AND STAFF



**2.6K**

MEMBERS OF ARIA ONLINE  
GLOBAL COMMUNITY



## CLOSING COMMUNICATIONS GAPS THROUGH PURPOSEFUL SOLUTIONS



### SERIOUS ILLNESS CARE PROGRAM

- › Launched new Conversation Guide for patients with serious illnesses
- › Serious Illness Program found to lower health care costs
- › Grew Aria Serious Illness Community of Practice to 1,800+ members, 11 experts named Aria Serious Illness Community Ambassadors



### PACT

The Pathway to Accountability Compassion and Transparency (PACT) project began building a community of health leaders committed to addressing medical errors with empathy, transparency



## CLOSING INTEGRATION GAPS THROUGH POPULATION-LEVEL SOLUTIONS



### PRIMARY HEALTH CARE PROGRAM

- › Expanded Vital Signs Profiles to 17 countries, in partnership with PHCPI
- › Welcomed UNICEF as new Primary Health Care Performance Initiative partner
- › Began research into equitable telehealth and chronic disease management for vulnerable patients and communities in the Boston area



### RURAL HOME HOSPITAL

- › Launched pilot study in Utah
- › Began developing a home hospital program with Blackfeet Nation and the Indian Health Service
- › Provided strategic counsel to the Center for Medicare and Medicaid Services (CMS), enabling them to nationally expand acute hospital at home



### BETTER EVIDENCE

Continued to facilitate access and uptake of the latest clinical evidence for more than 24,000 providers serving vulnerable populations, with partners Wolters Kluwer, Osmosis, others



### ATLAS INITIATIVE

Began testing Atlas Context Assessment tool at 11 health care sites across the U.S. and U.K. The Context Assessment is a series of surveys that are designed to help a health system identify its strengths and challenges.



### PRECISION POPULATION HEALTH

Ariadne Labs launched a new initiative to accelerate the diffusion of precision medicine from specialty care to primary care, where implementation hurdles stand in the way of realizing the promise of population-based monitoring and prevention.



## CLOSING SAFETY GAPS THROUGH PROCESS-DRIVEN SOLUTIONS



### SAFE SURGERY / SAFE SYSTEMS

- › Mary Brindle, MD, MPH, named new director of Safe Surgery / Safe Systems program
- › Launched a novel and scalable video-triggered teamwork training model
- › Surgical coaching program found to improve patient care and surgeon well-being
- › Launched new surgical onboarding guide for “traveling surgeons”



### BETTERBIRTH

- › BetterBirth program finds high adherence to WHO Safe Childbirth checklist lowers risk of newborn mortality
- › Initiated low birthweight infant feeding research in three countries with 10 global partners
- › Published study results looking at impact of newborn care education in India



### DELIVERY DECISIONS INITIATIVE

- › Completed pilot trial of TeamBirth and prepared to launch at 23 hospitals in 2021
- › Launched Nurse Impact project to identify ways to leverage data to support nursing leadership
- › Began developing a maternal well-being dashboard to center the needs of birthing people in city planning, with particular attention to the needs of Black, Indigenous, and those who have been historically marginalized.



### ELDERCARE

Launched new project designed to reimagine nursing homes



## COVID-19



**Launched eight priority areas to focus on innovating evidence-based solutions to support clinicians, patients, the general public, and public health decisions-makers:** Community Mitigation, Seniors & Vulnerable Populations, Global Learnings, Vaccine Delivery, COVID-19 Testing, Obstetrics, Outpatient Care, and Surgery



**Asaf Bitton named to CSIS Commission on Strengthening America's Health Security**, a bipartisan committee that aims to chart a bold vision for U.S. global health security that addresses the acute vulnerabilities exploited by the coronavirus, at home and abroad



**Developed blueprint for safer surgeries during COVID-19**, recommended by American College of Surgeons and adopted by surgical systems worldwide



**Serious Illness COVID-19 Response Toolkit** key resource for vulnerable seniors and patients with serious illnesses. Recommended by CDC



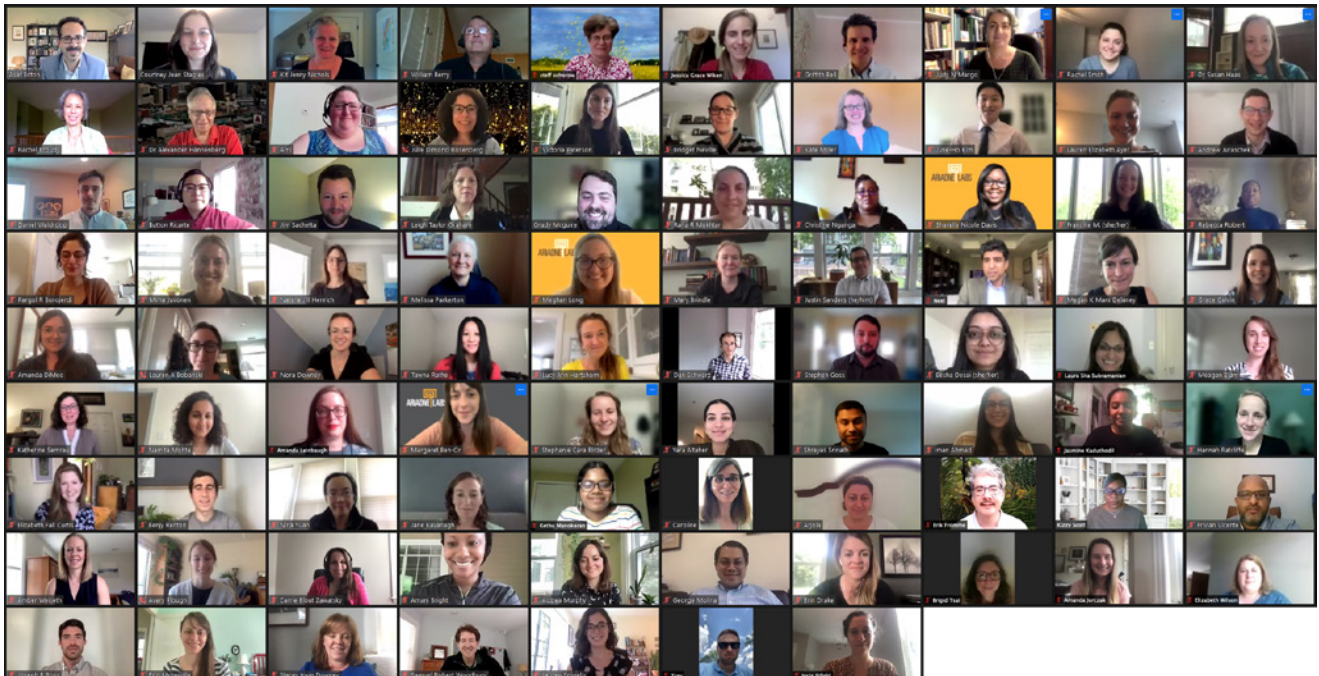
**Parabola Project** resources for in-person learning endorsed by Massachusetts Association of School Superintendents; impacts 53K+ students and teachers, with partners TLA and One8 Foundation



**Ariadne Labs Founder and Chair Atul Gawande named to President Biden's transition COVID-19 Advisory Board**



**Developed COVID-19 Vaccine Allocation Planner**, in partnership with Surgo Ventures. Endorsed by the National Governors' Association and recommended by the CDC, the tool supported decision makers with the data they needed to equitably allocate limited vaccine supply. It was accessed in 160+ countries around the world, processed more than 50 million transactions, and was used by the *New York Times*, *Washington Post*, *Wall Street Journal*, Univision, NBC, and others to develop interactive tools to help the general public understand their place in the vaccine line.







# CLOSING COMMUNICATION GAPS

## PURPOSEFUL INNOVATIONS TO CLOSE COMMUNICATIONS GAPS

Too often, patients and their providers face each other over a chasm of misunderstanding and misalignment. Yet the quality of communication directly correlates to the quality of care patients receive.

We are working to close this gap by guiding communications that are purposeful—grounded in shared goals, empathy, dignity, and equity. Not only are our innovations improving patient outcomes, but they are also enhancing the provider's experience of delivering care.

In 2020, we further closed communications gaps through our Serious Illness Care Program and our newly launched Pathway to Accountability Compassion and Transparency (PACT) community, which is working to improve how health systems respond to medical errors.



## SERIOUS ILLNESS CARE PROGRAM

*So that every person affected by serious illness feels known and cared for on their own terms*

### LAUNCHED NEW PATIENT- AND FAMILY-FACING SERIOUS ILLNESS CONVERSATION GUIDE

When we or those we love face serious illness, we are asked to make personal and medical decisions that can be frightening, difficult, and confusing. Individuals who have conversations with their clinicians about their values, goals, and wishes are more likely to receive the care they want, feel less distress, and report better quality of life. However, only a third of patients in their last year of life report having these conversations, and often, they happen too late in the course of illness to fulfill patients' most important wishes.

In 2020, our Serious Illness Care Program team designed and launched the patient-facing [What Matters to Me Workbook](#) to help patients with a serious illness think through and talk about what matters most to them—and make sure they get the care they want. Developed in collaboration with The Conversation Project, the workbook will undergo qualitative and quantitative testing in 2021.



*“A serious illness conversation isn’t about code status or procedures but really focuses on goals, fears, and strength. ... They are particularly important among patients who are disempowered or marginalized because these are the questions that they are not used to hearing.”*

JUSTIN SANDERS MD, MSC  
ASSOCIATE FACULTY, SERIOUS ILLNESS CARE PROGRAM



**TRAINED 240 CLINICIANS  
FROM 15 HEALTH SYSTEMS**

on effective conversations through  
our Serious Illness Implementation  
Collaborative in 2020



**VIRTUALLY TRAINED 400 PEOPLE**

in using the Serious Illness Conversation Guide



**1,800+ MEMBERS OF THE ARIA SERIOUS  
ILLNESS COMMUNITY OF PRACTICE**



## ELEVEN EXPERTS NAMED ARIA SERIOUS ILLNESS COMMUNITY AMBASSADORS



In 2015, our Serious Illness Care team formed an online community for providers and implementers of serious illness care. In the past five years, the Serious Illness Aria online community has grown to nearly 2,000 members from across the globe. In 2020, we named eleven experts to serve as community ambassadors.

Ambassadors serve in their role for one year and are leaders and innovators in serious illness care. As part of their role, they moderate discussion forums, share their experience in forums and webinars, and participate in Ariadne Labs projects to advance serious illness care and transform the community's ideas into action.

## ARIA: BUILDING AN ONLINE GLOBAL COMMUNITY

In 2020, Ariadne Labs announced an expanded launch of Aria, our virtual implementation support platform and learning community. While previously available to a small group of users, the updated platform has since grown to more than 2,500 members in more than 30 countries. It currently features webinars, publications, and implementation resources to accompany tools from Ariadne Labs' Serious Illness Care, Safe Surgery / Safe Systems, and BetterBirth programs. Resources from additional programs will be added in the coming months. Aria provides a novel platform for implementers around the world to join a community of like-minded professionals working to improve the quality of health care. Discussion forums and other resources within our Communities of Practice allow members to connect, share, and learn from the community's collective expertise. Learn more at [www.ariadnelabs.org/aria](http://www.ariadnelabs.org/aria).



*"I believe deeply in the work that Ariadne has done to contribute to Serious Illness Care both nationally and internationally. ... Over the years I have seen individuals' lives change based on the positive outcomes produced by this tool. ..."*

**EMMA PENTI**

CLINICAL SOCIAL WORKER, PALLIATIVE CARE  
SERIOUS ILLNESS CARE COMMUNITY OF PRACTICE AMBASSADOR

## SERIOUS ILLNESS CARE PROGRAM MAY LOWER PATIENT HEALTH CARE COSTS

Research by Ariadne Labs faculty published in *Healthcare: Journal of Delivery Science and Innovation* found that using the Serious Illness Care Program may result in lower health care costs by an average of \$4,000 per patient. Using Medicare claims data, the study compared the medical expenses of seriously ill patients who had a Serious Illness Conversation to those of patients who did not during the last year of their lives. Expenses billed to Medicare were lower during the last six and three months of life for those who had conversations.

## PATHWAY TO ACCOUNTABILITY, COMPASSION, AND TRANSPARENCY (PACT)

### *Responding to medical errors with empathy, transparency*

Annually, an estimated 300,000 preventable patient deaths occur due to medical error. In 2020, we continued to drive momentum to build a community of leading innovative health systems that desire to respond to medical errors and patient harm events in a thoughtful, compassionate, transparent, and reliable way. The Pathway to Accountability Compassion and Transparency (PACT) community will engage participants across 15+ health systems in 2021 in

virtual trainings on core clinical and implementation content, coaching and facilitation to support change, and outline measurement strategies to ensure accountability and sustain results. PACT is being developed in partnership with the Collaborative for Accountability and Improvement at the University of Washington School of Medicine and the Institute for Healthcare Improvement, and supported through the generosity of Liberty Mutual, Constellation, and Hoot.



*“If patients are hearing: What happened to me? How am I going to be cared for? How is the organization going to learn from this? There is data to show the trust that patients will have with that provider and with that system can be salvaged with a good Communication and Resolution Program (CRP).”*

**EVAN BENJAMIN, MD, MS, FACP**  
CHIEF MEDICAL OFFICER AT ARIADNE LABS



# CLOSING INTEGRATION GAPS

## POPULATION-LEVEL SOLUTIONS TO CLOSE THE GAP BETWEEN PUBLIC HEALTH AND CLINICAL MEDICINE

Health systems across the globe are continuously destabilized due to fragmentation, lack of coordination, and restricted resources that prevent successful implementation of care.

We are working to build stronger, more integrated health systems at the local, national, and global level that benefit populations worldwide. This work includes convening international bodies of influence; improving key functions of primary care; leveraging digital tools, data, and measurement; and enhancing the patient experience, regardless of location or level of resources.

In 2020, we further closed integration gaps through our Primary Health Care program, Rural Home Hospital program, Better Evidence program, and work exploring opportunities to apply a population health lens to precision medicine.



## PRIMARY HEALTH CARE

*Equitably strengthening primary health care for patients and communities, especially the most vulnerable*

### LEVERAGING DATA TO IMPROVE PRIMARY HEALTH CARE IN LOW- AND MIDDLE-INCOME COUNTRIES

Primary health care is the foundation of resilient, responsive health systems for healthy populations. However, many countries—especially low- and middle-income countries—are unable to improve due to a lack of clear data about how their primary health care systems are performing. In 2020, our Primary Health Care team continued to work with low- and middle-income countries around the world to help them understand and ultimately improve their health systems.

Working with the Primary Health Care Performance Initiative (PHCPI), we added profiles of five countries in Africa, Asia, and the Middle East to the [Vital Signs Profile \(VSP\) database](#). Country profiles are developed and maintained in partnership with country ministries of health, the World Bank, WHO, UNICEF, and others and provide the data needed to understand and drive evidence-based improvements. Since launching in 2018, the total number of profiles grew to 17 in 2020.

### PRIMARY HEALTH CARE PERFORMANCE INITIATIVE

In 2015, Ariadne Labs, alongside the Bill & Melinda Gates Foundation, the World Health Organization, the World Bank Group, and Results for Development, founded PHCPI.



PHCPI aims to ensure that data on primary health care is both accessible and used to drive decisions that change people's lives. In 2020, Ariadne Labs supported the successful recruitment of UNICEF as a new member of PHCPI and has worked to expand the organization's reach and influence despite the challenges of COVID-19.



## ABOUT THE DECLARATION OF ASTANA

In 1978, a pivotal conference was held in Alma-Ata, Kazakhstan, bringing together health experts and world leaders to commit to health for all. That 1978 declaration became the foundation for the last 40 years of global primary health care efforts

In October 2018, the Global Conference on Primary Health Care was held in Astana, Kazakhstan. At the conference the "Declaration of Astana" was endorsed, emphasizing the critical role of primary health care around the world. The declaration aims to refocus efforts on primary health care to ensure that people everywhere can enjoy the highest possible. Several members of Ariadne Labs' Primary Health Care team attended the 2018 conference to debut PHCPI's first Vital Signs Profiles.

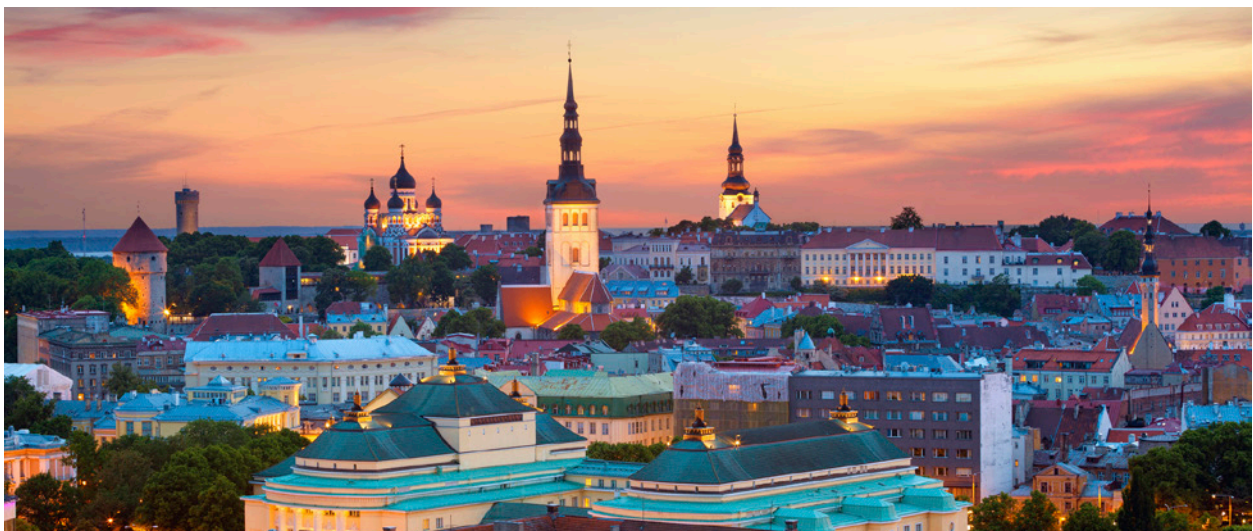
*"Two years ago, world leaders endorsed the Declaration of Astana, marking their commitment to strengthening primary health care as the cornerstone of resilient health systems and the most effective pathway towards health for all. ... Achieving high-quality primary health care is a whole of society commitment."*

ATUL GAWANDE, ORIN LEVINE, GINA LAGOMARSINO, EDWARD KELLEY, LU WEI PEARSON, AND MUHAMMAD ALI PATE  
BMJ OPINION

## PREPARING TO NATIONALLY SCALE ENHANCED CARE MANAGEMENT IN ESTONIA

Since 2015, our Primary Health Care team has worked in collaboration with the Estonian Health Insurance Fund (EHIF) and the World Bank to build and pilot an enhanced care management program for primary health care. Enhanced Care Management is a package of interventions that includes identifying high-risk patients through risk stratification, developing care management plans for these patients,

proactively linking care providers, and cultivating multidisciplinary primary health care team models of care. In 2020, Ariadne Labs began working with EHIF and the World Bank to apply the lessons learned during that initial pilot to nationally scale the program, with the goal of ultimately reaching all 800 of Estonia's primary care practices.



## EQUITABLE TELEHEALTH AND CHRONIC DISEASE MANAGEMENT IN MASSACHUSETTS

As of 2019, fewer than a quarter of the U.S.' community health centers were using any type of telehealth to provide real-time virtual care directly to patients. By June of 2020, 98 percent were using telehealth in some capacity due to the COVID-19 pandemic. In the fall of 2020, experts from Ariadne Labs' Primary Health Care team, the Boston University School of Public Health, and the Community Care Cooperative began research to evaluate the effects of telehealth on chronic disease management services

at community health centers in Massachusetts. Called the Crosswalk Telehealth project, this team will continue to look at quality outcomes and costs of care to better understand the impact of telehealth across racial, ethnic, and linguistic subpopulations; it also aims to identify and test innovative practices to improve the value and equity of telehealth in low-income populations. This work is funded through the generous support of the Donaghue Foundation and the Robert Wood Johnson Foundation.

## MAKING THE EVIDENCE-BASED CASE FOR FOCUSING ON PATIENT EXPERIENCE OF CARE IN LOW- AND MIDDLE-INCOME COUNTRIES

Although patient experience is widely recognized as an essential element of quality care that can dramatically impact whether individuals seek the care they need, there is scarce information about the patient experience in low- and middle-income countries. In 2020, experts from our Primary Health Care team published two studies that explored the patient experience of women in Ghana. One study found that 32% of surveyed women in Ghana reported bypassing their nearest health care facility for a more distant facility perceived to offer better care, and subsequently paid nearly double in out-of-pocket costs compared with women who used the closer facility. A second study based on the same survey found that better patient experience was highly associated with care meeting patient needs, likelihood of recommending the facility to others, as well as better self-rated physical and mental health. Together, these studies argue that the patient experience is



not a luxury, but an essential component of high-performing health systems. Additionally, these studies found large inequities in patient experience, highlighting the need for more nuanced measurement and improvement efforts targeted to local needs.

*“It must become a priority for policymakers, researchers, and implementers everywhere to more systematically and routinely measure responsiveness and act on the findings in order to build health systems that meet people’s needs and deliver better health for all.”*

HANNAH L. RATCLIFFE, GRIFFITH BELL, ASAF BITTON, JUNE-HO KIM, STUART LIPSTIZ, DAN SCHWARZ, LISA R. HIRSCHHORN, ET AL.

TOWARDS PATIENT-CENTERED CARE IN GHANA, BMJ OPEN QUALITY, 2020



## RURAL HOME HOSPITAL

### *Providing Hospital-Level Care at Home in Rural Areas*

Rural Americans are facing a health care crisis. Twenty-three percent of the country's 60 million people living in rural settings report access to health care as a major problem. Our Rural Home Hospital program is testing a solution to the growing challenges of rural health care in America by providing patients with acute, hospital-level care in their homes as a substitute for traditional hospital care.

Initially incubated as a Spark Grant in 2018, the Rural Home Hospital program this year launched a feasibility pilot and began enrolling patients to provide acute hospital care at home in Utah. Additionally, in 2020, we began recruiting for a randomized controlled trial, partnering with rural hospital sites to launch home hospital programs with the goal of generating evidence on the quality of care and costs of rural home hospital care.

## CO-DESIGNING RURAL HOME HOSPITAL WITH BLACKFEET NATION AND THE INDIAN HEALTH SERVICE

In 2020, Ariadne Labs began collaborating with Blackfeet Nation and the Indian Health Service to develop a version of the Rural Home Hospital model that will be customized to the resources and needs of tribal communities. In the summer of 2020, Blackfeet Nation passed a Tribal Resolution and formed a community advisory board to advise Ariadne Labs' research team and guide the development of the model so that it is co-designed to be culturally and context appropriate. As the co-design work progresses in 2021, Indian Health Services and Ariadne Labs will explore what other tribes wish to learn from the Blackfeet Nation experience and if there is potential to scale the model nationally.

### EXPANSION OF ACUTE HOSPITAL CARE AT HOME

In November 2020, Medicare announced a comprehensive strategy to help scale acute hospital care at home by allowing eligible hospitals to be reimbursed for these services. The decision followed consultations with an array of national experts, including Ariadne faculty. This exciting development has significant potential to expand the reach of Ariadne's work in this area.



## BETTER EVIDENCE

*Essential digital tools for clinicians everywhere*

### PROVIDING DIGITAL CLINICAL TOOLS TO MORE THAN 24,000 PROVIDERS SERVING VULNERABLE POPULATIONS

Keeping up with the latest science and medical research is a formidable task that requires both time and resources, and is particularly difficult for those in low- and middle-income countries. In 2020, in partnership with Wolters Kluwer, Osmosis, and others, the Better Evidence team continued to grow its digital health tool hub for more than 24,000 providers serving vulnerable populations. The [Better Evidence for Training program](#) also continued to connect medical schools across Africa with access to a variety of

digital clinical and training tools to habituate clinicians to consult the evidence early in their careers. In 2020 the program doubled from 24 teaching facilities to 50, including eight new universities. Sixteen medical schools are now enrolled, with more than 22,000 medical students, residents, and faculty eligible for free UpToDate subscriptions. This work has been made possible with support from the Patrick J. McGovern Foundation, Horace W. Goldsmith Foundation, Abundance Foundation, and Novartis Foundation.



# 24,000+

**PROVIDERS SERVING  
VULNERABLE POPULATIONS  
REACHED**

#### 50 TEACHING FACILITIES

enrolled in the program

#### 22,000+ MEDICAL STUDENTS, RESIDENTS, AND FACULTY

eligible for free UpToDate subscriptions

*“I am one of the first consultants to handle COVID-19 in our region. During this time no clinical guidelines from our infectious disease society were given. UpToDate helped me get reliable, quick, concise, and evidence-based data regarding this new disease that helped me manage my patients.”*

PHYSICIAN, PHILIPPINES

## ATLAS INITIATIVE

### HELPING HEALTH SYSTEMS SUCCESSFULLY IMPLEMENT QUALITY IMPROVEMENT PROJECTS

The success or failure of any tool hinges on sound implementation that accounts for unique factors of the context in which the tool is implemented. Launched in 2019, the Atlas Initiative is developing a toolkit to help health systems successfully implement quality improvement projects. In 2020, we began testing our Context Assessment tool at 11 health care sites across the U.S. and U.K. The Context Assessment is a series of surveys designed to help a health system identify its strengths and challenges in order to inform its implementation strategy.

In 2020, we also began testing our Context Data Repository at eight health care sites in the U.S. Expected to be complete in 2021, the Context Data Repository will be a first-of-its kind evidence base

in which contextual factors are most important to implementation success, as well as how these factors vary by types of interventions and health care settings. In 2021, we will begin developing resources to help facilities translate the results of their assessment into action. The resources will provide guidance on how to address challenges by adapting implementation to align with context. This work is generously supported by the Peterson Center on Healthcare.

All too often quality and safety efforts are plagued by poor adoption. In 2020, we began engaging with CRICO, the risk management foundation for Harvard clinicians, to design an "Implementation framework" to accelerate the adoption of patient safety initiatives into clinical practice.

## PRECISION POPULATION HEALTH

### *The Promise of Genetic Medicine for Primary Care*

#### NEW FOCUS ON PRECISION MEDICINE AND POPULATION HEALTH

Precision medicine and genomic sequencing have revolutionized specialty care, particularly in oncology and rare disease treatment. By targeting treatments to specific genetic, socioeconomic, biologic, and environmental factors, precision medicine allows clinicians to more accurately tailor treatment to patients' needs, leading to more effective and efficient care. However, while many of the predictive, diagnostic, and therapeutic tools developed for specialty care have begun to trickle into primary care settings, the migration is often uncoordinated and fraught with uncertainty. When applied at a population health level, precision medicine promises to transform the field of medicine from reactive to proactive—similar to the impact of empowering primary care clinicians to leverage advances in diagnostic imaging, such as the MRI—by identifying

genetic markers associated with common diseases such as heart disease and cancer and designing treatment plans to proactively address them (for example, beginning a patient on cholesterol-regulating medication years before it rises to dangerous levels).

In 2020, we began collaborating with Genomes2People, a research program at Brigham and Women's Hospital, Broad Institute, and Harvard Medical School, to apply precision medicine to population health in primary care. Together, we will focus on identifying implementation barriers, identifying ways to simplify the logistics, lower costs, and overcome educational challenges to advance lower-cost genomic screening into widespread use in primary care to improve care equitably across health systems.



# CLOSING SAFETY GAPS

## PROCESS-DRIVEN SYSTEMS-LEVEL SOLUTIONS TO CLOSE SAFETY GAPS

Errors in routine surgery leave people dead and disabled. Seriously ill patients are put through invasive treatments that have no benefit.

Mothers and their newborns needlessly suffer due to gaps in obstetrical care. COVID-19 has magnified gaps across the system and although researchers developed vaccines in record time, there have been breakdowns in the effective and equitable global distribution of those vaccines.

Since our founding, Ariadne Labs has worked on developing process-driven innovations to address gaps in safety at critical moments in people's health care journey. We have found that simple tools—checklists, coaching, data feedback—dramatically reduce suffering and save lives.

## SAFE SURGERY / SAFE SYSTEMS

### *Reducing Surgical Deaths and Complications*

#### LAUNCHED A NOVEL AND SCALABLE VIDEO-TRIGGERED TEAMWORK TRAINING MODEL

Teamwork and communication are important skills for health care workers to provide better, safer patient care. However, such skills don't develop automatically. In 2020, our Safe Surgery / Safe Systems team and the American Hospital Association Team Training launched a training framework for simulation-based training of these essential skills. The program, Video-Triggered Teamwork Training, can be completed in an hour, and is an easy-to-use solution to help teams identify and apply key tactics for effective communication.



*A team acts out a simulated surgery in the Video-Triggered Teamwork Training.*



#### NEW DIRECTOR OF SAFE SURGERY NAMED

After an extensive international search, Mary Brindle, MD, MPH, was named as the new director of the Safe Surgery / Safe Systems Program in 2020. An internationally recognized pediatric surgeon, Dr. Brindle has collaborated with Ariadne Labs since 2015, when she spent a year working with the lab as a visiting scholar. Dr. Brindle most recently served as director of the Efficiency Quality Innovation and Safety Research Platform at Alberta Children's Hospital in Calgary. She is scientific director of the Alberta Surgery Strategic Clinical Network and holds a leadership role within the International ERAS (Enhanced Recovery After Surgery) Society.



## IMPROVING SURGICAL SAFETY IN ETHIOPIA THROUGH BETTER LIGHTING

Poor surgical lighting—often due to weak energy infrastructures and a lack of reliable electrical power—is a major patient safety issue in low-income countries. Inexpensive and consistent lighting that stays on through power outages is key to improving surgical safety. In 2020, experts from our Safe Surgery / Safe Systems team collaborated with Lifebox to [publish findings](#) from their evaluation of the best designs for surgical headlamps that could be deployed in countries where the electrical grid is unstable. Models were tested by surgeons in Ethiopia, who helped pinpoint the best specs and price point. Findings will help make an affordable, high-quality surgical headlamp widely available in resource-constrained settings to improve surgical safety.



## NEW SURGICAL ONBOARDING GUIDE FOR “TRAVELING SURGEONS”

As U.S. health systems continue to expand via mergers and acquisitions, surgeons are often required to care for patients at new and unfamiliar locations, with different teams, resources, processes, and cultures compared with their primary institutions. To address this, in 2020 our Safe Surgery / Safe Systems

team developed a surgeon onboarding tool and implementation guide—[published in JAMA Surgery](#)—to address the major patient safety risks faced by so-called “traveling surgeons” when they are deployed to unfamiliar institutions, such as scheduling appropriate patients for surgery or running a code effectively.

## SURGICAL COACHING PROGRAM FOUND TO IMPROVE PATIENT CARE AND SURGEON WELL-BEING

Surgical coaching, which pairs surgeon coaches and coachees for one-on-one observation and feedback, is a promising strategy to improve surgeons’ technical and nontechnical skills. Launched in 2018, our [Surgical Coaching for Operative Performance Enhancement \(SCOPE\) program](#) was designed to enable surgeons to pursue surgical excellence through continuous professional development and performance improvement. In 2020, a [study published in Surgical Endoscopy](#) evaluated the effectiveness of the program and found that surgeons reported peer coaching positively impacted both patient care and surgeon well-being.





*“It’s very meaningful right now in health care and in surgery to harness different forms of technology.”*

NIKHIL PANDA, MD, MPH

CORE FACULTY, SAFE SURGERY / SAFE SYSTEMS AT ARIADNE LABS

## USING SMARTPHONE DATA TO IMPROVE SURGERY RECOVERY

Patients with cancer face challenging treatment decisions, which may lead to clinically significant decision conflict (CSDC). CSDC negatively affects patient-provider relationships, psychosocial functioning, and health-related quality of life; however, physical manifestations of CSDC remain poorly characterized. To examine this further, our [HealthPrism](#) project used smartphone data to explore the impact of decision conflict on recovery in patients undergoing cancer surgery. The [study, published in the \*Annals of Surgery\*](#) in 2020, found that patients who were conflicted or had second thoughts about

undergoing surgical treatment had lower levels of physical activity during their surgical recovery.

[An additional study](#) by the HealthPrism team, published in *Annals of Surgical Oncology*, examined whether smartphone GPS data could uncover differences in recovery following breast-conserving surgery and mastectomy. The study found that while patients undergoing mastectomy spent more time at home and traveled shorter distances in the 12 weeks following surgery, there were no significant differences in self-reported quality of life.

## IMPACT OF THE WHO SURGICAL SAFETY CHECKLIST ON “THE CHECKLIST GENERATION”

Since the landmark WHO Surgical Safety Checklist was launched, thousands of health care providers have used the tool, many of whom were exposed to it during their medical training. In 2019, Ariadne Labs launched research into the tool’s effect on the “Checklist Generation”—those medical students, trainees, and early career providers exposed to the WHO Surgical Safety Checklist during their training.

In 2020, a [study](#) published in the *World Journal of Surgery* concluded earlier and more formal clinical training may improve perceptions and future use of the Checklist among medical students, trainees, and early career providers. The study showed that of 318 survey respondents, 67% reported clinical exposure to the Checklist, and 60% were promoters of future Checklist use.





## BETTERBIRTH

*Giving Mothers and Babies a Fighting Chance*

### HIGH ADHERENCE TO WHO SAFE CHILDBIRTH CHECKLIST LOWERS RISK OF NEWBORN MORTALITY

The BetterBirth team continues to analyze data from the landmark [BetterBirth Study](#), one of the world's largest studies of maternal-newborn quality of care and mortality with 300,000 women and infants. In 2020, our team published research that used findings from the study to examine if using all or parts of the WHO Safe Childbirth Checklist could be connected to a decrease in infant mortality just before or immediately after birth. The team found that for each additional Checklist practice performed, there was a 22% reduction in the odds of infant mortality by seven days postpartum. No individual practice on its

own accounted directly for the decrease in mortality; rather, the more practices adhered to, the lower the chances of mortality.

In 2020, our team also analyzed the BetterBirth Study data to learn about complications management practices observed in the study. The analyses unpack the complexity of five life-saving, facility-based interventions observed during the BetterBirth Study: referral, cesarean deliveries, antibiotic use, neonatal resuscitation, and oxytocin administration. Findings will be released in 2021.



*“Often in randomized studies, we only look at the main question; it’s one and done. But the BetterBirth Study was a gigantic undertaking that produced a very large body of empirical evidence that relates more broadly to maternal and newborn health care. We have been able to leverage the depth of the data collected.”*

**KATHERINE SEMRAU, PHD, MPH**

DIRECTOR OF THE BETTERBIRTH PROGRAM AT ARIADNE LABS



## INFORMING GLOBAL INFANT FEEDING GUIDELINES

Approximately 20 million infants are born weighing less than 5.5 pounds. These low birthweight infants are at higher risk of suffering from disease, poor growth, and death. But there is a lack of information about feeding options for these infants in low- and middle-income countries. To close this gap, our BetterBirth team joined 10 partners around the world to launch the [Low Birthweight Infant Feeding](#)

[Exploration \(LIFE\) study](#) in 2019. The study, supported by the Bill & Melinda Gates Foundation, was initially designed to follow infants in Tanzania, Malawi, and India for their first six months; in 2020, we expanded the study to follow the infants until they reach a year old. This will give us insights about additional factors such as growth, immunization compliance, medication use, and overall well-being.



## BEGAN TESTING MATERNAL HEALTH CONTEXT ASSESSMENT IN INDIA

Maternal mortality and neonatal death in middle- to low-income countries continue to outpace that in high-income countries. The neonatal death rate in low-income countries is 26.4 deaths per 1,000 compared to 3.0 in high-income countries. Improving the quality of delivery care in limited-resource settings could significantly reduce maternal and neonatal deaths and serious illness; however, many evidence-based health interventions for these populations do not yield desired health outcomes

when applied in new settings. Having a more nuanced understanding of the context will lead to an improved enabling environment for providers and better intervention implementation. In 2020, the BetterBirth team began testing a conversation guide for context assessment in India to inform how evidenced-based interventions are introduced and sustained, in order to accelerate the spread of quality care during childbirth.



## PREVENTING NEWBORN ILLNESS AND DEATH THROUGH FAMILY EDUCATION

Approximately 2.5 million newborns die each year within the first month of life, mostly in low- to middle-income countries. Nearly three-quarters of newborn deaths happen in the first week of life; given the short length of stay in childbirth facilities in low- to middle-income countries, many newborn deaths occur at home. These deaths could be prevented by educating families on practices that can reduce illness and death—keeping babies warm enough, breastfeeding, handwashing, and umbilical cord care, to name a few. To better understand the impact of newborn care education, in 2020, the BetterBirth team published the results of a survey of more than

13,000 mothers across India, which found that fewer than half had received postnatal education on newborn care before leaving the hospital. Only a quarter of respondents recalled being taught about breastfeeding and fewer than 10% recalled being taught about hand hygiene, umbilical cord care, or warning signs of newborn illness. These results indicate there is a clear opportunity to improve education strategies, empower providers, and support families. The surveys were conducted in collaboration with Noora Health, and through their associated partner organizations.



A trainer educates families on caring for newborns in Punjab, India, through Noora Health's Maternal and Newborn Care program.



## DELIVERY DECISION INITIATIVE

*Providing Mothers and Babies with Safe, Respectful Care*

### TEAMBIRTH EXPANDED ACROSS THE UNITED STATES

In 2020, the Delivery Decision Initiative's TeamBirth project completed its pilot trial and partnered with health systems across the country to ensure people giving birth are at the center of their own care. TeamBirth uses a simple whiteboard and a series of huddles between the mother and her team to make it more likely she will receive care that is safe and dignified. In 2021, TeamBirth will be implemented at 23 hospitals and collectively involve more than 1,000

clinicians caring for tens of thousands of people giving birth in Michigan, Washington, Oklahoma, and Massachusetts. In 2020, we began evaluating the impact of TeamBirth on birth equity. This work was supported by the Peterson Center on Healthcare, the George Kaiser Family Foundation, Harvard Pilgrim Healthcare, and the Obstetric Initiative of Michigan.

### EXPECTING MORE CAMPAIGN GAINS MOMENTUM

The Delivery Decisions Initiative team launched the [Expecting More](#) campaign to generate more empathy for people with growing families. In 2020, the project gained momentum through significant media coverage, with more than 65 million impressions. The campaign also launched a video series, called "Dialogues," to model the opportunity to learn from lived experience, and highlighted issues such as the impact of COVID-19, lack of insurance, and police violence on maternal health. This work was supported by the Yellow Chair Foundation and the Rita and Alex Hillman Foundation.





## LAUNCHED NURSE IMPACT TO LEARN FROM EXCELLENT NURSING

### NURSE IMPACT

Labor and delivery nurses are members of the largest and most trusted group of health care providers in the United States. In 2020, the Delivery Decisions Initiative launched Nurse Impact to support nursing leadership in using data to improve childbirth care. Developed and launched in collaboration with the Boston College Connell School of Nursing,

Nurse Impact focuses on measuring the influence nurses have on the likelihood of cesarean section, understanding the best practices of labor and delivery nurses to improve patient safety, and optimizing nursing practice to improve childbirth outcomes. In 2020, the team published their methodology in [Health Services Research](#).

This work is supported by the Rita and Alex Hillman Foundation, CRICO, and the Rx Foundation.



## DESIGNING A MATERNAL WELL-BEING DASHBOARD FOR CITIES

As part of the Safer Childbirth Cities Initiative, the Delivery Decisions Initiative has been designing a maternal well-being dashboard to center birthing peoples' needs in city planning, with particular attention to the needs of Black, Indigenous, and other mothers who have been historically marginalized. The Safer Childbirth Cities Initiative was launched by Merck for Mothers, Merck's global initiative to help create a world where no woman has to die while giving

life. The dashboard is designed as a tool for all those working to make cities more livable for people giving birth, and includes data on transportation, access to healthy food and safe housing, and availability of equitable education and economic opportunity. In 2021, we will publish prototype dashboards for the cities of Tulsa, Pittsburgh, and New York.





## ELDERCARE

### LAUNCHING NEW RESEARCH TO SUPPORT THE ELDERLY

The elderly, especially those living in nursing homes and long-term care facilities, are among the most vulnerable populations in the U.S. COVID-19 has magnified their risks as the 2.1 million occupants of nursing homes and residential care communities in the United States have emerged as a group hit particularly hard by the pandemic. Breakdowns in

communication between the elderly, their loved ones, and their providers can be catastrophic, significantly decreasing the quality and dignity of their final years. In 2020, we launched a Reimagining Nursing Home project, completing the first stage of research and initial tool design that will undergo testing in 2021.





## MANAGING CRISIS: COVID-19

In the early months of 2020, it was clear to us that COVID-19 was on its way to becoming a global pandemic with devastating consequences. Drawing on our experience with Ebola and H1N1 in addition to our assumptions of how COVID-19 would spread and impact global populations, we quickly identified eight areas where we could innovate evidence-based solutions to support clinicians, patients, the general public, and public health decision-makers.

Our COVID-19 response builds on our core strengths—the ability to quickly convene, converge, and gather best ideas and practices; design and test guidelines and tools; and then strategically disseminate them as widely as possible through the many channels available to us.



In 2020, we became a leading voice on best practices and guidelines in addressing COVID-19.



**7.8 MILLION**

PEOPLE REACHED BY OUR COVID-19 RESOURCES



**49**

COVID TOOLS

**17,385**

DOWNLOADS



**19**

COVID-19 TRAININGS /  
WEBINARS / COURSES

**1,142**

PEOPLE TRAINED



**166**

COUNTRIES ACCESSED  
COVID RESOURCES







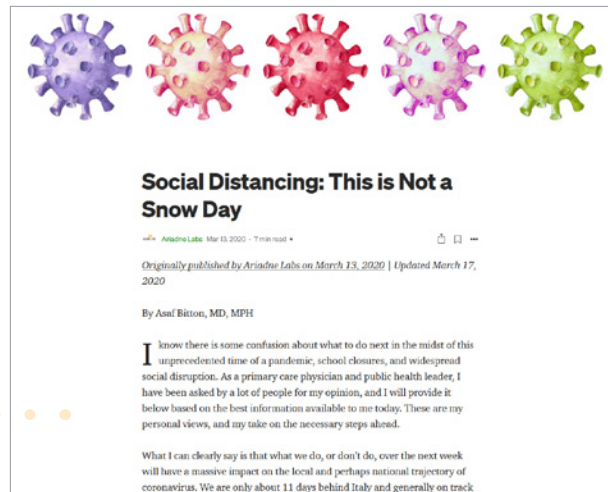
## COMMUNITY MITIGATION

One of the many challenges the general public has faced in responding to the COVID-19 pandemic has been processing the overwhelming amount of conflicting information, often from sources that are inaccurate, out of date, or unclear. Our Community Mitigation efforts have focused on communicating simple, easy-to-use information for people to apply in real-life scenarios to help mitigate the exposure and spread of COVID-19. Our research includes analyzing global and domestic community mitigation responses in order to develop and disseminate practical, evidence-based recommendations for the general public.

## SOCIAL DISTANCING GUIDANCE GAINS GLOBAL RECOGNITION

In early March, as COVID-19 was just beginning to spread in the U.S., Executive Director Asaf Bitton penned an opinion piece entitled “This is Not a Snow Day.” It urgently warned parents and the general public of the oncoming danger to them and their families, and offered guidance on how to interpret social distancing protocols and what precautions to take. The piece was read more than 7.7M times in 2020 and has been quoted in hundreds of news articles around the world.

**7.7 MILLION** . . . . .  
VIEWS OF “THIS IS NOT A SNOW DAY”



*“We have a preemptive opportunity to save lives through the actions we take right now that we will not have in a few weeks. It is a public health imperative. It is also our responsibility as a community to act while we still have a choice and while our actions can have the greatest impact.”*

**ASAF BITTON, MD, MPH**

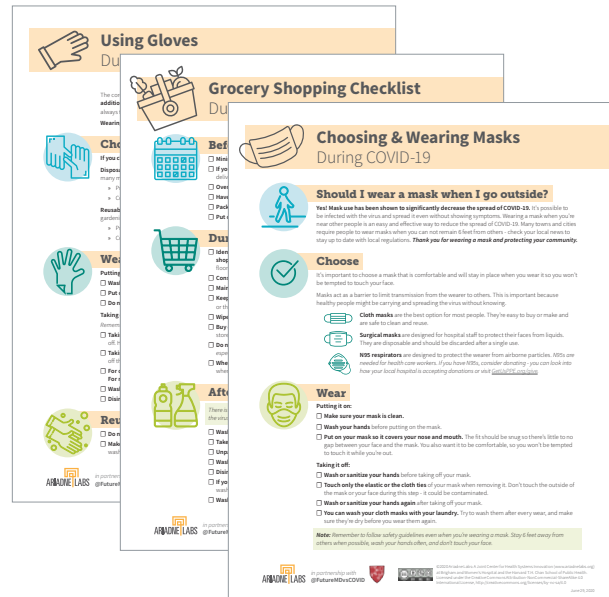
SOCIAL DISTANCING: THIS IS NOT A SNOW DAY

## COMBATING MISINFORMATION THROUGH EVIDENCE-BASED GUIDES

In the early days of the COVID-19 pandemic, many people were confused about the safety of ordinary tasks, such as grocery shopping. Ariadne Labs partnered with the Harvard Medical School student group, HMS COVID-19 Student Response Team, to develop and disseminate evidence-based, practical community guidance for shopping, mask and glove wearing, and other tasks. In 2021, we will be developing evidence-based guides for understanding the vaccines.

## MINIMIZING HEALTH RISKS WHILE MAXIMIZING LEARNING

In 2020, Ariadne Labs, The Learning Accelerator, and the One8 Foundation developed and launched the Parabola Project, an extensive online resource that outlines nine public health principles and supporting resources for school leaders to use when planning in-person instruction during the COVID-19 pandemic. The team collaborated with nine school districts in Massachusetts to pilot a School Reopening Readiness Guide. The evidence-informed tools include guides on staggering class times, physical distancing, preparing the classroom, improving air ventilation and filtration, serving meals, managing water and bathroom breaks, protecting bus drivers, and protocols to plan school reopenings and closings. Resources are being updated and added as new information becomes available. As of December 2020, the Parabola Project has impacted more than 53,000 students and teachers. It was endorsed by the Massachusetts Association of School Superintendents and shared with more than 340 school districts in Massachusetts.



*"I knew of no other resource out there that was even attempting to provide leadership teams with a framework or a roadmap for approaching this. ... Parabola was a coherent, pretty comprehensive, high-level framework to work with."*

**SCHOOL PRINCIPAL**



## SENIORS AND VULNERABLE PEOPLE

The COVID-19 pandemic has posed particular risks for adults over the age of 65 and those with preexisting health risks. Disproportionately at risk for morbidity and mortality from the virus, much of this population has also been challenged by social isolation, loneliness, and the lack of support and resources. Our work in this area includes developing evidence-based guidelines and tools to enhance care and well-being for older populations, and creating tools to promote conversations among patients with serious illness and their clinicians about goals and wishes for medical treatment.

### SERIOUS ILLNESS CARE PROGRAM COVID-19 RESPONSE TOOLKIT

The COVID-19 pandemic has put an unprecedented number of people at risk of serious or critical illness. This heightened risk has created a sense of urgency for high-quality, person-centered communication about COVID-19 that involves understanding patients' personal values and priorities in order to guide current and future medical care and decisions.

*"I hope I held the iPad still enough so that it didn't shake while you were saying the things you would regret not saying. I wanted you to feel as though you were alone in that room, to forget for a moment that your surreal farewell was being facilitated by a doctor you had never met."*

**DANIELA LAMAS, MD**

"TO MY PATIENTS' FAMILY MEMBERS, MY APOLOGIES," *NEW YORK TIMES*

To meet this need, the Serious Illness Care team applied their extensive expertise in designing and scaling high impact, evidence-based, and patient-centered communication tools to mobilize a rapid response. In just a few weeks, and with feedback from the program's Community of Practice, the team developed and disseminated the [Serious Illness Care Program COVID-19 Response Toolkit](#). The toolkit provides conversation guides for clinicians having serious illness conversations with patients in outpatient, inpatient, and long-term care settings, along with training simulations and other support resources. The team also developed a guide for patients to discuss their wishes for care and a crisis guide for hospitals facing difficult decisions on capacity and resource use. Materials have been translated into six languages.

The toolkit materials have been downloaded by more than 12,000 people around the world, and the toolkit has been shared by organizations such as the CDC, American Association for Hospice and Palliative Medicine, Society for Post-Acute and Long-Term Care Medicine, Massachusetts Medical Society, and Massachusetts Coalition for Serious Illness Care. The team also published an article detailing the rapid design process in the [Joint Commission Journal on Quality and Patient Safety](#).





## GLOBAL LEARNINGS

COVID-19 rapidly caused a worldwide crisis that affected nearly every country, regardless of size, demographics, or GDP. As the world struggled to understand how to contain the virus, protect health care workers and the general public—all while information about COVID-19 was quickly changing—a variety of tactics were used with varying degrees of success. Our work in Global Learnings leveraged our global connections, frontline clinical experience, and experience rapidly reviewing literature and protocols to identify best practices grounded in evidence.



*“If policymakers want to win the war against Covid-19, it is essential to adopt [a decision-making approach] that is systemic, prioritizes learning, and is able to quickly scale successful experiments and identify and shut down the ineffective ones.”*

**RAFFAELLA SADUN**

ASSOCIATE FACULTY, ARIADNE LABS, AND PROFESSOR OF BUSINESS ADMINISTRATION, HARVARD BUSINESS SCHOOL

*“LESSONS FROM ITALY’S RESPONSE TO CORONAVIRUS,”  
HARVARD BUSINESS REVIEW*

## LESSONS FROM SOUTH KOREA, JAPAN, AND ITALY

Our Global Learnings team researched and analyzed how countries around the world responded to outbreaks of COVID-19. Their research on South Korea, Italy, and Japan has been shared with governmental and policymaking bodies ranging from the Massachusetts COVID-19 Response Command Center to the Italian government. The team’s core research looked at how South Korea’s centralized triage system, patient isolation, and protections for health care workers supported the country’s successful

response and how Japan’s public health centers were key to the country’s COVID-19 efforts. The team also collaborated with COVID Translate to rapidly translate the South Korean COVID-19 playbook into multiple languages, which were distributed globally. In the fall of 2020, the Global Learnings team analyzed South Korea’s testing model, which Ariadne Labs Chair Atul Gawande featured in a *The New Yorker* article, “We Can Solve the Coronavirus Test Mess Now—If We Want To.”

## OBSTETRICS

During the COVID-19 pandemic, clinicians across the globe have strived to provide the continuum of quality obstetric services—from prenatal, labor and delivery, and postnatal services—while operating at strained capacity and personal risk. Our work has included developing evidence-based data to guide the ongoing COVID-19 response, including understanding and addressing racial and ethnic disparities.

### A ROADMAP FOR BETTER MATERNAL HEALTH CARE

The Delivery Decisions Initiative responded to COVID-19 by publishing a roadmap for “bold, anti-racist, and inclusive leadership” in making investments in maternal health that are likely to be sustained beyond the pandemic. The roadmap was the result of a six-month collaboration that convened 244 people from across the country, including those who

gave birth during the pandemic and those who took care of them. This work was conducted jointly with the University of California, Davis Betty Irene Moore School of Nursing, and supported by the Rita and Alex Hillman Foundation, the Gordon and Betty Moore Foundation, the Yellow Chair Foundation, the Patrick J. McGovern Foundation, and Spring Impact.



*“All of us—scientists, health care workers, pregnant people, and the public—need to be willing to rethink what we thought we believed last week. We must approach this crisis with humility and empathy: be willing to listen to each other, to learn from each other, and to understand the perspectives others bring to the situation.”*

**NEEL SHAH, MD, MPP**

DIRECTOR OF THE DELIVERY DECISIONS INITIATIVE



## OUTPATIENT CARE

During the pandemic, an urgent need has remained for safe, reliable access to outpatient medical care, both for COVID-19-related illnesses and for medical needs unrelated to the virus. We have been focused on developing resources for patients and providers that offer guidance and best practices to ensure safe, effective outpatient care.

### LEVERAGING PRIMARY HEALTH CARE

In partnership with PHCPI, we helped develop COVID-19-specific content for PHCPI's interactive knowledge management tool, [Improvement Strategies](#), and COVID-19-specific [Promising Practices](#), short case studies highlighting auspicious and innovative approaches that countries have taken to strengthen primary health care performance. These adapted tools focus on how primary health care can best be leveraged during COVID-19, including [maintaining](#)

[access to routine and essential health services](#) during the pandemic and [leveraging PHC](#) for COVID-19 surveillance and response. We also supported PHCPI in developing a Messaging Toolkit to help the global primary health care community make the case for how and why countries, global decision-makers, and donors can and should center primary health care as a key component of COVID-19 response.

*“Primary care is the bedrock of an effective health care system. In this time of COVID-19, primary care practices are rapidly evolving to deliver the care that their patients need, even in the midst of social distancing constraints.”*

**ASAF BITTON, MD, MPH AND  
MICHAEL BARNETT, MD**  
CNN OP-ED

### AMERICA'S HEALTH SECURITY

In 2020, Executive Director Asaf Bitton was appointed to the CSIS Commission on Strengthening America's Health Security to help the bipartisan commission, including six current and former members of Congress and two former heads of the CDC, fulfill its goal of charting a bold vision for U.S. global health security that addresses the acute vulnerabilities exploited by the coronavirus, at home and abroad.



## JOINT LEARNING NETWORK COVID-19 LEARNING EXCHANGES

The Ariadne Labs Primary Health Care and Safe Surgery/Safe Systems teams served as technical facilitators on several Joint Learning Network COVID-19 cross-country virtual exchanges. These sessions brought together frontline practitioners and country representatives to exchange and improve strategies for infection prevention and control,

human resource management, and population health management during the pandemic. Participants from more than 20 low- and middle-income countries joined the sessions to share best practices and resources and engaged in robust discussion around adapting and implementing these practices for continued COVID-19 response.

*“COVID-19 has made it painfully clear that we can’t afford to have weak primary health care continue as our reality. In the U.S., fragmented care and lack of clear communication from experts has left people anxious about where to turn. This doesn’t have to be the case. There are clear steps the world can take to fully unlock the potential of primary health care.”*

**BETH TRITTER AND DAN SCHWARZ, MD, MPH**  
HEALTH POLICY WATCH EDITORIAL



## RAPIDLY SCALING COVID-19 TESTING

To address gaps in access to COVID-19 testing, Ariadne Labs and the Cambridge Innovation Center co-founded the [Assurance Testing Alliance \(ATA\)](#). The ATA represents a group of organizations collaborating to ease access to very low cost testing for employers, schools, and other institutions and to enable universities and other facilities with laboratory space to contribute underutilized resources to increase testing capacity. The ATA is based on a blueprint for scaling COVID-19 testing proposed in a [Harvard Business Review](#) article co-authored by Atul Gawande, chair of Ariadne Labs. ATA member organizations have contracted with several laboratories for nationwide coverage, including the Broad Institute of MIT and Harvard and the University of Minnesota's Genomics Center.



*“Testing is the only way to know whether a person is potentially contagious and in need of isolation.”*

**ATUL GAWANDE, MD, MPH**  
ARIADNE LABS CHAIR





## VACCINE DELIVERY

Ending the pandemic will require vaccinating everyone in every corner of the globe; it will require robust, adaptive systems that deliver with speed, scale, and equity as supply and demand shift over time. In 2020, our Vaccine Delivery team leveraged years of studying health care delivery systems and evidence about what works to support health officials and decision-makers with the tools and information needed to allocate, distribute, verify, and generate demand for COVID-19 vaccines—to manage the uncertainty.



*“It’s in my most recent role here—as a vaccinator—that I’ve come to understand the shared work of healing after prolonged stress and grief. Each injection brings hope and relief. Our work continues as the equitable distribution of COVID-19 vaccines is our fastest route to end this pandemic.”*

**REBECCA WEINTRAUB, MD**

“WE THE PEOPLE MUST VACCINATE WITH SPEED AND EQUITY”

## GUIDING THE EQUITABLE ALLOCATION OF VACCINES

In 2020, the Vaccine Delivery team was among the first to explain the merits of equitable vaccine distribution and raise the alarm about the dangers of vaccine nationalism. In multiple op-eds, the team addressed how the prevailing “every nation for itself” approach to obtaining potential vaccines and other products for COVID-19 was not evidence-based delivery and called for countries to deploy coordinated customized strategies based on science, not politics.

To educate the public, Rebecca Weintraub advised Netflix/Vox on the Coronavirus series to communicate why we will need to manufacture and distribute billions of doses of the COVID-19 vaccines and provided testimony to the HHS Vaccine Advisory Committee. To support leaders in managing the uncertainty of the COVID-19 vaccine portfolio, the Vaccine Delivery team collaborated with the Center for Global Development to build an interactive web



tool to generate predictions, in real-time, with up-to-date data. The Vaccine Prediction model influenced multilateral investment in COVID-19 vaccines development and manufacturing.

In spring of 2020, the team detected a pattern of concern—similar to previous pandemics: all nations would face vaccine scarcity. Their research on the delivery bottlenecks—detailed the need to support public leaders’ planning for equitable vaccine allocation. To prepare state leaders, local implementers and the public, the team built the

Vaccine Allocation Planner with Surgo Ventures. Endorsed by the National Governors’ Association and recommended by the CDC, the tool supported decision makers with the data they needed to equitably allocate limited vaccine supply. State and local leaders used the tool, which was accessed in 160+ countries around the world, processed more than 50 million transactions, and was used by the *New York Times*, *Washington Post*, *Wall Street Journal*, Univision, NBC, and others to develop interactive tools to help the public understand their place in the vaccine line.



## SAFE SURGERY AND SAFE SYSTEMS

The strain that COVID-19 has placed on health care systems had immediate and consequential effects on hospital surgeries and procedures, physician capacity, redeployment, the rapid onboarding of physicians rushed into service, and the safety of health care workers. Ariadne Labs is developing resources to help health systems and providers navigate the impact of COVID-19 to ensure the safety of patients and the health care workforce.

### CREATING A WORLDWIDE BLUEPRINT FOR SURGERY DURING COVID-19

As COVID-19's rapid spread forced an unprecedented crisis in operating rooms worldwide, Ariadne Labs researchers developed responses and solutions to an ever-changing situation. Mary Brindle, MD, MPH, worked with Ariadne Labs Chair Atul Gawande to publish [recommendations](#) in the *Annals of Surgery* based on the best evidence of successful responses early in the pandemic. The publication was

recommended by the American College of Surgeons and formed the foundation for a blueprint to confront COVID-19 that has been adopted by surgical systems worldwide. Additional work from the team included developing guidelines for surgical triage, when and how to reopen operating rooms for elective procedures, and [considerations for surgical training](#) in the midst of a pandemic.

*“Critical challenges can remind us of how dynamic and exciting health systems work can be. They sharpen our focus on why this work is important and highlight the limitations of what we know. They also give us an opportunity to address our responsibility as physicians to improve, whenever we can, the systems that care for our patients and their communities.”*

**MARY BRINDLE, MD, MPH**

*“ADAPTING HEALTH SYSTEMS DURING CRISIS”*

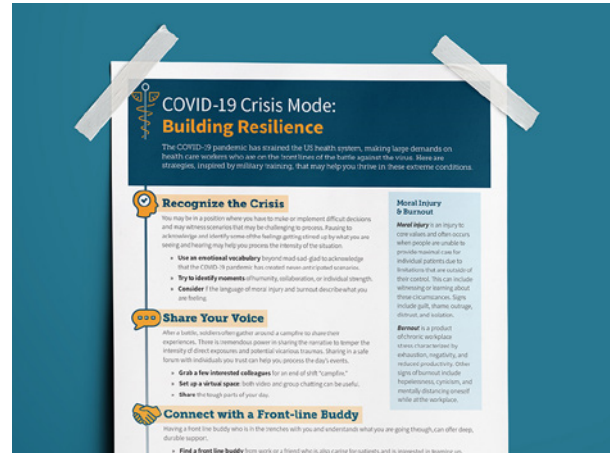
## DEVELOPED A TOOLKIT FOR REDEPLOYED CLINICIANS

As hospitals around the globe became overwhelmed by patients, clinicians had to be redeployed to new roles and locations throughout health care systems. The need for effective and rapid onboarding of physicians to their new clinical roles was imperative, especially given that these roles often differed significantly from the physicians' previous roles in terms of clinical

duties, intensity of care, and even geography. Through interviews with frontline physicians, our team quickly developed the [Rapid Onboarding Toolkit](#) to provide an onboarding framework and implementation guide for health systems seeking to transition clinicians into new roles fast and effectively.

## SUPPORTING FRONTLINE HEALTH CARE WORKERS' MENTAL HEALTH DURING THE CRISIS

As the pandemic strained the health care system, caring for the mental health and resilience of front line health care workers was paramount, especially to minimize moral injury and burnout. Using a literature review and expert opinion, our team quickly developed a [Crisis Guide](#) for both health care workers and their managers to help them build resilience under extreme conditions.



*“One week after President George W. Bush declared war in Iraq in 2003, I was deployed there as an Army nurse. ... Now we are at war again, with a pandemic as the enemy and health care workers on the front lines. Moral injury will undoubtedly occur. Health care workers will be strained ... They may have to make heart-wrenching choices.”*

**RACHEL MOYAL-SMITH**

*“LESSONS FROM A DIFFERENT WAR FOR PREVENTING MORAL INJURY AMONG CLINICIANS TREATING COVID-19”, STAT*

## USING ARCHITECTURE TO REDESIGN HOSPITALS DURING COVID-19

Ariadne Labs joined with MASS Design, Mount Sinai Hospital, and other partners to research and outline [key spatial interventions](#) that can mitigate infection

risks. Researchers identified actions by a frontline hospital that studied design strategies and renovations to reduce COVID-19 infections in health facilities.



# BUILDING AN INNOVATION PIPELINE

Founded in 2012, the Spark Grant Program ignites new ideas to broaden our impact and grow our community. Annually, we award Spark Grants to fund innovative early-stage ideas focused on building new solutions or tackling major problems in health care delivery.

The ideas are incubated at Ariadne Labs, and the projects can take a number of paths following their initial Spark funding. Some projects receive additional funding, allowing them to expand their impact and test their solution in the real world. In some cases,

projects have grown into key initiatives at Ariadne Labs. Many projects have been taken back to the grantee's home institution for further research or as a new standard of care in that hospital.

## 2019-2020 SPARK GRANTS

In 2020, the following projects concluded:

### EFFECT OF HEALTH SYSTEMS EXPANSION ON HEALTH CARE UTILIZATION AND OUTCOMES

This project investigated the impact of hospital closures and consolidations on patient outcomes, costs, and physicians. Using a master dataset, the team evaluated trends in surgical consultations, assessed differences in outcomes for surgeons operating at a single location versus multiple locations, and analyzed

the effects of rural hospital mergers on hospital financial performance and patient outcomes. The team plans to produce peer-reviewed publications, and the results of initial analyses will serve as pilot studies for future grants.

### BEHAVIORAL DRIVERS OF MENTAL HEALTH RESILIENCE

This project focused on promoting behaviors, such as meditation, sleep, exposure to nature, and physical activity, to reduce stress, anxiety, and mild depression. The team completed a landscape analysis of existing evidence and sought expert input to

inform development of a survey, to be administered to patients by primary care physicians, on stress, stressors, and resilience behaviors. The survey has undergone initial face validity testing, and the team continues to engage with experts.

## BETTER PARTNERSHIPS: FAMILY ENGAGEMENT IN PEDIATRIC HEALTH

This project aimed to develop a solution to enhance communication and strengthen relationships between pediatric providers and families or caregivers to improve follow-through of treatment plans for developmental delays. The resulting tool, the Clinician-

Caregiver Conversation Roadmap, supports pediatric providers and caregivers in having more collaborative conversations about a child's developmental care. The team at Brazelton Touchpoints Center will disseminate the tool for broad public use.

## NEW—2020-2021 GRANTS

In 2020, Ariadne Labs announced the expansion of the Spark Grant program through a partnership with Harvard Medical School to award two Dean's Innovation Grants in Health Care Delivery.

### ARIADNE LABS SPARK GRANT RECIPIENTS

#### BEYOND BIRTH: OPTIMIZING THE TRANSITION FROM OBSTETRIC TO PRIMARY CARE

The transition from pregnancy care to ongoing primary care represents a key opportunity to reduce short- and long-term adverse outcomes following birth and delivery. This project aims to design and test

a model to improve the handoff from obstetric care to primary care for those at highest risk of morbidity in the year after birth.

### HARVARD MEDICAL SCHOOL DEAN'S INNOVATION GRANTS IN HEALTH CARE DELIVERY RECIPIENTS

#### A PROVIDER-PAYER STRATEGY TO INCREASE USE OF HOME-BASED PALLIATIVE CARE

Home-based palliative care has been shown to offer numerous benefits; however, many patients who could benefit, including those with chronic, serious illnesses, do not receive these services. Identification of eligible patients at a population level is a key barrier to more

widespread use. This team will develop a scalable provider-payer collaboration to ensure rapid targeting of patients who would benefit from home-based palliative care, and address the barriers to adoption among payers and providers.

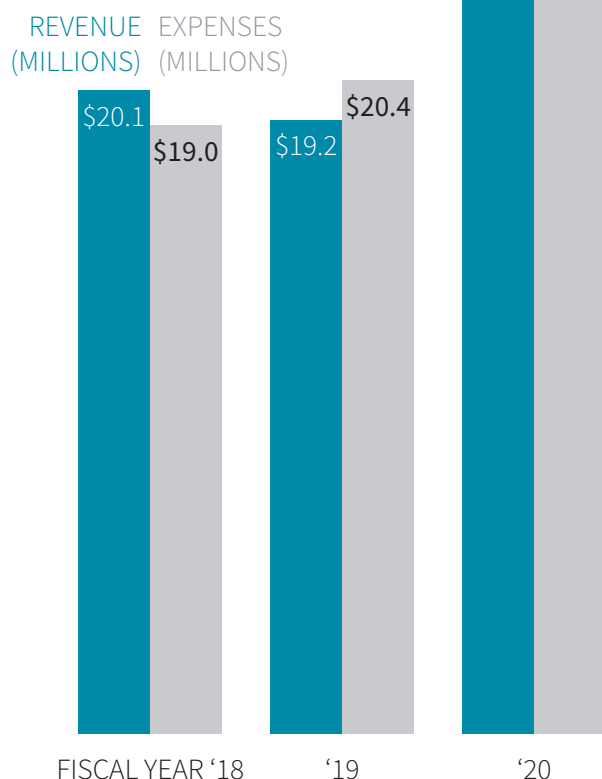
#### PROTOCOLS FOR SAFE POSTPARTUM CESAREAN CARE IN RURAL AFRICA

Cesarean sections are the most common surgery performed worldwide. There are standards of care for the procedure and hospitalization; however, a lack of guidelines for post-discharge instructions leads to inconsistent care messages and poor follow-up. This gap is particularly harmful for women at high risk of

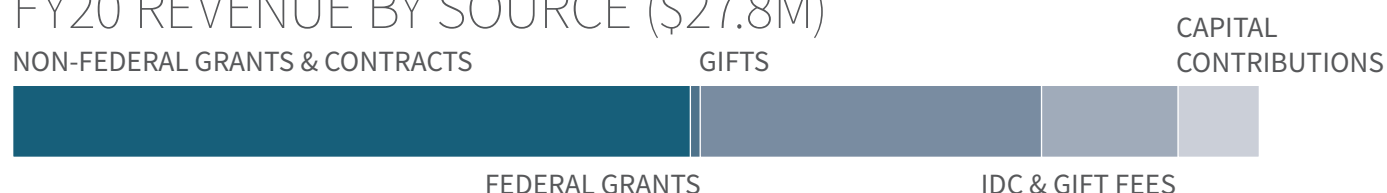
complications after discharge, most notably surgical site infection, which is common in women delivering via c-section in sub-Saharan Africa. This project will begin to develop protocols for postpartum care for women delivering via c-section.

# FINANCIALS

In FY20, thanks to a generous capital contribution, Ariadne Labs completed a multi-year renovation of our offices in order to continue to facilitate collaboration. Despite limited travel and other restrictions due to the COVID-19 pandemic, we doubled our grant revenue (including an increase in our federal awards) to support emerging initiatives as well as new projects in response to COVID-19. In a year of unprecedented uncertainty, we finished with a positive and healthy financial outlook.



## FY20 REVENUE BY SOURCE (\$27.8M)



## FY20 EXPENDITURE BY TYPE (\$25.7M)



## ACKNOWLEDGEMENTS

Special thanks to the students of Harvard T.H. Chan School of Public Health and Harvard Medical School who completed their Practicums with Ariadne Labs' Delivery Decisions Initiative, BetterBirth, and COVID-19 Global Learnings teams.

Special thanks to Harvard Medical School Dean George Q. Daley for helping with the expansion of the Spark Grants program to launch two new Dean's Innovation Grants in Health Care Delivery to Harvard-affiliated faculty in 2020.



# 2020 ADVISORY BOARD

**Our Advisory Board includes world-class leaders in science, education, health care, and business.**

They support Ariadne Labs by contributing expertise on research priorities, scientific plans, implementation approaches, and collaborations.

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Managing Director and Portfolio Manager,  
Morgan Stanley

**GWILL E. YORK, MBA**  
Co-Founder,  
Lighthouse Capital Partners

A special welcome to our new Advisory Board members who joined Ariadne Labs in 2021:

**ELLIOT COHEN, MBA**  
Co-founder and Chief Product Officer,  
PillPack

**KARIN S. LESCHLY, MD, FAFAP**  
Medical Director of Quality Improvement and Population Health,  
East Boston Neighborhood Health Center

## OUR SUPPORTERS

In our 2020 Honor Roll of Donors, Ariadne Labs gratefully acknowledges gifts and pledges totaling \$50,000 or more received during our 2020 fiscal year, between October 1, 2019, and September 30, 2020.

Anonymous (multiple)	Hackensack Meridian Health	Merck for Mothers
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The Duke Endowment	Laura and Scott Malkin	Yellow Chair Foundation
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Atul A. Gawande, MD, MPH, and Kathleen Hobson	The Patrick J. McGovern Foundation	

*Our mission is to save lives  
and reduce suffering  
for people everywhere,  
by creating scalable  
systems-level solutions  
that improve health care for  
the most critical moments  
and the stages in between.*



**HARVARD T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH

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