The Gillian Reny Stepping Strong
Center for Trauma Innovation

TURNING TRAGEDY INTO HOPE

The Gillian Reny Stepping Strong Center for Trauma Innovation
Annual Stewardship Report: 2017–2018

BRIGHAM HEALTH
BRIGHAM AND WOMEN’S HOSPITAL

Life. Giving.
Breakthroughs.
This past year was defined by remarkable momentum toward turning our vision of transforming trauma care into a reality. We gained traction by assembling brilliant minds from medical institutions and industries across the city into advisory boards, working groups, and research teams. We witnessed the first Stepping Strong-funded clinical procedure change lives for the better. And with leadership now in place, we are poised to catalyze multidisciplinary collaborations that inspire innovation and transform outcomes for countless trauma patients.”
Audrey Epstein Reny, Stepping Strong Co-founder and Advisory Board Chair

Steven, Gillian, Danielle, and Audrey Reny

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Dear friends and colleagues,

Four years ago, the Reny and Epstein families established The Gillian Reny Stepping Strong Fund to honor the Brigham and Women’s Hospital medical team that saved their beloved Gillian’s life following the 2013 Boston Marathon bombings. When I think back to that tragic day in Boston, I will always remember how we worked together to care for our patients and each other. We witnessed the courage and resilience of our staff and our city, along with beautiful acts of humanity. The spirit of hope, compassion, and determination we saw five years ago still shines today at the Brigham and throughout Boston.

Since the Stepping Strong Fund was first established in 2014, it has grown and evolved to become The Gillian Reny Stepping Strong Center for Trauma Innovation. And as you will see in the following pages, we have many reasons to be proud. Three plastic surgery fellows have trained with the best clinicians and researchers, and stand poised to make their marks as leaders in the field of trauma care. Stepping Strong Medical Director Mitchel B. Harris, MD, is expanding the scope and reach of the center in his new role as chair of orthopaedic surgery at Massachusetts General Hospital, where he will set the stage for new collaboration and proliferation of ideas between our two great institutions. Finally, 15 Stepping Strong research teams have helped push the boundaries of trauma medicine, bringing hope to patients everywhere. Their research has already led to government funding and a greater awareness about the importance of trauma research.

As we approach the fifth anniversary of the Boston Marathon bombings and report back on Stepping Strong’s fourth year, I marvel at the growth of this exceptional community, the wonderful progress we are making, and the future milestones we aim to achieve together. I am so grateful for your dedication to the Stepping Strong Center. Your generosity and vision make the work being done by our physician-scientists possible. Thank you, and I look forward to keeping you updated as we reach new frontiers in trauma care.

With gratitude,

Elizabeth G. Nabel, MD
President
Brigham and Women’s Hospital
Brigham Health
In 1966, a U.S. National Academy of Science report called trauma an unrecognized epidemic. More than 50 years later, resources clearly remain inadequate to address the scale of this problem, perpetuating an enormous human and financial cost.

Traumatic injuries can happen anywhere, at any time—in military combat, in motor vehicle accidents, on athletic fields, and increasingly, in terror attacks. The statistics are sobering. Trauma is the number one cause of death for people 46 years of age and under, ahead of cancer and heart disease, and nearly $700 billion a year is spent on decreased productivity, work loss, and medical costs.

According to the Centers for Disease Control and Prevention, nearly 200,000 people die from traumatic injury each year—that’s one person every three minutes. But these deaths are only the tip of the iceberg. Each year, millions of people are injured and survive. They are faced with lifelong mental, physical, and financial problems.

The Gillian Reny Stepping Strong Center for Trauma Innovation at Brigham and Women’s Hospital (BWH) is dedicated to mobilizing the full potential of interdisciplinary innovation to fuel trauma research and care for the benefit of civilian and military heroes worldwide who suffer from devastating traumatic injuries and events.

Under the leadership of Stepping Strong Medical Director Mitchel B. Harris, MD, Stepping Strong Program Director Nish Acharya, MPA, our Advisory Board and Medical Executive Committee, and thanks to your generous support, the Stepping Strong Center is making remarkable progress. A cohort of physician-scientists from diverse specialties—including trauma, plastic surgery, orthopaedics, emergency medicine, and bioengineering—are advancing trauma research and care in areas spanning soft tissue, muscle regeneration, next-generation prosthesis, and bone, skin, and wound healing. Stepping Strong-affiliated faculty are also studying mass casualty attacks across the globe to glean best practices for emergency preparedness and hemorrhage control, and training citizens to save lives in emergency situations.
A MULTI-INSTITUTIONAL, INTERDISCIPLINARY EFFORT FUELED BY YOUR SUPPORT

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The Gillian Reny Stepping Strong Center for Trauma Innovation is located in the Hale Building for Transformative Medicine.
A CONVERSATION WITH MITCHEL B. HARRIS, MD, AND NISH ACHARYA, MPA

Nobel Prize winner Linus Pauling once said, “The best way to have a good idea is to have a lot of ideas.” At The Gillian Reny Stepping Strong Center for Trauma Innovation, 2017 was marked by an accelerated exchange of knowledge, new initiatives, and exciting solutions. As Stepping Strong Medical Director Mitchel B. Harris, MD, takes on a new role at Massachusetts General Hospital (MGH) and participation of researchers from numerous Boston-area institutions expands, Stepping Strong has an unprecedented opportunity to build awareness and accelerate innovation within and beyond the walls of BWH. In this interview, Harris and Stepping Strong Program Director Nish Acharya, MPA, discuss opportunities that lie ahead.

**Q** Mitch, you recently started a new position as chair of the Department of Orthopaedic Surgery at MGH. And Nish, you joined the Stepping Strong Center earlier this year as our first program director. How is the transition going?

**Harris:** The momentum is extraordinary. I have already met with a number of MGH’s physician-scientists, and we are beginning to have regular meetings so I can educate them on the work taking place at the center. Our idea has always been to put a group of disparate experts with similar interests in a room to create innovative solutions for persistent clinical problems, so this is our opportunity to expand on that.

**Acharya:** As Mitch said, we are making significant progress. Clinicians from multiple institutions are now participating in our newly formed research collaboration efforts and working groups, helping to share their expertise as it relates to Stepping Strong’s mission to fuel interdisciplinary innovation.

**Q** Increasingly, our researchers are fostering collaborations with bioengineers and material scientists. Why is this direction so important?

**Harris:** We have found this equation to be quite interesting and productive. Bioengineers are the glue that connects the basic science to the clinical side. Because they have pragmatic, catalytic mindsets, bioengineers are able to take a fresh look at clinical problems and offer innovative solutions.
Can you say more about the types of projects Stepping Strong bioengineers are working on?

Harris: Natalie Artzi, PhD, who is on the Medical Executive Committee, is at Massachusetts Institute of Technology (MIT), and she also has a lab at BWH. In collaboration with Alex Haynes, MD, a traumatologist at MGH, Artzi is creating a material that will decrease pain for trauma patients after undergoing surgery, thus reducing the need for opioids. Their goal is to place a type of biomaterial just over or under the skin where a metal plate is surgically inserted to administer pain control medication, like Tylenol.

From the time of its inception, one of the center’s priorities was to encourage deep collaborations and enable researchers to obtain larger grants. Is there progress on that front?

Harris: Matt Carty, MD, received a $3 million Department of Defense grant for the Ewing Amputation procedure, which was directly related to his Stepping Strong Innovator Awards project. In addition, the two other Innovator Awards winners and a Stepping Strong fellow were recently awarded grants in the amount of $3.65 million from the National Institutes for Health and Toyota USA.

A priority this year was building the center’s infrastructure. What is the current strategy?

Acharya: Our core strategy is to provide seed funding and support services to the best and brightest innovators, which will ultimately result in larger traditional grants and better outcomes for trauma patients. Knowing that the Greater Boston area is home to many researchers, startups, and clinicians focused on trauma care, we are also committed to making our center, housed at BWH, the bridge that connects talented researchers and clinicians from across the region and beyond. By building our ecosystem across medical disciplines and institutions, we aspire to be the leader and go-to resource for anyone working in the trauma innovation space. More than 100 physician-scientists are now in our database, attending working groups and seeking connections to like-minded individuals, all with a common goal of advancing trauma innovation. So I think we are off to a tremendous start.
STEPPING STRONG PROGRAMS

Since its inception, the Stepping Strong Center has taken a multidisciplinary, three-pronged approach to advancing research and clinical programs that allow BWH to accelerate innovations in trauma care and save lives.

The Stepping Strong Innovator Awards program supports groundbreaking research that addresses clinical problems that impact both civilian and military patients; the Stepping Strong Research Scholars investigate basic science to advance bone and skin regeneration in trauma patients; and the Stepping Strong Plastic Surgery Trauma Fellowship trains the next generation of plastic surgeons in advanced techniques for treating acute and complex traumatic injury.

All of our physician-scientists are collaborating with medical experts from world-class neighboring institutions, including MIT, MGH, Beth Israel Deaconess Medical Center (BIDMC), and Tufts University, and many have moved their research from the lab to animal models—a crucial step in advancing our understanding of clinical challenges and exploring new solutions. One of our Stepping Strong Innovator Award winners achieved the ultimate goal and translated his project to patient care in three short years.

“Bioengineers are the glue that connect the basic science to the clinical side. Because they have pragmatic, catalytic minds, they are able to take a fresh look at clinical problems and offer innovative solutions.” Mitchel B. Harris, MD, Stepping Strong Medical Director

Natalie Artzi, PhD, a bioengineer and Stepping Strong Medical Executive Committee member, works with injectable materials to induce tissue regeneration.
THE STEPPING STRONG INNOVATOR AWARDS

//2014

A New Surgical Approach for the 21st Century
Matthew J. Carty, MD (BWH)
In collaboration with the MIT Media Lab (MIT)

Using Stem Cells to Regenerate Injured Muscle
Indranil Sinha, MD (BWH)

Using Silk-Based Implants to Promote Bone Healing
George S. Dyer, MD (BWH)
In collaboration with Ara Nazarian, PhD (BIDMC), and David Kaplan, PhD (Tufts)

//2015

Healing Bones with Nanodrones:
The Next Frontier in Orthopaedic Surgery
Omid Farokhzad, MD (BWH)
In collaboration with Mitchel B. Harris, MD (MGH), and Morteza Mahmoudi, PhD (BWH)

From Battlefield to Bedside:
A Portable Device for Rescuing Limbs
Bohdan Pomahac, MD (BWH)

Using 3D Bioprinting to Heal Muscle Trauma
Su-Ryon Shin, PhD (BWH)

//2016

New Hope for Trauma Patients with Severe Burn Injuries
Reza Abdi, MD (BWH)
In collaboration with Ali Khademhosseini, PhD (BWH), and Dennis P. Orgill, MD, PhD (BWH)

21st Century Tools to Measure Bone Healing
Michael J. Weaver, MD (BWH)
In collaboration with Jack Wixted, MD (BIDMC), and Ara Nazarian, PhD (BIDMC)

//2017

Best Practices in Treating Mass Casualty
Eric Goralnick, MD, MS (BWH), and Edward J. Caterson, MD, PhD (BWH)

First-time funding:
Mitigating Damage to Injured Limbs After Tourniquet Application
Giorgio Giatsidis, MD (BWH)

Renewed funding:
The Ewing Amputation
Matthew J. Carty, MD (BWH)
In collaboration with the MIT Media Lab (MIT)

Multi-functional Scaffolds that Promote Bone Healing and Regeneration
Omid Farokhzad, MD, MBA (BWH), and Morteza Mahmoudi, PhD (BWH)

Developing Common Standards for Disaster Medicine
Eric Goralnick, MD, MS (BWH), and Edward J. Caterson, MD, PhD (BWH)

A Simple, Ultraportable Device for Rescuing Limbs
Bohdan Pomahac, MD (BWH)

Restoring Skeletal Muscle Mass and Function
Using 3D Bioprinting
Su-Ryon Shin, PhD (BWH), and Indranil Sinha, MD (BWH)
STEPPING STRONG INNOVATOR AWARDS UPDATES

The Stepping Strong Innovator Awards program fills a crucial void in the trauma research landscape. The goal of the program is to facilitate and fund multidisciplinary collaborations that foster innovative discovery and accelerate translation to transform treatment, recovery, and ultimately the outcomes for trauma patients. These competitive grants fund high-reward projects by the best and brightest clinicians, researchers, and bioengineers conducting trauma-related projects not only at BWH, but across Boston and beyond. To date, Stepping Strong has funded 10 groundbreaking innovators and granted follow-up awards to five projects that have gained traction and show great promise. The additional funding will propel researchers to the next level, with a goal of securing larger federal grants and beginning the path toward commercialization.

RESTORING SKELETAL MUSCLE MASS AND FUNCTION USING 3D BIOPRINTING: SU-RYON SHIN, PHD, AND INDRANIL SINHA, MD

In 2017, two previous Innovator Award winners, Su-Ryon Shin, PhD, and Indranil Sinha, MD, joined forces to explore skeletal muscle regeneration following volumetric muscle loss injuries, which affect approximately 500,000 trauma patients each year. These injuries often occur after traumatic events and heal with fibrosis—the thickening and scarring of connective tissue—causing impaired muscle function. Sinha’s original project focused on using stem cells to heal muscle trauma, and Shin aimed to create viable cells with 3D bioprinting to heal muscle trauma, but they realized the potential to combine their projects and take advantage of each other’s expertise.

Together, they have developed 3D-printed bio-scaffolds that have been successfully implanted in animal models with volumetric muscle loss injuries. With the additional Stepping Strong funding, the team will create a customized scaffold that mimics the properties of human muscle tissue, incorporates muscle growth factors, and delivers muscle stem cells to the injured area following volumetric muscle loss. The collaborative nature of the Stepping Strong Center allowed this new project to form, and the result is an improved muscle regeneration project design that has the potential to revolutionize healing in patients with profound muscle injuries.

“Stepping Strong is a collaborative effort dedicated to bringing new therapies to trauma patients through state-of-the-art resources and a passion to change the paradigm in trauma care.”
Jeff Karp, PhD, Stepping Strong Medical Executive Committee member

Su-Ryon Shin, PhD, and Indranil Sinha, MD

Through bioprinting, Shin and Sinha hope to create 3D muscle tissue that mimics living cells.
THE EWING AMPUTATION: MATTHEW J. CARTY, MD

In 2014, Matthew J. Carty, MD, won the inaugural Stepping Strong Innovator Award for his groundbreaking idea of revolutionizing lower extremity amputations. Just two years later, he performed the first-of-its-kind experimental amputation procedure on Jim Ewing, a husband and father who damaged the nerves and bones in his left leg during a rock climbing accident. This milestone procedure represented the first clinical translation of Carty’s research work.

REINVENTING LOWER LIMB AMPUTATIONS

In what has been coined the Ewing Amputation, Carty and his team connect the leg’s front and back muscles to each other in a loop, allowing them to continue working together and communicate with the brain despite the amputation. Hugh Herr, PhD, from the Center for Extreme Bionics at Massachusetts Institute of Technology (MIT), who himself lost both legs below the knee in 1982, collaborated with Carty to develop this procedure and also designed a robotic prosthesis capable of acting like a natural limb.

Carty and his team have performed the procedure on six patients, including Army veteran Brandon Korona, whose leg was severely damaged by an improvised explosive device.

Through Stepping Strong funding, Carty and his team are continuing to enroll additional patients. Through modifications of the technique, they hope to improve the Ewing Amputation and eventually offer a similar procedure retroactively to patients who have already undergone standard amputations, greatly increasing the number of people who can benefit from this innovation.

FROM STEPPING STRONG SEED FUNDING TO A DOD GRANT

The power of the Stepping Strong Innovator Awards is to inspire creative, out-of-the box ideas that are not typically funded by traditional funding sources. The vision is that early Stepping Strong support enables research teams to generate compelling pilot data to then secure additional funding. We are so proud to announce that this cycle came to fruition recently when Carty’s team secured a $3 million grant to further develop the Ewing Amputation technique.

In addition, the team is now exploring how this procedure for lower limb amputations could be applied to the upper extremities.

Historically, amputations have been viewed by the medical community as a last resort, but Carty hopes the outcomes from the Ewing Amputation will elevate amputation to another form of limb salvage.

“...When I think about the pain I was in last year versus this year, I am so hopeful. Now I am experiencing a healing pain instead of a persistent pain that wasn’t going away. Dr. Carty has been so supportive and helpful, and I am so grateful to the Stepping Strong Center for investing in his work.”

Brandon Korona
Ewing Amputation patient
Injuries from severe trauma accidents can cause large open bone fractures and bone defects that are prone to poor bone healing and high rates of infection following orthopaedic trauma surgery. To minimize the need for patients to have follow-up surgeries after trauma, and even to prevent amputations, 2015 Stepping Strong Innovator Award winner Omid Farokhzad, MD, MBA, in collaboration with Mitchell B. Harris, MD, and Morteza Mahmoudi, PhD, successfully developed collagen patches with nanoparticles—small, biodegradable robots—that can deliver antibiotics and other drugs to promote bone growth and wound healing in trauma patients in a safer, controlled, and more efficient way than current approaches. With the additional Stepping Strong funding, Farokhzad and his team plan to enhance their product, apply the patches in animal models, and then facilitate the clinical translation of the product, with commercialization anticipated in two to three years.

Collagen patches with nanoparticles promote bone growth and wound healing.

During his Stepping Strong Plastic Surgery Trauma Fellowship, Giorgio Giatsidis, MD, explored many topics that led to a new Stepping Strong Innovator Awards project. When faced with a traumatic injury, tourniquets can control bleeding and save lives. But because they restrict blood flow to tissues, sometimes these life-saving pieces of equipment can also cause ischemic damage to limbs. To solve for this, Giatsidis seeks to develop a device that uses a therapeutic method of controlled, localized cooling to minimize the ischemic damage in injured limbs to which a tourniquet is applied. The goal is to apply the device to injured limbs immediately after application of a tourniquet, and then remove the device at the same time as the tourniquet, when blood flow to the limb is restored. A tool like this utilized in civilian and military trauma settings would reduce the amount of ischemic injuries and amputations that can follow tourniquet application.
AN ULTRAPORTABLE DEVICE FOR RESCUING LIMBS: BOHDAN POMAHAC, MD

With his initial Stepping Strong Innovator Award grant, Bohdan Pomahac, MD, and his team built a second-generation prototype of a portable device that expands the allowed time for replantation of an amputated limb from four to six hours to up to 24 hours. The device was previously used successfully in a series of experiments with animal models, and the team now has data that confirms the applicability on human limbs—a groundbreaking development for patients, first responders, and medical personnel who are faced with a traumatic injury. The additional Stepping Strong funding provides much-needed capital for further development. Pomahac and his team have already identified a potential partner to bring it to market for first responders, military installations, and major hospitals.
GLOBAL STANDARDS FOR DISASTER MEDICINE: ERIC GORALNICK, MD, MS, AND EDWARD J. CATERSON, MD, PHD

This past year, the world saw a rise in mass casualty incidents in civilian settings due to terror attacks and natural disasters. Eric Goralnick, MD, MS, and Edward J. Caterson, MD, PhD, have joined forces to address this deadly public health crisis.

EMPOWERING CIVILIANS TO STOP THE BLEED

Goralnick and Caterson are collaborating with Adil Haider, MD, MPH, and Mitchel B. Harris, MD, on two efforts to train and prepare civilians. The first focuses on empowering citizens to “stop the bleed.” Uncontrolled bleeding is a leading cause of mortality in traumatic injuries, and in the United States, it takes an average of seven minutes for EMS to respond to a disaster scene. Rapid intervention and control of extremity hemorrhage with tourniquets improves survival, decreasing preventable deaths by more than 50 percent. Armed with this compelling data and additional Stepping Strong funding, the team launched several initiatives designed to empower laypeople to act as first responders in trauma settings. These initiatives include a study with key civilian and military researchers to determine the most effective methods for training laypeople to apply tourniquets, as well as a six-month follow-up evaluation to determine retention of skills. The team plans to create a consensus-driven national bleeding control research agenda that will facilitate greater use of best practices like tourniquet training for lay personnel.

Earlier this year, Goralnick, Caterson, and their team trained more than 560 employees at Gillette Stadium, making it the first and only professional sports arena in the country in which 100 percent of its staff are trained in emergency preparedness. Stepping Strong and Gillette purchased 525 first-aid kits that will be worn by trained personnel. The team aspires to bring the training program to sports arenas across the country.

REVIEW OF MEDICAL RESPONSE TO TERROR EVENTS

An important part of emergency response is applying lessons learned in the aftermath of mass casualty incidents around the globe. Goralnick, Caterson, and their team have launched “GO Team,” an innovative concept whereby an international group of experts performs a standardized, academically rigorous, timely review of the medical response to an urban terror event. Current initiatives include a review of the terror attacks in Boston, Paris, and Brussels, and a focus group with 10 representative physicians from eight recent urban terror events around the globe, with the goal of creating a recovery checklist for medical directors in the wake of these devastating occurrences. The Stepping Strong Center will host a consensus conference where experts from around the globe will help to create a common set of standards and procedures around disaster medicine response and evaluation.

Team members have established themselves as key innovators in bleeding control in mass gathering venues and international urban terror qualitative reviews, and have now trained thousands of laypeople, public safety professionals, physicians, and students in these life-saving techniques.

Justin McCarty, MD, and Eric Goralnick, MD, MS, demonstrate the correct way to apply a tourniquet during a Stepping Strong-hosted event at BWH.
STEPPING STRONG RESEARCH SCHOLAR UPDATES

Stepping Strong research scholars Julie Glowacki, PhD, and Dennis P. Orgill, MD, PhD, were each given $500,000 grants to investigate ways to improve outcomes and deliver the best possible treatments for trauma patients. Glowacki is exploring the role of vitamin D in supporting fracture healing in patients, and Orgill is investigating techniques that promote skin regeneration and wound healing.

USING VITAMIN D TO ACCELERATE FRACTURE HEALING IN TRAUMA PATIENTS

Julie Glowacki, PhD, shows that a patient’s age and vitamin D status present new ways to accelerate bone healing and promote bone formation. This past year, Glowacki studied bone formation cells, called mesenchymal stem cells (MSCs), from orthopaedic surgeries at both BWH and Boston Children’s Hospital. She discovered that, while many adult fracture patients had extreme vitamin D deficiency, children had normal levels—an important distinction that suggests vitamin D levels may be related to a patient’s age. Based on Glowacki’s findings, the majority of traumatic injury patients at BWH are now receiving vitamin D before undergoing orthopaedic surgery, with the goal of accelerating their healing process and minimizing pain.

REGENERATING SKIN IN RECONSTRUCTIVE SURGERY

Following traumatic injury, reconstructive surgery often involves transferring tissues to create an envelope for healing. But this surgical transfer can impair blood flow to the tissue, causing complications such as necrosis and infection. Dennis Orgill, MD, PhD and Giorgio Giatsidis, MD, developed better ways to regenerate skin and heal wounds in trauma patients. Using animal models, the team developed a method that uses noninvasive external suction to treat tissues through angiogenesis—a process through which new blood vessels form from pre-existing vessels. They successfully demonstrated that inducing angiogenesis before surgery reduces tissue damage and length of treatment, significantly improving survival of transferred tissues and causing fewer complications for patients. These translational principles can transform clinical best practices in surgery and improve patient outcomes.
The Stepping Strong Plastic Surgery Trauma Fellowship makes it possible for promising young surgeons to train with experts to learn the most advanced and innovative techniques for treating acute and complex traumatic injury.

In this unique, yearlong program, directed by Christian Sampson, MD, fellows gain proficiency in surgical management, rehabilitation, limb reconstruction, and scar management. Eugene Y. Fukudome, MD, the 2015–2016 fellow, is currently on the faculty at Beth Israel Deaconess Medical Center, where he continues to strengthen the growing Stepping Strong network. Giorgio Giatsidis, MD, the 2016–2017 fellow, is on the faculty at BWH and remains deeply involved with the center, having been awarded a 2017 Innovator Award earlier this year.

In the fellowship’s third year, the Stepping Strong Center welcomed Trajan Alistair Cuéllar, MB, BCh, as the 2017–2018 fellow. Cuéllar, who is originally from London, earned his medical degree at the University College Cork in Ireland. He did his basic surgical training at The Royal College of Surgeons in Ireland, and completed residencies in general surgery and plastic and reconstructive surgery at the University of Florida and the University of Mississippi, respectively. In addition to winning several awards in the surgery field, Cuéllar has given presentations around the country and been published in many peer-reviewed journals. His research interests include microsurgical breast reconstruction and lower extremity traumatic reconstruction. During his time as the Stepping Strong fellow, Cuéllar will collaborate with expert researchers at the Stepping Strong Center to learn more nuanced solutions to treating complex traumatic injuries.
The Stepping Strong Medical Executive Committee is made up of constituents from each medical area that Stepping Strong represents. Led by Mitchel B. Harris, MD, the committee consists of 15 plastic and orthopaedic surgeons, bioengineers, and basic scientists who are associated with BWH, Massachusetts General Hospital (MGH), Beth Israel Deaconess Medical Center (BIDMC), Massachusetts Institute of Technology (MIT), Harvard Medical School (HMS), and Spaulding Rehabilitation Hospital (SRH). The committee advises the center on scientific and medical direction, utility of current initiatives, prioritization of future grant-making areas, and selection of Innovator Award recipients. In addition, committee members provide strategic guidance and work closely with the Advisory Board and Stepping Strong-affiliated faculty.

In addition to the Stepping Strong Medical Executive Committee, the Stepping Strong Center has formed working groups for discussions around bone healing, muscle regeneration, and trauma care. These groups, which meet throughout the year, foster dialogue, knowledge sharing, and collaboration among researchers, clinicians, and startups in Boston and across the region. The center has plans to form emergency preparedness and trauma immunology working groups within the next year.

**MEDICAL EXECUTIVE COMMITTEE**

Medical Director **Mitchel B. Harris, MD**: MGH, HMS; **Natalie Artzi, PhD**: BWH, HMS, MIT, Broad Institute;

Matthew J. Carty, MD: BWFH, HMS; David Crandell, MD: HMS, SRH, MGH; George Dyer, MD: BWH, HMS; Omid Farokhzad, MD, MBA: BWH, HMS; Eric Goralnick, MD, MS: BWH; Jeff Karp, PhD: BWH, HMS, Harvard Stem Cell Institute, Broad Institute, Harvard-MIT Division of Health Sciences and Technology; James Lederer, PhD: BWH, HMS; Bohdan Pomahac, MD: BWH, HMS; Olivier Pourquie, PhD: BWH, HMS; Christian Sampson, MD: BWH, HMS; Indranil Sinha, MD: BWH, HMS; Mike Weaver, MD: BWH, HMS; Jack Wixted, MD: BIDMC, HMS
A NEW CORPORATE WELLNESS INITIATIVE

Knowing that trauma can affect anyone, at any time, Stepping Strong is dedicated to creating programs that foster healthy, resilient lifestyles while raising awareness and critical funds for trauma research and care. One such initiative is Step Up for Stepping Strong. Launched in 2017 with Amica as the founding sponsor, Step Up is a wellness program that helps participants stay active and engaged through a month-long steps challenge.

The inaugural challenges in May and September 2017 were a resounding success. One thousand participants from across the country took more than 190 million steps, and 10 companies participated, raising critical funds to fuel trauma research.

By staying active and logging steps in the program’s mobile app, participants were eligible to win weekly prizes, including sporting goods gift cards and Fitbits. Through the app, participants also had access to nutrition and wellness content from BWH, as well as information about initiatives taking place at the center.

The next Step Up for Stepping Strong challenge, sponsored by Cigna Health Insurance, will begin in May 2018, and is open to the public.

“Step Up for Stepping Strong was a great way to get our employees thinking about and making healthier lifestyles choices. As a founding sponsor of the program, Amica was proud to help support and raise awareness for the wonderful work of the Stepping Strong Center.”

Patti Genovese, lead sponsorship coordinator Amica Mutual Insurance Company
THE STEPPING STRONG CENTER RUNNING PROGRAM

The Stepping Strong running program is comprised of a devoted community of runners committed to helping improve the quality of life for survivors of trauma through fundraising for the Stepping Strong Center. Each individual runs in solidarity with survivors of trauma, and many runners have their own story of how they or a loved one have been affected by traumatic injury. Since the team’s establishment in 2014, more than 900 dedicated runners have participated in the Boston Athletic Association’s 5K, 10K, and Half Marathon races; the Chilmark Road Race, the Falmouth Road Race, the Chicago Marathon, and of course, the beloved Boston Marathon.

“During my deployment to Iraq, I saw firsthand the impact of trauma, both physically and mentally. I run with BWH because Stepping Strong is a great platform to help survivors of traumatic injury.” Tom Steinbrunner, 2016 and 2017 marathon team member

The 2017 Stepping Strong Boston Marathon Team raised over $1.1 million for trauma care and research. The team was made up of 123 runners, including first-time runners, seasoned marathoners, BWH doctors and nurses, and grateful patients. These dedicated runners came from 19 states and as far as India and Malaysia—demonstrating Stepping Strong’s far-reaching impact.
April 3: Eric Goralnick, MD, MS, led emergency preparedness training for 562 employees at Gillette Stadium.

April 6: The Celtics hosted Stepping Strong night at TD Garden, honoring runner and BWH patient Stephen Teague as a Hero Among Us.

June 27: Stepping Strong runners raised more than $9K in the B.A.A. 10K race.

June 11: Grateful BWH patient Jackie Hamwey hosted a spin class to support the Stepping Strong Center.

August 20: Annie Nielsen, pictured with Gillian Reny, participated in the Falmouth Road Race, where the team raised $22,000.

November 9: Michael Weaver, MD, shares his research around bone healing with the BWH community.

December 6: The Hawk Foundation and Svenson and Nielson families were honored at a special ribbon-cutting ceremony.

2017–18: STEPPING STRONG IN THE COMMUNITY

nearly $13.5M given to the Stepping Strong Center

16,800 donations
2017–18 Highlights

April 15: More than 200 runners participated in the B.A.A. 5K on the Stepping Strong team, raising $72K

April 17: On Marathon Monday, 123 Stepping Strong team runners raised more than $1.1M

May 3: Amica employees were among those who participated in the inaugural Step Up for Stepping Strong wellness initiative

September 19: Stepping Strong hosted a tourniquet training in the Hale Building for Transformative Medicine

October 11: Gillian Reny was named a 2017 Patient of Courage by the American Society of Plastic Surgeons

January 22: Giorgio Giatsidis, MD, and Advisory Board member Ted Pappendick listen to Innovator Awards research pitches

January 30: Harpoon Brewery supported Stepping Strong through sales of Fresh Tracks pints and kegs

February 11: Carol Sharp and Tricia Winton raised $10K in the fourth annual SoulCycle charity ride for Stepping Strong

900+
Stepping Strong runners have raised $2.5M to advance trauma innovation
STEPPING STRONG IN THE MEDIA

All too often, the nightly news covers mass shootings and other traumatic events. Rarely, however, do they focus on solutions for the injured, or the critical need to improve patient outcomes. Stepping Strong continuously strives to be the voice that elevates the conversation.

With the help of local, national, traditional, and social media outlets, 2017 was an impressive year for Stepping Strong in the media, with coverage on issues ranging from research breakthroughs and emergency preparedness to patient stories and community fundraising events. Here are a few examples.

**4.17** Stepping Strong marathon team member Anne Tucci shares her story of recovery from a traumatic leg injury with Paula Ebben of WBZ-TV CBS Boston.

**4.17** WBZ-TV CBS Boston speaks with Stepping Strong about their goal of making tourniquet use common knowledge, much like CPR or the Heimlich maneuver.

**5.17** Brandon Korona, U.S. Army veteran and the second recipient of the revolutionary Ewing Amputation procedure, talks with Scott Pelley of “CBS Evening News.”

**5.17** Eric Goralnick, MD, MS, talks with Lester Holt of “NBC Nightly News” about increasing awareness and training for hemorrhage control.

**10.17** Harvard Magazine explains the groundbreaking process that Matthew J. Carty, MD, and his team developed for performing amputations.

**10.17** Devin McCourty talks about the Patriots’ partnership with Stepping Strong, and the need to train citizens to stop the bleed.
THANK YOU TO ALL WHO HAVE CONTRIBUTED TO THE GILLIAN RENY STEPPING STRONG CENTER FOR TRAUMA INNOVATION. WITH YOUR GENEROSITY, WE HAVE RAISED NEARLY $13.5 MILLION.

LEADERSHIP CIRCLE

We acknowledge the generous donors who have cumulatively given $25,000 or more to The Gillian Reny Stepping Strong Center for Trauma Innovation as of February 28, 2018.

$1,000,000+
Brigham and Women’s Physicians Organization, Department of Orthopaedics
Esta Gordon Epstein and Robert Epstein
Audrey Epstein Reny and Steven Reny
Jack Satter Foundation

$250,000+
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$100,000+
Stephanie F. and John P. Connaughton
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Jessica and Shane A. Baron
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Jeanne M. and John Blasberg

Members of the Leadership Circle at the 2017 Stepping Strong dedication event
ANNUAL HONOR ROLL (AS OF FEBRUARY 28, 2018)

ANNUAL SUPPORTERS

Thank you to the individuals, families, foundations, and organizations who have given $1,000 or more between March 1, 2017, and February 28, 2018.

$500,000+
- Jack Satter Foundation
- Esta Gordon Epstein and Robert Epstein
- Hawk Foundation, Svenson and Nielsen Families
- Audrey Epstein Reny and Steven Reny

$100,000+
- Barbara L. and Michael Eisenson
- Betsy Banks Epstein and David R. Epstein
- Barbara and Amos Hostetter

$50,000+
- Deborah C. and Timothy W. Diggins

$25,000+
- Anonymous

$10,000+
- Amica Insurance Company
- Francis X. Claro
- Paul and Sandy Edgerley
- Nina S. and David P. Fialkow
- Elaine F. and Werner F. Gossels
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MESSAGE OF HOPE AND GRATITUDE FROM THE RENY FAMILY

When faced with unexpected trauma, there are choices—succumb to the challenges or rise up to face them and turn them into a greater good. We chose the latter, and that is what inspired our family to start The Gillian Reny Stepping Strong Center for Trauma Innovation in the aftermath of the 2013 Boston Marathon bombings. Due to a world-class clinical team at Brigham and Women’s Hospital, our daughter Gillian’s recovery from devastating traumatic limb injuries has been remarkable. Even as we approach the fifth anniversary of the bombings, she continues to make progress. This past year she skied again.

We are beyond grateful—not only for her miraculous outcome, but also for the support of nearly 17,000 friends from across the globe who have joined us in our effort to pay it forward. Together, we are elevating the conversation about the societal burden caused by trauma, training civilians on bleeding control, funding innovations that will aid soldiers on the battlefield, studying how to regenerate muscle, skin, and bones, and developing new clinical procedures that enable trauma patients to get back to living their lives.

The progress outlined in this report is the result of our collective passion and generosity. On behalf of those whose lives will be marked by unexpected trauma and who will benefit from the work of the Stepping Strong Center, our family thanks you from the bottom of our hearts.

Audrey, Steven, Danielle & Gillian

Thank you
STEPPING STRONG ADVISORY BOARD

The Stepping Strong Advisory Board consists of distinguished business leaders and philanthropists in the Greater Boston area and beyond. Along with providing strategic guidance on Stepping Strong programming, fundraising, and outreach, advisory board members seek to connect Stepping Strong to leading corporations, philanthropies, and academic centers nationwide.

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