Dear Colleagues, Supporters, Collaborators, and Friends,

It is my great pleasure to provide our first-ever Annual Report of the joint Brown-Lifespan Center for Digital Health.

2020 was a year of flexibility, courage, and innovation for all of us. We thought we were just looking forward to rebranding our Emergency Digital Health Innovation program as a new, academic medical center-wide Brown-Lifespan Center for Digital Health. We never expected a novel coronavirus!

We are proud to have not only persisted, but thrived, in this moment. We developed a robust operations and leadership team (see page 6) with representation from departments across Lifespan and schools across Brown. With the support of Brown Tech Innovations, we developed a comprehensive strategic plan. We completed renovations on our new location at 139 Point St (and are looking forward to using them fully once we are all vaccinated). We transitioned our research to remote, and back again. We hired four new staff entirely virtually, and retooled our seminar series for the virtual world. Our senior staff completed the RI Bio Leadership program. We identified and implemented work on anti-racism for our staff and mentees. We were awarded multiple new federal and foundation grants, signed our first industry agreements, completed a small business technology transfer award, and grew partnerships with numerous local organizations including Rhode Island Commerce, the New England Medical Innovation Center, and RI Bio.

We also stepped up to the moment by making major contributions to local and national responses to COVID-19, developing and helping to evaluate numerous digital health-informed solutions to COVID-19. Among our most notable accomplishments was the launch of MyCOVIDRisk.app, a CDH-sponsored app that allows individuals to assess and mitigate their risk of infection by SARS-CoV-2 in real-time. The app has been used more than 1 million times in the past 2 months and has been featured by the LA Times, The Atlantic, Fast Company, CNN, and more.

Most of all, we are excited to build out our impact in our 4 strategic quadrants - Collaborate to Innovate, Practical Research, Experiential Education, and Scale for Impact - in 2021, with all of you. We truly look forward to creating and implementing digital health innovations that improve lives, together.

Best,
Megan Ranney MD MPH FACEP
Director, Brown-Lifespan Center for Digital Health
Brown-Lifespan Center for Digital Health

Our Mission
Creating digital health innovations that improve lives. Together.

Our Vision
The Brown-Lifespan Center for Digital Health (CDH) is a hub where creative minds across diverse disciplines and perspectives can create and implement impactful digital health. CDH is a model of how an academic medical center can influence health by uniting technology, science, entrepreneurs, healthcare, and health systems. We drive a rapid pipeline from discovery to dissemination through our deep commitment to methodological rigor, equity and ethics. Building on our direct connections with our patients, communities, and practitioners, our research is informed by both current and future clinical needs. We collaboratively design, test, and deploy digital health projects that address society’s most pressing health challenges. We anticipate and help shape the future of the field. We impact health through digital innovation - together.

Our Values
Impact: We pursue projects that make a real difference for real people. We are dedicated to ensuring that digital health is effective, usable, and feasible - and to making sure that digital health products that meet these metrics are shared widely.

Innovation: The best digital health interventions push the edge. They redefine how we think about health outcomes, how and where technology can influence health, and what new combinations of digital technology and healthcare may be possible. We believe that the most transformative innovations emerge from partnerships of unusual suspects; new connections between diverse disciplines, academic institutions, and private and public organizations are key to our long-term success.

Equity: Our work is deeply rooted in our communities - our patients, our clinicians, community partners, researchers, and students. Through careful inclusion of voices that have traditionally been underrepresented in the science and design of healthcare interventions, we can focus our work on addressing and preventing social inequities in health. We commit to diversity, equity, and inclusion in the deepest sense of the words. This focus on equity is too often missing from the world of digital health.

Integrity: In recognition of our responsibilities to our patients and colleagues, we ensure that our work is rigorous, using best-of-class methods for development, measurement, and dissemination. Our work must also be ethical. We respect our responsibilities to patients, participants, and providers; are attentive to conflict of interest; and maintain a purposeful eye toward issues of stigma, transparency, and justice.
Brown-Lifespan Center for Digital Health

Our Objectives

- To conduct high-quality, rigorous research on innovative digital health solutions for the acute care setting
- To facilitate partnerships between clinicians, researchers, and industry
- To use digital health solutions to improve health at both the individual patient and the population levels
- To train the next generation of leaders in digital health care

Research

Due to the lack of a rigorous evidence base, most of our projects focus on methodologically rigorous design and testing of digital technology to improve patient and provider experience. We have extensive expertise in dynamic, iterative development processes as well as randomized controlled trials and cohort studies. Project funding derives from federal grants, foundations, industry partnerships, and internal grants. CDH is a collaboration between The Warren Alpert Medical School of Brown University and its primary affiliated teaching institution, Lifespan Health System.

Services

In addition to conducting research on and implementing digital health solutions to improve patients’ acute care and long-term health, we are also working with venture capital and startup companies to provide services including short-term shadowing opportunities; focus group facilitation; advice on viability, usefulness, and acceptability of new informatics & digital health solution; and insider insights into clinical workflow.

Education

We are training the next generation of leaders in digitally-based health care. We hold weekly seminars, and sponsor opportunities for students of all levels through blogs, Twitter, pre-clinical electives, independent studies, and research opportunities.
Creating a space for our stakeholders to ideate and collaborate affects all aspects of our work; from education to research to commercialization, CDH brings together the necessary experts to accelerate innovation.
## Leadership

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<tr>
<td>Megan Ranney, MD, MPH, FACEP</td>
<td>Founding Director</td>
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<td>Nicole Nugent, PhD</td>
<td>Associate Director</td>
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<td>Michael Armey, PhD</td>
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<td>Don Dizon, MD, FACP</td>
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<td>Shira Dunsiger, PhD</td>
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<td>Elizabeth Goldberg, MD</td>
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<td>Ross Hilliard, MD</td>
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<td>Jeff Huang, PhD</td>
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<td>Mustafa F. Mazlumoglu, MSc, MBA</td>
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<td>Rochelle Rosen, PhD</td>
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<td>Anthony Spirito, PhD</td>
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<td>Kimani C. Toussaint, Jr., PhD</td>
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<td>Tyler Wray, PhD</td>
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## Staff

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<tr>
<td>John Patena, MPH, MA</td>
<td>Research Manager</td>
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<td>Justin D. Richard, MMCi</td>
<td>Center Manager</td>
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<td>Langa Bakhuluma-Ncube</td>
<td>Clinical Research Assistant</td>
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<td>Charlotte Bingaman, MEd, MArch</td>
<td>Senior Research Assistant</td>
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<tr>
<td>Selena Evora, MPH</td>
<td>Senior Clinical Research Assistant</td>
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<tr>
<td>Paola Jimenez-Munoz</td>
<td>Clinical Research Assistant</td>
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<tr>
<td>Ameera Kuforiji, MSc</td>
<td>Clinical Research Assistant</td>
</tr>
<tr>
<td>Emily Kutok</td>
<td>Senior Clinical Research Assistant</td>
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<tr>
<td>Kyler Lehrbach</td>
<td>Clinical Research Assistant</td>
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<tr>
<td>Elisa Liang</td>
<td>Clinical Research Assistant</td>
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<tr>
<td>Leah Salzano</td>
<td>Senior Clinical Research Assistant</td>
</tr>
<tr>
<td>Caroline Scherzer</td>
<td>Senior Clinical Research Assistant</td>
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</tbody>
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Leadership, Faculty, and Mentees

Affiliated Faculty

Jared Anderson, MD
Stephen Bach, PhD
Francesca Beaudoin, MD, PhD
Sara Becker, PhD
Beth Bock, PhD
Laura Brave Whiteley, MD
Larry Brown, MD
Liz Chen, PhD
Charlene Collibee, PhD
Hamish Fraser MBChB
Richard Gillerman, MD, PhD
Ziya Gokaslan, MD, FAANS, FACS
Ernestine Jennings, PhD
Deanna Kaplan, PhD
Leo Kobayashi, MD
Anastacia Kudinova, PhD
Kirsten Langdon, PhD
Alexis Lawrence, MD
Harish Lecamwasam, MD
Adam Lewkowitz, MD
Elizabeth McQuaid, PhD
Lauren Micalizzi, PhD
Cedric Priebe, MD
Alison Riese, MD, MPH
Jack Rusley, MD, MHS
Indra Neil Sarkar, PhD
Jon Steingrimsson, PhD
Sarah Thomas, PhD
Elizabeth Thompson, PhD
Mark Zonfrillo, MD, MSCE
Leadership, Faculty, and Mentees

Mentees

Eric Bai  The Warren Alpert Medical School
Swechya Banskota  The Warren Alpert Medical School
Katherine Barry  The Warren Alpert Medical School
Amalia Bay  Brown University
Melanie Bozzay PhD  The Warren Alpert Medical School
Shaquanna Brown PhD  Brown University
Taylor Burke PhD  The Warren Alpert Medical School
Kevin Chen  Brown University
Lauren Choi  Brown University
Natalie Choy  Brown University School of Engineering
Adriana C. Salazar Coariti  The Warren Alpert Medical School
Gregory Cohan  Brown University School of Public Health
Betty Czitrom  Brown University
Hari Dandapani  Brown University
Nediyana Daskalova PhD  Brown University
Natalie Davoodi  Brown University School of Public Health
Isabella Deckey  Brown University
Mbaye Diouf PhD  Brown University School of Engineering
Nicole Doria  Dalhousie University
Aaron Eisman  The Warren Alpert Medical School
Robbie Felton  Brown University
Gauri Gadkari  Brown University School of Public Health
Alice Hamblett  The Warren Alpert Medical School
Mohammed Haji MD  Brown University School of Engineering
Mitchell Harling  Brown University
Arenal Haut  Brown University School of Public Health
Sarah Helseth PhD  The Warren Alpert Medical School
Chris Hughes  Brown University School of Engineering
Gabriela Hoefer  Brown University
Ryan Hoopes  Brown University
Andrew Howes  The Warren Alpert Medical School
Galen Hu  Brown University
Chiaka Ibe  Brown University
Frances Jimenez  Brown University School of Public Health
Leadership, Faculty, and Mentees (cont'd)

Nicholas Jones
Deanna Kaplan PhD
Vishal Khetpal MD
Christopher Koehler
Krishangi Krishna
Kathleen Kuesters
Jeannie Le
Lily Li
Melinda Li
Zixi Lin
Sokunvichet Long
Renny Ma
Nathan Manrique
Sofia Mason
Talie Massachi
Madison McCarthy
Shivani Mehta
William Mims
Isabelle Moseley
Jacqueline Nesi PhD
Teniola Oguntolu
Benjamin Pallant
Ryan Rahm-Knigge
Johnny Roy
Nicholas Scott
Reid Secondo
Isabelle Sharon
Zach Siberman MD
Sophia Song
Dan Strauss
Meghna Tummala
Rebecca Wang
Jeannette Gonzales Wright MD
Maria Zou

Brown University School of Public Health
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Dan Strauss  The Warren Alpert Medical School
Meghna Tummala  Brown University
Rebecca Wang  Brown University
Jeannette Gonzales Wright MD  The Warren Alpert Medical School
Maria Zou  Brown University
Research Assistant Team

May 2020

(Row 1, Left to Right) John Patena, Emily Kutok, Kyler Lehrbach, Galen Hu

(Row 2, Left to Right) Maddie McCarthy, Renny Ma, Amalia Bay, Caroline Scherzer, Langa Bakhuluma-Ncube

(Row 3, Left to Right) Leah Salzano, Isabelle Moseley, Ben Pallant, Nick Jones

(Row 4, Left to Right) Dr. Ranney, Ameera Kuforiji, Nick Scott, Betty Czitrom

(Row 5, Left to Right) Ryan Hoopes, Greg Cohan
**Research Projects**

### Currently Funded


5. **Development of a Novel Mobile Health Tool for Age-Specific Dehydration Assessment and Management in Patients with Diarrheal Disease.** R01 DK116163 (Co-I: Rosen). 9/18-8/23.


Research Projects

Recently Completed

1. Health-related Technology Use and Quality of Life in Older Adults. NIA MSTAR T35 AG038027-10. 6/10-9/20. Amount: $12,256.


Davoodi NM, Healy M, Goldberg EM. “Rural America’s Hospitals are Not Prepared to Protect Older Adults From a Surge in COVID-19 Cases.” Gerontology and Geriatric Medicine, 2020 Jul;6:2333721420936168.


Peer-Reviewed


e-Publications, Book Chapters, and Non-Peer Reviewed


• Strauss DH, Goldberg EM. "Development of an Apple Watch Training Manual for Older Adults." Virtual Poster Presentation, AMS Academic Symposium, November 2020. https://doi.org/10.26300/08fn-3857


• Strauss DH, Chen K, Goldberg EM. Apple Watch Usability in Older Adults: An Emergency Department-Based Protocol. October 2020. (Abstract Presentation at The Patient and the Practitioner in the Age of Technology: Promoting Healing Relationships) *via Zoom due to COVID-19

• Chen K, Strauss DH, Goldberg EM. Recruiting Older Adults into an Emergency Department-Based Apple Watch Training Session and Field Testing Study. October 2020. (Abstract Presentation at The Patient and the Practitioner in the Age of Technology: Promoting Healing Relationships) *via Zoom due to COVID-19

• Hilliard RW, Haskell J, Gardner RG. Are specific elements of electronic health record use associated with clinician burnout more than others? Poster presentation at the Society of General Internal Medicine Annual Meeting. May 2020, Birmingham, AL *Cancelled due to COVID-19*


• Hilliard RW, Mast C, Sinsky C. Leveraging Your EHR to Reduce Administrative Tasks and Improve Patient Care. Scientific Session, American College of Physicians Internal Medicine Meeting. April 2020, Los Angeles, CA. *Cancelled due to COVID-19*

• Hilliard RW, Tufte J, Pandita D. Telling the Patient Story in the EHR World. Scientific Session, American College of Physicians Internal Medicine Meeting. April 2020, Los Angeles, CA. *Cancelled due to COVID-19*

• Ranney ML, Dizon D. Invited speakers, “Using social media to get more people involved in your research and practice”. COBRE on Opioids, Providence, RI. January 2020.

• Kudinova AY, Brick L, Jenkins GA, Gilbert AC, Barthelemy C, DeYoung L, MacPherson HA, Radoeva PD, Armey MF, Dickstein DP. “Trait irritability is associated with greater levels of negative and lower levels of positive mood assessed via ecological momentary assessment technology in youth.” Poster presented at the annual meeting for the American College of Neuropsychopharmacology (ACNP) in Orlando, FL. December 2019.

CDH Educational Programs

We have provided substantive research mentorship to undergraduate students (recipients of Undergraduate Teaching and Research Awards “UTRAs” and Summer Research Assistantships), graduate students, medical students, residents, fellows, and post-doctoral students. Student research assistants participate in a monthly Journal Club.

Blog

Combined, CDH and EDHI have published over 100 blog posts on a variety of digital health topics ranging from wearable medical technology, to maternal mortality, to mental health in the workplace. CDH and EDHI staff and affiliates write blog posts to share their knowledge in a particular area of digital health and engage critically with recent developments and current events in the field.

Social Media

We have expanded our social media presence with regular postings on LinkedIn, Twitter, Facebook, and Instagram. Our Twitter (@browndigihealth) has more than 1,600 followers, with over to 1,600 tweets.

Seminar

CDH and EDHI have held over 30 seminars on a variety of topics in digital health. Sessions are attended by residents, faculty, research staff, community partners, medical students, undergraduate students, and the general public. Topics cover a plethora of digital health domains. Recordings of a few of our 2020 seminars are listed below.

1. 9/30 Seminar with Intus Care: Machine Learning, Social Determinants, and Electronic Health Record Data to Reduce Preventable Long Term Care Utilization
2. 10/28 Panel Co-Hosted with Slater Technology Fund: Is This It? AI for Differential Diagnosis
3. 11/11 Seminar with Richard Gillerman, MD: Leveraging a Novel Self Service Reporting Tool - Epic SlicerDicer
4. 12/2 Seminar with Co-Founder and CEO of Sproutel, Aaron Horowitz: Designing With Empathy: Creating a Companion for Children With Cancer
In addition to the Seminar Series organized by CDH (and previously EDHI), we promote local and regional events relevant to our work in research and technology design, such as Brown Hack Health and the Digital Health Accelerator Program. On an international scale, we partnered with the Digital Medicine in Society (DiMe) in Fall 2020 to participate in their Tour of Duty; as a collaborator, CDH will work with industry stakeholders to develop the Playbook for the adoption of digital clinical measures.
We are thrilled with our 2020 accomplishments! By relaunching the Emergency Digital Health Innovation Program as the Brown-Lifespan Center for Digital Health, we are poised for great things in research, education, and partnership in the year to come. Our expertise and dedication to advancing science will lead to increases in our research publications, expansion of our team, and further developing our educational offerings through our seminar series and digital health research training programs.

We hope to strengthen our partnerships between clinicians, researchers, and industry over the next year. It is imperative that stakeholders from across the industry continue to collaborate in order to accelerate innovation. Together with our partners, we will get the digital health technologies to those that need them most; we will continue to conduct cutting edge research with methodological rigor; and, we will transfer our knowledge to the next generation of researchers.

### Industry and Non-Profit Partners

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### Moving Forward In 2021

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