How can UCSF redefine health research so it addresses the full spectrum of healthcare and into decentralized spaces in our homes, clinics, and retail stores—challenging traditional care capabilities to pinpoint the factors in our lives that create health. As these understandings become widespread and transformational, new approaches are needed to deliver care efficiently and effectively. Technological advances transform where and how health care is provided.

Over the next decade, an explosion of experiments aimed at rethinking the processes of education and learning are poised to disrupt traditional learning paradigms. For example, MIT’s new course on open learning platforms with Massive Open Online Courses (MOOCs) has enabled the university to find a new model for education, providing online courses that connect students around the world. This ability to offer courses to anyone is creating an opportunity for learners all over the globe. Create your own scenario in this map impact other areas? Using examples of projects, people, and change. Check out their websites or go to discuss how your community fits. Lead discussions or host public forums. Throughout this map there are pathways to the future for simple, concrete actions you can take to coexist and present opportunities for UCSF and its community to transform learning in the classroom.

The future of UCSF is open and collaboration. That means you need your ideas to reframe UCSF for the next decade and the opportunity for innovation. Below are some places you can join the conversation, share your vision, and start making the future today!

1. Anticipate the Future: Explore the Innovation Zones
   - Immerse yourself in the future by exploring the zones of innovation.

2. Consider the Possibilities: Map Your Future
   - Explore the zones of innovation and imagine your own vision of the future.

3. Make the Future: Join the Conversation
   - Share your ideas and join the conversation on social media.

Innovations in technology are transforming how we think about health care. For example, emerging technology is giving us both unprecedentedly small data—granular real-time information captured in real-time, Proteus hints at the possibilities of health care in the future. As we move into a world in which an increasingly wide array of information is measured and digitized—Emerging technology is giving us both unprecedentedly small data—granular real-time information captured in real-time, Proteus hints at the possibilities of health care in the future.

What if UCSF breaks down barriers between disciplines to create a holistic health ecosystem, UCSF will need to utilize open education platforms and new collaboration tools to enhance institutional structures that emphasize innovation, creativity, and disruption will further.

Creating transparent tools to enable interdisciplinary teams to easily and effectively identify each and their potential contributions to improving outcomes.

ABUNDANT DATA

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**FUTURE FORCE 1: SOCIALSTRUCTED WORLD**

Real-time collaboration tools enable crowds to create value from large-scale networks.

In recent years, socialstructing—using social technologies to aggregate small contributions from large networks—is enabling individuals and networks to accomplish tasks that once required large institutions. Already, early experiments in socialstructing are hinting at opportunities to transform our traditional models for research, education, and health. For example, Fold-It—an online, multiplayer game developed by University of Washington researchers—has enabled thousands of game players to participate in solving research questions that traditional researchers could not answer. As these kinds of technologies proliferate, they will break down traditional barriers to producing research and education.

- What new kinds of approaches to research collaboration outside the walls of the university could UCSF pioneer in a socialstructured world?
- How could UCSF enhance patient care with data from large networks of patients?
- How can UCSF use gaming and other social media to harness resources from across the community to transform learning in the classroom?

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**FUTURE FORCE 2: ABUNDANT DATA**

An exponential increase in the volume and variety of data unleashes new models for research and care.

As we move into a world in which an increasingly wide array of information is measured and digitized—through our phones, email, credit cards, and, increasingly, our wearable devices—the volume and variety of data that matters to health science research will explode. As the sheer volume of data outpaces the ability of a single person to comprehend it, scientific expertise will be redefined by the ability to synthesize and connect disparate concepts and findings from across siloed fields. Meanwhile, new players are emerging to innovate new ways of aggregating and mining data to generate new insight and value that promises to transform education, research, and medicine from outside the walls of formal institutions.

- How could UCSF use abundant data to define research that demands collaboration across fragmented disciplines and stakeholders?
- How could integrating data science transform education and learning at UCSF?
- How can UCSF ensure that the volumes of patient data it gathers now lead to action and insight; and translate to immediately enhance patient care?

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**FUTURE FORCE 3: OPEN LEARNING PLATFORMS**

Open learning and research models make a university-level education accessible for everyone on the planet.

Over the next decade, an explosion of experiments aimed at rethinking the processes of education and learning are poised to disrupt traditional learning institutions. For instance, MIT’s early experiments with Massively Open Online Courses (MOOCs) has enabled the university to found the EdX consortium of schools, offering videos, coursework, and certification to anyone with an Internet connection worldwide. This ability to offer coursework to anyone is creating an opportunity for universities to dramatically expand their global reach. At the same time, as course offerings become widely accessible and affordable, the operational models, and even the models we use for teaching and learning, will be called into question.

- How could open learning platforms define new forms of research collaboration?
- What opportunities exist for extending the reach of patient education on the new open learning platforms?
- How could the educational mission of UCSF reach millions of people worldwide?

**FUTURE FORCE 4: ANYTIME, ANYPLACE HEALTH**

Technological advances transform where and how health care is provided.

Innovations in low-cost technologies are turning health measurement from an occasional act performed in a clinic to a constant, ubiquitous process. Sensors ranging from wearable devices that measure health status to monitors embedded in our offices and homes are creating new capabilities to pinpoint the factors in our lives that create health. As these understandings become clearer, health interventions will increasingly move outside of traditional hospital and clinical settings and into decentralized spaces in our homes, clinics, and retail stores—challenging traditional care delivery models while enabling new strategies to engage.

- How can UCSF redefine health research so it addresses the full spectrum of health care to health—anytime, anyplace?
- How can UCSF define new models of care delivery outside the hospital, in the home, community, and on-the-go?
- How can education and learning opportunities extend outside and off-campus where patients and their health needs live?
**FUTURE FORCE 1: SOCIALSTRUCTURED WORLD**

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**FOLD-IT**: A massively multiplayer game with a Tetris-like interface, Fold-It enables researchers to break down complex biological problems into puzzles to enable the crowd to participate in research.

**SOYLENT**: Using Amazon’s Mechanical Turk, Soylent users enter an outline for an essay, which is then written and revised by the crowd to deliver a final essay.

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**KAGGLE**: An online data repository that uses contests to solicit the best results, Kaggle has enabled data scientists to develop novel findings in health, education, and a variety of other fields.

**PROTEUS**: Ingestible pills with a built-in sensor to monitor physiological signs in real-time, Proteus hints at a world in which individual health is tracked seamlessly and constantly.

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**EDX**: Founded originally by MIT, EdX has become a global consortium offering MOOCs developed by dozens of schools to learners all over the globe.

**GOOGLE HELPOUTS**: An online platform to connect individuals to global experts for on-demand help. Google Helpouts is designed to create learning opportunities on a just-in-time basis.

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**SCANADU**: An at-home diagnostic device that its makers describe as a medical tricorder, Scanadu enables individuals to diagnose a variety of basic ailments without consulting a physician.

**PARKINSON’S VOICE INITIATIVE**: A demonstration project that uses subtle changes in vocal patterns to detect the early signs of Parkinson’s disease, the Parkinson’s Voice Initiative has the potential to turn a routine phone call into a medical exam.
While this map depicts the landscape of possibilities available to UCSF and its partners, it is just the first step that anyone in the UCSF community can take today to help UCSF lead in a decade of change. You can use these pathways to start experimenting and jumpstart the future for UCSF.

**START A CONVERSATION**

Use this map to provoke conversations. What do you think about these visions of the future? What can you do about them? How can you lead in a decade of change, UCSF will need to find new ways to foster a community-wide effort to search for new and unexpected collaborators. Open platforms will continue to transform how research and learning is done, while new consumer technologies promise to disrupt traditional medical practice for putting health tools in the hands of everyday people. To continue this exponential increase in the volume and variety of data unleashes new possibilities from the community into innovation zones.

**EXPLORE TECHNOLOGY**

Many of the technologies that make these visions possible rely on open-source software. By opening up the source code of projects that are changing the way we live, work, and track our health journey, UCSF can create new opportunities to accelerate translational research and innovative applications.

**FUTURE PROOF IT**

Assess your own realities for the future. What do you see for your own career? What do you see for your community, research group, or department? How does your job connect with all of these visions of the future?

**FIND YOUR VISION**

Who do you want to be in 2027? What do you want to have accomplished in your career? What if UCSF becomes the leader in digital health innovation and converting data to care? By providing all patients with tools to easily gather and share their data in the gaps between clinical care and social and environmental factors, UCSF could dramatically lead in a decade of change.

**CREATIVE VISIONS**

What opportunities do these visions of the future present for your community? What if UCSF develops a Google-like lab to enable faculty to pursue big, bold research? What if UCSF breaks down barriers between disciplines to enable faculty, staff, and students to seamlessly identify potential collaborators? What if UCSF leads the creation of Bio Silicon Valley? What if UCSF becomes the leader in digital health innovation and converting data to care? What if UCSF becomes a center of translational research and innovation for personalized medicine? What if UCSF leads the development of an integrated health system across the urban and rural North Bay?

**REINVENT LEARNING AND EDUCATION**

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**NEW TECHNOLOGIES AND PRACTICES ARE DISRUPTING HOW, WHAT, AND WHERE WE LEARN. EDUCATION IS MOVING OUT OF EPISODIC EXPERIENCES AT TRADITIONAL INSTITUTIONS AND BECOMING A CONSTANT LAYER OVER EVERYDAY LIFE. LEARNING IS NO LONGER LIMITED TO A CERTAIN LIFE STAGE OR EVEN A CERTAIN TIME OF DAY. AS STUDENTS OF ALL AGES AROUND THE WORLD BEGIN TO SEE THEMSELVES AS PART OF A VAST LEARNING Ecosystem, UCSF WILL NEED TO UPLIFT OPEN EDUCATION PLATFORMS AND NEW COLLABORATION TOOLS TO TRULY REINVENT WHAT IT MEANS TO LEARN.**

**FUTURE POSSIBILITIES:**

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Innovations will be called into question. For instance, MIT’s early accessible for everyone on the planet.

Many of the technologies that make these futures possible are available, but which ones are most relevant to your network? Identify the broad forces shaping the future and guide you to the

What do you like about these visions of the future? What if UCSF develops a global university for learners all over the world? What if UCSF sets the standard for open health data? What if UCSF harnesses new insights from the social sciences to create precision engagement? Many of these futures possible are available, but which ones are most relevant to your network? Identify

UCSF could leverage new technologies for sharing, collaborating, and learning anywhere, anytime to promote interdisciplinary, learner-based problem solving.

UCSF could provide interdisciplinary, team-based aging care and guidance to become the leader in interprofessional, team-based aging care and guidance to become the leader in

UCSF could expand access to health science education to inspire passion for science in people of all ages. By working closely with a wide range of community partners to dramatically expand access to educational opportunities, UCSF could increase the number of medical professionals to serve the needs of the public.

UCSF could provide a visual framework to understand the many future possibilities that have been

UCSF could take advantage of being situated in the Bay Area's innovation ecosystem, UCSF will need to utilize open education platforms and new collaboration tools to

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A demonstration of how social structural tools can enable data scientists to provide more meaningful and actionable insights into complex data sets. For example, in the field of personalized medicine, where vast amounts of patient data are collected, social structural tools can help identify patterns and trends that can inform treatment decisions.

The future of health care is increasingly dependent on this kind of data-driven approach. As health systems seek to address the growing burden of chronic diseases and improve patient outcomes, they must rely on sophisticated analytics tools to make sense of the data. Social structural tools are a critical part of this effort, as they allow researchers to connect the dots between different data sets and uncover hidden insights.

In conclusion, the potential for social structural tools to transform health care is immense. By enabling researchers to analyze large data sets in new and innovative ways, social structural tools have the power to revolutionize the way we approach health care and improve patient outcomes.
UCSF: OPPORTUNITIES FOR INNOVATION AND LEADERSHIP

CONVERT DATA TO KNOWLEDGE, INSIGHT, AND ACTION

As the volume and variety of data continues to grow exponentially, UCSF needs to rapidly adopt new tools for data management and new practices in analysis and visualization in order to build knowledge to inspire the next generation of discoveries. New approaches to health, education, and research will be data driven, so this innovation zone lays an important foundation that can support the entire system.

FUTURE POSSIBILITIES:

• What if UCSF sets the standard for open health data?

• What if UCSF becomes the leader in digital health innovation and converting data to care?

• What if UCSF develops an open and interoperable platform that could accelerate efforts to convert data into practical research and advances in medical care?

• What if UCSF leverages the power of the human genome to develop new treatments? UCSF could use patient data to help refine models of disease progression and to discover new targets for treatments.

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• What if UCSF develops an open platform that could accelerate efforts to convert data into practical research and advances in medical care?
How are YOU making the future of UCSF?

**FUTURE POSSIBILITIES:**
- What if UCSF develops a Google-like lab to enable faculty to pursue big, bold research?
- What if UCSF creates a consulting group to utilize students, staff, and faculty?
- What if UCSF uses an open knowledge graph to enable faculty, staff, and students to seamlessly identify collaboration potential?

**CURRENT INNOVATIONS:**
- **The Entrepreneurship Center:**
  The Entrepreneurship Center at UCSF works to create an ecosystem of innovation and commercialization of UCSF inventions through startup ventures by providing scientists and clinicians the knowledge, support, and connections they need to become entrepreneurs.
- **UCSF Open Proposals:**
  With UCSF’s new model for collaboration in proposed creation and team development, proposals are posted online for peers to review, offer support and resources, and even join the proposal team.

**INNOVATION ZONE 4:** BUILD UPON AND ENHANCE A CULTURE AND ENVIRONMENT OF INNOVATION

To successfully tackle the biggest challenges in health, research, and education, UCSF needs to embrace the innovative spirit already so prevalent in the Bay Area. This will mean being open to experimentation, embracing the possibility of failure, and constantly searching for new and unexpected collaborations. An open platform will continue to transform how research and learning is done, while new consumer technologies threaten to disrupt traditional medical practice by putting basic health tools in the hands of everyday people. To remain at the leading edge, UCSF will need to find new ways to foster a community-wide effort to connect across silos and pioneer new innovations.

**FUTURE POSSIBILITIES:**
- What if UCSF extends its reach into a variety of health and aging care and guidance to become the global leader in aging science and decision contexts?
- What if UCSF mobilizes the entire university to execute on a precision initiative?
- What if UCSF harnesses new insights from the social sciences to create precision engagement?
- What if UCSF develops new ways of engaging patients globally in areas of critical need?
- What if UCSF extends its reach into a variety of health and aging care and guidance to become the global leader in addressing the needs of aging populations?

**CURRENT INNOVATIONS:**
- **Institute for Health and Aging:**
  UCSF’s Institute for Health and Aging has expanded the scope of its work beyond treatments, addressing the focus research and public service efforts on the promotion of health and the prevention of disease in old age.
- **Center for Digital Health Innovation:**
  UCSF’s Institute for Health and Aging has expanded the scope of its work beyond treatments, addressing the focus research and public service efforts on the promotion of health and the prevention of disease in old age.
- **Medical-Legal Partnership for Social Change:**
  Through the program of the UCSF eagles, Center on Law, Science & Health, UCSF’s Medical-Legal Partnership for Social Change provides free and low-cost legal aid to improve the health and well-being of low-income elderly patients in legal issues related to health, such as advance health care planning, estate planning, and public benefits.

**INNOVATION ZONE 3:** CATALYZE CITIZEN EMPOWERMENT AND ENGAGEMENT

As personal meanings of health and well-being vary, UCSF can increase efficacy and improve satisfaction by wrapping patients with the services and information to help make of their choices and increasing access to help empower people manage their health. UCSF can lay foundations for broad public participation in the management of health and health care. The tools of anytime, anywhere care are enabling UCSF to use high-touch, high-reward, and low-cost approaches to increase healthcare equity and make care accessible to all.

**FUTURE POSSIBILITIES:**
- What if UCSF sets the standard for open health data?
- What if UCSF becomes the leader in digital health innovation and converting data into improved care?
- What if UCSF harnesses new insights from the social sciences to create precision engagement?
- What if UCSF becomes the leading health system nation?

**CURRENT INNOVATIONS:**
- **Innovative Learning Models:**
  Innovative learning models make a university-level education available for everyone on the planet.
- **Bi-directional Link:**
  Real-time collaboration tools enable companies to create value from large-scale networks.
- **An experimental increase in the volume and variety of data creates new models for research and care.

**INNOVATION ZONE 2:** CONVERT DATA TO KNOWLEDGE, INSIGHT, AND ACTION

As the volume and variety of data continue to grow exponentially, UCSF needs to rapidly adopt new tools for data collection and management and new practices in analysis and visualization in order to break new data sets that will inspire the next generation of researchers and students. New approaches to health, education, and research will be data driven, so this innovation zone lays an important foundation for all others.

**FUTURE POSSIBILITIES:**
- What if UCSF catalyzes a movement to make the Bay Area the healthcare region in the world?
- What if UCSF pioneers a UC-wide health partnership?

**CURRENT INNOVATIONS:**
- **San Francisco Health Improvement Partnership:**
  UCSF and San Francisco Health Improvement Partnership, a collaborative effort relying on a range of public, nonprofit, and private stakeholders to work together to foster innovation in diverse communities.
- **Center for Digital Health Innovation:**
  UCSF and California Health and Human Services Agency, with UCSF leadership, created a report calling for a “Knowledge Network” to integrate the molecular data with environmental and patient data to develop personalized treatments.
- **ONE Precision Medicine Summit:**
  UCSF convened 170 of the world’s foremost clinicians, creators, and innovators to identify new approaches and spur action to make medicine more precise, preventive, and precise.

**INNOVATION ZONE 1:** CREATE TRANSFORMATIVE PARTNERSHIPS TO ADVANCE HUMAN HEALTH

No single institution can address the next decade’s health, research, and education challenges on its own. As players from a wide range of industries continue to venture into these health and healthcare arenas, it will be imperative for UCSF to form new partnerships to address familiar health challenges in creative, novel ways. To accelerate innovation and learning, UCSF needs to align and connect with potential collaborators and build a reputation as the convener of great innovators.

**FUTURE POSSIBILITIES:**
- What if UCSF leads the development of an integrated health system across the Bay Area?
- What if UCSF becomes the leader in digital health innovation and converting data into improved care?
- What if UCSF becomes the leading health system nation?

**CURRENT INNOVATIONS:**
- **UCSF Medical Center:**
  UCSF is part of San Francisco Health Improvement Partnership, a collaborative effort relying on a range of public, nonprofit, and private stakeholders to work together to foster innovation in diverse communities.
- **Hastings Consortium on Law, Science & Health:**
  Through the program of the UCSF eagles, Center on Law, Science & Health, UCSF’s Medical-Legal Partnership for Social Change provides free and low-cost legal aid to improve the health and well-being of low-income elderly patients in legal issues related to health, such as advance health care planning, estate planning, and public benefits.
- **FTC Open Proposals:**
  With UCSF’s new model for collaboration in proposed creation and team development, proposals are posted online for peers to review, offer support and resources, and even join the proposal team.

**INNOVATION ZONE 5:** ANYTIME, ANYPLACE HEALTH

New technologies and practices are disrupting how, what, and where we learn. Education is moving out of isolated experiences at traditional institutions and becoming a constant layer over everyday life. Learning is no longer confined to a certain life stage or even a certain time of day. As students of all ages all over the world begin to see themselves as part of a vast learning ecosystem, UCSF will need to utilize open education platforms and new collaboration tools to truly rethink what it means to learn.
How can UCSF redefine health research so it addresses the full spectrum of healthcare?

That measure health status to monitors embedded in our offices and homes are creating new and their health needs live?

SCANADU:
An at-home diagnostic device that can diagnose a variety of medical conditions without a visit to a physician.

FUTURE POSSIBILITIES:

INNOVATION ZONE 1:

No single institution can address the next decade's health, research, and education challenges on its own. UCSF is uniquely positioned to leverage its partnerships with the University of California System to create a regional innovation ecosystem that will connect across siloes and foster new innovations.

- **INNOVATION AND LEADERSHIP**
  - By catalyzing a global movement to make health data open and interoperable UCSF could leverage its leadership in the health sciences and build a global community of researchers, educators, and health practitioners.

INNOVATION ZONE 2:

The living lab at UCSF is an example of this kind of collaboration where connections are made among researchers, clinicians, and patients to design and test new approaches in real-world settings.

- **SOCIAL STRUCTURED WORLD**
  - What if UCSF catalyzes a movement to make the Bay Area the healthiest region in the world? By making health data open and accessible, UCSF could accelerate innovation and improve health outcomes for all.

INNOVATION ZONE 3:

BRING PRECISION TO THE FULL SPECTRUM OF HEALTH

- **FUTURE POSSIBILITIES:**
  - By making health data open and accessible, UCSF could accelerate innovation and improve health outcomes for all.

INNOVATION ZONE 4:

CATALYZE CITIZEN EMPOWERMENT AND ENGAGEMENT

- **FUTURE POSSIBILITIES:**
  - By making health data open and accessible, UCSF could accelerate innovation and improve health outcomes for all.

FUTURE FORCES:

- **INNOVATION ZONE 1:**
  - **What if UCSF mobilizes the entire university to execute on a precision initiative?**

- **INNOVATION ZONE 2:**
  - **What if UCSF takes a lead role in modifying organizational structures and incentives to enhance organizational culture?**

- **INNOVATION ZONE 3:**
  - **What if UCSF could build it a university leadership model that is a land of opportunity?**

- **INNOVATION ZONE 4:**
  - **What if UCSF rethinks the learning model to put the patient at the center of this abundant data?**


PARKINSON'S VOICE INITIATIVE: A demonstration of the changes in voice patterns that accompany the progression of Parkinson's disease, the disease itself, and the potential to use a voice application to evaluate the disease.

Innovations in low-cost technologies are turning health measurement from an occasional process into a clinical constant, ubiquitous process. Sensors ranging from wearable devices to our phones, email, credit cards, and, increasingly, our wearable devices — the volume and variety of data we generate are increasing.

How could UCSF enhance patient care with data from large networks of patients?

Real-time collaboration tools enable crowds to create value from large-scale networks. With Amazon's hits, Foldit, which uses cloud computing to unravel proteins relevant in the fight against Alzheimer's disease, it calculates the potential for virulent forms of the disease.

INNOVATION FORUMS:

- **OPEN LEARNING PLATFORMS**
  - A university-wide open learning platform that uses open-source software and sharing technology to provide a wide range of courses and services. It includes modules that focus on interdisciplinary collaboration and allow learning at all levels.

- **ANYTIME, ANYPLACE HEALTH**
  - A learning and research platform that enables faculty, staff, and students to access educational resources regardless of location or time.

- **CREATE TRANSFORMATIVE INNOVATIONS**
  - A repository that seeks to organize the best ideas and results from the center's collaborations to develop novel findings in health care and a variety of other fields.