

2018), an increased awareness of the differences in the norms, behaviors, and attitudes around the meaning of health across cultures will open up opportunities for community healthcare workers whose cultural backgrounds and upbringings resemble those of the people they serve.⁴

Healthcare navigators will assist in determining the most appropriate care regimens by communicating healthcare provider needs as well as the circumstances and understandings of the patients. Increased transparency around persistent racial, cultural, and socioeconomic disparities in health outcomes will drive new supporting occupations to aid medical professionals in determining the environmental, social, and economic realities of their diverse patient population in order to provide better care.⁵

Green Health

Increased attention from the healthcare industry to manage, monitor, and improve its environmental footprint will spur new demand for performance managers, evaluators and auditors to develop new metrics, collect data, and analyze the costs and the benefits of all green initiatives.⁶ In addition, the building, renovating and refurbishing of hospitals, assisted living settings, labs, and clinician offices will be heavily influenced by this trend of green health. Healthcare organizations will realize a new function as building companies, many with mandates to procure green materials and implement green processes. Inside hospitals, the trend toward fresher, local, and organic food will flourish with in-hospital farmers markets and partnerships with small, local farms.⁷ An emphasis on locally sourced, healthy food choices will create staffing needs focused on developing localized supply chains, and new employment opportunities will open up in the reprocessing and remanufacturing of medical devices.⁸

Quantified Selves

Presently, large interoperable clinical information systems are the focus of health information technologies (HIT) and information communication technologies (ICTs). This overlooks the growing practice of self-quantification. Increasingly, people track and measure themselves, from fitness to mood to chronic pain. With gadgets to monitor sleep, mobile apps to record food intake, and ever easier-to-use data visualization tools, individuals are becoming experts at understanding the patterns of their bodies and lives.

Healthcare providers will need support in integrating the personal health data collected by individuals with that captured within the clinical setting. Self-quantification opens up opportunities for new medical device innovators to make gadgets for capturing data and providing clinical decision support and for developers to build mobile application “apps” for recording, viewing, and analyzing data.⁹ Future workforce needs will include jobs in data analytics and visualization to aggregate and interpret huge amounts of raw data and to be able to interweave it into a care regimen prescribed by a health provider.

4 US Department of Labor, Bureau of Labor Statistics, “Interpreters and Translators” in *Occupational Outlook Handbook 2010-2011*. Online: <http://www.bls.gov/oco/ocos175.htm>.

5 Los Angeles County Department of Public Health, Office of Health Assessment and Epidemiology. *Mortality in Los Angeles County 2007: Leading causes of death and premature death with trends for 1998-2007*. June 2010.

6 Global Health and Safety Initiative. Online: <http://www.globalhealthandsafety.org/about/>.

7 Kaiser Permanente, “Building Green: Kaiser Permanente’s Green Building Practices” Online: <http://xnet.kp.org/newscenter/aboutkp/green/factsheets/index.html>

8 US Department of Labor, Bureau of Labor Statistics, “Home Health Aides and Personal and Home Care Aides” in *Occupational Outlook Handbook 2010-2011*. Online: <http://www.bls.gov/oco/ocos326.htm>

9 Indeed, “Job trends for Mobile Application Developer and iPhone Developer from July 2005-January 2010” Online: <http://www.indeed.com/jobtrends?q=mobile+application+developer%2Ciphone+developer>

The Institute For the Future

NOVA contracted with the Institute for the Future (IFTF) to complete this map. IFTF is an independent nonprofit research group founded in 1968 by a group of former RAND Corporation researchers. IFTF is committed to building the future by understanding it deeply.

IFTF works with organizations to help them make better, more informed decisions about the future and provides the foresight to create actionable insights. It brings a combination of tools, methodologies, and a deep understanding of emerging trends and discontinuities to its work with companies, foundations, and government agencies.

Methods

To develop the trends depicted on the map, researchers from across disciplines worked together to identify the trends and discontinuities shaping the future landscape of health, information, communication, the workforce, and technology. IFTF combined futures research analysis with more quantitative research to provide a deeper understanding of the changing workforce landscape in healthcare.

In launching the project, the researchers consulted IFTF’s existing research project findings, including: **Future of Health and Health Care 2020** highlighting the pressing challenges facing health and healthcare, and key response strategies likely to shape change; **The Future of Work** looking at convergent trends in technology and how a new workforce, with new technological skills, waits in the wings; **Mobile Health** examining the explosion of ubiquitous mobile communications and computing along with resultant opportunities for innovation in health management, service delivery and consumer/patient engagement; **Open Health** applying the principles of open innovation to the global health economy; **Baby Boomers: The Next 20 Years** exploring the transition of the country’s 77 million boomers from mid-life to later life over the next two decades; **Biocitizenship and Social Media** introducing the concept of biological citizens and examining how this transformation relies on advances in technology and social media; **Personal Health Ecologies Framework** outlining a broad set of resources, practices and strategies people leverage to support their health, make decisions, and interact with the health care system; **Rethinking Disability** arguing that the disability space is emerging as a major hot zone of marketplace innovation; and **Ruby’s Bequest** examining the future of caregiving in the United States.

Researchers infused a healthcare workforce focus with previous findings by applying a modified Delphi method to aggregate expert opinion, test assumptions, and build on experts’ ideas. IFTF and experts focused primarily on *disruptive trends* that would expand the traditional thinking around the future of Silicon Valley’s healthcare workforce and training strategies over the coming decade.



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FUTURE FORCES OF CHANGE MAP: 2010–2020 TRENDS SHAPING THE HEALTHCARE WORKFORCE

This map of trends shaping the healthcare workforce in Silicon Valley 2010–2020 highlights key disruptive shifts in the technology and socio-demographic landscape, new ways that people will conceive of and manage health and caregiving, and new intersections between health, the environment, and food.

The map is to help you think about the future of the healthcare workforce in **engaging and constructive ways**. The map’s forces of change indicate new concepts or patterns of behavior that will disrupt traditional assumptions about the future of health and healthcare in Silicon Valley over the next decade. The influencing forces will demand new sets of worker skills and produce new workforce opportunities. The five identified forces of change are:

- Children’s health commons
- Collaborative caregiving
- Diversity redefined
- Green health
- Quantified selves

The convergence of an aging population, chronic disease burden, and the next decade’s changing technological landscape serves as the springboard for the disruptive forces of change identified on this map. These forces will change how one works within and receives care in the healthcare system. Review and consider what this will mean to workers and patients.

The purpose of the map is to spark new conversations about roles and employment opportunities that may open up in the health ecosystem of Silicon Valley over the next decade. Use this map as a conversation catalyst.

Workforce Implications

For every forecast there exists a litany of potential implications; those below are by no means the only workforce implications possible. Focusing on the following *five disruptive drivers of change* for the healthcare workforce attempts to address the complexity of the future with a set of pointers that will help job seekers better prepare for what might be ahead. Please reflect on the below implications and consider them when planning actionable steps towards a future career in the healthcare workforce.

Children’s Health Commons

More community-based interventions will open up employment opportunities to prevent and reduce childhood obesity outside of formal healthcare settings and channels. There will be a preventative occupational focus, with jobs for specially trained fitness coaches to motivate and instruct children; nutritionists and cooking instructors, specialized in teaching the skills required to prepare nutritious, affordable family meals; and software and game designers to develop fun, engaging technological tools to encourage physical activity for the young and technologically-minded.

Schools will have to manage health conditions, emerging as a result of increased childhood obesity, such as diabetes. This will produce more jobs in schools and across communities to support health management for children’s chronic conditions. Already, California schools are required to have non-medical staff members trained to administer insulin and help children monitor blood-sugar levels.¹ More ancillary positions will become available to support children in managing their health conditions in a variety of settings.

Collaborative Caregiving

Caregiving will be one of most important—and redefined—health roles of the 21st century.² The role of the caregiver will be transformed—from constantly needed nurse and housekeeper to a more intelligently applied companion. The unbundling of the roles and responsibilities of caregiving will allow for advances in technology to take care of the monitoring and maintenance aspects, and allow caregivers to concentrate on the more subtle, nuanced social support for those in need.

Early examples of this change already exist in the “dashboard” interfaces for nurses who remotely monitor the vital signs and daily self-reports of large groups of patients. Remote monitoring will demand caregivers with skills and expertise around sensing and identifying patterns out of a deluge of data. Additional opportunities will arise for those able to connect large health IT systems to sensor networks and personal monitoring technologies that people are using in their homes and assisted living situations. In the meantime, traditional caretaking roles such as health home aides are projected to grow much faster than the average for all occupations.³

Diversity Redefined

Over the next decade, diversity will reshape both the healthcare workforce and patient populations of Silicon Valley. In addition to medical interpreter and translator employment (projected to increase 22% between 2008 and

1 Anita Manning, “Calif. Schools required to give medical help to kids with diabetes” in *USA Today*, (August 8, 2007) Online: http://www.usatoday.com/news/health/2007-08-09-diabetes-school_N.htm

2 IFTF, *Ruby’s Bequest From Caregiving to Caring: A new approach to civic engagement*. Online: <http://www.iftf.org/RubysBequest>.

3 US Department of Labor, Bureau of Labor Statistics, “Home Health Aides and Personal and Home Care Aides” in *Occupational Outlook Handbook 2010-2011*. Online: <http://www.bls.gov/oco/ocos326.htm>

future forces of change

2010–2020 trends shaping the healthcare workforce

MAP LEGEND

Drivers of change are major forces of transformation that will shape the future of healthcare and workforce opportunities in Silicon Valley. These distinct directional shifts point to new concepts or new patterns of behavior that will disrupt traditional narratives and assumptions about the future of health and healthcare over the next decade.

Workforce implications describe how the drivers of change will open up new workforce opportunities to respond to the expanding needs of Silicon Valley.

Help wanted ads from the future suggest new roles and functions that might emerge in the future healthcare ecosystem. **Imagine the possibilities** of occupations that do not exist today but could exist in some form in the future.

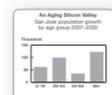
Signals are examples, or early indicators, of the changes described by the drivers of change.

Pace of change reflects the speed at which the drivers will evolve, mature, and spread throughout Silicon Valley between 2010 and 2020.

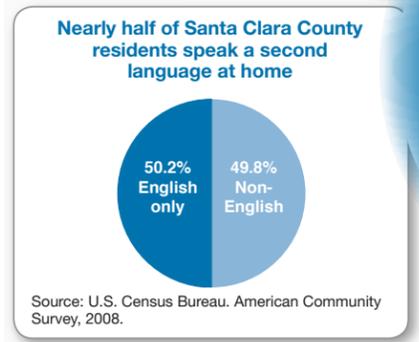
near-term = 0–3 years
mid-term = 3–5 years
long-term = 5–10 years

WORKFORCE IMPLICATIONS
Near-term needs for supporting occupations will include: medical interpreters and translators, and trainers and counselors in culturally agile care.

NEEDED:
Community Health Navigator
To enable continuity of care by assisting with the management of care and financial issues.



NEEDED:
Community Health Navigator
To enable continuity of care by assisting with the management of care and financial issues.



diversity redefined
Comprehensive cultural care will be delivered based on a richer understanding of health—viewed not only in strictly biological terms, but also in terms of the social, emotional and spiritual well being of people across cultures.

NEEDED:
Ethno-Cultural Ambassador
To enhance cross-cultural understanding by informing care providers of distinct attitudes and approaches.

WORKFORCE IMPLICATIONS

- Near-term needs for **supporting occupations** will include: medical interpreters and translators, and trainers and counselors in culturally agile care.
- Awareness of the differences in the norms, behaviors, and attitudes around the meaning of health will create opportunities for people with diverse backgrounds.
- Navigators will bridge the needs of providers and the circumstances of the patients to help determine the most appropriate care regimens.

NEEDED:
Visual Analytics Expert
To translate raw data into compelling infographics that help make information meaningful.

quantified selves
People will be tracking, visualizing, and analyzing their fitness levels, chronic pain, sleep, diet, and other factors, and health care providers will be looking for support in integrating this patient-generated data into clinical HIT infrastructure.

WORKFORCE IMPLICATIONS

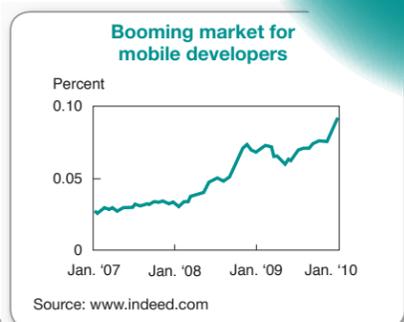
- Near-term needs for **supporting occupations** will include: web developers, network administrators, and software engineers.
- Anticipate new opportunities for medical device innovators to make gadgets for capturing data, and for developers to build apps for recording and viewing data.
- Jobs in data analytics and visualization will be needed to make sense of the raw data and apply it to personal health.

NEEDED:
Anti-Obesity Crusader
To provide family-level counseling on nutrition, exercise, and lifestyle changes.

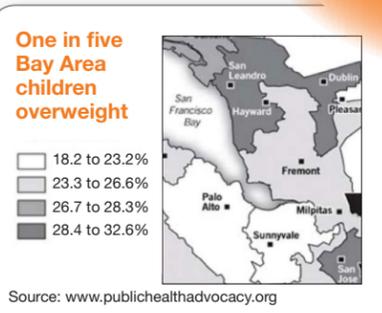
children's health commons
In the interest of our collective long-term future, the creation of a commons—or a new cultural platform—will facilitate an integrated approach to improving the health and well-being of children.

WORKFORCE IMPLICATIONS

- Near-term needs for **supporting occupations** will include: fitness coaches, counselors, nutritionists, meal planners, and cooking instructors.
- Opportunities will emerge for software designers who can develop engaging software to encourage physical activity and healthy eating.
- Non-medical staff members will be needed in schools to support students in managing diabetes, asthma, and other chronic conditions.



NEEDED:
Self-Quantification Coach
To assist chronic disease patients with skills and tools for self-measurement.



NEEDED:
School Chronic Care Liason
To administer insulin and help children monitor blood-sugar levels during the school day.

collaborative caregiving
New technologies will allow for greater remote presence in and intelligent awareness of patients' lives, enabling professional caregivers to focus on providing more meaningful social support.

WORKFORCE IMPLICATIONS

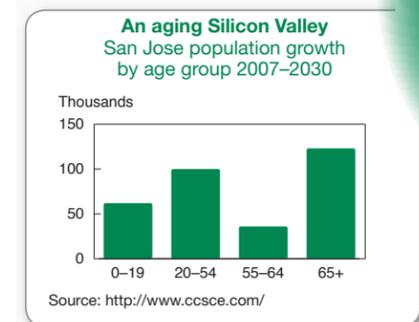
- Near-term needs for **supporting occupations** will include: home health aides, personal assistants, health data analysts, and IT technicians.
- Caregivers will be needed to monitor the sensor data from multiple patients to ascertain when in-person support is required.
- IT support will be essential to integrate internal IT infrastructure with external sensor networks and personal health technologies.

NEEDED:
Environmental Health Impact Appraiser
To evaluate and quantify the environmental footprint of a healthcare institution.

green health
Sustainability initiatives—from the design and construction of green hospitals, to the greening of pharmaceuticals, medical, and cleaning supplies, to green sourcing of food and beverage offerings within a healthcare setting—are sprouting up across the healthcare industry, and new metrics and accounting structures will be required to demonstrate their efficacy.

WORKFORCE IMPLICATIONS

- Near-term needs for **supporting occupations** will include: organizational development specialists, accountants, and analysts.
- Developing local supply chains will create new staffing needs to link healthcare institutions with local resources.
- Opportunities will open up in the reprocessing and remanufacturing of medical devices.



NEEDED:
Needs Curator
To monitor a diverse set of data streams and determine appropriate care interventions.

NEEDED:
Pattern Sensing
To identify subtle variations to routine pattern—mood change, physical activity—suggesting in-person support needed.

New organizations advocate for health and sustainability

Source: www.noharm.org

NEEDED:
Local Sourcing Coordinator
To connect local resources with supply chain management at large medical facilities.