Leading the Biomedical Revolution in Precision Health:
How Stanford Medicine is Developing the Next Generation of Health Care

Annual Stanford Medicine Population Health Sciences Colloquium
October 26, 2015

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Carl and Elizabeth Naumann Dean, Stanford University School of Medicine

A bold vision for 2025

<table>
<thead>
<tr>
<th>Health care today</th>
<th>Precision Health tomorrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>after-the-fact</td>
<td>predictive and preventive</td>
</tr>
<tr>
<td>one-size-fits-all</td>
<td>personalized</td>
</tr>
<tr>
<td>fragmented</td>
<td>patient-centered</td>
</tr>
<tr>
<td>uninvolved</td>
<td>participatory</td>
</tr>
<tr>
<td>low value</td>
<td>preeminent</td>
</tr>
</tbody>
</table>
The P’s of Precision Health

**predictive and preventive**
targets interventions and stops disease before it starts

**personalized**
tailors care to individual variations (i.e., Precision Medicine)

**patient-centered**
coordinates care and empowers patients and families

**participatory**
involves individuals in their own health care

**preeminent**
delivers the best health outcomes at the lowest cost

Predictive and Preventive

Targets interventions and stops disease before it starts

**today**

- Lipid profile
- Immune profile
**Personalized**

Tailors care to individual variations (i.e., Precision Medicine)

<table>
<thead>
<tr>
<th>today</th>
<th>tomorrow</th>
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</thead>
<tbody>
<tr>
<td>Some targeted treatments for cancer</td>
<td>Targeted treatments for other diseases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Today</th>
<th>Tomorrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid</td>
<td></td>
<td>56%</td>
</tr>
<tr>
<td>Colorectal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endometrial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Pancreatic</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Other Gyn</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Other Gyn</td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>

Percentage of patients whose tumors were driven by certain genetic mutations

**Patient-centered**

Coordinates care and empowers patients and families

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Targeted treatments for other diseases

Percentage of patients whose tumors were driven by certain genetic mutations
Participatory

Involves individuals in their own health care

today

By 2020, eighty percent of the adult population will own a smartphone

tomorrow

Economist, February 28, 2015

Preeminent

Delivers the best health outcomes at the lowest cost

today

trial-and-error dosing
adverse drug reactions
late diagnoses
reactive treatment
unnecessary hospitalizations

Cost

Outcomes

Value

tomorrow

late diagnoses
unnecessary hospitalizations

11/20/2015
Why now?

Now is a time of unprecedented possibilities for human health, a time when new knowledge and technologies are accelerating the pace of biomedical discovery.

A biomedical revolution is underway.

Why Stanford Medicine?

A place driving change.
The Precision Health difference

<table>
<thead>
<tr>
<th>Precision Health</th>
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<tbody>
<tr>
<td>Precise</td>
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</tr>
<tr>
<td>Personalized</td>
<td>Personalized</td>
</tr>
<tr>
<td>Proactive</td>
<td>Reactive</td>
</tr>
<tr>
<td>Includes prediction and prevention</td>
<td>Relies on diagnosis and treatment</td>
</tr>
<tr>
<td>Focuses on keeping you healthy</td>
<td>Focuses on treating you when you’re sick</td>
</tr>
<tr>
<td>Health care</td>
<td>Sick care</td>
</tr>
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How will Stanford Medicine lead?

- **Preeminent Clinical Care**
- **Transformative Biomedical Platforms**
- **Innovative investments and creative collaborations**
- **Fundamental Research & Biomedical Data Science**
The driver: Big data

- Genomics
- Epigenomics
- Metabolomics
- EMR history
- Lab tests
- Imaging
- Social factors
- Environment
- Lifestyle choices

New Stanford Department of Biomedical Data Science

Biostatistics  (quantitative models)
Biomedical Informatics  (qualitative models)
Building a learning health system

Data influences practice and practice influences data

My discovery

Superior Canal Dehiscence
Vital role for population health sciences

Partnering with Google
Health technology

Sharing health data

We need to incentivize individuals to share their data and create a new culture of engagement.

Survey on participation in Large-Scale Research Cohort

- 43% are willing to have "their" information and research results available on the Internet to anyone, if anonymized
- 58% believe research participants should help decide what to do with study results
- 74% want their genetic results from the study returned to them

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There’s a role for all of us

Together we at Stanford Medicine have an opportunity to develop the next generation of health care.

join us

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