The Challenge of Digital Health

Dr Richard Ashby
Chief Executive, eHealth Queensland
The five major agendas of first world health
Strategic Health Agendas

- Integrated care
- Precision medicine
- Population health
- High reliability healthcare organisation
- The intelligent healthcare enterprise
Integrated Care

- My Health Record – National Health Record
- eReferrals
- Provider and Consumer Portals
- Remote monitoring
- Wearable Technology
- Internet of Things
  - 1 trillion sensors by 2024
  - 400 ZB 2020
- Apps
  - 250,000 → 30% prescribing
  - Library
  - Overregulation
Precision Medicine is a healthcare model that proposes significant personalisation of decisions with preventative strategies, diagnosis and treatment tailored around the:

- genetics
- biology
- environment
- lifestyle

of the individual patient, enabled by eHealth and the digital world.

e.g. Obama: “Precision Medicine Initiative, 2015”
Precision medicine exemplar - Melanoma
Population Health

- Real time trials
- Big Data
- Small Data
- Geospatial visualisation
- Citizen Science
- Online Communities, Online “Nations”
The High Reliability Healthcare Organisation

❌ Variation  ✔️ Zero Harm

“Can you predict the next harmful incident and prevent it?”

Dave Roberts - Leadership Forum May 2017

Descriptive ↓ Predictive
prescriptive analytics
The High Reliability Healthcare Organisation

How?

• Active and passive clinical decision support. For example:
  – Allergy alerts
  – Drug-Drug interactions
  – Complex prescribing (insulin, warfarin etc.)
    • 85,000 order sentences
    • 600 complex medication orders
  – Automated checking of levels, sensitivity, renal/hepatic function etc.
    • e.g. GENTAMYCIN

Power Plans

• Evidence based diagnostic and therapeutic plans for specific conditions (e.g. STEMI, Fractured NOF etc.)
The High Reliability Healthcare Organisation

Visualisation / Virtualisation
The Intelligent Healthcare Enterprise

“Evidence into practice in a day, not a decade”

- Predictive, prescriptive, streaming analytics
- Cognitive Computing /Desktop Learning/NSP/Augmented Intelligence
- Big Data/Small Data
- Visualisation/Virtualisation
- Data fusion
Departmental dashboards
Departmental dashboards
Disease dashboards
National Safety and Quality Standards Dashboards
The Case for Digital
The Digital Hospital

A digital hospital is a hospital service facility with highly connected, interactive digital information systems which support precise, informed treatment of individual patients/clients while enabling optimally efficient use of infrastructure.
Digital Hospital

Other

- Advanced imaging / Radiomics
- Genomics
- Microbiomics
- Synthetic biology
- Nanotechnology
- Advanced analytics
- 3D printing
- Robotics

etc ...
Digital Hospital Benefits

Better consumer and staff experience

<table>
<thead>
<tr>
<th>Safer Care</th>
<th>Efficiency and Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication errors</td>
<td>Length of stay</td>
</tr>
<tr>
<td>Serious falls</td>
<td>(500 bed hospital)</td>
</tr>
<tr>
<td>Hospital infection</td>
<td>Nursing care time</td>
</tr>
<tr>
<td>VTE</td>
<td>Activity</td>
</tr>
<tr>
<td>Cardiac arrests</td>
<td>Duplication</td>
</tr>
<tr>
<td>(record high 16/17 activity – Record low cardiac arrest)</td>
<td>Cost per WAU</td>
</tr>
<tr>
<td>Evidence based care</td>
<td>Access and throughput</td>
</tr>
<tr>
<td>Readmissions</td>
<td>indicators record high</td>
</tr>
</tbody>
</table>

- ↓ indicates decrease
- ↑ indicates increase
- ✔ indicates increase with a record high
Challenge

Use technology to:

- enhance personal efficiency
- improve personal and group reliability
- improve collaboration
- predict and prevent harm
- Improve system efficiency.

“The clinician of the future will be more autonomous, but also more accountable”
Challenges

- Legacy infrastructure and systems
- Pace of technology advances
- “The myth of interoperability”
- Participatory health and democratisation of medicine
- Cyber security
- Workforce transformation
Thank you