Innovation, the diffusion challenge

Presented by Tracey Watson, NHS Digital
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Joseph Connor, NHS Digital Innovation Associate
## Key stages in the digital pathway

<table>
<thead>
<tr>
<th>Pathway stage</th>
<th>Key activities</th>
<th>Evidence generated</th>
<th>Goal</th>
</tr>
</thead>
</table>
| **1 Exploring opportunities and challenges** | - Early stage discovery  
- Horizon scanning and market review  
- NHS systems mapping  
- Establish relationships with key partners  
- Protect intellectual property | - Existing market and evidence  
- NHS context - assets, opportunities and constraints | • A well understood and clearly defined problem or opportunity |
| **2 Generating ideas** | - Crowdsourcing ideas  
- Human-centred design activities (such as personas and patient journeys) with stakeholders  
- Map clinical workflows and care pathways  
- Assess clinical safety, privacy and regulatory requirements (for example, CE marking) | - A clear account of change supported by evidence  
- Alpha prototypes | • An idea or set of ideas to develop and test |
| **3 Developing and testing** | - Feasibility  
- Prototyping  
- Trialing  
- Light touch evidence generation  
- Address clinical safety, privacy and regulatory requirements | - Beta prototype  
- A stronger case with cost and benefit projections developed through practical trials and experiments, involving potential users | • Demonstrate that the idea works, or evidence to support a reworking of the idea |
| **4 Making the case** | - Business case development  
- Identify benefits and savings  
- Scope and size the market  
- Undertake controlled pilot / public beta  
- Design and generate evidence  
- Identify sustainability/commercial models and consider procurement | - Even stronger case with cost and benefit projections developed through practical trials involving end users | • Clarity about what warrants implementation and funding |
| **5 Delivering and implementing** | - Find initial clients and customers for evidence generation  
- Establish implementation models and service support capability and capacity | - A robust and detailed case developed through formal evaluation and evidence gathering – use of a control group to isolate impact | • An implemented and sustainable innovation |
| **6 Growing, scaling and spreading** | - Scale customer base and extend adoption  
- Improve evidence base and iterate  
- Refine implementation models and support | - Evidence derived from evaluations in multiple sites, independently run | • Impact at scale |
<table>
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<tr>
<th>Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholly digital health</td>
<td>The initiative is solely aimed at digital health in England.</td>
</tr>
<tr>
<td>Partially digital health</td>
<td>Digital health is a specifically identified sector but not the only sector in scope. Geography limited to UK.</td>
</tr>
<tr>
<td>Health only</td>
<td>The initiative supports health innovation in the UK but it does not include a digital focus.</td>
</tr>
<tr>
<td>Data</td>
<td>The initiative is solely aimed at data &amp; health in England and or the UK.</td>
</tr>
</tbody>
</table>

**Funding Sources:**
- Public
- Academia / Research
- Private
- Third
- Collaboration with private
- Collaboration without private

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<tr>
<td>Incubator / accelerator + funding</td>
<td>Programme of structured support for early stage innovation (stages 1-3). May include workspace, mentors, training, networking. Includes a cash injection. Will usually involve competition and have limited entry points.</td>
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<tr>
<td>Incubator / accelerator (no funding)</td>
<td>Programme of structured support for early stage innovation (stages 1-3). May include workspace, mentors, training, networking, but not direct cash injection. Will usually involve competition and have limited entry points.</td>
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<td>Portal</td>
<td>An online-only service that provides access to information and or is a mechanism for the innovator to promote themselves and their products.</td>
</tr>
<tr>
<td>Community (free)</td>
<td>A physical or virtual place where there is support for innovators ranging from information and signposting, networking events, workshops, etc. No membership fees. No entry requirements or access controls (e.g. selection process).</td>
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<tr>
<td>Community (membership fee)</td>
<td>A physical or virtual place where there is support for innovators ranging from information and signposting, networking events, workshops, etc. Involves a membership fee (usually nominal but not always). No entry requirements (e.g. selection process) and access controls.</td>
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<td>Fund</td>
<td>Cash injection provided following a call for proposals. Always involves competition and will have limited access points.</td>
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<tr>
<td>Advice &amp; brokerage</td>
<td>A service that provides general advice and guidance, including signposting and introductions. No fees. No competition, limited access controls (selection criteria or entry points).</td>
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<td>Evidence mechanism</td>
<td>A programme involving NHS organisations and a significant time commitment to assist innovators to generate real world evidence. Usually competed. Will usually involve competition and have limited entry points.</td>
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<tr>
<td>Paid consultancy / support</td>
<td>Offers that can assist innovators in various aspects of their journey that are sponsored by the public or third sectors. (e.g. does not include businesses providing support).</td>
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<tr>
<td>Course / training</td>
<td>Provision of structured learning that does not include formal ongoing support such as community / mentoring / funding (e.g. less than an incubator or accelerator).</td>
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</table>
Digital Health Innovation Pathway - Types of Support

- Paid consultancy/support
- Fund
- Community (free)
- Incubator/accelerator (no funding)
- Advice & brokerage
- Portal
- Evidence mechanism
- Community (membership fee)
- Incubator/accelerator + funding
- Course/training
## Support mapped against digital pathway

<table>
<thead>
<tr>
<th>Pathway stage</th>
<th>Digital Health Innovation Pathway - Number of initiatives addressing each stage</th>
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<tr>
<td>1 Exploring opportunities and challenges</td>
<td>35</td>
</tr>
<tr>
<td>2 Generating ideas</td>
<td>62</td>
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<tr>
<td>3 Developing and testing</td>
<td>62</td>
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<tr>
<td>4 Making the case</td>
<td>48</td>
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<tr>
<td>5 Delivering and implementing</td>
<td>37</td>
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<tr>
<td>6 Growing, scaling and spreading</td>
<td>12</td>
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What have we learned from our initial research?

• Less support is focused on the initial and latter stages of the digital pathway
• Suspect these areas are closely linked
  • if barriers to entry and clinical & patient needs haven’t been properly factored at the very beginning, the impacts will be felt when diffusing or scaling
  • where the system has yet to find a solution to specific challenges e.g. evidence gathering or innovation disruption, less support is offered
Phase 2 R&D considerations

- Thought Leadership
- Innovators Journey
- Classification
- Navigation
- Simulation Labs
NHS Adventures in AI (Artificial Ignorance)

6 months on…

Presented by Joseph Connor,
NHS AI and ML Innovation Associate
Agenda

• Challenges
  ▪ clinicians need to understand the benefits of Artificial Intelligence (AI)
  ▪ GDPR and algorithmic choice and labelling
  ▪ developing open products

• Results
  ▪ Mental Health Test Bot User experience (UX) testing and trials
  ▪ new data analysis, prep and labelling tools
  ▪ the development process and pipeline
Challenges
Clincians need to understand the benefits of AI

NO

YES - IF CLINCIAN AND UX LED
GDPR & algorithmic choice & labelling

RESEARCH YES, CDSS NO

RESEARCH YES, CDSS YES
Developing Open products for the NHS

- Design With the User
- Understand the Existing Ecosystem
- Design for Scale
- Build for Sustainability
- Be Data Driven
- Use Open Standards, Open Data, Open Source, and Open Innovation
- Reuse and Improve
- Address Privacy & Security
- Be Collaborative
Results
MH TestBot UX testing & trials

- MH clinicians challenge the features not the benefits
- One Trust going to clinical trial with the Bot ‘As is’

- New User: No

- Existing User: maybe
New: analysis, prep & labelling tools
The development process and pipeline to Dec ‘18

Machine Learning in OpenEHR: lexicon creation for NLP

An Ethical GDPR compliant AI Challenge Platform: algorithm testing at scale

Contextualizing clinical dialogue: analysing voice & text data

Increasing access to Triage: a voice UI for clinical questionnaires
AI in healthcare learning points

• Clinicians are King
• Content is Queen
• Algorithms' are not the ACE