Our Time to Shine

Empowering the Data, Information and Knowledge Workforce as a Driving Force for Digital Health and Care

August 2019

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HEALTH & CARE
INSTITUTE

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SCHOOL: ᵗᵒ ARᵗ

University of
Strathclyde
Glasgow

Acknowledgements

Appendices

Appendix 1: Scoping review of the literature on workforce models, workforce planning and development approaches.

Appendix 2: High level mapping of relevant existing capability/competency/career frameworks.

Appendix 3: Emergent themes from consultation with strategic stakeholders

Appendix 4: Baseline workforce survey

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Empowering the Data, Information and Knowledge Workforce as a Driving Force for Digital Health and Care

This report summarises the outcomes of a scoping study of the Specialist Data, Information and Knowledge workforce across Scotland's health and care. It draws together the results of a literature review, mapping of current capability frameworks, stakeholder interviews, a national survey and roundtable consultation. It aims to inform implementation planning for the Workforce Capability Domain of the Digital Health and Care Strategy[i], and development of the informatics capability within Public Health Scotland[ii].

Part 1 of this report presents the major conclusions from the study as a basis for moving forward:

- Key overall message
- Three priorities to create a growth mindset to realise the full potential of this workforce.
- Recommendations for development – including quick wins and longer term development.

Part 2 provides more detail on the study approach and results which underpin the overall conclusions. This section includes project sponsorship, policy context, methodology and key points about current state and challenges for this workforce.

Part 1: Major conclusions to support moving forward

1.1 Key message

All the research and consultation approaches used in this study, and a strong collective voice from practitioners and managers in the Roundtable event, confirm the same overarching message:

The data, information and knowledge workforce has the strengths, core capabilities, and potential to be a driving force in delivering the benefits of data science and knowledge mobilisation for public health and digital health and care.

Since there are no current plans to expand this workforce nationally, we need to maximise their existing strengths, and to develop essential new capabilities. This requires fostering a growth mind-set to empower and enable this workforce, and to support them to collaborate across specialisms, organisations and sectors.

1.2 Three priorities to create a growth mindset

The combined research and consultation methodology identified three major priorities for action to create the growth mind-set that will realise the full potential of this workforce.

Priority 1: Develop a fresh perspective at senior management and practitioner levels, to enable this workforce to maximise their impact on health and care.

There is an imperative for senior management to empower these staff to develop the skills and leadership needed to meet the demands presented by digital transformation and the changing nature of health and care.

At the same time, the workforce also needs to challenge itself to grow, to work in new contexts and with new partners, to deliver the full benefits data, information and knowledge can offer:

- Empower citizens and communities to take ownership of health and wellbeing.
- Enable professionals to use evidence for safe, effective, person-centred care, and to generate and spread innovation and service improvement.
- Provide predictive and anticipatory knowledge to prevent the causes of ill-health, improve population health, and minimise complications and costs of illness.
- Link outcomes and economic intelligence to maximise efficiency and value for money.

Priority 2. Strengthen existing capabilities within this workforce, and develop new capabilities

This is necessary to:

- Support new users – especially citizen empowerment and partnership with third sector and public sector partners beyond health.
- Get the benefits of the full spectrum of data and knowledge, particularly real-world evidence from practice data and lived experience, beyond the traditional research sources.
- Use the power of digital technology to automate routine processes and free up specialist capacity to meet the demand for new skills in advanced analytics and artificial intelligence.

Priority 3. Facilitate joined up working across specialisms and organisations.

Just over half of the current workforce is based in the Public Health and Intelligence Unit in NHS NSS. The remainder are thinly dispersed across Boards and local authorities. There is also evidence of a risk of becoming professionally factionalised within specialist silos. A framework for collaborating to bring together complementary skills for specific purposes, together with building transferable skills, will enable this workforce to support the growing demand for a wide range of information, and for new types of evidence.

1.3 Recommendations for development

Practitioners and managers were inspired and motivated by coming together in the Roundtable in April 2019 to learn about data, information and knowledge-driven innovations. For many it was the first time they had shared learning and experience with colleagues in other specialisms, sectors and organisations. Building on the study findings and case studies shared at the Roundtable, their discussions called for the following developments:

A. Quick wins – requiring minimal new investment

The major opportunity for quick wins is through continued development of the network of Data, Information and Knowledge Specialists initiated at the Roundtable event. The vision is of this network evolving, not only as a learning network, but also as a "doing" network – a

kind of improvement collaborative that will produce, test, share and spread, data- and knowledge-driven digital innovations.

Practical, low cost ways to build the network could include:
1. **Knowledge exchange** sessions to share innovation and learning.
2. **Joint training** sessions and engaging in leadership development opportunities.
3. **Signposting to freely available online learning opportunities** – e.g. MOOCs from online academies, accompanied by mentoring and reverse mentoring opportunities.
4. **Encouraging collaboration to deliver high-impact innovation**. Senior leaders should encourage collaboration across disciplines and organisations on projects of mutual benefit.

The following principles were highlighted for network development:
1. **An inclusive approach**. This means, firstly, bringing together health, social care, local authority and third sector, and engaging with citizens and professionals. For this to succeed, the network needs to value all types of knowledge - classic research, realworld evidence, lived experience and practitioner wisdom.
2. **A focus on conversations and building relationships**, within the network and with practitioners and citizens as users of data, information and knowledge. Joint meetings with other networks – e.g. clinical informatics and the Self-Management Network would be one way to achieve this.
3. **A focus on the skills of translating data and knowledge into action** – e.g. by translating user needs into specifications, and presenting knowledge in decision-ready formats.
4. **A commitment to spreading successful innovation**

B. Longer term development
A business case needs to be made – potentially through the Steering Group for the Workforce Capability Domain of the Digital Health and Care Strategy - to invest in developing:

1. **Data, information and knowledge capabilities at basic, advanced and expert levels across the workforce.** This would be accompanied by awareness-raising and engagement at Executive level and would encompass:
   - Generic, transferable skills alongside speciality-specific skills, to maximise synergies and collaboration across these staff groups.
   - Facilitating adoption and spread of digital innovation.
   - A mix of self-directed and work-based learning, mentorship and coaching, and multi-professional training.

2. **Distributed informatics leadership for the data, information and knowledge workforce**, actively including third sector, local authority and social care as well as health.

3. **Career development pathways** which position this specialist group in the context of careers frameworks for the wider health informatics workforce.

4. **Workforce planning** to ensure that capacity and skill mix meet future demand. This should include identifying where digital technology can automate routine processes, freeing up time for application of more expert capabilities.

5. **A systematic, funded approach to creating collaborative models that develop and implement data- and knowledge-innovation at scale**. For example, this could take the form of a programme of 'grand challenges', requiring the data, information and knowledge workforce to work across disciplines, sectors and organisations, to address priority service needs in public health and delivery of health and care.

Part 2. Study approach and key results

2.1 Sponsorship

The Digital Health and Care Institute, in collaboration with Scottish Government eHealth, and with the support of NHS Education for Scotland, NHS National Services Scotland and the Scottish Social Services Council, commissioned SMCI Associates to scope the extent and nature of the Specialist Data, Information and Knowledge (SDIK) workforce in Scotland's health and care, and to identify their future development needs.

2.1 Policy context

The Scottish Government's Digital Health and Care Strategy (2018) and Public Health Reform provide the policy agenda for this study. The current strategic context – exponential technological development, changing demography, policy shift to digital transformation and a citizen- and community-centred model of health and care – provides a timely opportunity to recognise and value the Specialist Data, Information and Knowledge workforce in delivering data-drive, intelligence-informed and evidence-based health and care. The scoping work was designed to contribute to these strategic plans by consolidating and strengthening specialist data, information and knowledge roles so that these staff realise their full potential in supporting the changing needs for health and care in Scotland.

2.2 Methods

The study was undertaken in 2018-19, and involved multiple methods: strategic stakeholder interviews, a review of the literature relating to the roles of Specialist Data, Information and Knowledge staff, a mapping of potentially relevant capability/competency/career framework, a national baseline survey, and a strategic roundtable event bringing together key national stakeholders to consider the findings of the study and develop recommendations.

Key results which underpin the study conclusions are highlighted below. Detailed reports on each strand of the study are available as appendices:

- **Appendix 1:** Scoping review of the literature on workforce models, workforce planning and development approaches.
- **Appendix 2:** High level mapping of relevant existing capability/competency/career frameworks.
- **Appendix 3:** Emergent themes from consultation with strategic stakeholders
- **Appendix 4:** Baseline workforce survey
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2.3 The need for change

The exponential growth in new technologies is transforming the delivery of health and care services as the demands on these services grow as people are living longer. There are increasing calls for the development of data-driven, intelligence-informed and evidence-based approaches to deliver new cross-sectoral models of health and care in Scotland.

Whilst this transformation is impacting on all people working to deliver health and care services in Scotland, this study focuses on the crucial role of Specialist Data, Information and Knowledge staff.

The roles and functions undertaken by these staff are rapidly changing, and need to be strengthened so that[iii]:

1. Clinicians can use the insights generated by skilled analysts to improve diagnosis and disease management.
2. National and local NHS leaders can evaluate innovations and new models of care to find out if expected changes and benefits were realised.
3. Board members of local NHS organisations and systems can use analysis to inform changes to service delivery in complex organisations and care systems.
4. Local NHS leaders can improve the way they manage, monitor and improve care quality day-to-day.
5. Senior NHS decision makers can better measure and evaluate improvements and respond effectively to national incentives and regulation.
6. Managers can make complex decisions about allocating limited resources and setting priorities for care.
7. Local NHS leaders will gain a better understanding of how patients flow through the system.
8. New digital tools can be developed and new data interpreted so clinicians and managers can better collaborate and use their insights to improve care.
9. Patients and the public will be able to better use and understand health care data.

2.4 The current workforce

This scoping study demonstrated that the Specialist Data, Information and Knowledge workforce in health and care has a relatively low profile, and that key stakeholders are unclear about how to define and identify this workforce.

Despite this, the baseline survey showed not only that staff in these roles identified sufficiently strongly with the title 'specialist data, information and knowledge workforce' to complete the survey (617 responses), but also that there was a high level of interest in being involved in understanding future needs for SDIK skills and capabilities, and in developing new ways of working.

- 72% of the workforce categorise themselves as having data and information roles; 17% identify themselves with knowledge and research roles.
- More staff are working in these roles in health than in social care[1].
- Demand for the expert services provided by this workforce is growing, from service managers, frontline teams, and national programmes. Survey participants provided many examples of their support delivering impact for all these user groups.

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[1] Exact figures unclear due to low response rate from local authorities, but qualitative evidence confirms the difference in capacity between health and social care.

- There is a clear service need for flexible and transferable skills to support growing demand for data, information and knowledge expertise. Encouragingly, workforce identifies generic categories of skills that would support this need: almost two thirds (60%) of all respondents said that their work involved all of the activities suggested in the survey questionnaire i.e.
  - Transferring, sharing, presenting and/or communicating data/information/knowledge
  - Organising, managing, quality assuring and/or validating data/information/knowledge
  - Sourcing, collecting and/or selecting data/information/knowledge
  - Analysing and/or interpreting data/information /knowledge including synthesising knowledge e.g. through systematic reviews
  - Identifying user needs for data/information/knowledge

2.5 Challenges for the current workforce

2.5.1 Dispersal and fragmentation

The baseline survey showed that there is a significant critical mass (51%) of Specialist Data, Information and Knowledge staff working within NHS NSS, mainly in PHI. The remaining 49% are very widely, and thinly, distributed across NHS Boards and local authorities (see Figure 1). Many work in small teams – a quarter (24%) in teams of 5, and a third (33%) in teams of 6 – 10 (see Figure 2).

Figure 1: Where are specialist data, information and knowledge staff employed?
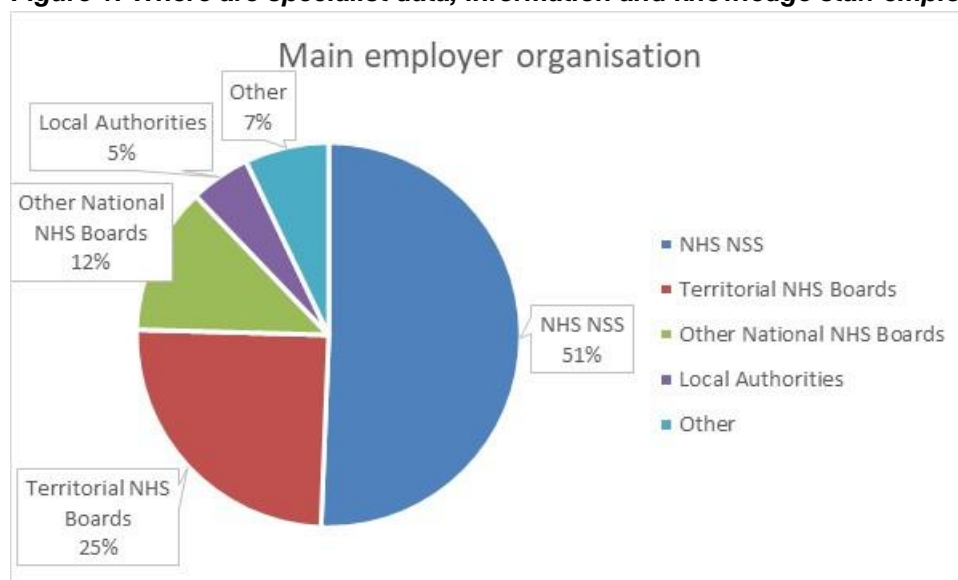
N=395   Total number of responses is greater than the number respondents to the question because respondents were invited to 'tick all that apply'

Figure 2: What size of team do specialist data, information and knowledge staff work in?
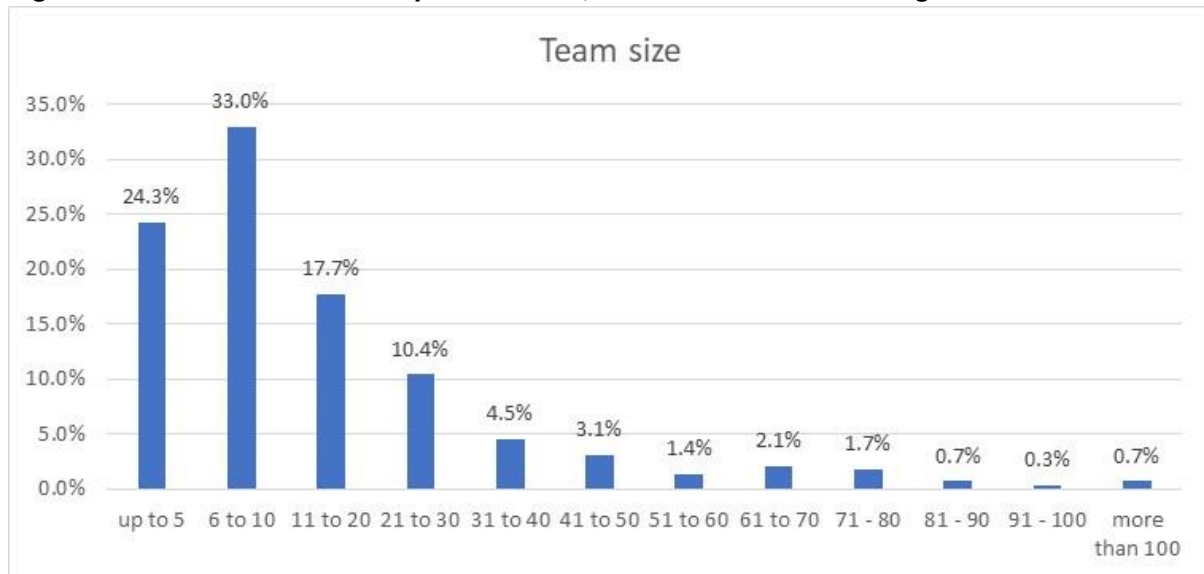

N=288 Where both national and local team sizes were provided, analysis has included local team size only

In addition to the geographical and organisational fragmentation, this workforce is also professionally factionalised, with very small numbers of survey respondents belonging to each of 161 widely varying professional associations. The literature similarly points to a tendency to factionalisation of this workforce, focusing on increasing levels of specialisation, and with an absence of a platform for this workforce as a whole.

2.5.2 Limited learning and career development opportunities

The baseline survey showed that Specialist Data Information and Knowledge staff salary ranges are relatively low, with 70% earning less than £40,000, and 35% earning less than £30,000. A quarter (26%) respondents have been in their current job for more than 10 years, suggesting that there are few career development opportunities. Just under a third of the workforce (29.5%) were older than
50 years old; with only 12.5% being 30 years old or younger (see Figure 3).

Figure 3: Age range of specialist data, information and knowledge workforce.
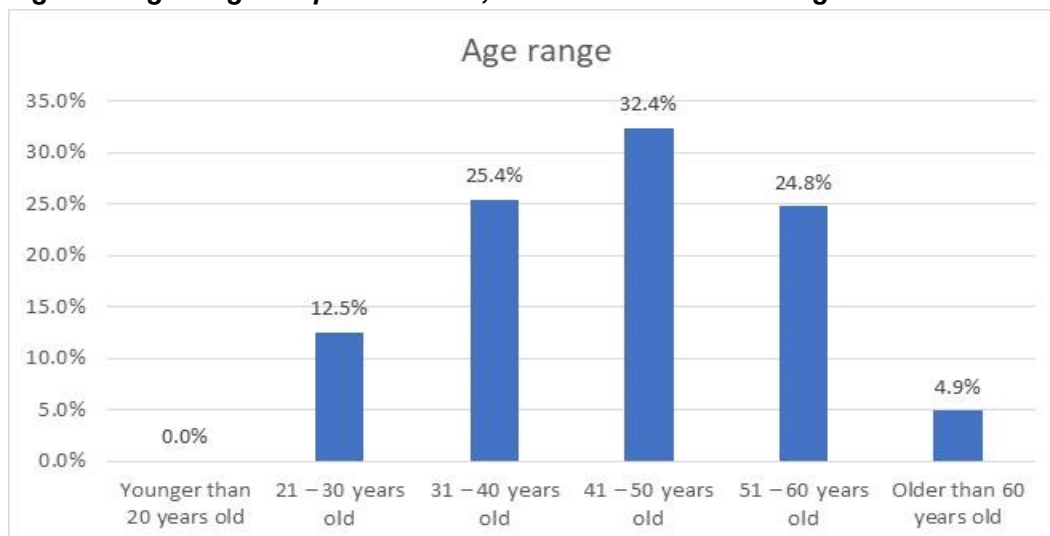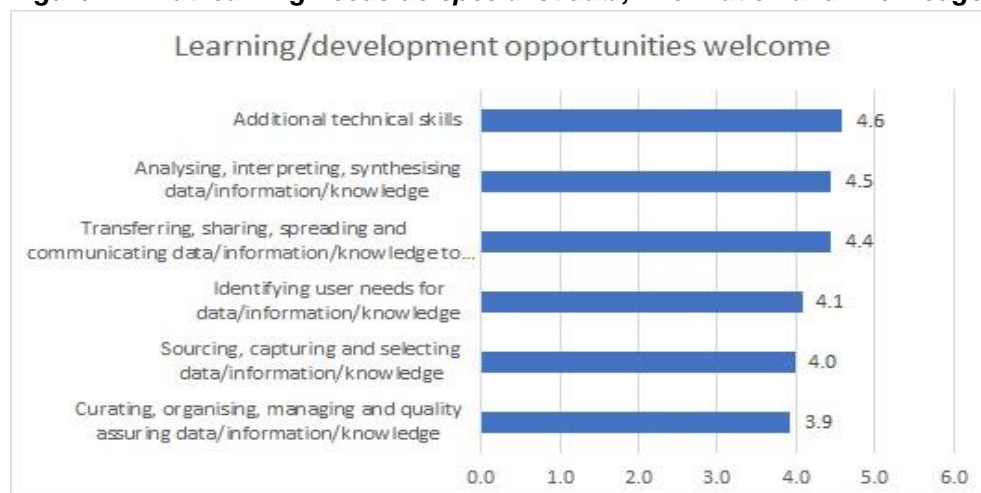

N=327

A mapping exercise found no clear career/capability/competency framework for Specialist Data, Information and Knowledge staff. There is a diverse range of frameworks for individual professional groups – e.g. data scientists, coders, health records staff, librarians, information managers, knowledge managers etc. Many of these frameworks have been defined by Professional Associations representing different parts of the workforce striving to establish distinct professional identities and standards. Despite the diversity, there is considerable commonality and transferability across the functions/capabilities/competencies described in the frameworks.
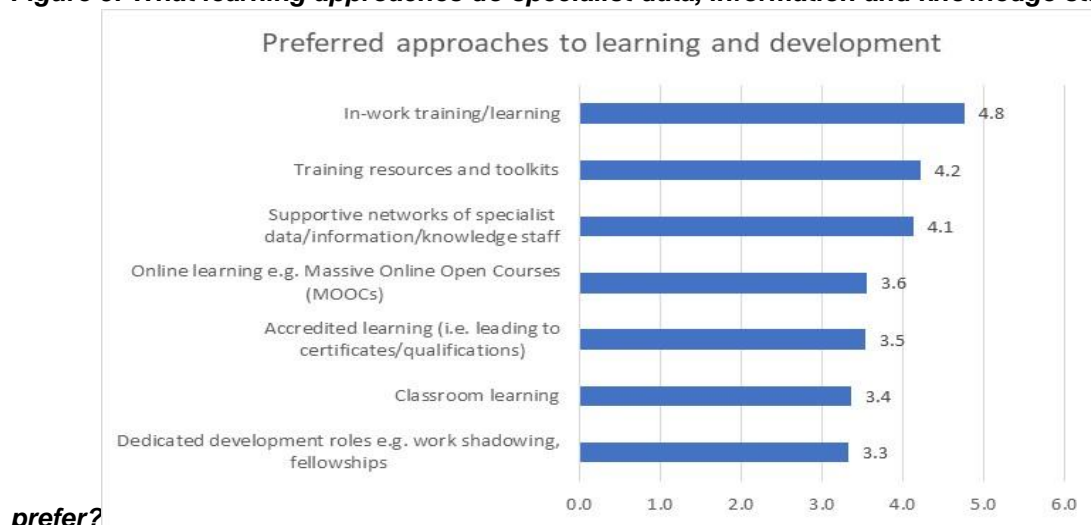
Only 6% of baseline survey respondents said that they were currently engaged in defined learning activities (i.e. not ongoing on-the-job-learning, such as web-searching, learning from colleagues), notably online learning activities. However, 64% said that they would welcome learning and development opportunities, covering the full range of skill categories, and with a particular emphasis on new technical skills such as artificial intelligence methodologies, R and Python (see Figure 4). Preferred learning styles were in-work training/learning and informal self-directed learning approaches linked with day-to-day work (see Figure 5).

Figure 4: What learning needs do specialist data, information and knowledge staff prioritise?

Learning/development opportunities welcome

Category	Value
Additional technical skills	4.6
Analysing, interpreting, synthesising data/information/knowledge	4.5
Transferring, sharing, spreading and communicating data/information/knowledge to…	4.4
Identifying user needs for data/information/knowledge	4.1
Sourcing, capturing and selecting data/information/knowledge	4.0
Curating, organising, managing and quality assuring data/information/knowledge	3.9

N=395 On a scale of 0 – 6, where 0 = not welcome and 6 = definitely welcome

Figure 5: What learning approaches do specialist data, information and knowledge staff

Preferred approaches to learning and development

Category	Value
In-work training/learning	4.8
Training resources and toolkits	4.2
Supportive networks of specialist data/information/knowledge staff	4.1
Online learning e.g. Massive Online Open Courses (MOOCs)	3.6
Accredited learning (i.e. leading to certificates/qualifications)	3.5
Classroom learning	3.4
Dedicated development roles e.g. work shadowing, fellowships	3.3

prefer?

N=395 On a scale of 0 – 6, where 0 = not welcome and 6 = definitely welcome

[i] Scottish Government, 2018. Scotland's Digital Health and Care Strategy: Enabling, Connecting, Empowering.
https://www.gov.scot/publications/scotlands-digital-health-care-strategy-enabling-connecting-empowering/

[ii] Scottish Government, 2019. *New national public health body 'Public Health Scotland': consultation*
https://www.gov.scot/publications/consultation-new-national-public-health-body-public-health-scotland/

[iii] Health Foundation, 2019. *Untapped potential: investing in health and care data analytics*
https://www.health.org.uk/publications/reports/untapped-potential-investing-in-health-and-care-data-analytics