Short report

Interoperability in health and social care: organisational issues are the biggest challenge

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INTRODUCTION

Interoperability in health and social care is complex and the term has many definitions. This paper adopts the Institute of Electrical and Electronics Engineers (IEEE) definition as cited by the United States Office of the National Coordinator for Health Information Technology (ONC): 'the ability of two or more systems or components to exchange information and use the information that has been exchanged'.[1] As the ONC commentary highlights, this definition encompasses not only health information *exchange*, but the ability to *use* that information. The concept is broad and multi-dimensional and there is a limited in-depth knowledge of what it means within the care practitioner workforce.[2,3]

According to NHS Digital,[4] the primary benefit of interoperability is to offer safe and reliable information transfer, improve data sharing across the care pathway and reduce the likelihood of adverse clinical outcomes. Essentially, interoperability supports continuity of care. It is widely agreed that a set of harmonised standards is the most effective and efficient way to achieve and deliver best interoperable healthcare.

Interoperability standards and layers

Interoperability standards provide a common language which enables and supports health service improvements, economic benefits and safety improvements in care delivery.[3] Some of the widely used healthcare interoperability standards are:

- Health Level Seven (HL7)
- SNOMED CT
- Integrating the Healthcare Enterprise
- OpenEHR

Interoperability is usually described using various layers of abstraction.[2,5] NHS England[6] depicts it as two layers that need to be resolved to achieve interoperability: the 'how' (technical interoperability) and the 'what' (semantic interoperability).

- Technical interoperability is the process of moving data between two systems and is not dependent on the type of information being moved. At this layer, there is no requirement at the receiving end of the system to interpret the content of the data.[2] This is what is elsewhere defined as
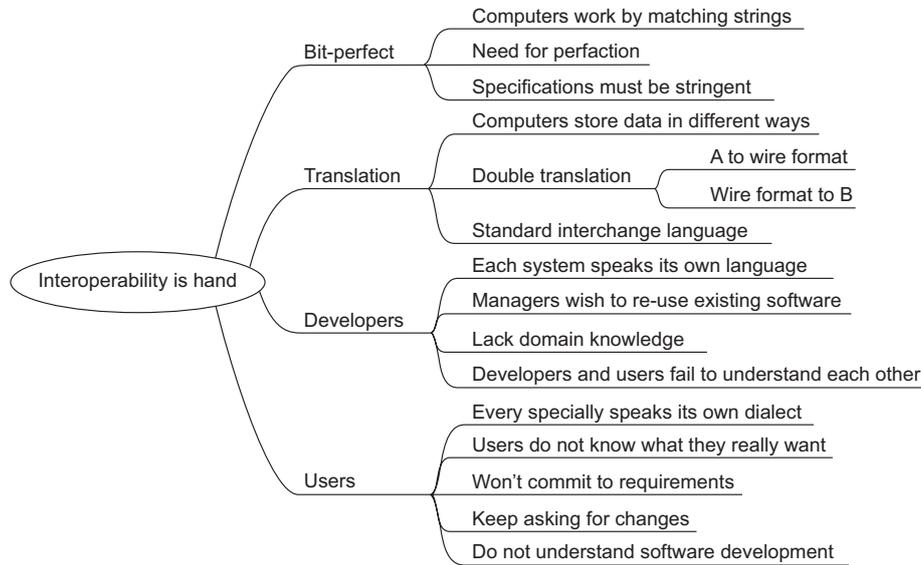
Figure 1 Why healthcare interoperability is hard (from[2])

information *exchange*. This NHS definition is not interoperability in the IEEE sense.

- Semantic interoperability ensures each system has the ability to understand the information received from others without ambiguity. This layer uses coded clinical terminologies, messaging schemes, value sets and profiles.[7] An example of semantic interoperability is GP2GP, which enables patients' electronic health records to be transferred safely between general practices in England.[4]

As an alternative to moving data between multiple producers and consumer systems, information can be consolidated into a shared data repository. Of course, this still requires at least 'technical interoperability' between source systems and the shared record. Shared care records can facilitate common access to clinical information across and between health systems to enable joined-up care and improve health care outcomes. Examples of shared records, some of which are summaries and some are rich longitudinal records, in the United Kingdom are:

- Care and Health Information Exchange – CHIE[8]
- Summary Care Record (SCR) in England[9]
- Oxford Care Summary[10]
- Northern Ireland emergency care record[11]
- Individual Health Record (IHR) in Wales[12]
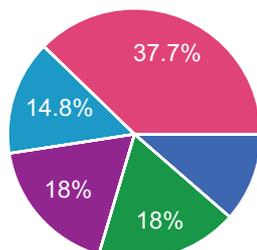- Emergency Care Summary (ECS) in Scotland[13]

OBJECTIVE

This paper reports an investigation of stakeholder views about the major interoperability challenges in health and social care data in England. It is widely acknowledged that there are numerous barriers to achieving an interoperable healthcare environment, as shown in Figure 1 below. This study set out to determine the relative importance of these barriers.
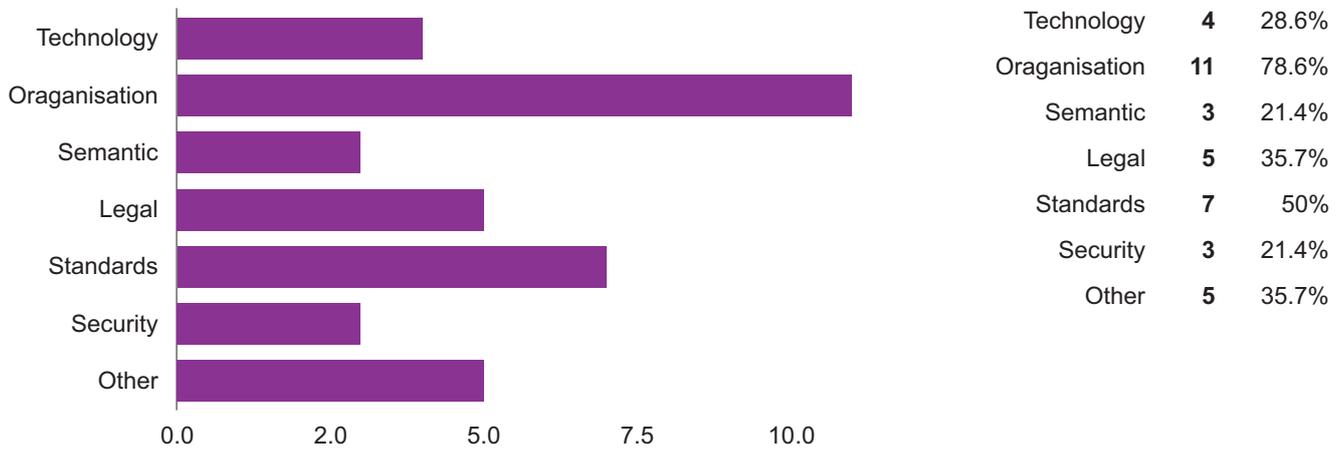
METHODS

Primary data were collected through semi-structured telephone interviews and surveys with an opportunistic sample of IT practitioners and clinicians within health and social care organisations in England. A mixed methods approach using both quantitative and qualitative data was utilised. The interview and survey were designed for this study as no prior relevant instruments were identified from the literature. As this work comprised part of an undergraduate degree project, time did not permit a measurement study to validate the instruments. Quantitative data were analysed using descriptive statistics and qualitative data were analysed using content analysis.

RESULTS

It was found that NHS organisations have a limited pool of experts who specialise in this area. Given this and the

Government	7	50%
Health and Care Providers	0	0%
Standards Bodies	0	0%
NHS England	11	78.6%
HSCIC	11	78.6%
Industry	9	64.3%
Other	23	164.3%

Figure 2 Who is responsible for resolving interoperability challenges?

Technology	**4**	28.6%
Oraganisation	**11**	78.6%
Semantic	**3**	21.4%
Legal	**5**	35.7%
Standards	**7**	50%
Security	**3**	21.4%
Other	**5**	35.7%

Figure 3 Major issues of interoperability

project time constraints, it was impractical to obtain a large sample size. In total, we had 14 survey participants and four interviewees.

The study reinforced that there is no single definition for interoperability; however, it is generally defined informally by the NHS participants as *communication and exchange of information between two or more systems* which is similar to the IEEE definition noted in the introduction.

Only half of the participants were aware of the regulations (Data Protection Act and Information Governance) required when handling personal data. However, it was not clear if the regulations were being applied in a robust manner. Additionally, there was some misunderstanding and confusion about responsibilities for key regulatory issues.

The interviews indicated general understanding that 'everyone' has some role in achieving interoperability. One participant explicitly noted that 'responsibilities do not lie on a single body or group, everyone is responsible for resolving interoperability challenges'. It is interesting to note in Figure 2

below that NHS England and NHS Digital [still called the Health and Social Care Information Centre at the time of the study] were felt to have equal greatest responsibility in solving interoperability issues. By contrast, none of our participants viewed provider organisations or standards bodies as responsible.

Over 78% agreed that organisational issues were the main interoperability challenge, as shown in Figure 3 below. Commercial competition between suppliers was an additional factor identified by participants, which was categorised as an organisational issue. 'Other' issues included factors such as finance, skill sets and staffing levels.

DISCUSSION

There are serious challenges to health and social care interoperability. This small-scale study has emphasised the importance of organisational barriers to interoperability, including commercial issues.

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