Interoperability

The [Healthcare Information and Management Systems Society](#) (HIMMS) has applied considerable resource and member participation to define the term **Interoperability**.

Its final definition of the term in a healthcare context is:

> *Interoperability is the ability of different information systems, devices or applications to connect, in a coordinated manner, within and across organizational boundaries to access, exchange and cooperatively use data amongst stakeholders, with the goal of optimizing the health of individuals and populations.*
>
> ([HIMSS – What is Interoperability?](#))

It goes on to say:

> Health data exchange architectures and standards allow relevant data to be shared effectively and securely across the complete spectrum of care, within all applicable settings and with relevant stakeholders (including with the person whose information is being shared). Optimally, interoperability facilitates connections and integrations across these systems to occur regardless of the data's origin or destination or the applications employed, and ensures the data are usable and readily available to share without additional intervention by the end user.
>
> In the health ecosystem, interoperability furthers the goal of optimizing health by providing seamless access to the right information needed to more comprehensively understand and address the health of individuals and populations.

What does this mean in reality?

In an ideal world, this means that all systems talk to each other, can retrieve, interpret, use and update **all** of each other's data without the need for additional intervention. Effectively the user of a specific system just gets the information that he needs, where that information is stored or how it is formatted is irrelevant to the user and the information availability is totally transparent. How it is displayed and contextualised lies totally within the remit of the system on which it is used.

Getting true interoperability

True interoperability that meets the requirement of the last paragraph is available in a limited form in organisations like the NHS today. Unfortunately, it is only available between systems implemented by the same manufacturer and does not occur in full between different manufacturer's patient record systems.

So HIMSS has defined four different levels of interoperability, specifically for the healthcare ecosystem, from very basic connectivity to the almost utopian dream mentioned two paragraphs above.

The graphic shows how these interoperability levels interact, although the second one gives a much better impression of the real capability. It is important to recognise however, that a major reason for lack of interoperation is the limited political / manufacturer willingness to share all data, even within the constraints of information governance.

The graphic demonstrates the path to true interoperability, the stage that HIMSS identifies as *Organisational*, although very few NHS-deployed systems are capable of reaching this Organisational Stage. The y-axis represents the number of systems in the market than can achieve each stage.
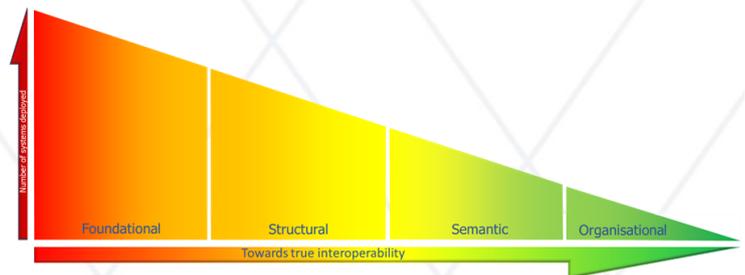
Although in fact, the reality is probably more like this
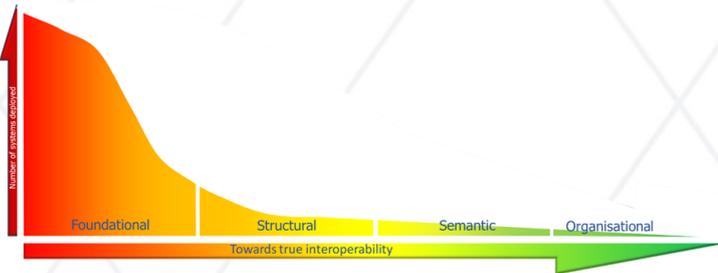
FOUNDATIONAL LEVEL

The Foundational level is defined by HIMSS as:

Foundational interoperability develops the building blocks of information exchange between disparate systems by establishing the inter-connectivity requirements needed for one system or application to share data with and receive data from another. It does not outline the ability for the receiving information technology system to interpret the data without interventions from the end user or other technologies.

This is basically the use of an API to connect the two systems together, a bit like phoning someone in China, the technology creates the connection, you are communicating with a local person, but neither of you can understand what the other person is saying.

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STRUCTURAL LEVEL

This is defined by HIMSS as:

Structural interoperability defines the structure or format of data exchange (i.e., the message format standards) where there is uniform movement of healthcare data from one system to another such that the clinical or operational purpose and meaning of the data is preserved and unaltered. Structural interoperability defines the syntax of the data exchange. It ensures that data exchanges between information technology systems can be interpreted at the data field level.

Here they are talking about matching data fields between the two systems: surname with surname, date of birth with date of birth and most importantly the NHS number, which is used as the index for all NHS data. This means that the patient can be matched between systems and therefore some data can be drawn across and put into the right place in the adjacent system. Unstructured data such as a discharge summary letter in .pdf format can also be shared.

There is still an issue in sharing data between systems that do not both use the NHS Number, for example between a primary care system and a local authority social care system. If all the representative fields are completed in the same way, interoperation is possible – although it may be limited in extent. A problem will develop however, if the patient's name is input as Michael on one system and Mike on another.

SEMANTIC LEVEL

This is defined by HIMSS as:

Semantic interoperability is the ability of two or more systems to exchange information and to interpret and use that information. Semantic interoperability takes advantage of both the structuring of the data exchange and the codification of the data, including standard, publicly available vocabulary, so that the receiving information management systems can interpret the data. Semantic interoperability supports the electronic exchange of patient data and information among authorized parties via potentially disparate health information and technology systems and products to improve quality, costs, safety, efficiency, experience and efficacy of healthcare delivery.

This is an interesting level, as we come to the point where we acknowledge that the various systems will not natively interoperate, so we codify the data to enable it to be understood by each system. This is synonymous with the use of common codes to talk to someone who speaks another language, or even the use of a translator who speaks both languages. The codification system used in the NHS as well as other organisations is called SNOMED and it is a structured clinical vocabulary that acts as a reference translator.

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ORGANISATIONAL LEVEL

This is defined by HIMSS as:

Organisational interoperability encompasses the technical components as well as clear policy, social and organizational components. These components facilitate the secure, seamless and timely communication and use of data within and between organizations and individuals. Inclusion of these non-technical considerations enables interoperability that is integrated into end-user processes and workflows in a manner that supports efficiencies, relationships and overall health and wellness through cooperative use of shared data both across and within organizational boundaries.

This is where things really get interesting. Although it is still constrained by the data constructs, this form of interoperability utilises the context of the information to augment the codification and so facilitate the integration of information into existing workflows. This form of interoperability can incorporate information governance and information sharing agreements into the intelligence of the interoperability engine. This allows the management of the data flow according to the data owner's wishes and so reduces the risk of data breaches.

Within organisational boundaries, information governance is relatively easy to preserve, but when we go outside those boundaries, for example interoperation between healthcare and social care, this becomes a much larger problem. For this we need a gatekeeper (like a firewall) between the two agencies so that only data that can be legally shared is shared. A social worker, for example will not need to know the detailed history of a diagnosis and therefore as there is no need to know, exchange of that information will not be authorised.

The application of such a gateway is known as Cross-Enterprise Document Sharing or XDS: in much the same way as your home wireless network provides the equivalent of in-organisation data sharing, XDS is analogous to the router that links your home to the internet service provider.

When will Organisational Interoperability be truly possible?

Contact us and we will arrange a demo!

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