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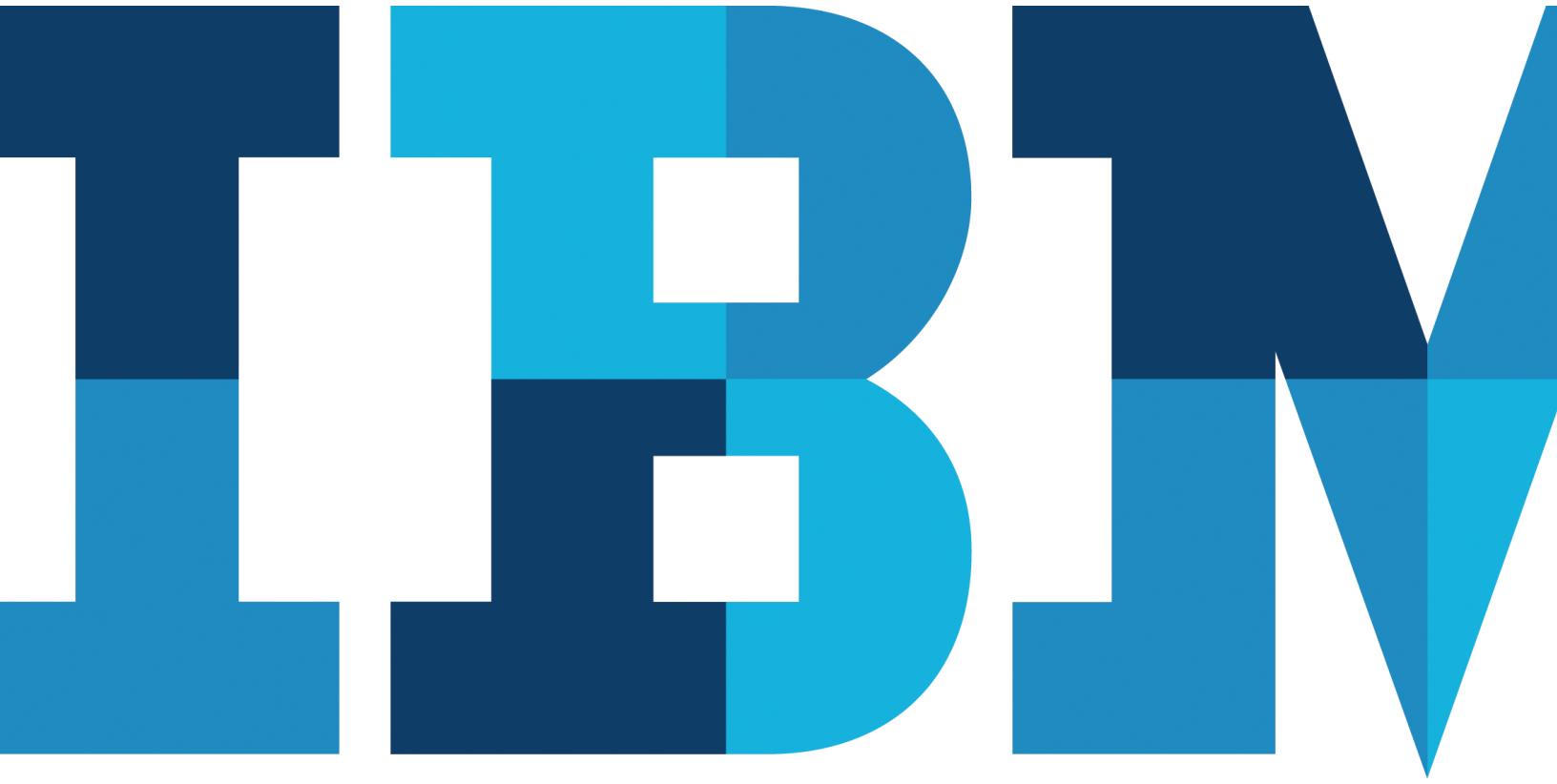
The Enterprise Master Person Index – Delivering better eHealth in Europe, the Middle East and Africa (EMEA)

Matthew Shelley, Ph.D.
Penny Schlyer



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Introduction and overview

eHealth offers a potent means for health services in EMEA, and worldwide, to tackle the daunting challenges of the 21st century. Ageing populations, long-term management of chronic illnesses, escalating costs[1], changing patterns of disease, and a worldwide shortage of healthcare workers are all driving the need for health information and communication technology (ICT) to improve healthcare administration and delivery.

For future sustainability, the healthcare system demands efficient and affordable access to finite healthcare resources, improving care for all and reducing healthcare inequalities. To achieve its potential, eHealth must facilitate the secure movement of patient data out of system silos and transform it into intelligence for improved patient administration and enablement of patient-centred, coordinated care.

The enterprise master person index (EMPI)[2], or patient registry, has an essential role to play, facilitating trusted data exchange while protecting the privacy of patient information. An EMPI provides a real-time way to locate, identify, match and cleanse information about a person from many sources to create a comprehensive view for authorised health service providers. It is proven to reduce duplicate records within and across systems to improve patient administration and care delivery. This paper explores the advance of eHealth and the role of the EMPI in its future.

The EMPI in eHealth

A variety of roadblocks have to be negotiated for eHealth to achieve its potential, some technical, others social and economic; an EMPI at the foundation can do much to help. Some of the most important issues that must be addressed include the type of information being made available, and to whom. For example, mental health records, certain test results or children's health records can be very sensitive and should only be shared with certain individuals during specific episodes of care. An EMPI accurately associates the right records to the right patient, ensuring accurate identification at the point of care. It can be architected to only identify where all relative records exist or to enable information sharing for an electronic health record (EHR), portal or other sub-specialty applications.

Because of this flexibility, the EMPI can help deliver three essentials to advance eHealth and provide the basis for trust including protecting patient privacy, ensuring data quality and accurately identifying the patient.

Patient Privacy

In many countries there are profound worries among citizens and political decision makers about ensuring that only authorised healthcare providers with a need to know, access information about a patient. How and where information is stored and accessed can help alleviate these concerns and add a high degree of trust that is required for patient data sharing.

There are essentially three implementation models organisations have used to govern healthcare data to protect patient privacy while facilitating health information sharing. One option – the hybrid model -- adopted by Canada Health Infoway leverages provincial EMPIs as part of its Health Information Access Layer (HIAL) to identify patients within the province and enable health information sharing.

In this Canadian model:

- Each province has an EMPI that serves as a registry (directory) of patients with demographic information and in some cases the Health Card number.
- Patients in the directory are linked to their associated medical records residing in multiple systems throughout the province.
- Contributing providers can share records through the EHR and also manage privacy by defining access rights at the patient level.

As a result:

- When an authorised healthcare provider queries for a patient in the EHR, he is more likely to identify the right patient and all available records associated to the patient.
- Sensitive or unauthorised records can be identified but not shared electronically unless special permission is granted. Sensitive records can also be blocked from view.
- These registries will enable information sharing across provinces by linking the right patient to the right records.

This hybrid data governance methodology helps reassure healthcare providers and patients that information sharing is tightly managed to protect privacy and to prevent unauthorised users from gaining access.

The second approach is exemplified by NHS Wales which operates a centralised data governance model with a national EMPI supporting patient identification for seven local health boards (LHBs). In this model, each LHB loads its data into the central EMPI, but patient data is partitioned for each LHB allowing them to maintain privacy and share only what is needed. The LHBs benefit from the power of the EMPI, and maximise financial and administrative resources by leveraging the national solution. In the future as trust in information sharing grows, the LHBs will have the flexibility to grant permission to connect and share information with other national services.

The third approach, adopted by the Louisiana Rural Health Information Exchange (LARHIX) is a federated data governance model. This model gives healthcare providers a strong sense of confidence and trust in the data quality and security of the HIE by allowing them to retain complete control and ownership of their data and only share what is needed, when it is needed. As opposed to loading data into a central EMPI, the federated model allows data owners to provide a minimal amount of demographic data to the EMPI so that when a provider queries the system, they accurately identify the patient and can see where additional records exist. As trust in data sharing grows, more data can be shared proactively.

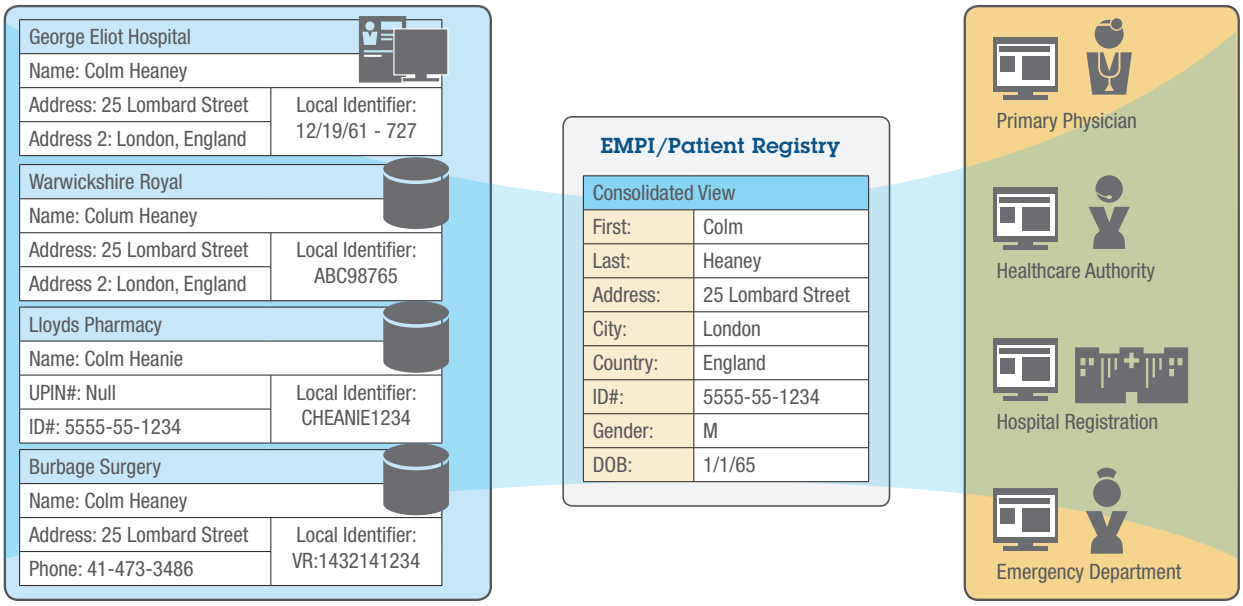
As a result of this distributed methodology, LARHIX was able to avoid the common worries many providers have over data ownership and work involved in creating duplicate centralised databases, and go live in less than five months. Clinicians can now query the system, and in real time securely access a portal-based view of patient-centric data housed in disparate applications across multiple hospitals.

Data Quality and Accurate Identification

Two additional concerns that go hand in hand for eHealth include creating and maintaining a high data quality foundation within health information systems, and accurately identifying the patient at the point of care. The EMPI improves data quality by reconciling patient identities within a system that has duplicate records, and across systems that manage patient data in different ways. It can work independently in the eHealth architecture or augment the function of a national health identifier to accurately associate the right records to the right patient.

With the vast proliferation of IT products, and multitude of ways in which they are configured, the EMPI must not only integrate with one or two marginally distinct systems, but with dozens of sub-specialty systems which are fundamentally different from one another.

The EMPI must reconcile identities, even to the point where a patient has presented at several care settings over many years, has changed addresses, and where records have several versions or spellings of his or her name – possibly including new surnames due to marital status.



An EMPI establishes linkages across disparate systems to create a single view of the patient. This helps identify the patient at the point of registration and ultimately facilitates information sharing for EHR and portal applications.

A sophisticated EMPI that uses probabilistic technology more accurately matches patient identities by going beyond basic name, address and health identifier matching. It employs advanced statistical algorithms to understand errors in name spelling, demographic information and identify when records refer to the same patient. Statistics from the data are used to determine the optimal way to put data together for identification. The probabilistic EMPI is therefore more effective at selecting the right information, assuring that the patient record is complete, accurate and can be trusted.

This technology was important in Wales, for example, where there are some 1,928 people called Margaret Jones in a population of three million. Equally, popular names such as Thomas/Tomas may have Welsh (spoken by 20% of the population) and English versions. Parents in some countries pass names to sons or daughters, so it is important to distinguish between generations.

The ability to uniquely identify patients with similar names, complex spellings or in different languages was also paramount to a large hospital group in Brussels. This organisation required its EMPI to link patient records together across five hospitals to reduce existing duplicate records and prevent creation of duplicate records during the admission process. This organisation is also now leveraging the EMPI as part of its interoperability platform for a clinical portal, providing access to medical records across all of its facilities.

As part of their eHealth or Health Information Exchange (HIE) architectures, many healthcare organisations have implemented a probabilistic EMPI that is capable of identifying patients who are the same across different institutions (even if their names are spelled differently, addresses have changed or records have typographical errors), to help them mobilise patient data from an institution and share it across borders, subject to applicable patient consent rules.

eHealth architectures and approaches

Health Information Exchanges (HIEs) enable the collection and movement of information between systems including Electronic Health Records (EHRs). Vital to their success is ensuring that the information from disparate sources is accurately combined and delivered in a way that is meaningful to the end user. While all eHealth and HIE architectures have unique features and requirements, many depend on some form of EMPI or patient registry to accurately aggregate and match information to provide an electronic record or complete view of the patient that can be trusted.

Some examples of public hospital groups and national EHR initiatives that have an EMPI at the foundation of the eHealth architecture are provided below.

Public Hospital Groups:

A public healthcare consortium in Switzerland included an EMPI as part of its eHealth architecture to create single views of patients across their 12 healthcare facilities. Since deploying the solution, duplicate records have been reduced from 10% to 1% and the organisation has expanded the EMPI to enable information sharing via a clinical portal to improve patient safety and quality of care.

ACT Health, a provider of government funded health care services in the Australian Capital Territory is implementing a probabilistic EMPI to create the territory's new patient master

index (PMI). The primary objective of the PMI is to integrate all patient registration sources to create a trusted, unified view of patients for use by all clinical and administrative systems, facilitate participation in the national Individual Healthcare Identifier service (IHI) and provide identification services for the ACT and national electronic health records (EHR).

National EHRs:

Canada Health Infoway created a national blueprint to deliver an integrated, pan-Canadian EHR which allows essential patient information such as medications, x-rays, and lab results to be securely viewed, shared and updated across communities, provinces and territories[3]. Each province deploys and manages its own architecture, which includes among other things a master patient registry and a master provider registry that works in conjunction with the social insurance number, to accurately match and link patient or provider identifications[4]. This approach helps ensure a high degree of data quality by accurately identifying the right records with the right patient, even across provinces.

Singapore is implementing a single medical record for every patient, with the first phase due to go live in 2011. The national electronic health record (NEHR) is based on a common enterprise architecture that includes an EMPI, data quality standards and privacy and security guidelines.[5] By accurately aggregating patient identification information into the EMPI, each participant will have secure access to trusted and comprehensive information about the patient.

The National Health Information Network (NHIN) being developed in the USA is designed to provide a standards-based foundation that enables providers and public and private organisations to identify where records for a patient exist and if possible, securely share information via the internet. Some defining characteristics of the NHIN architecture are technology neutral interfaces and shared processes and procedures such as an EMPI to support real time patient identification.

In the UK, healthcare is publicly funded by the National Health Service (NHS) but policy and decision making has been devolved to the four constituent home nations (England, Scotland, Wales and Northern Ireland).

- In England eHealth developments have been managed by Connecting for Health, which created a National Care Record for each citizen. Information is accessed on a need-to-know basis, using the patient's 10-digit NHS number. The EMPI links the NHS number to patient records to ensure accurate patient identification.
- Scotland, where care is delivered by 14 territorial NHS health boards overseen by the Scottish Government, has its own patient identification system, known as CHI (Community Health Index) numbers.[6]
- In Wales the Informing Healthcare strategy developed an Individual Health Record (IHR) for each patient. Access is confined to the local health board (of which there are seven) rather than being national, is based on a standard data extraction model and a common user interface, and is being powered by an EMPI at the foundation.

EMPI Boosts Effectiveness of National Health Identifiers

Some countries have introduced, or are considering, a social insurance number, universal health identifier, or national ID card to manage patient identification. The EMPI has been shown to enhance the effectiveness, and reduce the implementation time and cost, of these national identifiers in a number of ways including by:

- Tying the national number to patient records in each system without requiring legacy systems to take in the ID as a new attribute. This speeds implementation time for the national ID card.
- Leveraging additional attributes to capture historical records as demographic information changes over time. This increases the depth of medical information for the EHR and improves patient identification.
- Identifying errors, or duplicate records, by matching on multiple identifying attributes. This improves fraud detection and makes it easier to maintain data quality.

Perhaps one of the most attractive features of the EMPI in this context is that it brings all the above benefits, while integrating with legacy systems in a way that is minimally invasive.

Health Information Exchanges (HIEs) and EHRs around the world have been developed – or are being developed – using a variety of architectures to achieve a range of eHealth objectives. They are being adapted to serve the needs of large, populous, independent countries like the USA and small, semi-autonomous ones like Wales. All have complex healthcare systems and distinct needs, but regard electronic information exchange as a route to reduced administration and expense, improved patient outcomes and increased organisational efficiency.

Whatever the course, these eHealth architectures are leveraging an EMPI or a patient registry to accurately identify the patient and enable secure data exchange.

Choosing the Right EMPI Solution for Better eHealth

Movement is a defining feature of the 21st-century world – whether between communities, regions, nations or continents. And the interplay between human mobility and the multiplicity of healthcare providers presents fundamental challenges. These increase rather than decrease as healthcare becomes more sophisticated, as it can tend towards growing fragmentation. Patients may move and change names over time, but their medical information needs to follow them.

To address challenges around data fragmentation, healthcare organisations of all types around the world have implemented IBM® Initiate® Patient and IBM® Initiate®Provider to improve data quality and enable interoperability between health information systems, while continuing to protect patient privacy.

Why IBM® Initiate® Patient and IBM® Initiate® Provider?

Interoperable, Standards-Based Technology

IBM Initiate solutions are built with a Web Services integration methodology and industry standards including HL7 and IHE. The solutions are software independent, which enables a plug-and-play eHealth architecture that can grow over time and integrate with other regions, providers or federal entities.

Flexible Data Governance

IBM Initiate solutions address the common challenges of data governance and ownership with adaptable data models (federated, centralised or hybrid) that meet the needs of stakeholders concerned with sharing sensitive data. IBM offers a collaborative data stewardship tool to allow individual participants to proactively manage their own data quality.

The Most Trusted EMPI Technology

IBM® Initiate® Patient is in use in public and private hospital groups in Belgium, Switzerland and the United Kingdom. It is the client registry across much of Canada and will be implemented as part of Singapore's National Electronic Health Record. Additionally it is used in six of the national health information network (NHIN) II and all four of the NHIN I demonstrations in the USA, and is in use by 77 integrated delivery networks and 41 health information exchanges. The IBM solution has improved data quality and claims processing for many large private health insurers, and is a key component of the U.S. national ePrescribing network and is also used by large military healthcare services.

Extensible Solution, Ongoing ROI

eHealth is a journey, not a short term endeavour. IBM® Initiate® Master Data Service can be used to manage all types of people and organisations, and can also provide record locator services for the most federated environments. Entity types include patients, providers, health insurance members, citizens and people subscribing to social services. The open and standards-based integration allows ongoing return on investment and growth over time to support broader initiatives such as chronic disease management, provider management or connected social services.

Proven Experience

IBM Initiate solutions are backed by a highly experienced team of implementation consultants and support specialists with decades of real world experience in healthcare installations of all types. As pressures mount for healthcare providers, many suppliers are developing solutions that will enable them to harness the potential of eHealth to provide more and better patient care. IBM is among the leaders. To learn more visit: www.IBM.com/healthcare.

Footnotes

1 Recent research (eHealth Taskforce, 2007, 12) citing the PWC study, HealthCast 2020: Creating a Sustainable Future, 2006, puts health spending in the EU at c.9% of GDP and predicts c.16% by 2020 in OECD countries.

2 EMPIs are known by various names including Master Patient Index (MPI), Patient Registry or Client Registry.

3 Defined as providing needed 'information so that the appropriate granularity, flexibility and reusability are enabled throughout the different layers of functionality described in the architecture'. For a full description see the EHRS Blueprint at knowledge.infoway-inforoute.ca/EHRSRA/doc/EHRS-Blueprint-v2-Exec-Overview.pdf (last accessed 4, December 2010). For details of a range of national approaches see HIMSS, 2008. For a diagrammatic representation of typical EHR and EPR architectures which distinguish between SOA and federated see (HIMSS, 2008, 14).

4 For further information on the Canadian approach, and a contrast with some EMEA and worldwide attempts to create standardised infrastructures or standards-based (such as through the use of variations of HL7) see HIMSS, 2008, 8-10.

5 The NEHR sets out the system-level architecture for how the existing and new systems must fit together. For a full description of the architecture see the Ministry of Health Singapore website at www.moh.gov.sg, see also HIMSS, 2007.

6 NHS Scotland's eHealth Strategy 2008-11 is available online at www.scotland.gov.uk/Resource/Doc/236550/0064857.pdf (last accessed 4, December 2010).

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