Effective Electronic Patient Record Implementations
Interoperability and System Integration

September 2021
Effective EPR Implementations: Overview of the Series, Purpose, and Schedule

The Effective EPR Implementations webinar series is a set of seven one-hour virtual sessions with Healthcare providers. This series is focused on EPR implementations and driving your success through a holistic implementation approach.

**Purpose**

- Focus on effective partnerships necessary to succeed in EPR implementations
- Highlight common pitfalls faced by clients and areas needing support
- Share key strategies necessary for healthcare practice transformation through EPR implementations

**Schedule**

- **Today**
  - Interoperability and System Integration
- **Date**
  - 25 Feb
  - 31 Mar
  - 29 Apr
  - 27 May
  - 24 Jun
  - 29 Jul
  - 2 Sep

- **Helping You Navigate Your Electronic Patient Record Journey**
- **Change Management and Communication**
- **Integration and Reporting**
- **Testing for Excellence**
- **Clinical Workflow Design and Content**
- **Sustainability and Optimisation**
Speaking With You Today

Fran Cousins
Partner, UK

Marc Perlman
Global Digital CARE Leader, US

Tony Jurek
Managing Director, US

Mike Morrison
Senior Manager, Canada
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<td>Tony Jurek, Mike Morrison</td>
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<td>Why Interoperate?</td>
<td>Tony Jurek, Fran Cousins</td>
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Setting a strong foundation from the beginning enhances overall outcomes and Programme success.

### Governance
A well-structured governance model helps ensure decisions are made at the right level, by the right stakeholders, at the right time.

- **Establish Leadership Support**
  Leadership support and buy-in is cultivated from the very beginning of the Programme

### Guiding Principles
Establishing appropriate Guiding Principles sets the ground rules for system design and implementation, guides decisions, and keeps teams focused on overall goals, objectives, and the desired end state.

- **Guiding Principles**
  - Be event driven and message centric, not document centric
  - Adopt a FHIR-First approach... strategically
  - Put the patient care first in the interoperability solution
  - Design for Adoption
  - It must be trustworthy
  - Policy Driven, Exception Based Design
  - It’s about Governance, Participant Engagement & Performance Management more than data

### Effective Decision Making
Decisions that could potentially impact the programme timeline, cost, quality, safety and/or future-state operating model should be escalated to programme and clinical governance.

- **Average % of Decisions Made**
  - 5%
  - 15%
  - 80%

### Importance of Governance, Guiding Principles and Effective Decision Making

1. **Commitment from key stakeholders**
2. **Align direction**
3. **Better decisions**
Interoperability Defined

Interoperability is a critical barrier to overcome in meeting the needs of the **empowered healthcare consumer**; a capability which brings all relevant information to all points of care and connects workflows throughout the health care continuum.

- Health care data exchanges are **NOT “plug and play”**
- Interoperability requires a varying combination of strategies, architectures, standards, approaches, data types, security and tools to **unify data/information access** across 4 areas;
  1. Data Level
  2. Application Level
  3. User Experience
  4. Workflow
- The components an organisation needs depends on **service goals, regulatory requirements, current state, experience, budget, and vision**
- Each component has many options and subcomponents. The options that are right for you **depends on your requirements**

**THE ABILITY TO:**

- **Exchange data** using the industry’s most common standards: HL7 (v2/FHIR), X12, IHE/XCA
  - **AND** –
- **Share / Access data** in real-time using Application Program Interfaces (APIs). The API approach is becoming more popular and will allow applications to interact with each other at the functional level (e.g., triggering a work flow, a report generation or an alert)
  - **AND** –
- **Integrate Workflows** to enable seamless coordination of activities among patients and providers regardless of the system(s) of record (e.g. handoffs between and EPR and CRM Systems, reconciling patient and provider identities and establish relationship context between them)
Interoperability continues to be part of an overall technology investment strategy

Investments in Interoperability, Enterprise Information Management (EDW/Reporting/Analytics) & Population Health Management/Care Coordination form the core foundation for Clinician-Led, Patient-Centric Care in a Value Driven Environment.

<table>
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<tr>
<th>Interoperability</th>
<th>Data Aggregation and Management</th>
<th>Reporting and Analytics</th>
<th>Clinical Workflow Capabilities</th>
<th>Core Applications &amp; Vendor Management</th>
<th>Patient and Provider Engagement</th>
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<tr>
<td>• Easily accessible API Catalog</td>
<td>• Data aggregation into a central Unified Data Platform</td>
<td>• User facing dashboards to support MIPS and APM goals</td>
<td>• Identification, Segmentation and prioritisation of patients eligible for care management</td>
<td>• Systems to manage the delivery and documentation of Care Delivery</td>
<td>• Robust patient &amp; provider portal</td>
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<td>• Integration of data beyond the EPR (e.g., ERP, IoT, etc.)</td>
<td>• Data governance</td>
<td>• Real time performance statistics</td>
<td>• Focused disease rosters and worklists to support pop health</td>
<td>• CEHRT certified vendors</td>
<td>• Integration of wearables and IoT strategies</td>
</tr>
<tr>
<td>• Robust enterprise service bus capabilities</td>
<td>• Master data management</td>
<td>• Defined KPIs</td>
<td>• Care coordination and closed loop referral workflows</td>
<td>• Submission strategy (vendor, attestation, claims data or other)</td>
<td>• Telemedicine support</td>
</tr>
<tr>
<td>• Standards-based (FHIR,eHEX,IHE)</td>
<td>• Data normalisation &amp; transformation</td>
<td>• Quality Registry Reporting</td>
<td>• Consolidation of platforms for cost savings</td>
<td>• Allow setting of medical &amp; behavioral health consent preferences</td>
<td>• Inbox, Alerts, Workflow &amp; quality measure support</td>
</tr>
<tr>
<td>• Semantic/syntactic normalisation</td>
<td></td>
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</table>

Governance and Decision Framework
However, to be Effective, Interoperability Must Evolve...

Document Centric Platforms

- Hospital/Clinic/Office
  - EPRs
  - ADTs & MPI
  - Admin Systems
  - Outpatient Services
  - Case & Operational Integration
  - Results & Discharge

Client Exchange / Partnerships

- Standardised Registry Use

Event Driven, Message Centric APIs and Services

- Standardised eHealth Services
- Inter-Network Exchange

Partner Network

- Discovery & Common Services
- Validation Services (mdm)
- Standard Services & Audit
- Interoperable Platform Services
- Service Catalogue
- EPR Repositories
- Reporting, Performance, KPIs
- Standardised Network Services, Registries, Partner and SLA Management

Scale of Integration

- Clinical Applications
- Inter-Facility
- Care Networks
- Across-Geographies

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... and address the gaps in today’s healthcare interoperability platforms

Industry Implementations To-Date are limited

Designed for point-to-point Clinical Application Interfacing, failing to address the multiple complexities of true interoperability

What’s needed are Standardised APIs and Services...

Designed for Data and Workflow integration Delivery & Mgmt

- Self Service/ Onboarding
- Standards/ Conformance
- API/ Service Management
- SLAs / Policy (Service Rules) Driven
- Service Monitoring
- Prebuilt APIs/Flows/ Services
- Integrated API/Service Catalog(s)
- Governance / Stewardship / Auditing
- Security / Authorisations
- Consent Management
- Operational Dashboards
- Analytics / Reporting
- Governance / Workflows

Integration Platform, Configuration Based

Federated Enterprise Model, Policy Driven
Macro Forces Shaping Interoperability

Transition to Integrated Care Systems
The transition to integrated care systems and a focus on value-based care (VBC) payment model will require all system partners to collect and share more data to improve outcomes and lower costs.

Unsustainable Ecosystem Requires Collaboration
System-wide recognition that collaboration across multiple entities is required to improve the current healthcare system, lower unsustainable rising costs, and enable better outcome.

Expanded Insights into ‘Consumer’ Needs
Leveraging analytics generated from new sources of data, like Social Determinants of Health (SDoH) and Behavioural Health, are needed to gain deeper insights into ‘consumer’ needs to deliver more customised care.

Engage Consumers
Increasingly available on-demand data seen in other industries has led to an increase in consumer demand for healthcare in terms of access and convenience, quality transparency, and alternatives.

Stakeholder Evolution & New Entrants
Ecosystem players are continuing to evolve, vertically integrate, and shift focus to meet the changing landscape, as well as the proliferation of new entrants and disruptors (e.g., Amazon, Google, Apple).

Drive for Open Data Sharing
Increased focus to address preventing information blocking, promoting APIs, deliver Payment Transparency, enable trusted exchange networks, and empower consumers to be the owners of all health information will drive extensive changes to interoperability landscape.

Evolution of Technology
Cloud, Cognitive (Machine Learning, AL, etc.), blockchain, and other new technologies as well as the overall shifts to API-based integration are beginning to disrupt healthcare industry and enable enhanced/new use cases.
Engaged and Motivated Consumers Will Exert Pressure
Regardless of regulatory changes, New Entrants are driving Consumers to look for even more!

**Personalised Experience**
Customised solutions powered by consumer-generated data

**Affordability & Transparency**
Ability to compare prices and reviews to make informed, cost-effective decisions

**Seamless Efficient Experience**
Seamless interaction and engagement in retail transactions, integrating personal data and preferences across channels

**Greater Access and Choice**
Access to a wide selection of products and services at different tiers and price points across channels

**Quality**
Expect to receive quality and value for products and services that is commensurate with price they are paying
Interoperability Technology Maturity Framework

Because the start and end points, as well as service models and goals are different for every organisation, there is no “one-size-fits-all” solution. Interoperability requires a varying combination of integration, data management, security, administration and innovation to unify information access and integrate workflows effectively.
Interoperability Organisational Maturity Framework

Having the technical capability to interoperate means having the organisational and procedural maturity to know what to do with it.

- **Clinical systems**
- **Portals**
- **mHealth**
- **Non-clinical systems**
- **Other Integration**
- **Registries**
- **Shared Repositories**

**Information Access Layer**

- **Sophistication of capabilities delivered**
- **Time**

**Leveraging connectivity to deliver increasingly sophisticated support to health service delivery over time**

<table>
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<tr>
<th>CAPABILITY DELIVERED</th>
<th>EXPECTED BENEFITS</th>
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<tr>
<td>Ability to aggregate and share information across the organisation</td>
<td>Safety and Quality benefits arising from provision of richer data at the point of care</td>
</tr>
<tr>
<td>Ability for selected subsets of data to be view in a contextually relevant way (e.g. pharmacy view vs. GP view)</td>
<td>Increased clinical utility and efficiency for the information that is presented</td>
</tr>
<tr>
<td>Ability for patients to view and manage service coordination activities (e.g. e-referrals, electronic scheduling)</td>
<td>Reduction in administrative load and improved capacity management</td>
</tr>
<tr>
<td>Ability to support shared care models (e.g. multi team approaches, chronic disease) starting with targeted populations.</td>
<td>Improved provider collaboration and better health outcomes for patients</td>
</tr>
<tr>
<td>Ability to perform analytics across a broad and rich data set to support better decision making at the point of care.</td>
<td>Reduction in adverse events leading to further improvements in care safety and quality</td>
</tr>
<tr>
<td>Ability to support research with a rich (broad and deep) data set.</td>
<td>Reduction in cycle time between research and application to care delivery.</td>
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</table>
Consistent with Healthcare Sector Maturity Models for EPRs

The maturity model provides a general model on the layering and order of interoperable data capabilities across the development of an EPR.
Most health systems have adopted one of several available interoperability solutions – initially to allow their own applications to exchange data, and increasingly to participate in health information exchanges with other providers and health care stakeholders.

Notes:
- Interoperability technologies can be “distributed” and overlapping, i.e. each of the participants may have multiple HIE technologies and solutions.
- The adoption of SaaS technologies is accelerating. The adoption of HL7 FHIR tools is also accelerating and should fuel the growth of an “API” ecosystem.
- Many initiatives are exploring Blockchain as an additional interoperability model and testing which used cases it would benefit the most.
For most health systems, the preferred approach is for a fully integrated system. The cost of transition, the long term affordability, the availability of different integration methods, make the Multi-Platform approach the only practical strategy.

### Single Platform (Total Integration)
- Single platform for all core functions (clinical, financial) and for all facilities.
- Minimal interfaces required.
- Minimal data integration required.

### Multi Platform (Maximized Integration)
- Selected platforms to support enterprise.
- Interface Engine.
- Data Aggregation required to perform Analytics.

### Best of Breed (Point-to-Point)
- Selection of best available solution (at time of acquisition) for each functional system.
- Aggregate Viewer Interface Engine Registries.
- Requires standardisation and aggregation to perform analytics.

### Community
- Interoperability between community providers with respective, mostly different platforms.
- Full HIE (registries, consent, vocabulary services, etc).
- Population Management.
- Community HIE Adoption.
How to Implement – Development Process

1. Requirements
   Service Functional & Non Functional

2. Functional Design
   Architecture/ Flow System Components

3. HL7 Mapping Specs
   ESQL/XSLT, New/Existing, Product/Client

4. Service Catalog
   Services, SLAs, Policies
Dealing with the Complexity of Healthcare Interoperability
Managing Variances through Exception Based Processing

1. **Model Interoperability Policies for Healthcare Organisations**
   Deloitte assists clients in creating a model of how organisations should exchange health information exchange using legal and standards to guide policies.

2. **Accommodate Group / Organisation Type Policies**
   It may be, in any given network, a type of organisation are subject to a different interoperability policy. (e.g. LOINC validation / mapping applying for Labs)

3. **Organisation Specific Policies / Variances**
   Only exception to the standardised policies are managed when onboarding a specific Participant into the network. (e.g. one Lab within the group cannot supply LOINC codes, requires custom terminology mapping policy)

*Interoperability Policies are modelled, group exceptions to policies managed, so only variances across individual Participants need to be managed and governed over time*
Mitigating Risks

The risks to individual stakeholders must be mitigated to foster an environment favourable to interoperability.

Increased Security & Privacy Risk

- Ubiquitous mobile devices including:
  - Users bringing their own devices
  - Tablets and mobile devices with wide-area network and Wi-Fi capabilities – including medication scanners, patient-monitoring systems and imaging devices
- Virtualisation strategies and use of the cloud
- Emerging threats including viruses spreading through social media, international crime rings

Costs of Compliance

- New regulations introduce new challenges to overcome
- The provider leaders are contributing valuable time in attempts to align local, state and federal standards organisations
- New partnerships with private industry leaders, have contributed valuable solutions
- Much room for improvement remains
- Alignment is key to mitigate this risk

The Rise of “Technical Debt”

- Ward Cunningham coined the term “technical debt” to describe the trade-offs associated with releasing “immature” code—code that works, but isn’t quite right.
- Technical debt often stems from making poor short-term/long-term trade-offs.
- It can accrue when architects pick products or approaches without fully considering the ramifications of their choices.
- CIOs use the concept as to focus technical teams on quality, increase transparency into IT costs and operations, enhance the entity’s understanding of IT delivery, and help the C-suite prioritise IT projects.
## Lessons Learned – Setting the Right Expectations

Below are some of the lessons we learned through our long and rich experience.

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<th>Lessons Learned</th>
<th>Our POV</th>
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<tr>
<td><strong>Quality and consistency of data:</strong> The quantity of health care data has been growing exponentially, so has the level of variability and inconstancy</td>
<td>There is a very high level of variability in the data that we find in each of the health system applications. Health care data is generated through a series of workflows and activities; some are relatively consistent (e.g., ADT), other are unique for each organisation (e.g., care path, order-sets, formulary, health plan product, etc.). Therefore most transaction (or data exchange) needs to be addressed individually.</td>
</tr>
<tr>
<td><strong>Data fluidity:</strong> Clinicians and patients expect interoperability to make all data to be available anytime through the EPR or other applications they are using.</td>
<td>Interoperability provides partial data fluidity, i.e., it allows for some data to be available in some systems or applications. As the data is “exchanged”, as opposed to shared, fluidity is limited by the capability of each application and by the consistency and usability of data. Data exchange by definition is a partial interoperability model – and does not include the broader application collaboration at the workflow and user interaction level.</td>
</tr>
<tr>
<td><strong>Technology solution:</strong> Can using the right technology solve the interoperability challenge.</td>
<td>HIE technologies are relatively mature and have been adopted by a majority of the health care system. The current technologies however have limited capability to help address the variability of the data. A “Rosetta Stone for HIE” is not available yet. The implementation of HIE technologies is therefore very iterative and relatively lengthy. In situations where separate entities need to exchange data, governance and collaboration become very challenging.</td>
</tr>
<tr>
<td><strong>Repeatable and scalable process:</strong> Health systems expect to be able to “connect” a large number of clinics within a short timeline.</td>
<td>Health system leadership often have a gap in understanding the data complexities and limited to no experience with multi-organisations interoperability. Data ownership is still a controversial topic and individual health care systems still have the majority of the data ownership responsibility and influence.</td>
</tr>
<tr>
<td><strong>Blaming the vendors?</strong> Industry observers have been pointing the finger at the vendors who have been &quot;blocking&quot; data exchange.</td>
<td>Most EPR vendors have sophisticated data exchange capabilities, and some limitations which in many cases can be addressed using alternate methods. The vendors, as much as other industry stakeholders, have not been able to agree on detailed data standards.</td>
</tr>
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</table>
STEP 1: Define the Vision

- In-depth review of the proposed rules and other regulatory actions, including proposed timelines and impact to specific lines of business
- Define the Interoperability vision for the organisation
- Establish initial interoperability governance structure
- Identify in-flight initiative impacted by interoperability and initial alignment

STEP 2: Assess Current State

- Building off of initial understanding of proposed rules and impacts, define (or refine) baseline interoperability strategy
- Undertake market scan to evaluate how partners, competitors and other health care stakeholders are preparing for interoperability
- Identify people, process and technology impacts to achieve the vision
- Conduct system analysis and key impact areas for change

STEP 3: Get Ready to Mobilise

- Prioritise initiatives and align with overall organisational strategy
- Explore and finalise partnerships and potential solutions
- Finalise Interoperability architecture and roadmap
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