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Realities of Putting Interoperability Standards into Practice

Nothing is as simple as it seems at first glance, and the more you look the more you see.

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Agenda

Standards and Interoperability

- Why Interoperability is so important
- How Standards ease Interoperability
- Using Interoperability for system integration

Limits of usage standards

- Scope and approaches
- Adherence to business needs
- Resolution of shared data
- Non functional requirements

Personal opinion

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Standards and Interoperability

Why Interoperability is so important

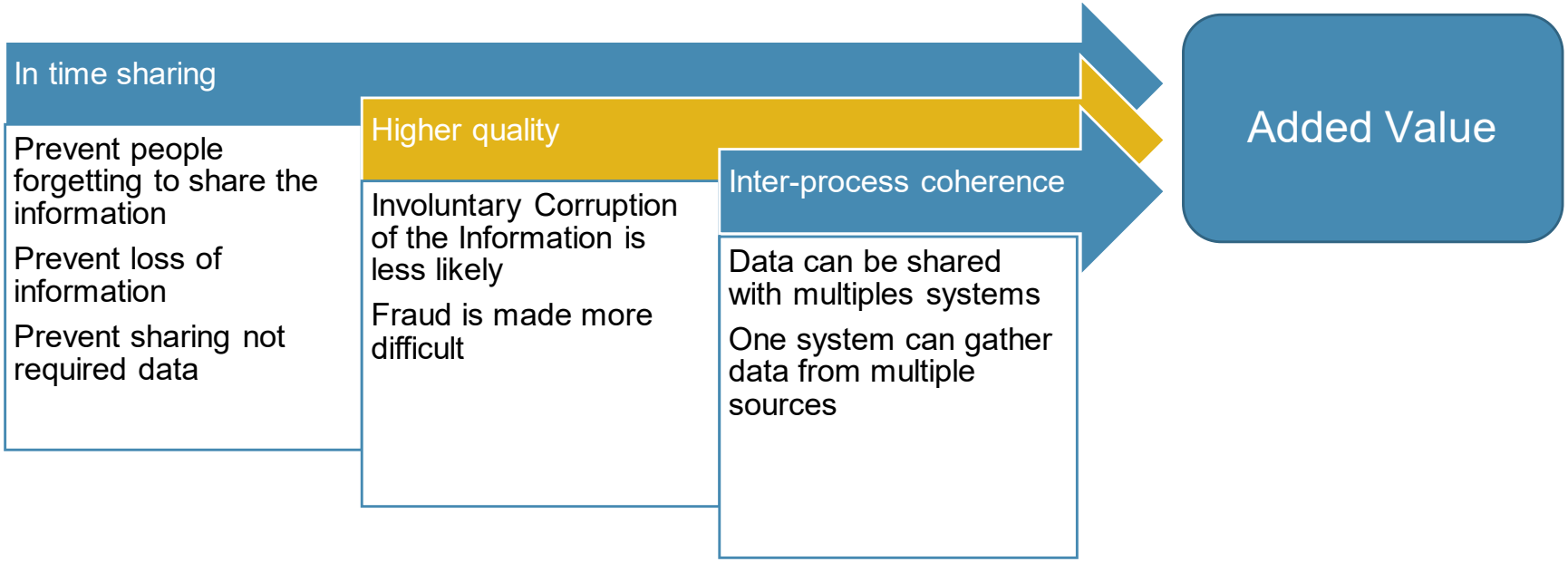
Why are we digitalizing health?

The digitalization is not an end but simply a means to increase patient experience, care quality, and reduce cost.

But the health sector is composed by many types of activities with specific requirements, therefore often specific systems.

Why Interoperability is so important

Why systems need to be integrated



System integration requires decision

Business needs	• Integrating systems for the sake of integration does not make sense, an expected business gain must be defined
Elements to be shared/integrated	• Often systems have multiple representations of a given data/fact (full data, relevant data, restricted data, etc.)
Resolution of shared data	• Source of truth / main platforms • Mapping/Terminology servers
Format / encoding	• There is plenty of formats to share payload such as binaries or other data formats: XLS, Json, CVS, etc • For a given payload format many encoding can be used (UTF, ISO, etc)
Information vectors	• How the system must reach each other, in western country often use HTTP over TCP • In LMICs, this is not always straight forward
Constraints and other non-functional	• Validation rules • Encryption • Authentication, Authorization, Accounting/Auditing

How standards ease interoperability

Standards as “out of the shelf” solution/decision bundle

Using standards provides a set of a pre-established rules for integration

This has multiple advantages:

- It saves time by bundling several decision-making in a single one
- A proper (in its scope and details) documentation is available in most of the cases
- It saves money when computer libraries are actionable

In that sense, using a Standard increase a system interoperability if this standard is also common in other systems used in the same fields

Unless the integration goes into detail (regulated, tried and tested), the interoperability will have limits and some specificities will have to be addressed during integration

How standards ease interoperability

EMCARE / FHIR example

Business needs	• Pluggable guideline • Shareable data collected
Elements to be shared / integrated	• Encounter • Observation • Condition • Patient
Resolution of shared data	• ValueSet and conceptMap can be used • Still the issue of the mapping itself with other code systems (CIEL, ICD …)
Format / encoding	•Fully specified
Connections	• Anything that support HTTP(S)
Constraints and other non-functional	• Validation rule fully specified / specifiable • Security is out of scope

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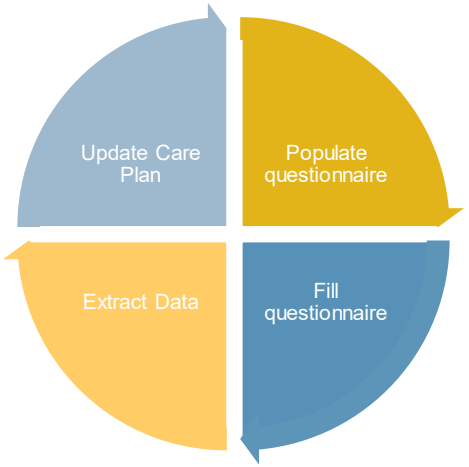
Limits of using standards

Limits of using standards

Scope and approaches

- Which parts of the standard will be actually used
- Specification of the flexible/undefined part of the standard



EmCare

- We only save Patient, Encounter, Observation,Condition
- We are using PlanDefinion, Questionnaire, Library,StructureDefinition, StructurMap CodeSystem and values
- But we are NOT using Task, Medication, Procedure, DiagnosticReport, etc.

Limits of using standards

Adherence to business needs

Standards cannot foresee every use cases

Different SOP — Coverage (aka policy) is mandatory in FHIR Claim v4

- For national health coverage, this is a burden (does not add value)

Internal IDs — Mandatory DHIS2* internal ID

- Advanced use cases (update, complex dataset integration) force the integrated system to resolve internal DHIS2 Id,
- It complexify integration therefore reducing DHIS2 interoperability

Cross businesses — FHIR is of little help for interoperability with Accountant system

- To integrate openIMIS to an Accountant system, new API had to be build because the systems were not sharing the same standard
- The Accounting system has very low adoption of FHIR because it does not match their core business

* Not a standard but widely adopted in LMIC

Limits of using standards

Profiles and validations

- Flexibility and customization required
- Standard versioning requires to adapt to new/changing needs

Incompatible customization — SMART EMCare won't work well will SMART ANC patients

- SMART ANC patient lacks important extension such as DateEstimators defined in the EMCarePatient

Version conflict — openMRS FHIR claim module is not compatible with latest openIMIS FHIR API

- openMRS FHIR claim module was build for openIMIS integration but using the now deprecated FHIRv3 API
- The change in the resource use by this integration broke the retro compatibility

Assumptions — EmCare create observation even if the finding it represent was not found

- To save the information that of an unsuccessful research for finding we save an observation with the status "Cancelled": one must check the status when looking for EmCare Observation

Limits of using standards

Resolution of shared data

Transformation and loss of meaning within the same standard

Different coding — SMART EMCare and SMART ANC use different coding for similar concepts

- Translation between the system coding are often required, reducing the interoperability
- Different solution exists: hard coded mapping, ETL layer, Terminology server, but all comes with pros and cons

Coding unilateral evolution — Very specific / new drugs used in HF not available in insurance systems

- Coding is evolving with time and needs but integrated systems might not evolve at the same pace because of different needs

Lost of meaning — Multiple successive mapping might derived for the originally reported one

- Because of lack of exact mapping, an initial finding might change over multiple integrations because of successive little loss of meaning in the mappings

Limits of using standards

Non-functional requirements

They should also be considered within interoperability

AAA — Authentication, auditing/accounting mechanism often have their own standard

- If one system expects all the payload to be digitally signed, the way to sign and validate signatures must be shared between the integrated systems

Authorization — Integration does not mean that the systems could do everything on the other systems

- Authorization could impact the type of resources accessible but also based on resource content (location, history, etc.)

Workflow — Workflow could impact how the integration is used

- Bulk update capabilities could be mandatory of overnight sync
- Implementation of specific search criteria could be critical: searching an Observation based on its encounter id …

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Personal opinion regarding standards

Personal opinion regarding standards

Good but needs a bit of salt

Context	• Interoperability should always refer to a context; health, banking, etc.
Go for added Value	• Implementing a standard in a business oriented system for the sake of implementing a standard is a waste of money • Always have in mind integration that will bring value in production
Takes all integration requirements	• Never underestimates all the aspects that are not covered by the data standards • A good share of the ressources (time and money) will be consumed in those activities
Identify registries/code systems and their maintainers	• Make sure the responsible of the references and codification are identified and have the capacity to maintain those registries
Be careful of mapping	• If mapping or transformation can be avoided (meaning little to no risk of deviation in the future), prepare that path beforehand because it will take time • If mapping or transformation is required, use ETL and/or terminology server to ease maintenance

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Thank you for your attention

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