The Global Language of Business

Support Emerging Use Cases for GS1 Identification

GS1 Architecture Finding

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1 Introduction

This Request for Finding asked the GS1 Architecture Group to review, improve, then approve a series of recommendations to support expansion of the GS1 identification system's relevance to new entities, in new application areas and in ways that supports interoperability and efficiency across sectors, regulations, and regions. It will focus on GS1 identification keys (referred to as GS1 identifiers in this Finding) where they are used to access data today or may be in the future. It will also address new situations where access to data is not currently possible (e.g., hospitals working through digitalization of medical records) or where it may not ever be possible or desired (e.g., emergency relief supply chains). The recommendations aim to speed decision making and reduce divergent national application of GS1 standards or use of proprietary solutions where use of GS1 identification would add value. The immediate scope will focus on tier 1 and 2 GS1 identification keys where GS1 data carrier and GS1 or non-GS1 data sharing standards are used. In a subsequent phase, we can consider where tier 3 and 4 keys (non-GS1) are used with non-GS1 data carrier and/or GS1 data sharing standards (e.g., BIC URN within EPCIS).

2 Executive Summary

GS1 provides many tools, like standardised identifiers (e.g., GTIN, GLN, GIAI, GSRN, SSCC), data carriers (e.g., EAN/UPC, GS1 DataMatrix, QR Code, EPC RFID), data sharing standards (e.g., Global Data Model, EDI messages, EPCIS visibility data, GS1 Web Vocabulary) and services (e.g., GDSN, GS1 Registry Platform). Across the system of GS1 standards, globally-aligned decisions on which standards and tool(s) industry will use to address a particular business requirement are defined within a construct called a GS1 Application Standard.

The GS1 community faces challenges when balancing how they address local industry needs quickly while also participating in global standards development and deployment. When A GS1 member asks a GS1 MO for advice on which standards and tools to use, there are situations where existing GS1 application standards do not specify a common answer. Nonetheless, it is essential that GS1 MOs are able to respond to local needs by providing advice in a timely fashion.

If all MOs were to arrive at the same conclusions and provide the same advice in response to an expressed industry need, there would be no need for the recommendations of this Finding. But the provision of globally-aligned, common advice is often influenced by local factors (e.g., processes, regulation, common practices, cultural or labor factors, varied capabilities) or legacy implementations that lead to divergence of the advice/guidance/feedback/responses provided by a GS1 MO to their industry members.

The process that is used across GS1 to arrive at common answers that can be implemented consistently and globally across industry is the GS1 Global Standards Management Process (GSMP). Convening industry and GS1 together to deliberate an industry challenge and to define a solution within the GSMP process can take time and is not suited to every industry challenge that is encountered around the world.

To improve the consistency with which GS1 can respond to industry needs, to set the foundation for increased transparency about the challenges that industry is facing and to strengthen those pieces of work that are submitted into GSMP, this Finding addresses three identified gaps:

- **Awareness and Visibility of Local Needs:** The first gap is awareness of emerging use cases. If two or more MOs knew they were working to solve the same industry problem, they could partner to speak with one voice.

- **Common Methodology:** The second gap is use of a consistent method to arrive at common solutions to any single industry challenge. If all MOs are equipped with a common methodology to assess and develop identification solutions, more consistent guidance will result.

- **Guiding Principles for Novel Use Cases:** The third gap is establishing clear guiding principles that the GS1 community can use when working to fill strategically important gaps in GS1's identification standards and tools (e.g., needs that cross sectors or that support regulation). Clear guiding principles will increase the efficiency and consistency of the outcomes of GSMP working groups.

This Finding discusses operational and strategic topics related to the expansion of GS1 identifiers into new use case areas. This Finding will be published in two releases.

- This first release focuses on the first two gaps: **Awareness and Visibility of Local Needs** (section 3.1 below) and **Common Methodology** (section 3.2 below). Both topics are presented with a set of recommendations (section 4 and 5 below) that will enable other groups across GS1 to begin to implement mechanisms that will improve our overall operations:

  - Section 3.1 asks GS1 experts in customer service, community engagement, public policy and standards to consider ways to reduce divergence in advice related to what GS1 identifier to use for new use cases.

  - Section 3.2 will ask GO to consider AG recommendations for procedures that will drive common assessment and development for emerging GS1 identification use cases.

- The second release will focus on the third, more strategic gap: **Guiding Principles for Novel Use Cases** (section 3.3). This topic requires additional time to address, as the gap relates more intimately to our system architecture, processes and possibly even our policies. Once the second release is published, recommendations related to this gap will be published in section 6.

3 Problem Statements

So far, twelve GS1 identification keys, constructed using the GS1 Company Prefix, have been approved. When combined with data elements such as serial numbers, the number of GS1 keys are greater and discussed in the GS1 System Architecture in Section 4. As it relates to global use in open networks, all GS1 identifiers except Component and Part Identifier (CPID) conform and as it relates to multi-sector use, all GS1 identifiers except CPID and Global Coupon Number (GCN) conform. Today, GS1 is facing many identification requirements which present three issues for the organisation.

3.1 Awareness and Visibility of Local Needs

GS1 Member Organisations (MOs) provide advice each day on which GS1 identifier to use for a specific use case. In common use cases (e.g., made-to-stock trade items, logistics units), local recommendations for which identifier to use align, but when novel (yet to be defined in global standards) use cases are presented, recommendations often diverge (e.g., fish traceability, biological samples). Some of the more common reasons for divergence are described below:

- Needs for identification solutions occur at different times in different countries/regions or sectors.

- Different markets may have regulatory or industry requirements.

- Different experts may focus on different aspects of defining a solution such as the functionality required for the identifier (e.g., class, instance), a match with the entity definition, the identifier's capacity, the data elements used with it, and/or allocation rules.

- Experts may base solutions on different data sharing capabilities or different assumptions about business processes. For example:

  - One expert may consider, and another ignore upstream and downstream process requirements.

  - One expert may consider, and another ignore or is unaware of ancillary use cases for the same entity.

  - For the same outcome (i.e., identifying patient-specific medicinal doses), there are several different ways in which they are produced (automated, manually), different parties involved (e.g., repackager, care facility med techs or nurses), and different ways they are distributed to the patient (e.g., home delivery, bedside administration). GS1 standards should accommodate as many use case requirements as possible and avoid looking at the requirements separately (or at different times) to achieve the highest level of interoperability possible. It's also important to consider who are all the stakeholders who provide or consume the data – and which kind of data is needed by each (master data, transactional, event data).

  - A patient-specific dose that is packaged in automated fashion may be sent to the patient for consumption over time (e.g., 30 packets for each day for one month) whereas, in a long-

term care facility, the patient-specific dose may be produced manually each day and given to the subject of care directly in a disposable cup. It would be up to the GSMP WG to determine whether both processes can be supported by one entity, therefore one identifier, but the WG scope should look across the use case process variables for a common goal and similar outcome before solutioning.

☐ The table below illustrates several areas where a global standards discussion began with various starting points based on divergent national recommendations.

Initiative	Various key recommendations before entering the GSMP
Fishing vessel	String for any kind of recognised vessel ID, GLN, International Maritime Organization (IMO) number (plain syntax vs. IMOVN URN)
Fish traceability	SSCC using barcodes and labels, SGTIN using barcodes and labels, SGTIN using RFID and event messaging
Biological samples	GIAI, SSCC, GSRN, GSRN-SRIN
Patient specific does (repackaged medicine)	SGTIN, SSCC, GIAI

In rare circumstances, there may be an exceptional requirement to use two different GS1 identifiers for the same entity, in the same sector AND for the same application. For example, medical devices that undergo repeated sterilisation can be source-marked to provide full traceability to the manufacturers using GTIN plus serial number, but for devices which were procured prior to a requirement for source marking, a hospital (rather than the manufacturer) may assign and apply an identifier using GIAI.

Proposals in section 4 address the problem statement in this section by making new use case requirements visible at the earliest point possible, to document common solutions faster (outside the standards process) where there is a common agreement of GS1 MOs, and to use the GSMP only to resolve areas where a lack of common agreement requires it.

3.2 Common Methodology

If implementation of the local advice remains confined to one nation, divergent guidance may not present an issue. When implementations cross borders, divergent guidance must be resolved at the global (GSMP) level. Entering the GSMP with divergent implementations is sub-optimal for those who have already implemented a solution and are subsequently disrupted by an incompatible global standard. Additionally, this divergence can create delays and frustrations in the global standards process. The basic problem is that GS1 MOs need to respond to these requests for guidance faster while avoiding future disruption caused when global standards are agreed. As many of the reasons for divergence relate to a need to distribute the expertise for assessment and development, a common methodology is warranted.

Investing time in making a complete assessment based on a common methodology early in the process reduces the risk of improper routing (e.g., does it require a standard at all, is it simple standards change, does it require a Mission Specific Work Group (MSWG), will it impact or need to account for data sharing standards such as master data, transactions, visibility data).

For example, the assessment may indicate we can use an existing GS1 identifier so we may only need to add it to the *What GS1 Identifies Catalogue* being proposed in Section 4 and possibly develop a guideline in GSMP or implementation guidance at the local level. We may also want to add the new example to an existing application standard via the ID SMG (typically a simple change). On the other hand, if a new key is required or if there exists divergence of guidance on use of an existing key, then an MSWG may be required to reach consensus on which key to use and to develop guidance on migration to the global standard. Getting the assessment right and determining the level of divergence up front helps to reduce rework.

Documenting and deploying a common development methodology will also remove delays and friction in the standards process. The methodology can be improved upon over time but should lead to a common set of viable options and enforce the rigor that ensure all identification standards "boxes are checked".

Proposals in Section 5 address the problem statement in this section. In Section 5, we provide for a common methodology to assess and develop solutions when GSMP is required to come to a common agreement.

3.3   Guiding Principles for Novel Use Cases

For 50 years, GS1 stakeholders have relied on GS1 standards to support automatic identification and data retrieval for "made-to-stock" consumer trade items and their higher levels of packaging. GTIN allocation rules for retail, healthcare, apparel, fresh food and upstream are designed for made-to-stock contexts (e.g., change in net content, the "20%" change in dimension rule). Soon, these rules will be updated to support Marketplace needs related to bundles, so-called "non-branded" products and products of a condition other than "new", but in all these cases, the made-to-stock model applies.

Of course, beyond trade items, GS1 identifiers are also used to retrieve information about broad entity types that span sectors, applications, and nations. For example, they are used to identify parties, locations, assets, logistic units, shipments, consignments, service relationships, coupons, and document types in open value networks.

Today's use cases for GS1 identifiers are more diverse than the GS1 system currently defines. They are:

a.   developed in response to regulatory requirements (e.g., healthcare, consumer communication, sustainability);

b.   developed for global, multi-sector needs like most of today's existing tier 1 GS1 identification keys; or

c.   developed for sector-specific or application specific ecosystems of identification.

Examples of the above categories include:

d.   Digital Product Passports (and components and models depending on the product type), reusable ready-to-eat meal containers scanned at retail Point-of-Sale

e.   Made-to-order/customised products, product subassemblies, components, or parts that may or may not be trade items themselves

f.   Patient-specific doses (automated repackaged medicine, manual dispensing of dose), non-reusable biological sample containers, identification of event participants (e.g., RFID Marathon race bibs)

Given the advent of high-capacity AIDC data carriers like 2D barcodes and RFID, today's use cases may make use of these data carriers to provide enough information to maintain process flows. For example, in transport, enough information could be present to ensure delivery to the correct address without requiring an online look-up via SSCC. In another example, a patient wristband may contain enough attribute data (e.g., last name, first name, date of birth, gender) to ensure identification of the right patient without requiring an online look-up of patient information via GSRN. This new capability does not mean GS1 identifiers will not be used when data is available online or used with devices which are offline after being updated online. It simply means that identification may not always be immediately used to share data even if online retrieval of information via identification always provides the most current information. *Note: AIDC data is defined as data encoded in an AIDC data carrier that provides business information about an entity such as a use by date or weight*).

An object (such as a piece of safety equipment or a fire extinguisher) may be purchased as a product and marked with an SGTIN by the manufacturer / brand owner but is later treated as an asset. In this situation, there may be other relevant data beyond what is provided by the manufacturer, such as details of usage cycles, maintenance/repair/inspection/recalibration cycles. By marking with two identifiers or by linking from the individual asset identifier to the previous product instance identifier, GS1 Digital Link resolver infrastructure can be used to redirect to both authoritative data from the licensee / brand owner / manufacturer, as well as usage/maintenance data recorded (and controlled) by the asset owner. If the asset owner operates their own resolver, it can point to usage/maintenance data even if that asset is still identified by an SGTIN, while also being able to redirect to master data provided by the brand owner / manufacturer.

Proposals in Section 6 address the problem statement in this section. In Section 6, we provide areas for subsequent consideration by the AG for addressing these novel requirements, but recommendations will occur in Release 2 of this Finding.

4 GS1 Identification Use Case Alignment

This section highlights the need for a new mechanism (e.g., process, stack overflow platform, searchable catalogue) to make new use case requirements visible, to find common answers quickly (outside the standards process) where common agreement exists and to use the GSMP where a lack of common agreement requires it.

Proposals:

1. Document a knowledge base for currently supported use cases in a *What GS1 Identifies Catalogue* so MOs can provide consistent answers but also address where a common answer does not yet exist. The exercise of cataloguing examples of what our existing GS1 identifiers identify would be conducted by MO industry, public policy, standards and customer service experts. The platform for the catalogue, would allow MOs to check if there is already an answer to identification questions. If not, they would move to Proposal 2. Note: A caution should be included to say, "In the absence of contradictory or overriding regulatory requirements, GS1 would ordinarily recommend the following identifiers for these entities".

2. Develop a common template, process, and platform that allows the MO community to document use case "gaps" and make them visible as soon as they are asked to provide advice.

3. Establish a process where new use cases made visible in Proposal 2 can be addressed quickly at the global level.

   a. Where new uses cases are non-controversial, they could be added to the catalogue. If there is a need, they could also be added as examples in the standards, but the MO would not need to wait on the standards process to provide guidance.

   b. Where differences of opinion or divergence of local advice exists, move to Section 5.

Were Section 4 proposals prioritised by an appropriate governance group of GS1, a project team of community engagement, public policy, customer service and standards experts would be created to design and implement the new process and platform to operationalise it. This would not be a GS1 Architecture Group project, but a GS1 AG member would serve as a liaison and other members might participate. See Section 7.0 for related action items 1-3.

5 Common Assessment and Solution Development Methodology

This section is intended to make GS1's global response to new GS1 identification use cases more efficient and consistent, by ensuring a common and comprehensive approach is followed in the assessment phase by GS1 Identification Subject Matter Experts. This will reduce rework, determine if standards and/or guidelines are required, if an MSWG is required and will help to establish what level of implementation divergence may already exist.

Proposal:

Where, per Section 4 – Proposal 3.b, "differences of opinion exist or where local divergence of advice already exist", develop a common framework to assess GS1 identification requirements and develop solutions per a common methodology as outlined in the steps below.

GS1 Identification Assessment and Development Methodology

1. Develop (and use) a common business process mapping approach, inclusive of entity(ies) currently using or requiring GS1 identifiers, parties involved in the process, data produced and shared, and mechanisms for how the data is shared (e.g., registries and resolvers for GS1 Digital Link, master data, transactions, event data, AIDC data, non-GS1 data sharing standards such as HL7). Below you will find an example of how this could be documented. The step-by-step description and the process flow graphic explain the business process and the Sequence then Activity UML diagrams explore the process from a modelling perspective.

Figure 5-1 Business process example for biological sample collection, testing, and reporting
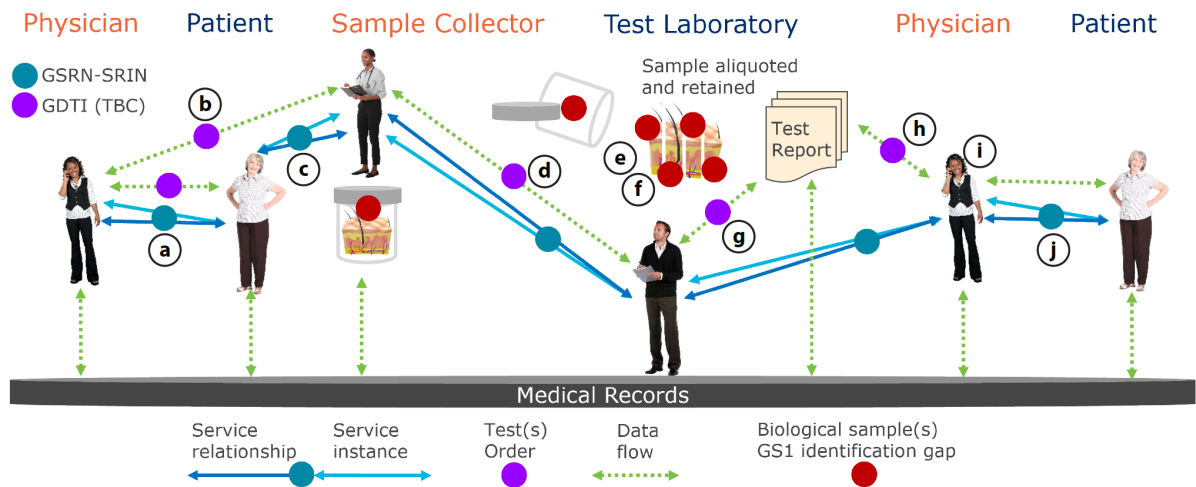
a. Doctor (GSRN-Provider) prescribes test(s) for patient (GSRN-Recipient). Episode of care may be recorded via GSRN-SRIN.

b. Test order is sent from the doctor to sample collector. Test order could be identified by GDTI. An instance of the document's use could be identified by GDTI optional serial number.

c. Sample collector (GSRN-Provider) collects sample from the patient (GSRN-Recipient) and identifies sample (ID to be determined by future GSMP group). Episode of care may be recorded via GSRN-SRIN. If the sample collector and the doctor work for the same organisation then the patient would have the same GSRN-Recipient as the organisation the doctor and sample collector work for has only one GSRN for their service recipients.

d. Sample collector sends sample(s) to test laboratory(s).

e. Test laboratory may aliquot (divide into multiple parts) the sample and if so, identifies the sample (ID to be determined by future GSMP group). Aliquoted test samples may have a shelf-life or years, months, days, hours, or even minutes in some cases.

f. Test lab then conducts tests.

g. Test lab compiles a test report. Test report could be identified by GDTI. An instance of the document's use could be identified by GDTI optional serial number.

h. Test laboratory sends test report(s) to doctor.

i. Doctor reads and analyses the test report(s) received.

j. Doctor reports test results to the patient.

Figure 5-2 UML activity diagram example for biological sample collection, testing, and reporting
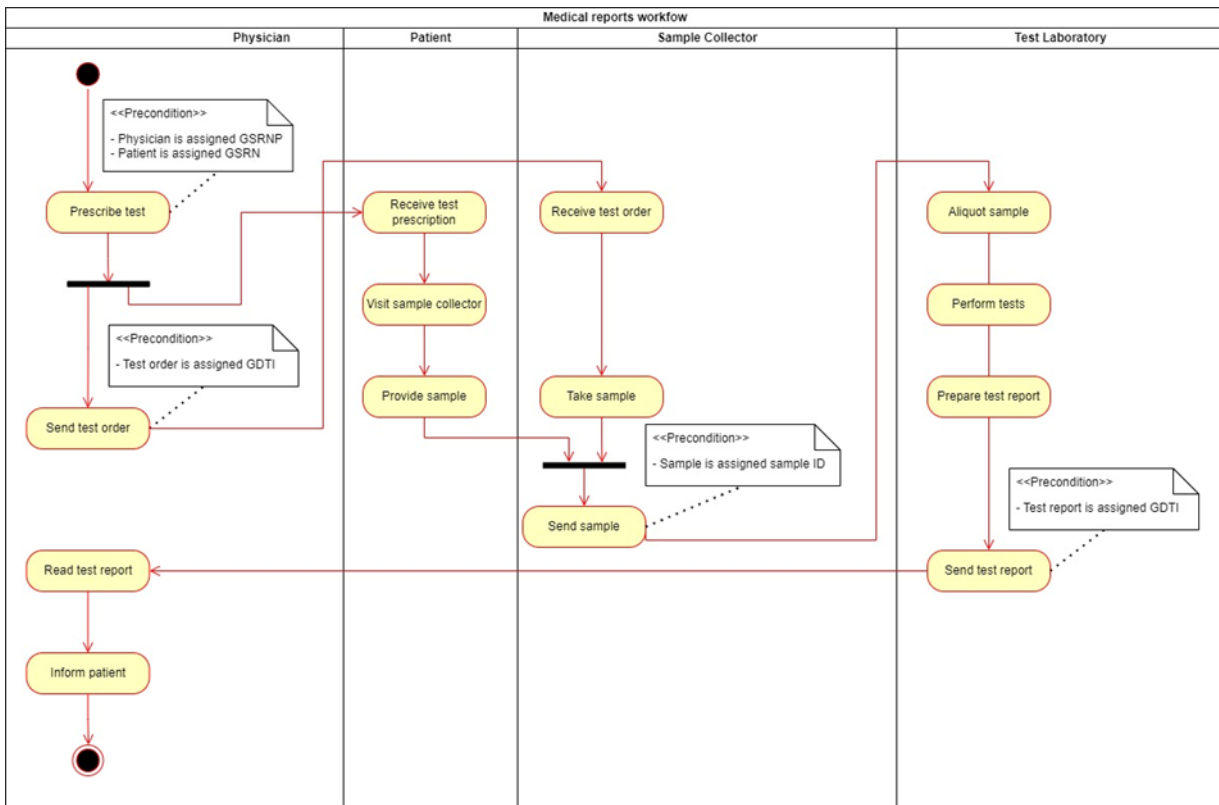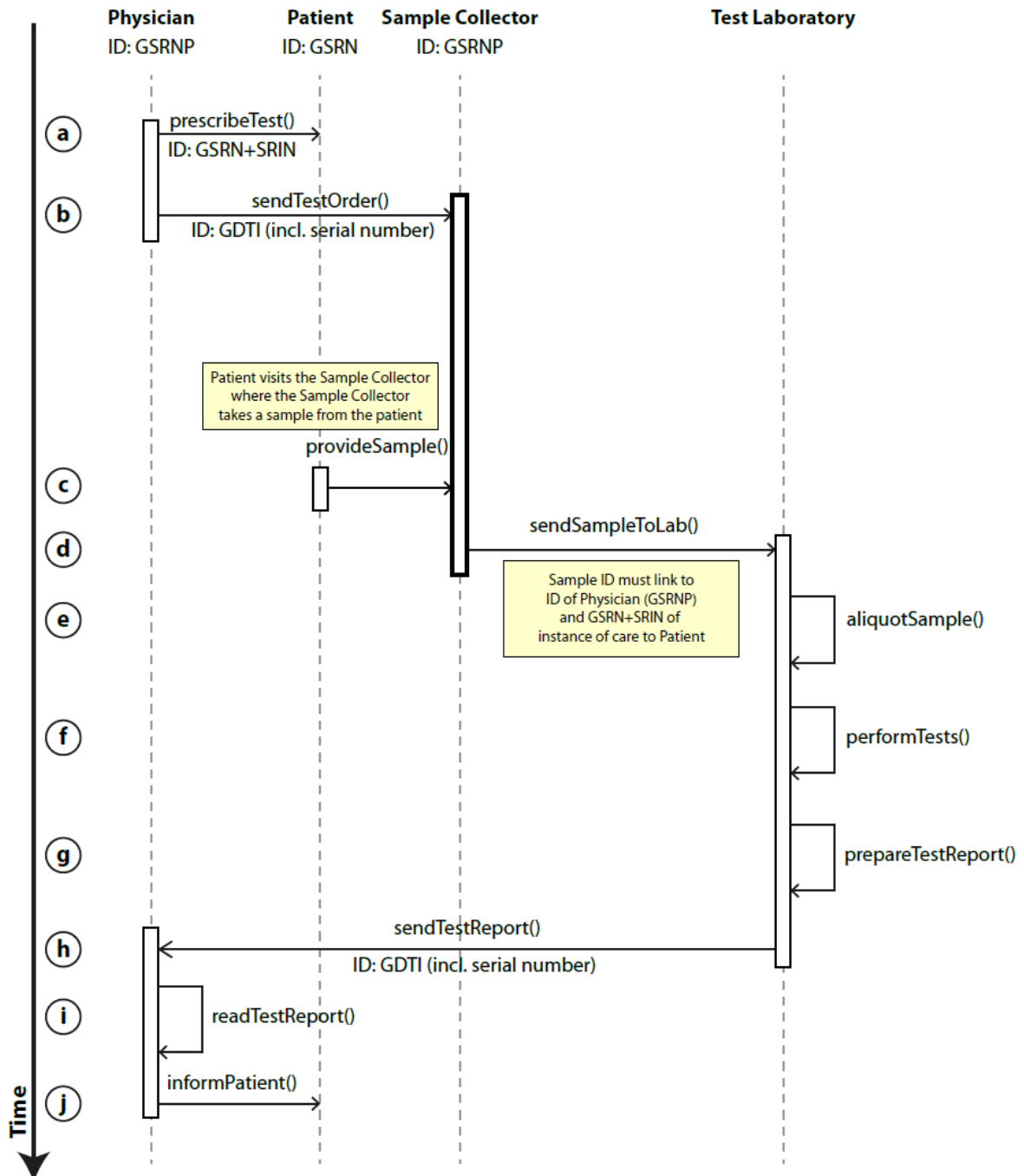
Figure 5-3 UML sequence diagram example for biological sample collection, testing, and reporting

2. Determine where globally unique, non-significant GS1 identifiers are (or are not) required across the business process map(s).

   a. Required: Multiple companies are (or will be) willing and capable of sharing standard data (e.g., master, transactional, and/or visibility) AND require standardised identifiers across all parties. Where a GS1 identifier is suited for the new use case, move to Step 3 below.

   b. Not required: Multiple companies are unwilling or incapable of sharing standard data across networks and, therefore, standardised identifiers are not required.

Figure 5-4 Summary of Methodology Steps 3 to 5

Steps 3 to 5 are summarised in the Figure below before providing greater detail.

```
┌─────────────────────┐
│    GS1 ID needed    │
└─────────────────────┘
          │ Y
          ▼
┌─────────────────────┐      ┌──────────────────────────────────────────────────┐
│  Existing GS1 Key   │  Y   │ 3. Add to What GS1 Identifies Catalogue and via GSMP as a new │
│       Works         │─────▶│    application standard or example in existing standard │
└─────────────────────┘      └──────────────────────────────────────────────────┘
          │ N
          ▼
┌─────────────────────┐      ┌──────────────────────────────────────────────────┐
│  New Global, Multi- │  Y   │ 4. Follow GSMP process to define new key within an application │
│  Sector Key Needed  │─────▶│    standard using common methodology then…         │
└─────────────────────┘      │                                                    │
                             │ 5. Assess impact of new key on other standards and services │
                             └──────────────────────────────────────────────────┘
```
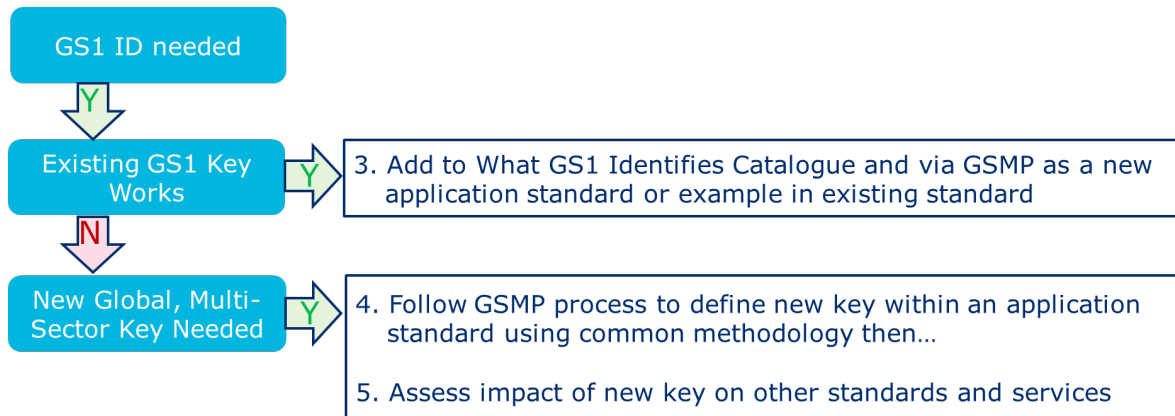
3. Where standard identifiers are required, reuse existing GS1 identifiers *wherever all the following are true*:

    a. The new entity is the same as the entity defined by GS1 (e.g., asset, trade item, physical location)

    b. The allocation rules for the existing identifier will work and expanded rules will not be disruptive to the current base of users implementing the identifier

    c. The existing identifier is not excluded by contradictory requirements of regulation or legislation in the region of activity.

    d. The capacity (e.g., number of characters, character set used) of the existing identifier supports the requirements for persistent identification

If an existing GS1 identifier matches the new use case, add it to the *What GS1 Identifies Catalogue* according to Section 4, Proposal 2 and consider adding the new use case as an example in the appropriate GS1 General Specifications application standard via GSMP. If no existing application standard covers the use case, consider whether adding an application standard is needed.

It is important to note that one physical entity may support various use cases, so identifiers relate to the physical entity and the use case for it. For example, a master carton could be a trade item marked with a GTIN but later be a logistic unit marked with an SSCC. A machine or device could be a trade item marked with a GTIN (and possibly with a serial number) but later be managed as a company's asset for financial purposes (e.g., asset valuation, depreciation) and marked with a GIAI or GRAI.

4. Where a GS1 identifier is required, but existing GS1 identifiers are not appropriate, create the new GS1 identification key via GSMP and ensure the following is considered and documented:

    a. The application standard justifying its introduction is documented (e.g., GS1 General Specifications Section 2 sub-section)

    b. The new entity subject to identity is defined in an unambiguous manner

    c. A GS1 Application Identifier is assigned to it as it contains a GS1 Company Prefix

    d. Allocation rules for the new identifier are defined including consideration of whether they can be reused or must remain persistent in perpetuity

    e. The capacity (e.g., number of characters, character set specified) of the identifier supports the level of persistent identification required

    f. Ensure against the downstream use of significance within the identifier. An identifier may be constructed in with significance (e.g., starts with GCP, ends with check digit), but downstream systems must not be required to parse the identifier in order to connect the identified entity to data about it.

    g. Avoid duplication of identifiers (e.g., two GIAIs on one asset to signify different sides of the assets) and instead, add an attribute

    h. Delimiters are specified for concatenated data elements to signal when one ends, and another begins

    i. Ensure a through i are written in a manner that conformance can be measured

5. Based on 1 through 4 above, detail the impact on other standards and services. For example:

    a. Can AIDC data elements attributed to the existing identifier work or be expanded without disruption to the current base of users implementing the identifier (or those AIDC data elements)?

    b. If AIDC is required, can the solution work with existing carriers/specs?

    c. If used in AIDC, specify mandatory or invalid AIDC data element relationships and confirm the solution will work with existing carriers/specifications

    d. Will master data validation rules and data standards be used and if so, will they work?

    e. Will transactional messaging standards be used and if so, will they work?

    f. Will visibility messaging standards be used and if so, will they work?

    g. Will any core services of GS1 be impacted or needed?

With Section 5 proposals approved, the GO Subject Matter Expert Team Leader and the GO AG Co-Chair will document the necessary procedures based upon the factors and principles in this Finding. Those procedures should explain what constitutes a complete answer to the questions, include examples, and explain terminology that may not be known to all. This would not be a GS1 Architecture Group task, but GS1 AG members might be asked to provide peer review. Local training on the procedures might follow via the MO training platform, but this is not in scope for the AG. See Section 7 for related action items 4-6.

6   Novel Use Cases, Novel Solutions

To be completed and published in Release 2 of this Finding.

7   Summary of actions proposed

Finding Release 1 Actions	Responsible
1. Document examples of currently supported use cases in a *What GS1 Identifies Catalogue*	GO & MO customer service, CE, PP, and standards experts
2. Develop a common template and process to allow the MO to document gaps in the use cases	GO & MO customer service and standards experts
3. Establish a process where new examples can be added to the *What GS1 Identifies Catalogue*	GO & MO customer service and standards experts
4. Ensure assessment and development of requests are conducted by GS1 identification subject matter experts per the procedures that will be developed based upon Section 5 Proposals and Annexes A, B, and C	GO SME Leader and GO AG Co-Chair
5. Develop online training, and possibly certification, for MO subject matter experts involved in assessing emerging use cases for GS1 identifiers on the procedures per action item 4	GO customer service and training
6. GS1 to determine internal versus public access to the platform and/or methodology to expand the ambassadors for GS1 identification standards.	GS1 GO

A   General GS1 Identification Principles, Policies, and Rules

A.1   Excerpts from the GS1 Architecture Principles, Release 4, 2020

GS1 identification keys

The GS1 system is founded on identification keys whose values are unique within their designated domains and which unambiguously identify business objects.

The principle regarding the use of the identification key classes (see definition) in GS1 standards is as follows:

1. Use of class 1 or class 2 identification keys as primary identification is mandatory for an implementation to be conformant with the GS1 System.

2. All GS1 standards, guidelines, solutions and services are designed to use class 1 identification keys as the primary identification for business objects. Class 2 identification keys might introduce restrictions or process rules that are not fully aligned with GS1 models.

3. The use of class 3 identification keys for primary identification is recognised in specific components of the GS1 system.

Interoperability

GS1 system components and any underlying processes that are developed must strive to be interoperable in their design, development, and implementation to enable the widest adoption and the greatest value to the GS1 community. (see definition interoperability)

Non-duplication

The goal of the GS1 system is to establish one and only one way to perform a given function in a GS1 system conformant way. Therefore, the GS1 System Architecture should avoid duplication.

When migrating to new and better ways to achieve existing functions, some form of duplication is inevitable. The impact is mitigated if these new and better ways are backward compatible (see "Forward looking") and superseded standards are deprecated (see "Deprecation").

Non-significance of keys

A GS1 identification key is non-significant as it does not embed business information about the business object it identifies; information about the entity is instead associated with the key.

Embedding information into a key severely limits the capacity of the key space and leads to severe problems if the nature or structure of the embedded information ever needs to change.

Open supply chains and value networks

The GS1 system shall be developed to suit open supply chains and value networks.

GS1 standards that are applied at the interfaces between organisations are defined outside the context of any particular trading relationship. This provides interoperability without the need for organisations on each side of the interface to negotiate in advance.

Re-use of components

Standard data elements should be re-used consistently across different GS1 standards. GS1 should store, reuse and share precise core component and business definitions and their equivalent representations in the GS1 system.

Technology independence

The GS1 System Architecture should promote technology independence and a layered approach.

The GS1 identification keys and GS1 data standards are defined in a modular way, independently of the data carrier and information sharing technology in which they are used.

A.2 Excerpts from the GS1 General Specifications, Release 22.0, 2022

Identification system policies

The GS1 identification system provides the world a globally unique and unambiguous identification system for physical entities, parties and relationships exchanged in the supply chain. The policies that follow apply to all sectors making use of the GS1 Company Prefix in association with GS1 keys and the Application Identification System. These policies provide for the long-term integrity of the GS1 identification system so vital to the global supply chain.

Mandatory identifiers

All GS1 standards shall incorporate GS1 identification standards as mandatory identifiers exclusive of all other mandatory identifiers.

Non-GS1 identifiers

Non-GS1 identifiers may only be used with GS1 standards as additional identifiers (not alternates). Implementations using non-GS1 identifiers as primary identifiers are not compliant with GS1 standards.

GS1 Company Prefix

The GS1 Company Prefix is used exclusively within GS1 identification standards that may be expressed in GS1 approved barcode applications, in GS1 EDI messages, for global data synchronisation, network registration and in EPC tags within the header values reserved for the GS1 system. See section 1.4 for further details on the GS1 Company Prefix allocation.

Carrier independence

GS1 identification keys are defined and utilised per GS1 definitions independent of data carrier (e.g., barcode, radio frequency identification (RFID), business message).

GS1 business messages

GS1 business messages or GS1 standards-based applications use GS1 identification keys for identification exclusive of GS1 data carrier features.

Global, open numbers (unrestricted distribution)

Global, open is an identification number used in unrestricted distribution which signifies that such system data may be applied on goods to be processed anywhere in the world without restraint as to such things as country, company and industry.

Restricted Circulation Numbers

Restricted Circulation Numbers (RCN) are GS1 identification numbers used for special applications in restricted environments, defined by the local GS1 Member Organisation (e.g., restricted within a country, company, or industry).

GS1 identification key

A GS1 identification key is a unique identifier for a class of objects (e.g., trade items) or an instance of an object (e.g., logistic unit). The type of the GS1 identification key is declared implicitly or explicitly by the data carrier or electronic message in which the key is used.

Character set

Regardless of the identification key type, the GS1 Prefix and (if applicable) the GS1 Company Prefix within any identifier use only the digit characters. NOTE: This is critical as all GS1 tier 1 and 2 identification keys SHALL begin with a digit as this is GS1's ISO/IEC Issuing Agency Code or IAC.

A.3 Excerpt of General Rules from ISO/IEC 15459-3, Section 6.0

For the full text, purchase the standard at the ISO store.

6.1 General

An identity is assigned to an individual entity, item, unit or grouping by an identity issuer.

The following requirements apply to identities:

a) an identity shall include a qualifier from one of the qualifier identification methods listed above.

b) the string component of an identity shall start with one or more characters for the identification of the identity issuer, i.e. Issuing Agency Code (IAC) followed by Company Identifying Number (CIN).

c) the string shall conform to the format specified for the qualifier to which it applies.

d) the string shall be unambiguous within its qualifier in the sense that no issuer re-issues the string within the qualifier over the entire life cycle for the identified entity or until a sufficient period time has passed so that the identity has ceased to be of significance to any user.

e) each qualifier shall require its own independent set of rules that enable the identities for this qualifier to be held in a separate field on a database, be defined as a separate data element in an EDI message or as a separate search criterion in a directory search. For each qualifier the rules should minimally determine (1) the maximum length of the string for that qualifier and (2) the repertoire of characters that may be used in the string following the identity issuer identification.

f) for some parts of this standard an identity may be made up from a combination of two or more qualifiers and their associated strings, according to rules defined for the qualifier identification method. This is explained in each part.

It is recommended that the Issuing Agency provide application guidance to identity issuers (e.g. check-digit algorithms, selection of GS1 Application Identifier or ASC MH10 Data Identifier, etc).

6.2 Common rule for the length of an identity

The common rule for the length of an identity is that it should be kept as short as possible, enabling coding using different AIDC techniques …

6.3 Common rule for the character set of an identity

The common rule for an identity is that it shall use alphabetic, numeric and special characters from the invariant character set ISO/IEC 646, see Annex A.

Any data processing system shall be capable of processing identities using the full repertoire of characters permitted by ISO/IEC 646.