

# A YEAR OF TRVST

## REFLECTIONS FROM THE PAST YEAR

In 2022, the Verification & Traceability Initiative (VTI) – a multi-stakeholder partnership composed of Gavi, The Bill & Melinda Gates Foundation (BMGF), The Global Fund, UNICEF, USAID, the Rwanda Food and Drug Authority (FDA), the Nigeria National Agency for Food and Drug Administration and Control (NAFDAC), and The World Bank with Vital Wave as the Program Management Unit (PMU) – launched the Traceability and Verification System (TRVST) in response to challenges identified across low- and middle-income countries (LMICs) with substandard and falsified vaccines and medicines. TRVST is a new, collaboratively designed system that allows countries to verify the authenticity of health products and track and trace them through their supply chain.

Over the course of two years, VTI partners have worked alongside country regulatory authorities in Rwanda and Nigeria, vaccine manufacturers, private businesses, and development partners to connect national information systems and pave the way toward end-to-end traceability systems for all health products. TRVST relies on a global repository, built by SolidSoft Reply, that stores health product information such as Global Trade Item, serial, and batch numbers as well as production and expiry dates. The data is fed into the TRVST repository by medical product manufacturers. Users, such as health care workers, regulatory authorities, and customs agents can access TRVST through a mobile device or through an integration with a national traceability system to scan medical product barcodes and verify their authenticity in real time. Any verification failure or suspect activities will trigger an alert which will be sent to respective manufacturers and regulatory authorities.

### Value of TRVST

- Protecting individuals from substandard and falsified health products and related negative outcomes
- Strengthening country supply chains with increased visibility of product status
- Accelerating country traceability journeys/roadmaps and strategic plans
- Institutionalizing TRVST into country plans and end user workflows
- Receiving and ingesting GTINs and serialized data into country systems
- Using TRVST dashboards to access data for informed decision-making

In July 2022, during the unprecedented speed and scale of the COVID-19 vaccine rollout, TRVST was launched in Nigeria and Rwanda with the first Global Standard 1 (GS1) scans, marking a milestone patient safety and addressing the urgent risk of falsified and diverted vaccines. COVID-19 vaccines were the first products used in TRVST thanks to Johnson & Johnson providing the first batches of data into the repository. Currently, TRVST is scaling up and expanding into routine vaccines and other health products for the prevention and treatment of HIV, tuberculosis, and malaria, as well as reproductive health supplies and other essential medicines like antibiotics.



*Figure 1 – Nigeria Trial and Rwanda Trial*

The VTI and TRVST complement other global efforts led by partners and countries to digitalize public health supply chain systems. This unique multi-partner initiative strives to help strengthen country supply planning and demand capacity with the objective of ensuring greater levels of access to health products and treatments.

Since the collaboration began, many lessons have been learned. This document is an opportunity to reflect on progress and take stock of lessons learned in four key areas, all integral to the roll out and progress made: country engagement and deployment, data sharing, manufacturer engagement, development of TRVST, and global program coordination.

## PROGRAM MANAGEMENT AND GLOBAL COORDINATION

Since its inception in April 2021, the VTI has become an active and dynamic community of practice, bringing together multiple and diverse voices across government, donors, and the private sector. Partners have come with different contributions, some financial and some in-kind in the form of time and commitment in shaping the initiative. Careful coordination and management across partners to ensure all voices are heard and goals are met has been an important element in maintaining a successful and unified community. Good governance has been key to that coordination.

### Create Inclusive Governance Structures

The VTI established management and coordination structures to ensure day-to-day progress in developing and deploying TRVST capability while keeping all VTI partners and key stakeholders involved in essential discussions and decisions.

Governance is formed by a steering committee where all VTI partners come together on a regular basis to support TRVST development and deployment and provide guidance as necessary. It includes three task teams supporting the work on technical management, country deployment, and data sharing agreements.

In the steering committee, each partner has one vote, ensuring equal voices. While the steering committee is limited to VTI partners, the task teams have become an important forum for other stakeholders (such as VTI members' contractors, GS1 Healthcare, etc.) to provide their expertise and support to the initiative. As such, the task teams are an important forum for bringing in non-VTI organizations that are central stakeholders in verification and traceability as well as ensuring proper buy-in of the priorities and vision for TRVST.

### Foster Leadership

The VTI has a strong focus on ensuring country-level ownership of TRVST. Leadership is fostered through interactions with countries, identifying a focal person within each government to drive a country's adoption of TRVST, bringing together country-level partners to support the effort, and selecting the modality and pace of adoption.

The presence of two countries, Nigeria and Rwanda, in VTI's Steering Committee has supported this country-focused vision and has helped balance the donor perspective.

### Coordinate Strategies

The VTI, by virtue of bringing together key donors in supply chain systems, has become a dynamic forum for discussion and coordination. GAVI, the Global Fund, and USAID have used the VTI as a forum to discuss joint initiatives and align on supply chain topics. Going forward, the VTI will continue to play this role and help donors have a unified message to countries on supply chain issues.

# VTI – REFLECTIONS FROM THE PAST YEAR

Coordinating messages and strategies requires a clear understanding of the goals and plans of the initiative. A robust project plan detailing milestones and delivery dates facilitated this understanding, and weekly review of the plan allowed the team to manage expectations and coordinate parallel workstreams.



## DEVELOP TRVST

TRVST is a technology solution that had to be developed and rolled out. Managing this required the setup of a Technical Management Task Team whose works focused on the development and implementation of the requirements defined in the vendor contract. The vendor contract is held and managed by UNICEF, but TRVST development has been an inclusive exercise, involving inputs and oversight from multiple stakeholders in the initiative. The development was divided into two releases, the first to enable the verification use case, and the second implementing additional track and trace features.

### Ensure Clarity

Clarity is key to the effective development. Initially, lack of clarity on the use and functioning of several features caused confusion and reduced efficiency. Clear specification of each feature was extremely important. New features should be based on detailed use cases that provide needed clarity.

This also applies to individual roles. While UNICEF is the vendor contract holder and manager, Vital Wave is serving as the PMU for the initiative. At times this can lead to inefficiencies and a risk of misunderstanding of roles. Early on, a task team charter was developed to define the roles and responsibilities of UNICEF (the contract holder) and Vital Wave (the PMU) when managing the TRVST development and operations. This helped to set expectations for individuals and partners.

### Build Rapport

The VTI initiative started in 2021, during the height of COVID where in-person meetings were not possible. Virtual collaboration allowed for highly effective collaboration for over a year, but in 2022 when in-person meetings became a possibility, partners welcomed the opportunity. Several face-to-face meetings with the software vendor, UNICEF, and the PMU proved extremely useful and accelerated development. Virtual bi-weekly meetings are efficient, but in-person meetings are helpful to improve rapport and mutual understanding.

### Plan to Test

Completing ad-hoc testing before moving into formal user acceptance testing (UAT) is necessary to support the vendor's quality assurance team. Several bugs were picked up before moving into UAT, highlighting the importance of this step.

### Expect Delays and Adapt

There were multiple delays throughout the course of the development. Contracting of the vendor was delayed, and development began only in Q2 2022. Release 2 was delayed by several months. When delays are experienced, it is important to identify and communicate the implications to relevant partners and to adapt quickly.

## COUNTRY ENGAGEMENT AND DEPLOYMENT

TRVST is designed to meet the supply chain needs of countries for verification and eventually traceability. Working closely with country governments and their partners has been a centerpiece of the VTI's activities since 2021. Country regulators form part of the initiative's highest governance body (the steering committee) as well as operational task teams, in which they are key decision makers. As countries adopt TRVST, they are supported by VTI partners to further define country-specific goals, use cases, and requirements that leverage existing investments, align with strategic plans, and design an approach that meets countries where they are. To facilitate continuous learning and refinement of country engagement approaches, VTI partners and countries participate in peer-to-peer learning through the Country Deployment Task Team. The Country Deployment Task Team meets on a bi-weekly basis, enabling regular information sharing, collaboration, and learning.

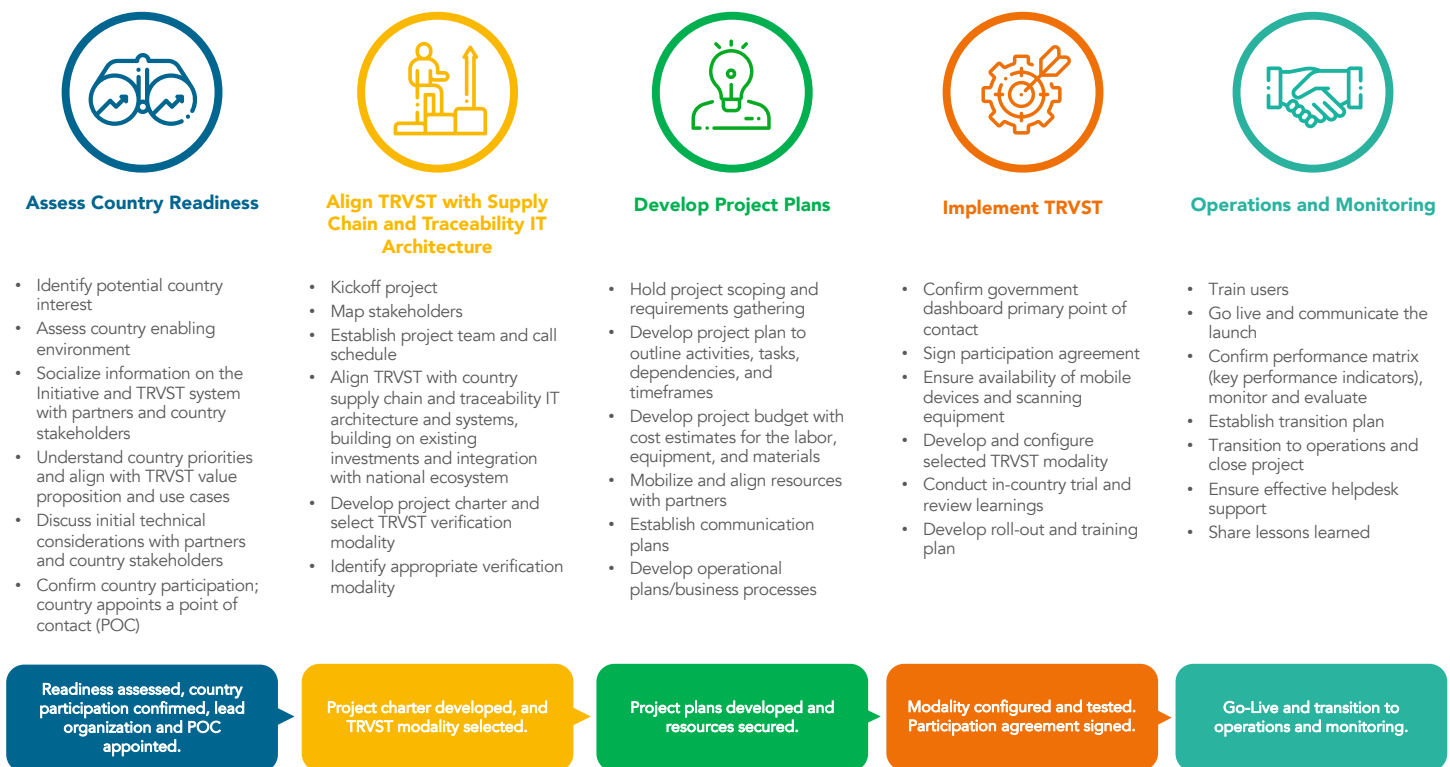
Based on promising approaches learned through initial country deployments in Nigeria and Rwanda, VTI partners collaboratively developed the Country Engagement Blueprint ("Blueprint"). The Blueprint captures the experience of deploying TRVST and serves as a guide for country partner coordination and planning activities to help define a set of phases and key activities to plan for and deploy TRVST. To support countries and partners, a set of reusable resources and guides were developed to assist countries with planning activities.

### Key Phases of the Blueprint are:

- **Assess Country Readiness:** Initial engagement with a country focuses on socializing information on the initiative and the TRVST system to determine interest. This phase also considers country readiness and the current enabling environment.
- **Align TRVST with Country Supply Chain and Traceability IT Architecture:** During the architecture alignment phase, initiative partners, country government, and other key stakeholders engage in discussions to understand details of the country architecture, including existing traceability systems as well as broader supply chain systems and where TRVST fits into the current and future state. A decision on TRVST verification modality, related use cases, and scoping is also part of these discussions.
- **Develop Project Plans:** The project planning phase is focused on developing detailed plans around communications, stakeholder engagement, timelines, and budgets for project execution.
- **Implement TRVST:** The implementation phase focuses on ensuring necessary agreements and approvals are complete in preparation for go-live and the selected TRVST verification modality is configured to meet the country scope.
- **Operations and Monitoring:** During this phase, a country implementation of TRVST transitions to operations and maintenance mode and monitoring of usage and any related issues.

## Accomplishments and Lessons Learned

In 2022, six countries committed to participate, and 14 more reached out to VTI partners to learn about opportunities to engage. Nigeria and Rwanda were early adopters, championing use of TRVST through helping shape VTI plans, defining system requirements, and trialing the TRVST mobile application in country. In addition, the governments of Malawi, Liberia, Nepal, and Tanzania confirmed plans to participate and use TRVST. To achieve country engagement accomplishments, donors and partners worked in close collaboration to leverage expertise, resources, and funding to support countries.



Country Engagement Blueprint: Key elements across the different engagement phases.

As the first year of TRVST ends, VTI partners and countries reflected on key country engagement accomplishments and learnings to inform next year's plans and increase impact.



## Assess Country Readiness

During exploratory country and partner conversations to socialize information on TRVST, it was critical to leverage partner relationships to connect with the right people and government authorities. Exploratory conversations typically continue over several months to properly socialize information across stakeholder groups and get buy-in. As a country decides to move forward, VTI partners provide support with selecting the most appropriate TRVST modality and approach. To provide the best support possible, it is essential for VTI partners to have a solid understanding of the country enabling environment and readiness in order to support countries on their traceability journey.



## Align TRVST with Country Supply Chain and Traceability IT Architecture

After countries commit to participation in TRVST, VTI partners learned that it is critical to engage in stakeholder mapping to ensure relevant individuals and groups are engaged early and at appropriate levels. In addition, VTI partners found that it is important to gain clarity around use cases, scope, requirements, and intended end users. This informs and guides the design of country's TRVST project and deployment, and it takes many conversations to work through these technical details. Regular calls are needed to drive progress and enable open and transparent collaboration.



## Develop Project Plans

To advance a country's TRVST planning and make well informed, key decisions, it is essential to have both technical and programmatic team members as part of project planning conversations. A detailed workplan, timeline, and supporting materials ensure clarity on project needs and alignment on plans to move forward. During the more detailed project planning phase, it is important to get clarity on funding sources and address funding needs.



## Implement TRVST

To prepare for a country deployment, an in-country trial provides valuable end user experience and feedback that can help refine approaches and improve plans. Through a trial, VTI partners and countries can identify challenges and mitigation approaches as well as promising approaches that can be reused. By this phase of work, it is essential that countries have signed a participation agreement confirming agreement with terms of use. In addition, countries must have a plan for resourcing and financing on-going operations and maintenance activities for sustainability.



## Operations and Monitoring

After a country deploys TRVST, continuous monitoring of usage and outcomes to identify potential barriers or issues that can be resolved and lead to improvements is important. As country staff come and go, a plan can be made for on-going training opportunities, and refreshers encourages usage and empowers staff to use TRVST effectively. In addition, peer to peer learning has helped accelerate activities and maximize the potential of TRVST capabilities.



## DATA SHARING

The data TRVST holds and the data it shares with its partners is critical to its operation and value. Since April 2021, a Data Sharing Task Team (DSTT) has worked to define a set of governance documents that detail the data sharing and decision-making processes of TRVST and the legal agreement that will be signed between stakeholders and the TRVST Organization. The DSTT is made up of representatives from each stakeholder organization and meets every two weeks to work on emergent issues, develop strategies and documentation, and ratify documents for acceptance by the Steering Committee.

UNICEF Legal Council has led the group of legal experts in the development of legal agreements and frameworks, working with lawyers from each member organization. This group completed a thorough review of frameworks and legal documents from similar projects and, through engagement with lawyers and experts from external organizations including the Global Family Planning Visibility and Analytics Network (GFPVAN) and the European Medicines Verification Organization (EMVO), the group defined a relevant legal framework for TRVST.

Work started with the initial development of a data sharing document. This evolved into the Data Sharing Protocol and the Data Sharing Matrix. Subsequently, the Core Principles document was created and ratified, and was used as a guide for further work. Next was the creation of the Data Governance Framework, which referenced other documents and detailed the change management of TRVST governance. The legal framework was then put together, consisting of a single master agreement to be signed by each participating organization and a Terms of Use to be agreed to by all users of the TRVST tools. The master agreement references the other documents, with a view to modularizing the framework and reducing the need to change the contract. Care was taken to make the agreements as readable and accessible as possible, preferring plain English language over convoluted legalese. Another core part of this work was the definition of stakeholder roles and the enumeration of each data element used within the system. Subsequently, a data sharing matrix and protocol were developed lay out the access that each role has to each data element. A summary of the various documentation developed by the initiative can be found at the end of this section on page 12.

### Accomplishments and Lessons Learned



#### Legal Agreements

Significant effort was spent developing an appropriate Participation Agreement to be signed by multiple stakeholders, including countries, onboarding partners (OBPs), and other stakeholders. The agreement is identical for all participants, with each stakeholder role specified in the cover letter.

Following consultations with stakeholder legal counsel, including representatives from The Global Fund, BMGF, GAVI, NAFDAC, Vital Wave, Rwanda FDA, JNJ and Pfizer, the agreement was iteratively updated and ratified by the DSTT and Steering Committee. Subsequently, the agreement was signed by several stakeholder organizations, allowing for the submission of

manufacturer data to TRVST, the trials in Rwanda and Nigeria to commence, and access to the dashboard by the organization single point of contact (SPOC).

Strong leadership from the legal team was essential to move the development of documents forward. As additional legal capacity was added to the TRVST team, document development accelerated significantly. Both bi-lateral conversations and broad forums were necessary to gain consensus on legal documents. Stakeholder-specific enhancements to the agreements can be added to the cover letter, which forms part of the contract. This allowed TRVST to maintain a single legal document for signature by all stakeholders. Key issues were identified around liability and applicable law. These were discussed at length with stakeholders, and suitable clauses were added to the agreement. Further discussion is ongoing as the Enterprise Agreement is finalized.



### Data Sharing Matrix

A key achievement of the DSTT is the development of the data sharing matrix, a tool to encapsulate access to each data element by individual role. The original Release 1 matrix was expanded to cover track and trace functionality provided in Release 2, and the increase in available data elements necessitated modifications to the matrix. These included collapsing individual data elements into categories, where every data element in a category had the same data access rules. The matrix was also split into areas for verification and track and trace functionality due to the differences in data usage between these two use cases. Future enhancements include further refinement of each role, and changes to access based on scenarios and use cases put forward by stakeholders of each role type. The data sharing matrix is an evolving tool that will change according to emergent use cases and functionality. Complimentary access matrixes, such as the report access matrix, and functional area access matrix should be integrated into the data sharing matrix in the future.

The data sharing matrix provides a very clear view of exactly which pieces of data are available to each stakeholder and detailed the situations in which data would be shared. For example, serial numbers are only shared with country authorities if a failed verification or suspicious activity was identified. This protocol increased confidence in TRVST data sharing and enabled stakeholders to easily understand the framework.

Further work needs to be done to define the bulk sharing of serial numbers to country authorities, procurement agents, and funders. Serial numbers are considered sensitive and should only be shared in specific circumstances and in a secure fashion. As these stakeholders have requested access to serial numbers, detailed requirements need to be defined.

Stakeholder roles can be more clearly articulated. The “Global Stakeholder Role” in Release 1, which had access to aggregate data across all countries and manufacturers, was superseded by several other roles (procurement agent, supply chain node, funder). These roles need to

be further defined, and non-system access (data access outside of the TRVST dashboard functionality) needs to be clarified, especially in terms of secure mechanisms for data sharing, and any agreements needed with data owners.



## Community of Practice

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## Examples of Documents Developed to Date

### **Data Sharing Matrix**

A tabular matrix detailing exactly which data elements are accessible by which roles in different situations.

### **Data Sharing Protocol**

A narrative document giving the context and descriptions of the roles and data elements contained in the Data Sharing Matrix.

### **Core Principles**

Nine core principles which guide the development and implementation of TRVST.

### **Data Governance Framework**

The overarching governance framework of the TRVST, referencing other governance documents and detailing the process for changes to the governance mechanism and related documents.

### **Participation Agreement**

A single contract for signature by every participant in TRVST. This document references the other governance documents and details how changes to governance will be made via a feedback loop with all signatories. This will be superseded by an Enterprise Agreement for the TRVST operational phase, starting in Q1/Q2 2023.

### **Terms of Use**

Agreements that users of the TRVST tools must accept before using the tools, detailing acceptable use policies, data confidentiality and data sharing. If the Terms of Use change, users will need to re-accept them via a click-through on the verification app, dashboard, or Track & Trace Portal.

## MANUFACTURER ENGAGEMENT

The success of TRVST depends on the product data supplied by the manufacturers. Defining the product scope of TRVST has been key, and while the original focus was on COVID-19 vaccines, this has been expanded to antiretroviral, tuberculosis, and malaria medicines (ATM) within global humanitarian health supply chains. This scope may be further expanded in the future, depending on country use cases.

To accelerate the onboarding of manufacturers, a tested and repeatable blueprint for engagement was developed. Key phases of the Blueprint are described below:

- **Manufacturer Readiness:** Identification of product categories and suitable manufacturers for engagement with TRVST. Outreach to manufacturers through relevant international procurement agencies.
- **Initial Engagement:** Sharing of TRVST advocacy and informational documents and initial socialization calls with manufacturer serialization teams.
- **Legal Engagement:** Bi-lateral engagement with manufacturer legal teams to socialize participation and enterprise agreements and to secure signature of these documents.
- **Implementation:** Engagement with manufacturer technical teams, technical onboarding and testing, and identification on manufacturer SPOCs. Training of manufacturer staff on technical integration and dashboard and Track & Trace (T&T) portal usage.
- **Operations and Monitoring:** Hyper-care and “business as usual” (BAU) operation of TRVST, with regular key performance indicator reports disseminated to manufacturers and TRVST operations staff.



### Manufacturer Readiness

- Define scope of products and supply chains to include in TRVST
- Invite manufacturers to engage
- Introduce TRVST through Webinar series and conference presentations
- Assess interested manufacturer GS1 adoption and serialization maturity
- Set up kick-off meeting



### Initial Engagement

- Hold kick-off meeting with manufacturer serialization and brand safety teams
- Review FAQs and emergent questions, implementation timeline, and level of effort requirements
- Support socialization with other internal manufacturer teams (account management and legal)
- Set up legal team engagement



### Legal Engagement

- Facilitate TRVST legal counsel engagement with manufacturer legal team
- Review legal documents
- Sign Enterprise Agreement
- Set up technical team engagement



### Implementation

- Share technical documentation pack
- Engage with manufacturer technology team and/or L4 provider
- Select business triggers for data submission to TRVST (ship-to or ordered-by)
- Train technical and other staff on dashboard and T&T portal use
- Test integration in testing and QA environments and promote to production



### Operations and Monitoring

- Ensure hyper-care support for first months of integration
- Support manufacturer usage of dashboard and T&T portal
- Monitor data submission and verification alerts
- Provide regular KPI metrics
- Share lessons learned

List of manufacturers defined.

High-level implementation timeline defined, and internal teams socialized.

Signed Enterprise Agreement

Successful technical integration with business rules defined.

Go live and transition to operations and monitoring.

## Accomplishments and Lessons Learned



### Scope and Outreach

The initial scope of TRVST was restricted to COVID-19 vaccines, and all relevant manufacturers were approached. Several early adopters agreed to engage with TRVST and were instrumental in moving the initiative forward. Strong support was also provided by GS1 Healthcare. Care was taken to make engagement with TRVST equitable so as not to unfairly advantage any manufacturers. It was important that outreach to the manufacturers was led by the organization involved in procurement to leverage and maintain existing relationships.

The decision to expand to other product categories such as routine vaccines and ATMs was discussed at length during Steering Committee and DSTT calls, and engagement with these manufacturers was managed by the procuring agents. However, the rapid expansion in scope from verification of COVID-19 vaccines to track and trace of multiple product categories proved challenging. A clear definition of the scope of TRVST and the value proposition to each stakeholder type needed to be developed as soon as possible. Further definition of the scope of TRVST is underway, and decisions on depth of coverage of products per country vs. breadth of coverage across each product category are being discussed. TRVST will set up a manufacturer forum for multi-lateral discussion in order to provide more clarity on scope and roadmap. Over the course of the expansion, it became clear that manufacturers have differing levels of appetite for serialization and traceability as well as differing levels of GS1 adoption and serialization. Many manufacturers stated that they would serialize their products and engage with TRVST based on national legislative requirements or conditions enforced by procurers. Others were proactive supporters of traceability, GS1, and TRVST.



### Initial Engagement

The first contact with manufacturers is ideally through their serialization and traceability teams. For the initial tranche of COVID-19 manufacturers, the TRVST team reached out to known contacts and serialization champions from several manufacturers, who eagerly engaged and supported the set-up of contracts and the initial manual submission of product data to enable the country trials. Support from these manufacturers was essential. Their inputs clarified the strategy and enabled the project to clear challenging hurdles. The team then developed an engagement pack, including FAQs and slide decks, which enables the rapid onboarding of other manufacturers. Subsequent rounds of engagement were initiated during vaccine industry consultations, where broad calls were put out to all manufacturers again, to ensure equitable access and ensure that none were unfairly advantage. Leveraging existing industry events and consultations for socialization of TRVST enable wide engagement. Even with proactive traceability champions, the time between initial engagement and submission of product data into TRVST was over six

months, highlighting the need for extended consultation before successful integration. This period is expected to reduce considerably as the materials, legal documents, scope, technology, and value offering of TRVST are more clearly defined. As timelines to onboard manufacturers stretched for longer than expected, it was vital to maintain communications and rapidly respond to any questions coming in to the TRVST team.



## Legal Engagement

It was important for traceability teams within manufacturer organizations to socialize the value and use cases of TRVST with their legal teams. Manufacturer legal teams did not always understand the business value provided by verification and traceability, and support from their serialization counterparts accelerated progress. Bi-lateral engagements between the DSTT, UNICEF legal counsel, and these legal teams resulted in a fit-for-purpose participation agreement that was signed by three major manufacturers before the end of 2022. Additional inputs are being incorporated into the enterprise agreement, which will supersede the participation agreement as TRVST moves into an operational phase in early 2023. Importantly, development of the initial, time-bound participation agreement gave manufacturers assurance that they were not locked into an indefinite agreement with the TRVST Organization, allowing them to engage in the preliminary trial period while lessons were being learned and the governance was being finalized.



## Implementation

While initial upload of manufacturer data was achieved through manual import of data files, two API interfaces have been developed for automatic submission of data to TRVST. While initial upload of manufacturer data was achieved through manual import of data files, two application programming interfaces (APIs) have been developed for automatic submission of data to TRVST. The first, the TRVST OBP API is a Simple Object Access Protocol (SOAP) based API similar to the EMVO integration API. This allows for those manufacturers already providing data to EMVO to quickly retool their platforms to work with TRVST. The second provided an Electronic Product Code Information Services (EPCIS) compliant API, the TRVST OBP EPCIS API, that caters for standard EPCIS data submission, allowing for the submission of aggregation information to facilitate traceability. This was important to include in the early stages so that traceability functionality was built in and redevelopment by manufacturers and Level 4 (L4) providers will not be necessary once the full traceability functionality is enabled. After several consultations, a set of business rules for data submission into TRVST were developed. The preferred rule for the verification use-case is based on the organization that procures the products (sold-to). This allows for submission of non-country specific product data to TRVST.

Another option was to trigger data submission dependent on where the products are shipped (ship-to). While this rule is preferable for a traceability use case, as it would

enable subsequent sharing of data with relevant country authorities, it became clear that many consignments are not shipped directly to countries and often do not specify country GS1 Global Location Numbers (GLNs) in the ship-to field. Many products are dispatched to regional warehouses, and their final destination is unknown. The warehouses often do not have capacity to re-aggregate shipments, and thus cannot send EPCIS-compliant serialization shipping messages to TRVST.

Successful testing from one manufacturer and a major L4 provider have been completed, with live data submission scheduled for Q1 2023. It was important to share level-of-effort estimates and timelines with manufacturers so that they could secure budget and capacity for integration.



### Operations and Monitoring

Participating manufacturers were trained on dashboard usage and, during the initial trials, were able to identify anomalous data from verification scans. The TRVST operations team began regular monthly reporting on system usage in preparation for the operational phase. Feedback from manufacturers was noted and added to requirements for the second TRVST platform release. The TRVST system is moving into an operational phase where scheduled operations reviews and feedback on system performance will be more critical. However, it became clear that self-service reporting was necessary, so system metrics reports were built into the TRVST dashboard.

To learn more about the Verification and Traceability Initiative or to get involved as an implementer, please contact the Program Management Unit for the initiative (Vital Wave) on: [traceability@vitalwave.com](mailto:traceability@vitalwave.com) or contact a representative of your local development partner organization.