VIPS VACCINE INNOVATION PRIORITISATION STRATEGY

VIPS Phase I executive summary: Radio Frequency Identification (RFID)

June 2019

Gavi The Vaccine Alliance

World Health Organization

BILL & MELINDA GATES foundation

PATH

unicef

Radio Frequency Identification (RFID)

VIPS VACCINE INNOVATION PRIORITISATION STRATEGY

About Radio Frequency Identification (RFID)

- RFID tags can be affixed to vaccine primary containers and **store a wide range of information useful for inventory control, patient monitoring** and **providing data for electronic medical record systems.**
- An RFID system consists of **three components; (i) a tag, (ii) a reader and (iii) the middleware**, which is the computer hardware and software that connects the reader to computer systems by converting data captured from tags into tracking or identification information.
- RFID tags also enable all the tags within range to be identified and every tag does not need to be individually scanned.

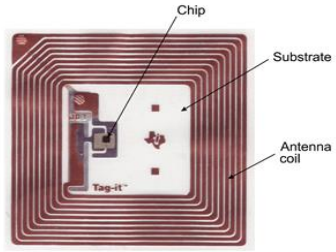
There are three types of RFID tags:

- **Passive tags** – which do not contain a built-in power source and cannot initiate communication with a reader.
- **Semi-passive RFID tags** – which have built-in batteries and function with a lower signal power and act over long distances.
- **Active RFID tags** – which are battery powered devices that have an active transmitter and can communicate over greater distances.

Stage of development

- RFID tags are **commercially available and are widely used** as a tracking system in a variety of industries including agriculture, food, pharmaceuticals and various healthcare practices for the tracking of patients, medical supplies and medical equipment in hospitals.

http://endtimestruth.com [a]



RFID Tag

RFID Tag

ww1.prweb.com [b]

RFID tags used for hospital medication trays

www.abr.com [c]

Handheld RFID readers & scanners

[a] http://endtimestruth.com/wp-content/uploads/2014/01/RFID-chip-and-antenna-3.png
[b] http://ww1.prweb.com/prfiles/2014/10/05/12223944/HCL%20-%20Seal%20Tags%20Kit%20Check.jpg
[c] https://www.abr.com/products/rfid-products/

Radio Frequency Identification (RFID) scorecard

Comparator: no RFID

VACCINE INNOVATION PRIORITISATION STRATEGY

Quality of evidence: Low to moderate

VIPS Criteria		Indicators		Priority indicators - Country consultation: RI* Facility	RI* Community	Campaigns
Primary criteria	Health impact	Ability of the vaccine presentation to withstand heat exposure	Neutral	+	++	++
		Ability of the vaccine presentation to withstand freeze exposure	Neutral			
	Coverage & Equity impact	Ease of use [a]	Worse	+	+	++
		Potential to reduce stock outs [b]	Better			
		Acceptability of the vaccine presentation to patients/caregivers	Better		+	+
	Safety impact	Likelihood of contamination	Neutral			+
		Likelihood of needle stick injury	Neutral			
	Economic costs	Total economic cost of storage and transportation of commodities per dose	Neutral	+		
		Total economic cost of the time spent by staff per dose	Better	++	++	+
		Total introduction and recurrent costs [c]	Worse			
Secondary criteria	Potential breadth of innovation use	Applicability of innovation to one or several types of vaccines	All vaccines are candidates.			
		Ability of the technology to facilitate novel vaccine combination	No			

* RI : Routine immunisation

++	Given significantly more importance
+	Given more importance
	Kept neutral

[a] Ease of use can prevent missed opportunities and impact ability for lesser trained personnel to administer the vaccine, including self-administration

[b] Based on the number of separate components necessary to deliver the vaccine or improved ability to track vaccine commodities

[c] Total economic cost of one-time / upfront purchases or investments required to introduce the innovation and of recurrent costs associated with the innovation (not otherwise accounted for)

Radio Frequency Identification (RFID):
Assessment outcomes

VIPS VACCINE INNOVATION PRIORITISATION STRATEGY

KEY BENEFITS

- **Potential to positively impact coverage and equity**:
  - Potential to **reduce missed opportunities** by **improving the quality** and **accuracy of immunisation data** for patient vaccination records and surveillance.
  - ✚✚ Potential to **increase acceptability** by improving record keeping of patient/immunisation information which could **reduce waiting times and speed up accessing of patient information**.
  - May **reduce stock-outs:** RFID tags can facilitate product tracking by having a unique identifier at the primary container-level, **improving inventory data and increasing efficiencies in stock management.**
- ✚✚ Potential to **save health care worker time** when delivering health services by improving patient workflow and the operational processes.
- **Antigen applicability:**
  - RFID could be **applied to all vaccines,** there are **no restrictions based on technical feasibility.**

KEY CHALLENGES

- **Rated lower than the comparator on some aspects of coverage and equity:**
  - ✚✚ May reduce **ease of use** due to **additional equipment necessary for capturing and processing data** (e.g. reader for scanning the RFID tag) and **increased number of steps and complexity** compared to having no RFID system.
- **One-time upfront costs and recurrent costs:**
  - Use of RFID system entails **upfront costs** for equipment such as the readers, computers, and software **and recurrent costs** for items such as software updates, network connectivity, and maintenance. Active RFID tags also require batteries, adding cost and complexity.
- Challenges exist regarding the availability of internet servers to power the RFID system, software, readability of the tags, lack of global standards and privacy concerns.
- Some of the benefits of RFID system may not be realised unless the country has implemented electronic data capture systems for recording vaccinations or for tracking adverse events.

✚✚ Important attribute for at least 2 settings or for the 3 settings based on the country consultation (see slide 3)

✚ Important attribute for campaigns or routine facility-based immunisation based on country consultation (see slide 3)

Radio Frequency Identification (RFID): Rationale for prioritisation

VIPS VACCINE INNOVATION PRIORITISATION STRATEGY

- RFID is **recommended to be prioritised** for further analysis under Phase II given their **supply chain and patient record-keeping benefits** and **broad applicability to all vaccines**.
- While use of RFID system requires equipment and resources, countries can chose to make such investments (or not) within their own timeframes.

Additional important information to be analysed in phase II (if prioritised for Phase II)**:**

- RFID should be evaluated alongside barcodes in Phase II.
- Inclusion of RFID is likely more costly than inclusion of barcodes on primary containers. However, the **benefits of this technology versus barcodes requires further analysis.**