

# VIPS Phase I executive summary: Barcodes

June 2019

# Barcodes

## About Barcodes

- Barcodes are symbols that **encode information** such as **product numbers, serial numbers, supplier data, batch numbers and expiry dates** which can be scanned electronically using two dimensional (2D) scanners, laser or mobile device cameras to automatically capture information.
- Barcodes **enable tracking and monitoring of vaccine products** in supply chains, providing information to manufacturers, transport providers, health facilities and other relevant parties involved in the logistics management systems, assuming the supporting infrastructure is in place.
- 2D barcodes can hold a significant amount of information and there is a possibility to automatically import data into patient electronic medical records (EMRs).
- This assessment is based on barcode placement on vaccine primary and higher packaging levels.

## Stage of development

- 2D Barcodes are **commercially available and pilots have been introduced** in a number of countries.
- **WHO currently recommends GS1 compliant barcodes for secondary and tertiary packaging** of vaccines containing the Global Trade Item Number (GTIN), vaccine expiry date and vaccine batch/lot number. **This recommendation is anticipated to soon become a critical characteristic necessary for WHO prequalification.**



NewsWire.ca<sup>a</sup>

Barcode on primary packaging



PATH

Barcode on secondary packaging

# Barcodes scorecard

Quality of evidence: Low to moderate

| VIPS Criteria      |                                     | Indicators  | Comparator                   | Priority indicators - Country consultation |               |           |
|--------------------|-------------------------------------|---|------------------------------|--|---------------|-----------|
|                    |                                     |   | No Barcodes                  | 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 <sup>a</sup>  | Worse                        | +  | +             | ++        |
|                    |                                     | Potential to reduce stock outs <sup>b</sup>                               | 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 <sup>c</sup>                       | 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                        |

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

<sup>b</sup> Based on the number of separate components necessary to deliver the vaccine or improved ability to track vaccine commodities

<sup>c</sup> 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)

# Barcodes: Assessment outcomes

## 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 patient safety** in terms of reducing errors for vaccine administration and timeliness/accuracy of documentation of data in health records.
  - May **reduce stock-outs**: Integration of barcodes on primary packaging could **improve traceability** of vaccine commodities in supply chains, **increase efficiencies in stock management**.
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- ++ Potential to **save health care worker time**: By capturing key vaccine product information quickly and without error and reducing immunisation documentation time.
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- **Antigen applicability:**
    - Barcodes 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 barcodes) and **increased number of steps and complexity** compared to having no barcoding system.
- **One-time upfront costs and recurrent costs:**
  - Increased resources and equipment are required, including scanners, software, computers and network connectivity, and integration with electronic data capture systems.
- Some of the benefits of barcodes 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)

# Barcodes: Rationale for prioritisation



- Barcodes are **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.**
- Additional considerations include **WHO's current recommendations for barcodes on secondary and tertiary packaging, UNICEF's interest, existing country interest, technology availability, and the need for barcode standardisation on vaccine products.**
- While the use of barcodes requires equipment and resources, countries can choose to make such investments (or not) within their own timeframes.

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

- Barcodes should be evaluated alongside Radio Frequency Identification (RFIDs) in Phase II.
- Appropriate mechanisms to move barcode implementation forward for vaccines given the current lack of global coordination.