Name	Full Stock Availability
Description	Percentage of re-supply periods with full availability of all or a selected set of tracer vaccines and immunization supplies. Full availability is defined as **no** stock out (stock=0) in the store or health facility at any point in the resupply period.
Purpose	Measures the availability of immunization products. Low stock availability can indicate system problems that needs to be addressed. Availability of vaccines and immunization supplies is important to reach immunization programme targets (e.g. immunization coverage). The following questions can be answered by monitoring the performance of this indicator: • Do health facilities within my district have full availability of vaccines and immunization supplies? • What is the full availability percentage by district or region? • Is there a link between availability of vaccines and immunization supplies in the national store and health facilities? • What is the impact of low availability in the national store on the availability at the lower levels? Are certain health facilities or regions' full availability lower than expected?
Strategy objective	Availability
Domain	Stock management
Full indicator name	• % health facilities with full availability • % districts with full availability • % districts with at least x percentage of facilities with full stock availability
Dashboard Use Levels	This indicator is recommended in dashboards used by sub-national and national managers and for store managers at all levels. Stocked according to plan is recommended for health facilities and stores.
Precondition	This indicator can be implemented in any context as it requires only observation of zero stock balance during the resupply period.
System design	Relevant in all types of logistic systems.
Data needed	• Product stock-outs in stores and health facilities
Data sources	• Stock cards or ledgers • Physical inventory / physical stock counts • Stock-out reports from health facilities • LMIS / HMIS
Data collection method	Where necessary, full availability can be determined for a basket of tracer indicator products representing the availability of immunization supplies.
Calculation	Full stock availability = re-supply periods without stock-out of any (tracer) vaccine or immunization supplies At sub-national and national level, the indicator is aggregated as % health facilities or % districts with full stock availability. The calculation for a sub-national region is:

% health facilities with full stock availability = (# health facilities with full availability) / (total number of health facilities in sub-national region) x 100

Alternatively, for the national level, the aggregation can be based on the percentages of health facilities in a district exceeding a set threshold.

Districts with full availability in more than x % health facilities = (# districts with more than x % health facilities with full availability in the last resupply period) / total # districts) x 100%

The threshold is set by the country to reflect the expected standards. When reporting the value of the indicator, the threshold value must be included.

Example
Health facility A reports on stock availability in Q2 for the tracer immunization products in the country. Deliveries to Health Facility A are monthly. The table below shows the report received at the district.

Vaccine	April	May	June
BCG	YES	YES	YES
PCV	YES	NO	NO
Pentavalent	YES	NO	NO
Rotavirus	YES	YES	YES
Syringe 0.5 ml	YES	YES	YES
Measles	YES	YES	YES
Full availability?	YES	NO	NO

There were no stock outs in Health facility A in April. In the other months, there was a stock out of at least one vaccine. Therefore, Health facility A only had full stock availability in April.

At the national level, the full stock availability percentages for each district is received. The national stock availability can be calculated as a national average or as a percentage of districts above a set percentage of health facilities with full availability.

District	# health facilities with full availability	Total # health facilities	Q2
District A	6	15	40%
District B	10	16	63%
District C	15	21	71%
District D	10	12	83%
District E	18	19	95%
District F	15	18	83%

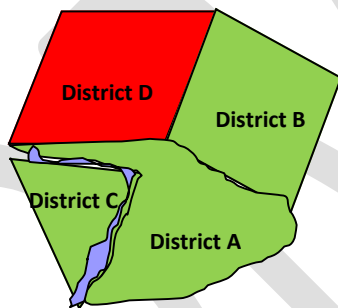|			
District G	9	11	82%
District H	16	24	67%
District I	16	21	76%
District J	16	16	100%
District K	15	18	83%
National Full Stock Availability	146	191	76%

National full stock availability = # health facilities with full availability / total # health facilities x 100% = 146 / 191 x 100% = 76%

The country has set 80% as the defined threshold for health facilities with full stock availability.

% districts with at least 80% health facilities with full stock availability = # districts with > 80% health facilities with full stock availability / total # districts) x 100% = 6 / 11 x 100% = 55%

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Visualisation and interpretation	Spatial analysis can be colour coded to visually identify the district's full availability percentages. In the visualisation below of a region, 80% was used as a threshold for performance. The red district has less than 80% health facilities with full availability of a set of tracer vaccines and immunization supplies while the green districts have more than 80% health facilities with full availability. Vaccine stores are excluded. Red = Full stock availability < 80% of HF Green = Full stock availability > 80% of HF Full stock availability can also be shown in a line graph to show performance over time.

Full stock availability for 7 tracer indicators in 2014
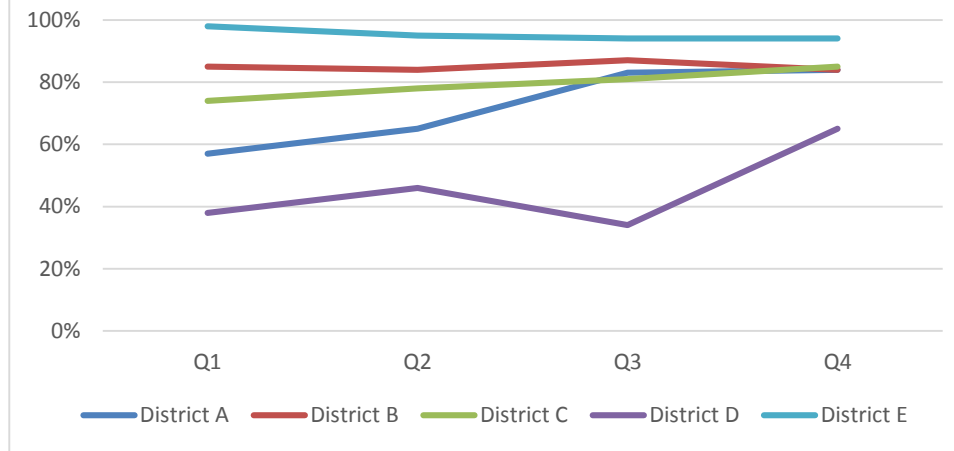
A colour coded table can also be used to quickly identify the performance of the districts. The threshold for green and red performance has to be set according to the context and the availability. Here, 80% was used as the threshold.

District	Q2
District A	40%
District B	63%
District C	71%
District D	83%
District E	95%
District F	83%
District G	82%
District H	67%

Corrective actions	• Verify the full availability of products in the past re-supply period • Perform root-cause analysis to identify the reason for low stock availability including inventory management, re-order policies (push or pull), distribution plans, national stock availability and distribution performance. • Review emergency re-supply policies if there is a historical pattern of low stock availability • Review supply pipelines and planned orders for stores
Related Indicators	• Stocked According To Plan • Average Duration of Stock-Outs • Percentage of Stock-Outs Resolved Within a Period of Time • Months of Stock • Open Vial Wastage

Name	Stocked According To Plan
Description	Percentage of health facilities or stores stocked according to plan of the total number of health facilities. Stocked according to plan is defined as stock levels between set minimum and maximum stock levels.
Purpose	Used to monitor and manage immunization products and as a pre-warning to avoid stock outs or wastage. Diversions from the planned stock levels can signal risk of stock-outs (if significantly below the minimum level) or closed vial wastage (if significantly above the maximum level). For stores, the indicator performance provide information on the ability of the store to dispatch the products and quantities needed by the health facilities. The following questions can be answered by monitoring this indicator: • Is there a risk of stock outs? • Is there a risk of overstock and expiry? • Will the supplied quantities be enough until next delivery? • Are the demand methodology and assumptions adequate? • Are the inventory policies and practices adequate?
Performance objective	Availability
Domain	Stock management
Full Indicator Names	• % of health facilities stocked according to plan • % of districts with x percentage of facilities stocked according to plan • % of stores stocked according to plan
Dashboard Use Level	This indicator is recommended in dashboards used by national and sub-national managers. In health facilities and stores, the indicator is recommended for visually displaying the current stock balance in relation to recommended stock levels.
Precondition	This indicator is relevant in supply chains where: • Established minimum and maximum levels per health facility and store / products • Health facility and/or store uses its minimum and maximum stock levels
System design	Relevant for all supply chain systems
Data needed	• Stock balance • Minimum and maximum levels
Data sources	• Stock cards or ledgers • Physical inventory count • LMIS
Data collection method	Stock balances should be collected at least twice per resupply period: just after and before resupply to provide the highest and lowest stock balances in the resupply period.

Calculation	Stocked according to plan is determined by comparing the stock balance (stock on hand) to the established minimum and maximum levels to identify which products have stock balances below, within, or above the recommended stock levels. Stocked according to plan is when the stock balance is between the set minimum and maximum stock levels.
	In a store or health facility, each product can be assessed as stocked according to plan. Alternatively a set of tracer products can be considered. When aggregating the indicator at higher levels, then a health facility or store is considered stocked according to plan if all vaccines and immunization supplies are stocked according to plan.
	% products stocked according to plan (in health facility or store) = (# vaccines stocked according to plan for all or a set of tracer products) / (total # health facilities) x 100
	% of health facilities stocked according to plan = (# health facilities stocked according to plan for all or a set of tracer products) / (total # health facilities) x 100
	Examples For health facility A, the inventory policy for all vaccines is: • Min level: 10 doses • Max level: 20 doses
	The table includes the actual stock balances in the beginning and near the end of the supply period for health facility A.
	<table><tr><th>Vaccine</th><th>Stock balance (start of supply period, doses)</th><th>Stock balance (end of supply period, doses)</th><th>Stock balance within SATP</th></tr><tr><td>Rota</td><td>16</td><td>4</td><td>NO</td></tr><tr><td>PCV</td><td>19</td><td>12</td><td>YES</td></tr><tr><td>Penta</td><td>20</td><td>15</td><td>YES</td></tr><tr><td>OPV</td><td>19</td><td>10</td><td>YES</td></tr><tr><td>Measles</td><td>18</td><td>8</td><td>NO</td></tr><tr><td>IPV</td><td>22</td><td>13</td><td>NO</td></tr></table>
	% products stocked according to plan = 3 / 6 x 100 = 50%
	The health facility would be considered not stocked according to plan since not all products were stocked according to plan.
	District A has 7 health facilities that monitor stocked according to plan at the end of each week. The district has monthly resupplies so the indicator is reported monthly. 6 products are used to monitor stocked according to plan.

	Week 1	Week 2	Week 3	Week 4	SATP in resupply period
HF 1	SATP	SATP	BELOW	BELOW	NO
HF 2	SATP	SATP	SATP	SATP	YES
HF 3	ABOVE	ABOVE	ABOVE	ABOVE	NO
HF 4	ABOVE	SATP	SATP	SATP	NO
HF 5	SATP	SATP	SATP	SATP	YES
HF 6	SATP	SATP	BELOW	BELOW	NO
HF 7	SATP	SATP	SATP	BELOW	NO
SATP (weekly)	71%	86%	57%	43%	29%

% health facilities SATP (week 1) = 5 / 7 = 71%
% health facilities SATP (resupply period) = 2 / 7 x 100 = 29%

The weekly calculations show that by end of the resupply period health facilities that were stocked according to plan in the beginning of the resupply period (right after supplies were received) reach below the minimum stock levels for one or more of the tracer products by the end of the resupply period. And overall for the resupply period only 29% were stocked according to plan.

Visualisation and interpretation	In stores, the stock balances can be visualised in charts as the ones below. For easier interpretation of the visualisation of stocked according to plan, the minimum and maximum stock levels are included in the graphs. In the national store, a more sophisticated graph can be used which predicts the future stock levels based on consumption. In health facilities, a simpler graph can be used to track the stock levels. The graph is equally useful if drawn manually on a paper chart.

*Visibility of Vaccines (ViVa) prototype[6], UNICEF*

[6] https://www.innovateforchildren.org/projects/viva-visibility-vaccines?quicktabs_192837465=first#quicktabs-192837465
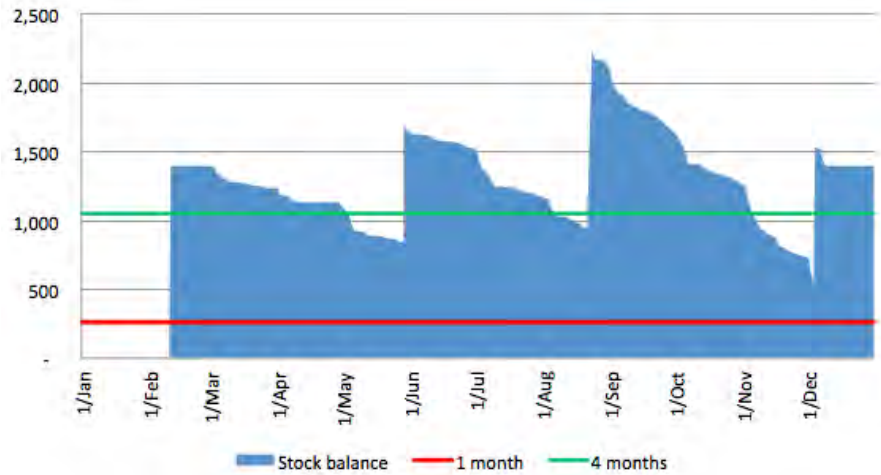
The above chart indicates that stock levels exceed maximum level after each delivery but then returns to stocked according to plan during the resupply cycle. There is therefore minimum risk of expiries, but delivered quantities could be reduced and delivered to other facilities if resources were limited.

When considering the aggregated reporting, a stacked bar chart or a table could be used. The stacked bar chart shows the number of health facilities in a district that are stocked according to plan (green) and above (red) or below (blue) the recommended stock levels.

The table shows the percentages of health facilities that are stocked according to plan and the stock balances of IPV vaccine that was recently introduced. A table is also recommended for use at the national level. Stock balances can be included for a limited number of health facilities to keep the table simple to read.
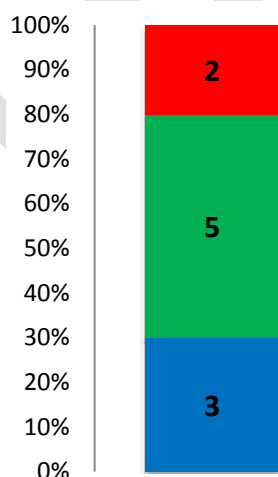
	SATP (resupply period)	IPV stock balance (doses)
HF 1	YES	15
HF 2	YES	16
HF 3	NO	43
HF 4	YES	21
HF 5	NO	8
HF 6	YES	16

Corrective actions	Operational corrective actions: • Verify stock level excursions outside of the stocked according to plan interval

	• Perform root-cause analysis to identify the reason for under- or oversupply. Analysis should account for the time of measurement relative to stock receipt (i.e. stock levels should be at or slightly exceed max upon stock receipt and decrease over time).
	Strategic corrective actions:
	• Prioritise actions for critical or problematic products and/or locations with low stocked according to plan percentages.
	• Review and revise inventory and distribution policies.
Related indicators	• Full Availability
	• Functional Status of CCE
	• On-Time and In-Full Delivery
	• Inventory Near Expiry
	• Closed Vial Wastage
	• Cold Chain Capacity Utilisation

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Name	Closed Vial Wastage
Description	Percentage of spoiled closed vial vaccine doses in a store or health facility in a particular period of the total doses managed in the same period. Reasons for closed vial wastage include expiry, heat exposure (measured by vaccine vial monitor status), freezing, breakage, loss of the accompanying diluent, or because unopened vials are discarded at the end of an outreach session. Wastage at point of administration, because of incomplete use of the content of a multi dose vial is referred to as open vial wastage, and is not included in closed vial wastage. Please refer to http://whqlibdoc.who.int/hq/2005/WHO_V&B_03.18.Rev.1_eng.pdfhttp://whqlibdoc.who.int/hq/2005/WHO_V&B_03.18.Rev.1_eng.pdf for further information on wastage.
Purpose	The indicator is used to measure avoidable wastage during storage. Wastage is related to the performance of the vaccine ordering and store management. It can indicate excessive ordering practices that are not well-aligned to actual consumption rates, vaccine exposure to heat or freezing temperatures, breakage, and mishandling of inventory. This indicator can answer questions such as: • How much extra vaccine needs to be procured in addition to the vaccine that will be administered? • What is the approximate economic value of closed vial wasted vaccine? • Is wastage similar between facilities and between districts? • Is there a need for targeted reinforcement of SOPs and vaccine management principles?
Strategy objective	Availability Efficiency
Domain	Stock management
Full Indicator Name(s)	• Closed vial wastage rate per facility • Average closed vial wastage rate • Closed vial wastage rate per district/administrative level
Dashboard Use Level	This indicator is recommended in dashboards used by sub-national and national managers and for store managers at all levels.
Precondition	A system for recording closed vial wastage, optionally with reason codes, needs to be in place.
System design	Relevant in all types of logistics systems.
Data needed	• Number discarded doses, reported by vaccine and preferably by reason code. • Number doses under management during a certain period, defined as the starting balance plus all of the received doses during that period.
Data sources	• Vaccine stock ledgers • Vaccine orders • Batch management to track VVM status and expiry dates (may be automated, for example through using GS1 barcoding systems)

	- LMIS - Wastage reporting tools
Calculation	Conceptually, wastage could be calculated as the percentage of vials that were discarded out of the total number of vials in a batch that was completely used throughout the system. Although this is the most precise method, it is not easily applied unless an advanced digital system is in place. A more appropriate method is to calculate the *proportional vaccine wastage in unopened vials* or visualise discarded vials in absolute values. This should be collected as a part of the normal reporting of stock on hand, or at minimum quarterly. Proportional vaccine wastage in unopened vials = (number of doses discarded during reporting period) / (doses under management during the same period) x 100% Doses under management is defined as the opening balance plus all doses that were received during the period. Issued doses should not be subtracted. Closed vial wastage should include vials wasted due to: **Expiry**, which may indicate ordering practices that are not aligned to actual consumption rates, failure to respect FEFO policies, a supply design that is too slowly moving (i.e. it takes too long for a vaccine to go through the chain to the point of administration), or bad organization in a vaccine store such that older lots can be overlooked. **VVM** status 3 or 4, while the expiry date of the vaccine is not yet reached which may indicate poor cold chain quality, or breaches in the cold chain in general. **Freezing,** which is an indication of poorly functioning cold chain equipment, or poor adherence to standard operating procedures during storage or transportation. **Breakage,** either of the vials or accompanying diluent Inclusion of reason codes in reporting of closed vial wastage allows additional precision and more thorough investigation of root causes. ***Examples*** In a regional store, 500 doses of pentavalent vaccines expired during the past year. The numerator for that period was 740 doses. If in that same store there was a beginning balance of 5,000 doses of pentavalent, and 4 shipments of 5,000 doses were received during the year, then the total doses under management during that year were 25,000 doses of pentavalent vaccine. Proportional vaccine wastage in unopened vials (pentavalent) = (740 doses / 25,000 doses) x 100% = 3% Proportional vaccine wastage in unopened vials due to expiry (pentavalent) = (500 doses / 25,000 doses) x 100% = 2%

Visualisation and interpretation	The performance of the closed vial wastage can be visualised in a table that includes the numbers of doses and the % of doses that were wasted. Adding target makes it easier to identify where actions are needed.			

Reason code	Doses under management	Wasted doses	Actual closed vial wastage	Target closed vial wastage
Expired		500	2%	
VVM status		240	1%	
Frozen		0	-	
Breakage		0	-	
Closed vial wastage	**25,000**	**740**	**3%**	**10%**

Closed vial wastage can also be visualised in a line graph to show the performance over time for different districts in a country.
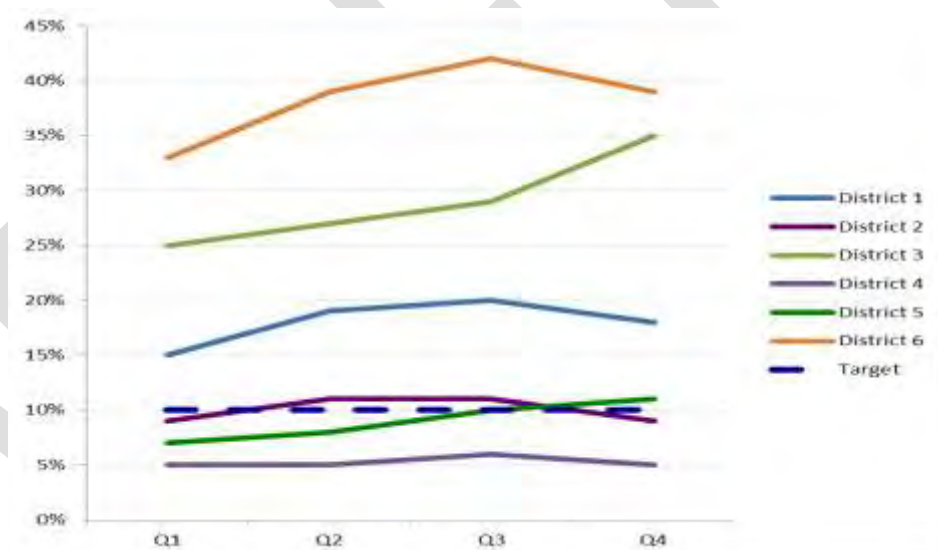
The graph shows that districts 1, 5 and 6 have much higher closed vial wastage throughout the year, while the other districts perform below the target.

Corrective actions	• Perform root-cause analysis to identify the reason for closed vial wastage and identify areas for improvement based on the reason for wastage • Implement improvement activities • Develop relevant operating procedures or review existing ones
Related indicators	• Temperature Alarm Rates • Stocked According To Plan • Time to Expiry • Open Vial Wastage