EVM
Setting a standard for the vaccine supply chain

TechNet-21
The Technical Network for Strengthening Immunization Services

June 24th, 2022

What does EVM tell us about the evolution of immunization supply chains from 2010 to 2022?

Paul Colrain (WHO Consultant)

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EVM1 Framework

Criteria & Requirements

What does the Effective Vaccine Management (EVM) assess?

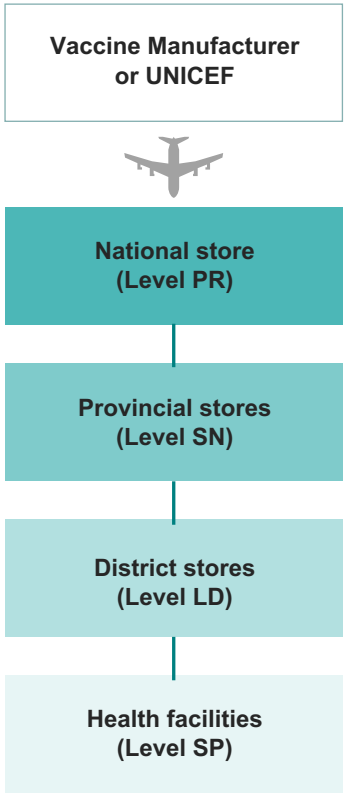
EVM assesses each level of the supply chain

Primary level (PR):
Vaccine stores that receive vaccine direct from an international vaccine manufacturer or distributors or a local vaccine manufacturer.

Sub-national level (SN):
Vaccine stores that receive vaccine from a primary store or higher level sub-national store. There may be 0, 1, or more SN levels.

Lowest distribution level (LD):
Vaccine stores that receive vaccine from a primary level or a sub-national store and supply vaccine to one or more health facilities.

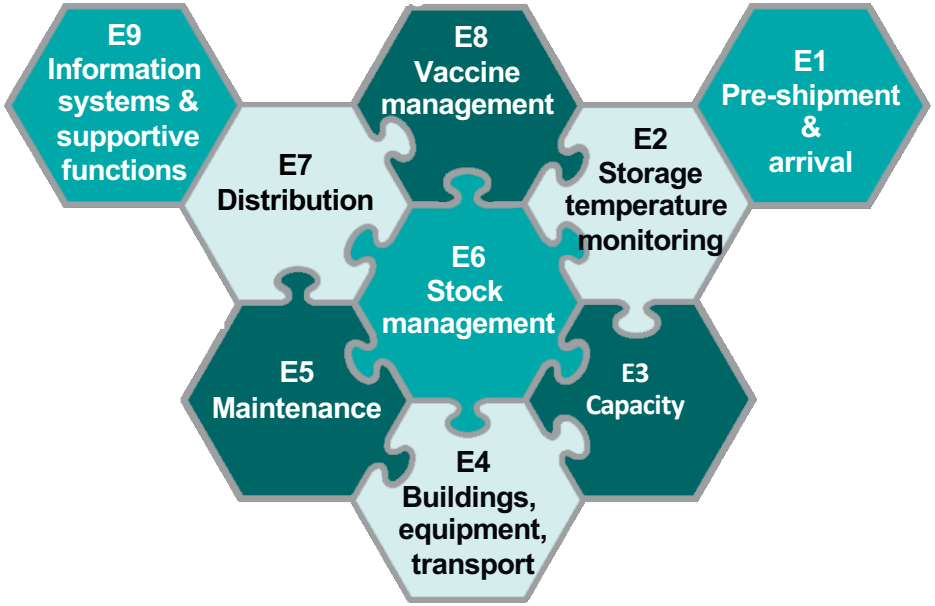
Service point level (SP):
Facilities that receive vaccine from any higher level store and supply immunization services.



Criterion Scores

- A representative sample of sites is selected at each level of the supply chain.
- Each of the 9 EVM Criteria is assessed at each supply chain level by observation, inspection of infrastructure and records, and by interview of staff.
- Inputs, process and performance indicators are evaluated in each of the 9 areas at each level.
- Indicator scores are combined to give criterion scores for each area at each level.
- An area of vaccine management is considered "Effective" if its criterion score is greater than or equal to 80% - the EVM standard.

EVM assesses 9 areas of vaccine management – the 9 EVM "Criteria"



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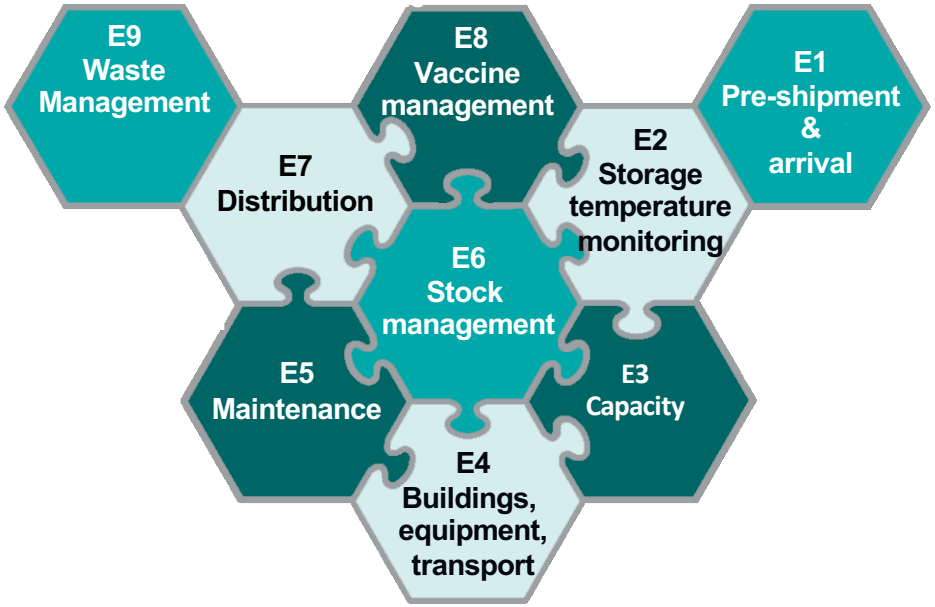
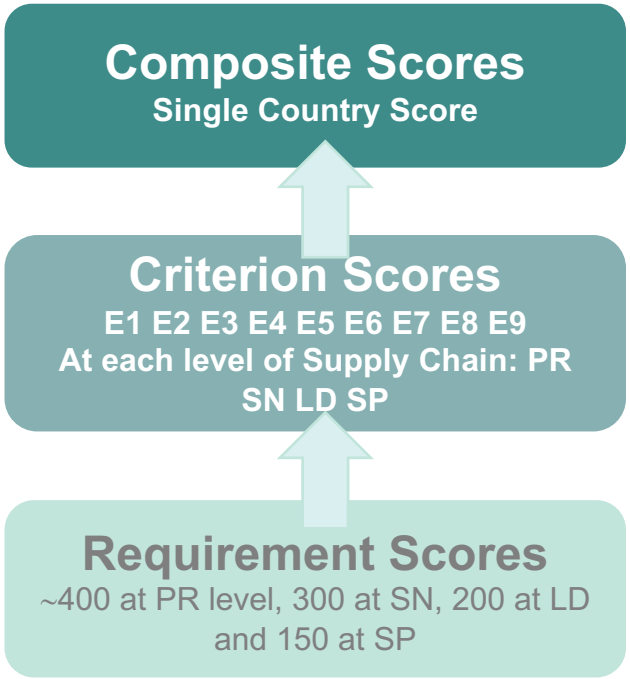


The Effective Vaccine Management (EVM) Assessment



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EVM1 Global Data Analysis

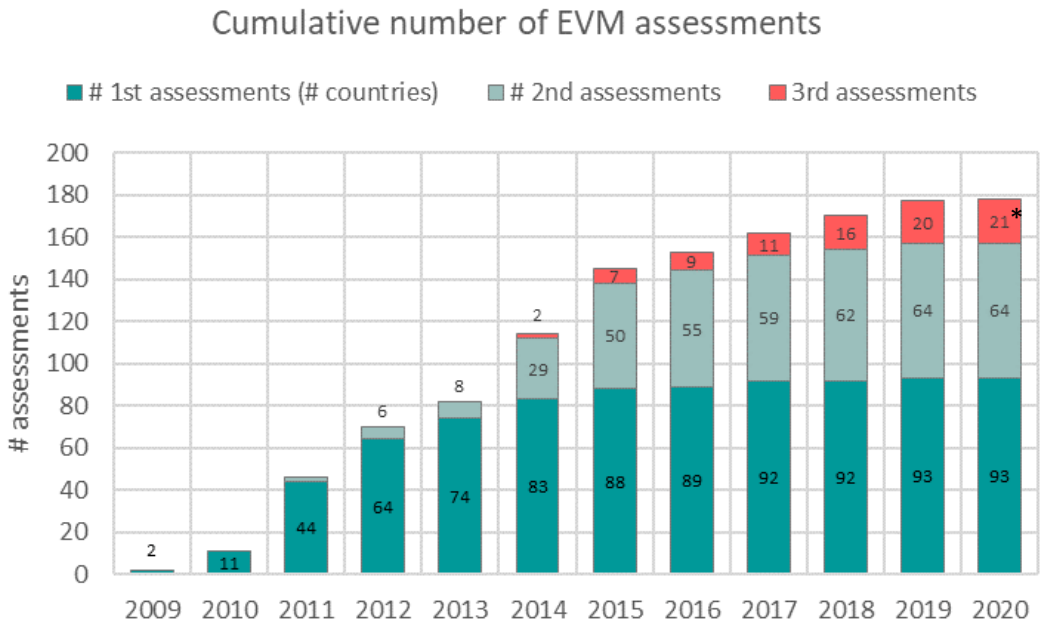
EVM1 Assessments

Where & When?

*Where a country has conducted 2 or more assessments, only the most recent is included.

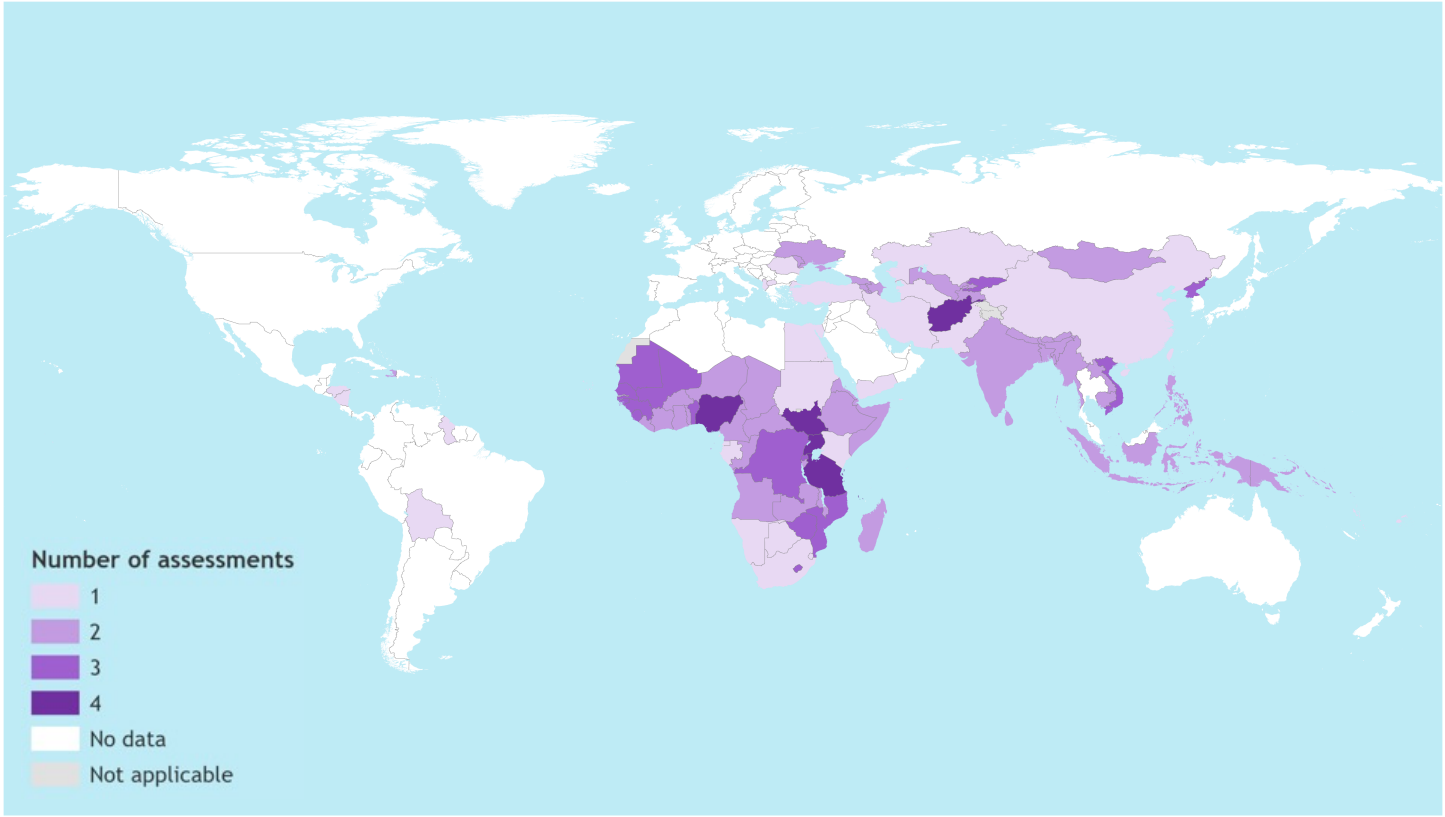
Update: WHO EVM1 database, July 2021

Assessments (2009-2020)



*The last EVM1 assessment was in 2020 and the first EVM2 assessment was in 2019 (https://extranet.who.int/evm2/web/Public).

Countries (2009-2020): Assessments Completed



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Data Source: EVM Assessments 2009-2020
Map Production: WHO GIS Centre for Health, DNA/DDI

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EVM1 Criterion Scores

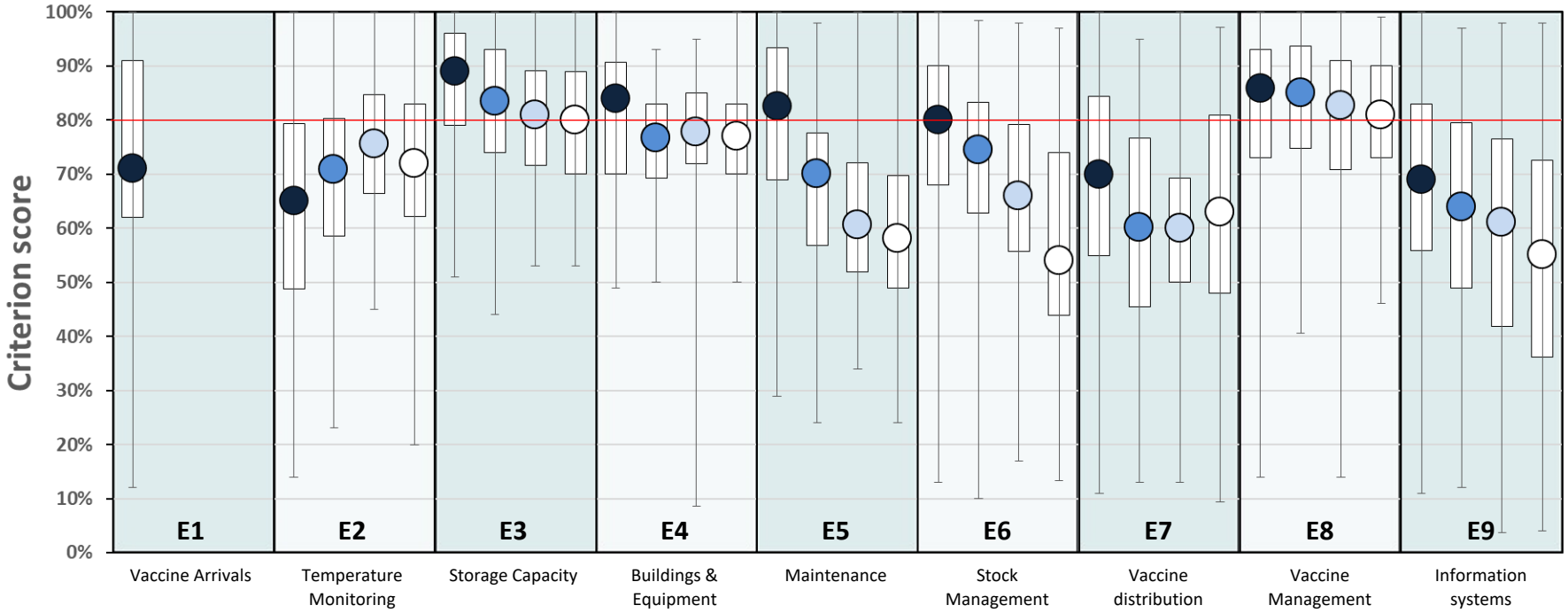
(most recent assessments only*)

2009-2020

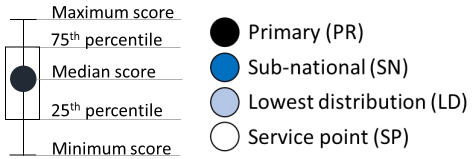
*Where a country has conducted 2 or more assessments, only the most recent is included.

Update: WHO EVM1 database, July 2021

Criterion Scores (2009-2020)



- The median scores decrease from PR to SP for all criteria except E2, where the opposite happens.
- The strongest criteria are E3 and E8 for which the median scores are above 80% at all levels of the supply chain.
- The weakest criteria are E2, E7 and E9 for which the median scores are below 80% at all levels of the supply chain.



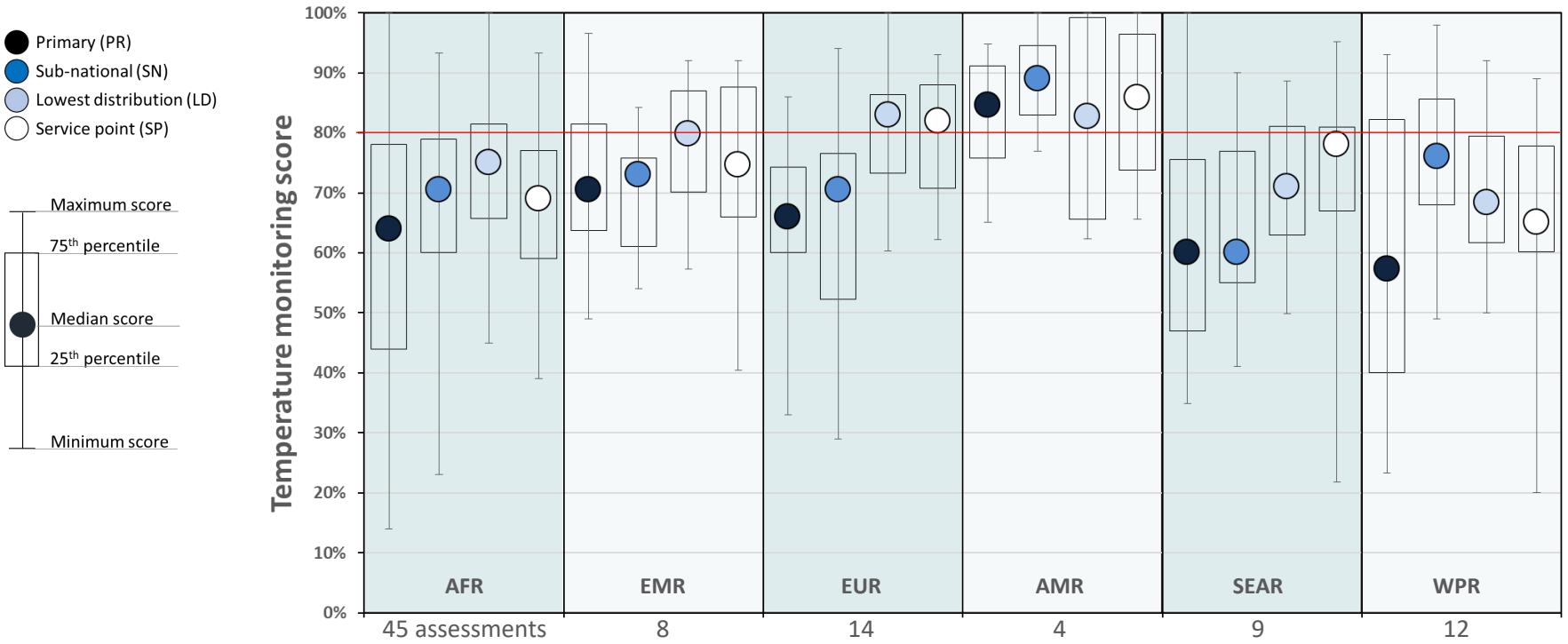
Criterion Scores by Region

(most recent assessments only)

2009-2020

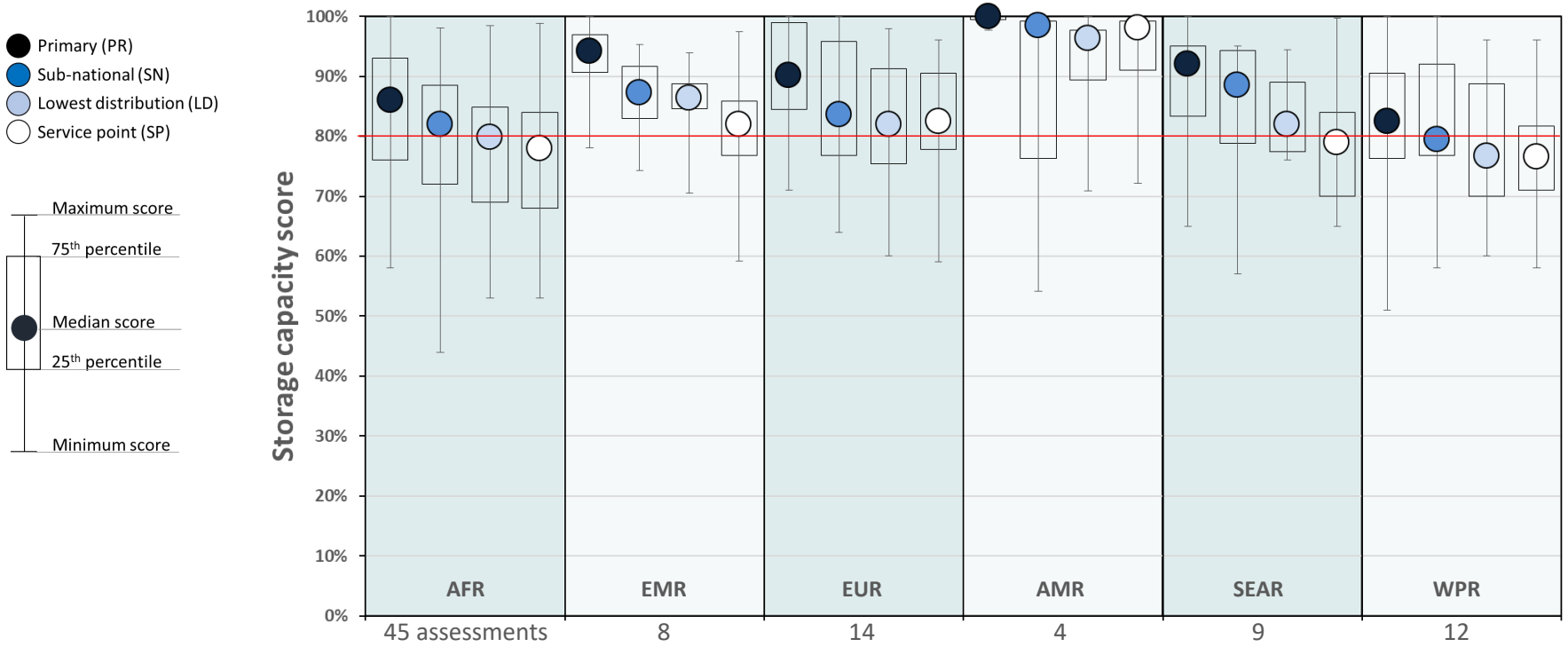
Update: WHO EVM1 database, July 2021

E2 Temperature Monitoring (2009-2020)



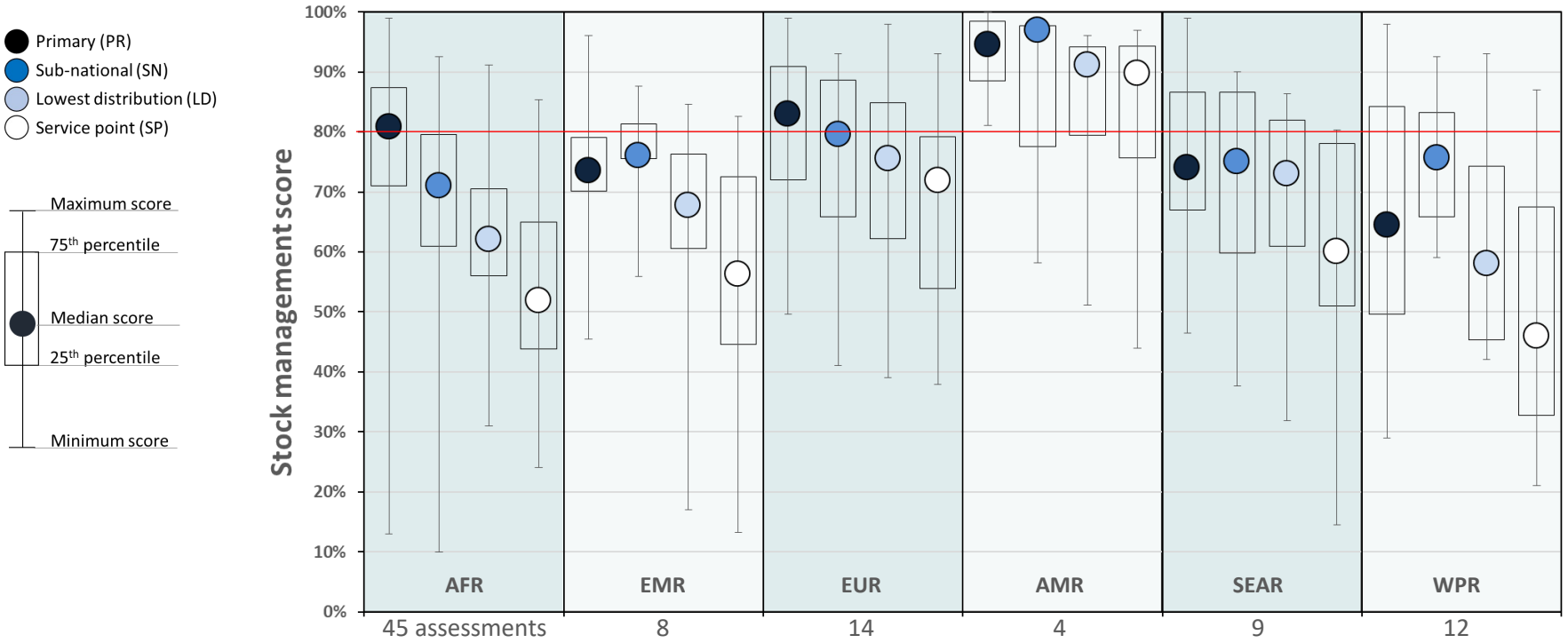
- Apart from in EUR and AMR, few countries meet the EVM standard for temperature monitoring, at any level.
- In EUR, more than 50% of the countries assessed meet the standard at LD and SP levels.
- In AMR, more than 50% of the countries assessed meet the standard at all levels.

E3 Storage and transport capacity (2009-2020)



- The median scores decrease from PR to SP in all regions.
- The median scores are above 80% at each supply chain level in all regions except at SP levels in AFR and WPR, and at LD in WPR.

E6 Stock management (2009-2020)



- The median E6 score decreases from PR to SP in all regions.
- The median scores are below 80% at all levels in all regions except at PR level in AFR and EUR, and all levels in AMR.

Criterion Scores Evolution

1st assessment versus
last assessment (64 countries)

2009-2020

Update: WHO EVM1 database, July 2021

Mean criterion scores (64 countries)

1st Assessments

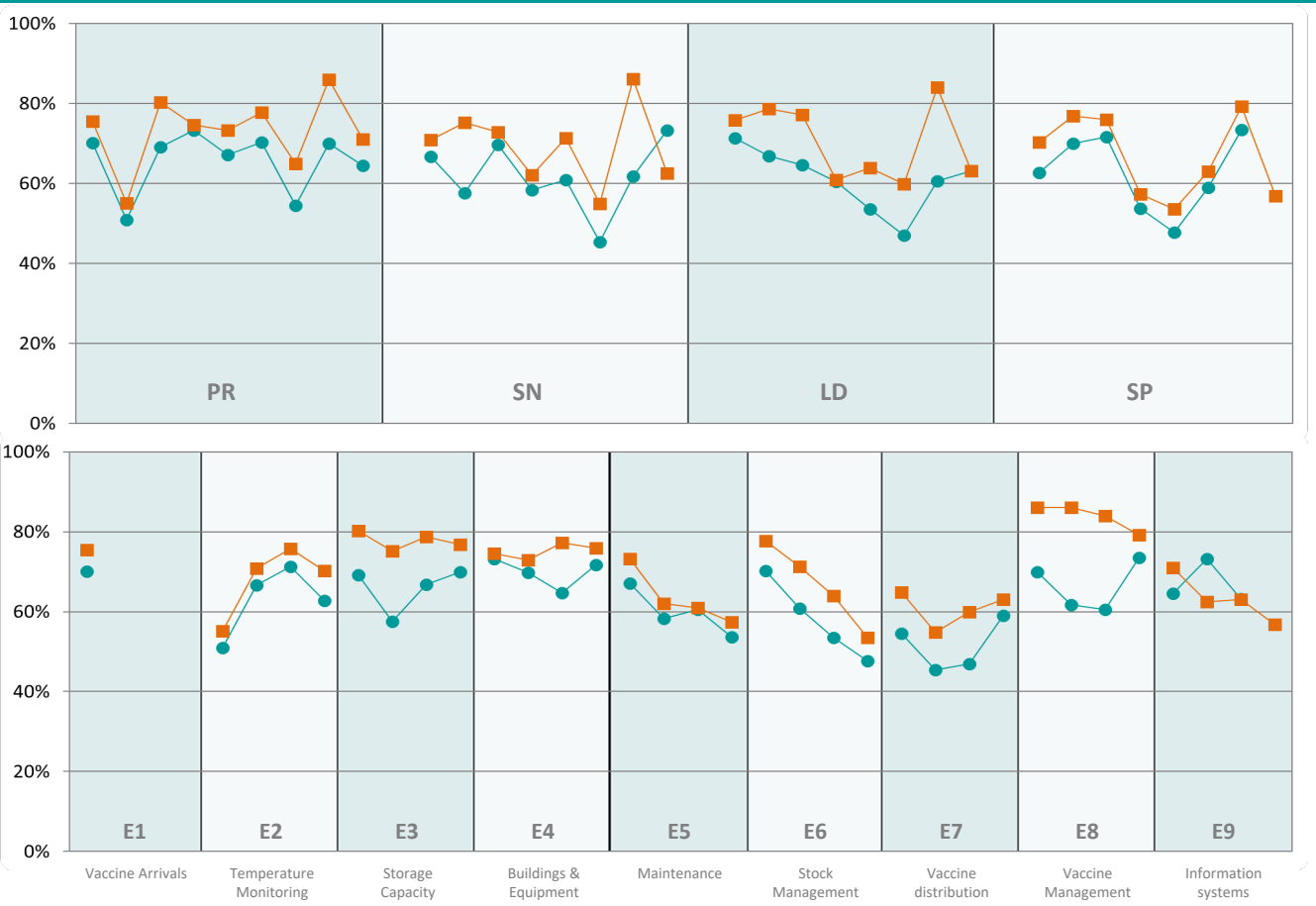
Last Assessments

- ❑ Moderate improvement at PR, SN and LD levels.
- ❑ Little or no improvement at SP level.

- ❑ Significant improvement in E3 and E8.
- ❑ Moderate improvement in E1, E6 and E7.
- ❑ No improvement in E2 and E5.

*The E2 and E9 standards were set higher in 2012.

AFR mean criterion scores (36 countries)



1st Assessments

Last Assessments

- Consistent improvement at all levels.

- Significant improvement in all criteria.

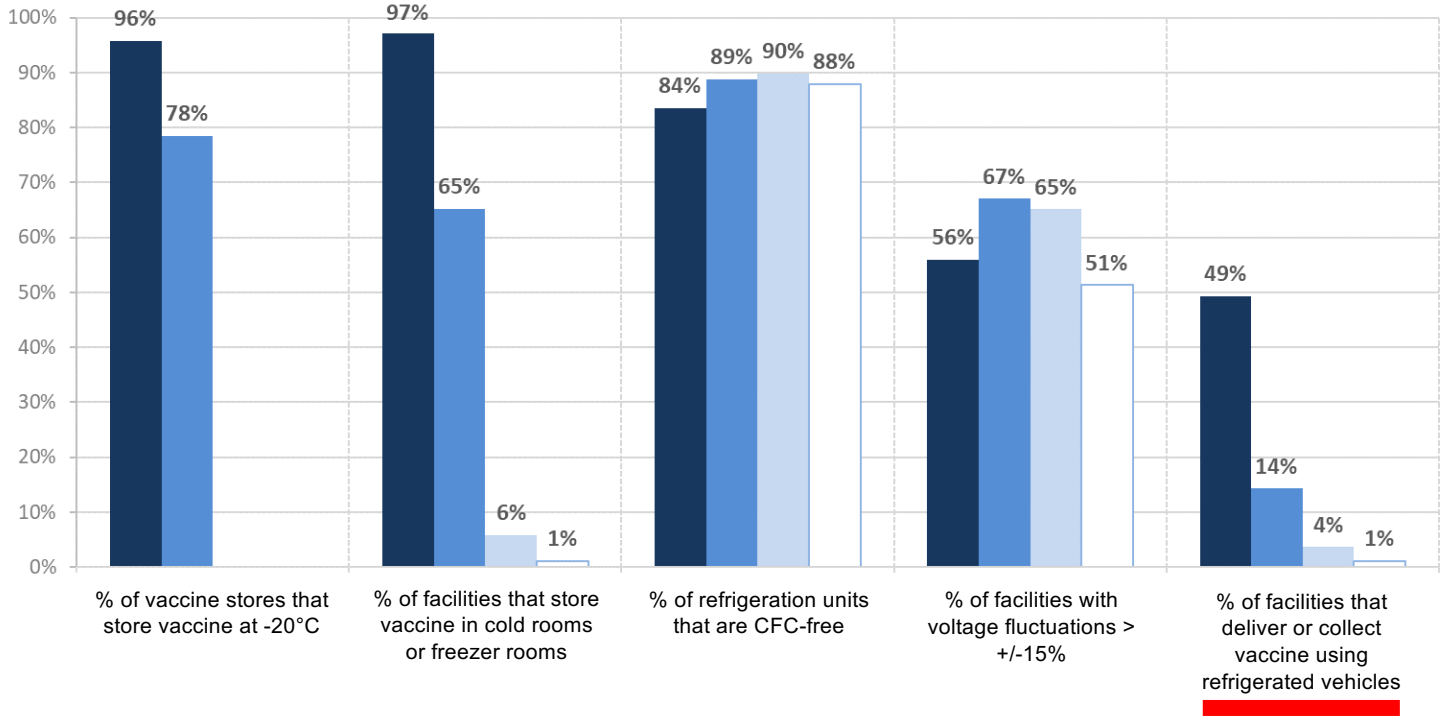
Selected Indicator Scores

Most recent assessments only

2009-2020

Update: WHO EVM1 database, July 2021

Context: Infrastructure (2009-2020), 1



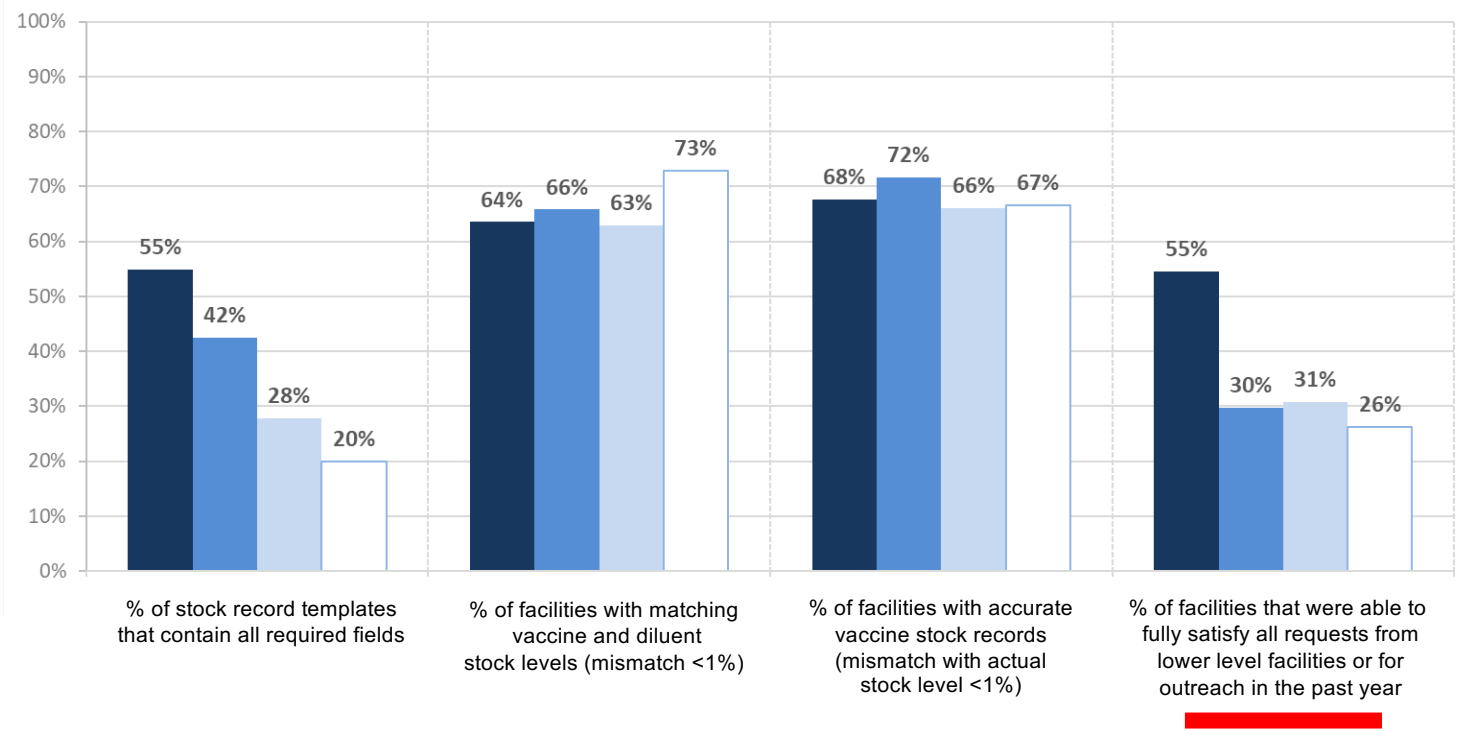
Primary
Sub-national
Lowest distribution
Service point

Key observations:

- Refrigerated vehicles are used to transport vaccines from the national store in about 50% of countries.
- More than 50% of countries experience significant voltage fluctuations.
- About 90% of refrigerators are CFC-free.

*The data was collected between 2009 and 2020 in 93 countries across all 6 WHO regions.

Availability indicators (2009-2020)



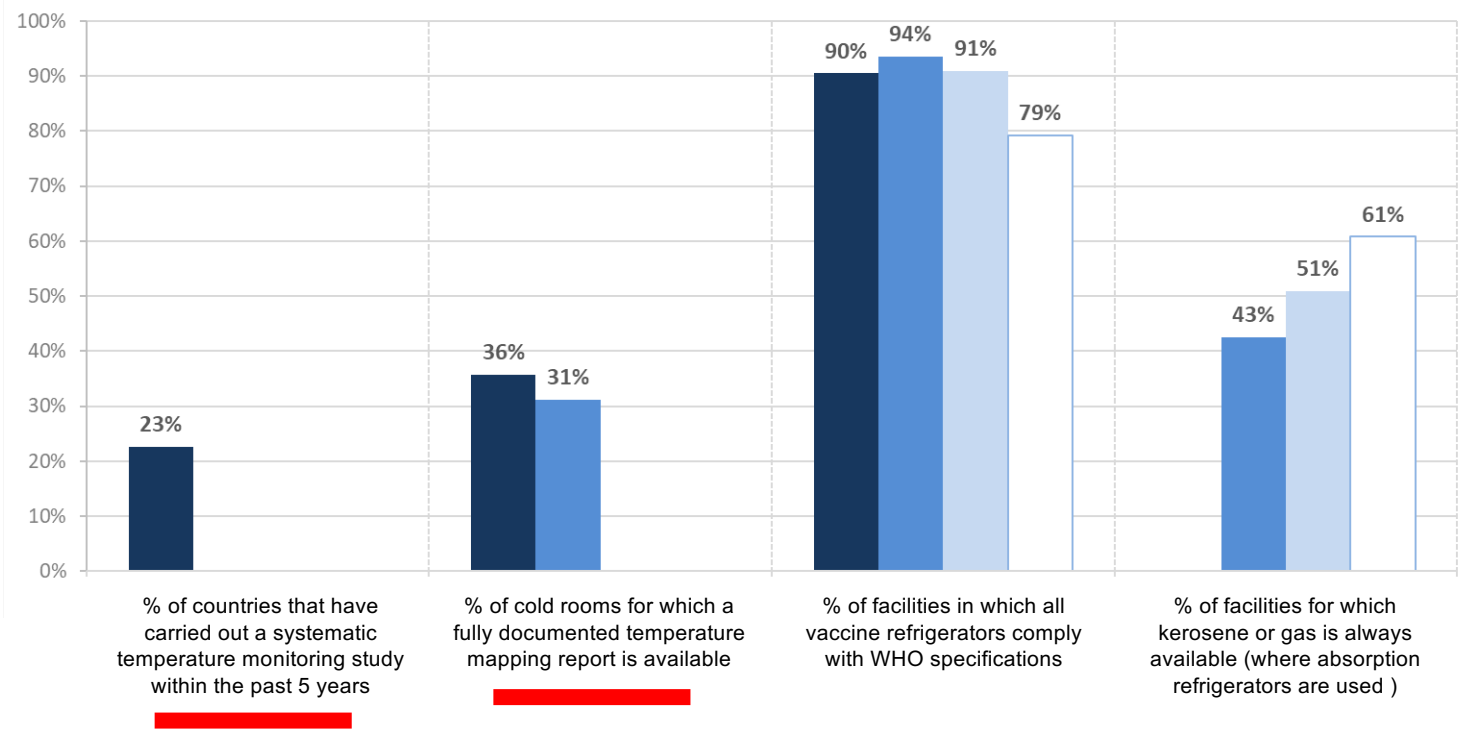
Primary
Sub-national
Lowest distribution
Service point

Key observations:

- ❑ Most of the stock record templates in use do not contain all of the recommended fields.
- ❑ A third of stores and facilities at each level of the supply chain have inaccurate stock records.
- ❑ Vaccine and diluent stock levels match in about two thirds of stores and facilities.
- ❑ Most stores and facilities have been unable to meet demand on at least one occasion in the year preceding assessment.

*The data was collected between 2009 and 2020 in 93 countries across all 6 WHO regions.

Quality indicators (2009-2020), 1



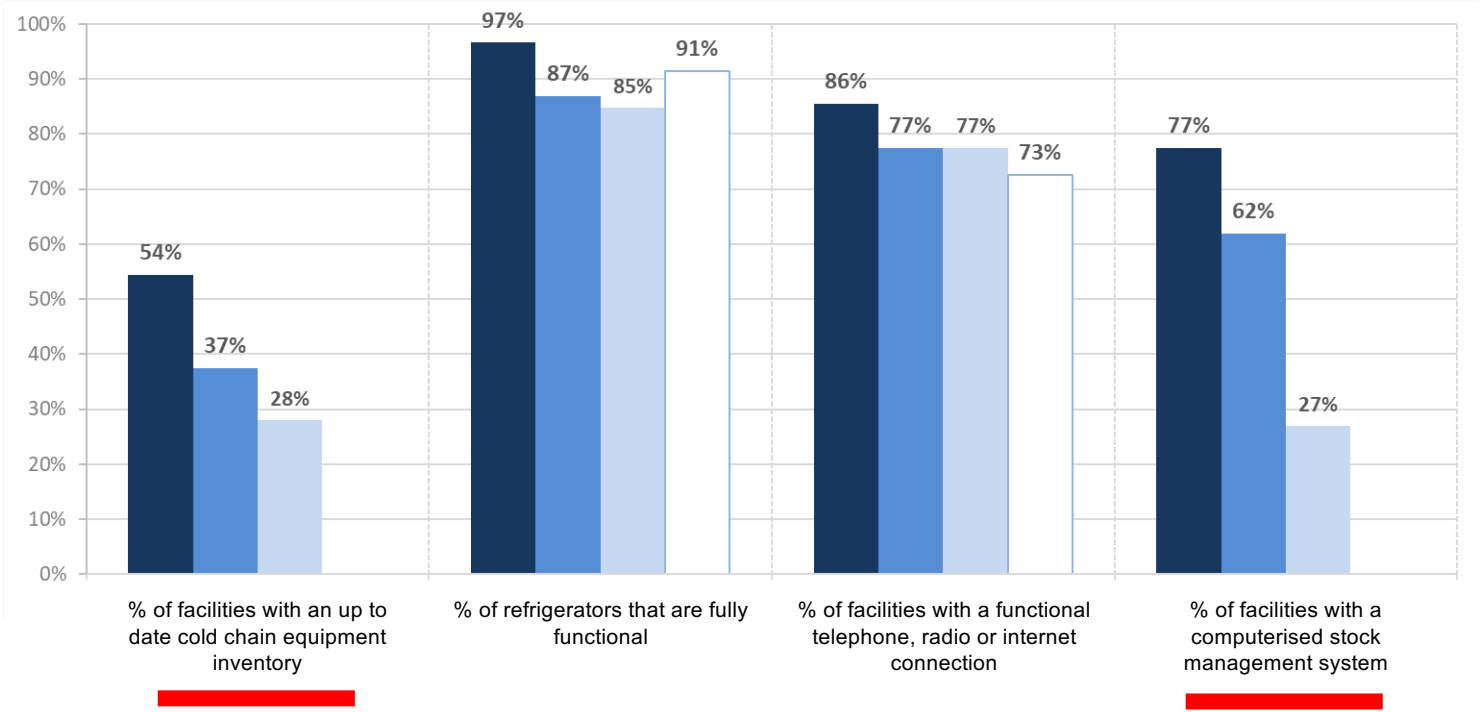
Primary
Sub-national
Lowest distribution
Service point

Key observations:

- ❑ Only a quarter of countries have conducted a temperature monitoring study in the past 5 years.
- ❑ Only about 20% of cold rooms have been temperature mapped.
- ❑ On the plus side, almost all vaccine refrigerators comply with WHO specifications.

*The data was collected between 2009 and 2020 in 93 countries across all 6 WHO regions.

Efficiency indicators (2009-2020), 1



Primary
Sub-national
Lowest distribution
Service point

Key observations:

- ❑ Most countries do not have an up-to-date cold chain equipment inventory.
- ❑ About 25% and 40% of national and sub-national stores respectively still use paper-based stock management systems.

*The data was collected between 2009 and 2020 in 93 countries across all 6 WHO regions.

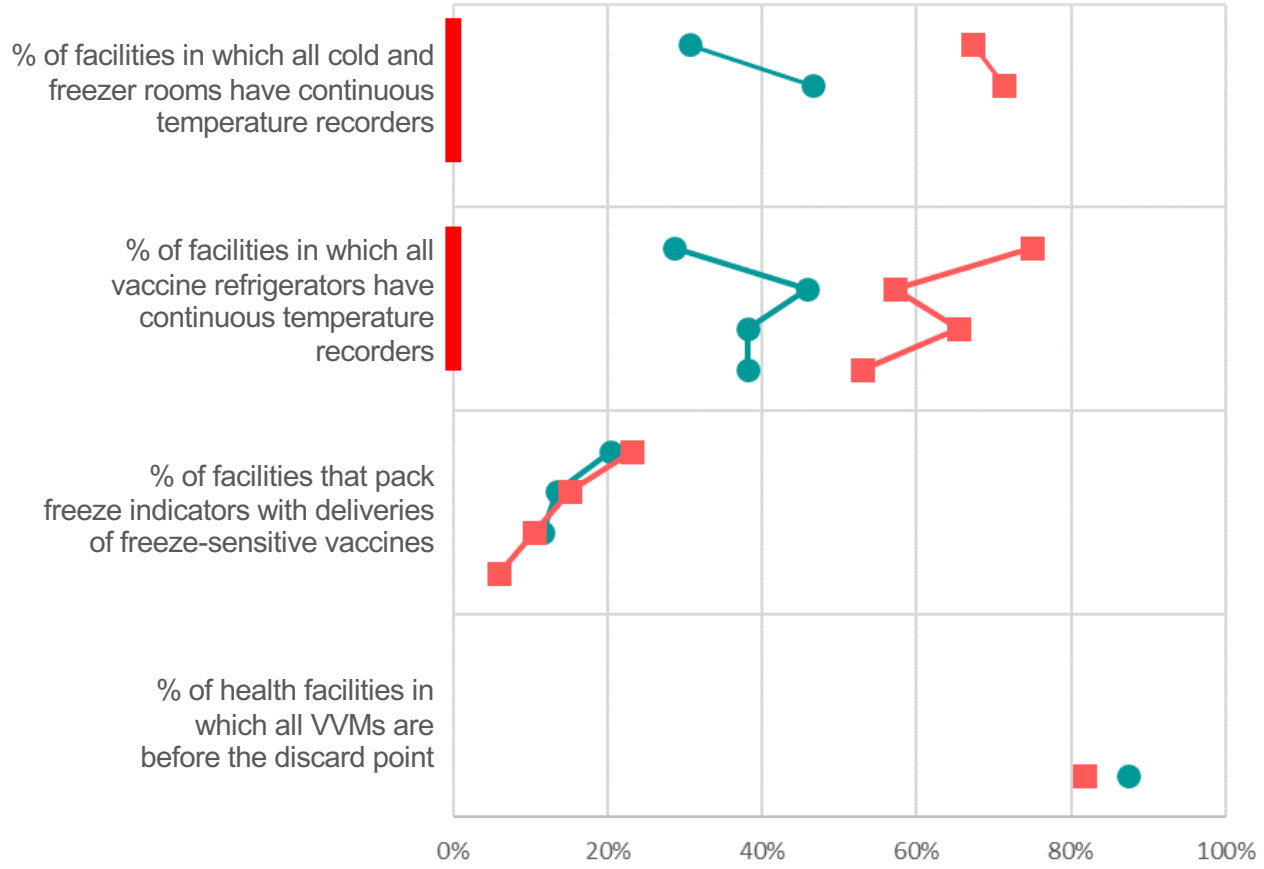
Selected Indicator Scores

1st assessment versus
last assessment (64 countries)

2009-2020

Update: WHO EVM1 database, July 2021

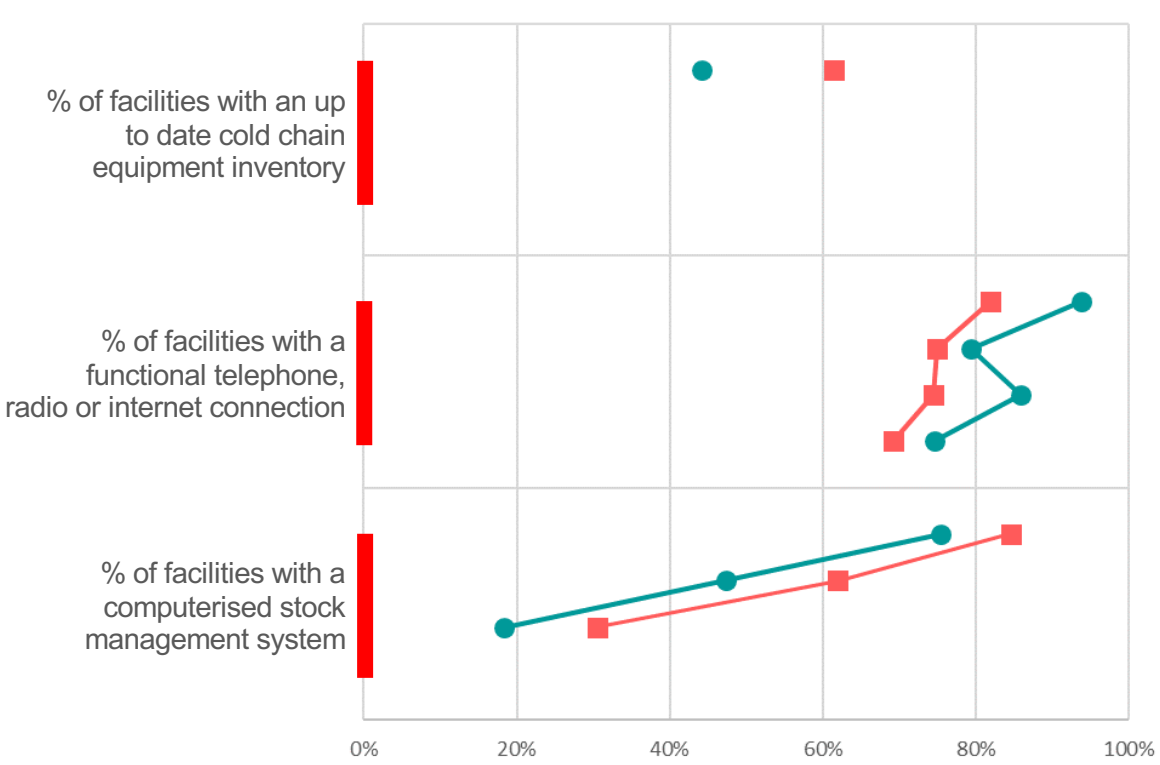
Quality indicators 2 (64 countries)



Key observations:

- ❑ More cold rooms are being equipped with continuous temperature monitoring systems.
- ❑ Countries are equipping refrigerators with 30DTRs at all levels of the supply chain.
- ❑ Freeze indicators are still not being routinely packed with freeze sensitive vaccine when transported with conditioned ice-packs.
- ❑ A slight increase in the number of VVMs beyond the discard point at health facilities.

Efficiency indicators 1 (64 countries)



Key observations:

- A significant increase in the number of national stores with up-to-date cold chain equipment inventories.
- The number of health facilities with a functional landline telephone or internet connection has decreased.
- Increase at all levels in the percentage of facilities with computerised stock management systems.

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EVM2 Framework

Economics Framework – Factors of Production

Input Categories

F1	F2	F3	F4	F5		Functions	O	P
Land	Capital	Labour	Knowledge	Enterprise			Output	Performance
✓	✓	✓	✓	✓	I1	Car Manufacture	✓	✓
✓	✓	✓	✓	✓	I2	Dairy Farming	✓	✓
✓	✓	✓	✓	✓	I3	Coal Mining	✓	✓

A function requires inputs (e.g. staff, equipment) to achieve its desired outcome or performance (e.g. profit, happiness).

A function generates outputs as it is carried out (e.g. records can be inspected, practice can be observed).

Economics Framework – Factors of Production

F1	F2	F3	F4	F5			O	P
Land	Capital	Labour	Knowledge	Enterprise			Output	Performance
✓	✓	✓	✓	✓	I1	Car Manufacture	✓	✓
✓	✓	✓	✓	✓	I2	Dairy Farming	✓	✓
✓	✓	✓	✓	✓	I3	Coal Mining	✓	✓
Electricity Water Sanitation	Cooker Refrigerator Van	Chef Cleaner Waiter	Menu Recipes		B1	Restaurant	Orders Stock records Kitchen	Profit Feedback
✓	✓	✓	✓	✓	B2	Bakery	✓	✓
✓	✓	✓	✓	✓	B3	Website Designer	✓	✓
✓	✓	✓	✓	✓	T1	Bake a Cake	✓	✓
✓	✓	✓	✓	✓	T2	Clean the House	✓	✓
✓	✓	✓	✓	✓	T3	Get Fit	✓	✓

A function requires inputs (e.g. staff, equipment) to achieve its desired outcome or performance (e.g. profit).

A function generates outputs as it is carried out (e.g. records can be inspected, practice can be observed).

EVM2 Framework

- EVM2 sets standards for the immunization supply chain.
- EVM2 sets standards for the inputs, outputs and performance of supply chain functions.
- EVM2 sets standards for functions carried out at vaccine stores and immunization service points.
- EVM2 sets standards for functions carried out at the program management level.
- The input standards are grouped into 6 different categories, similar to the factors of production.
- EVM standard = EVM requirement.

EVM2 Framework – Facility Operations & Management

Input Categories

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources		Functions	Output	Performance
✓	✓	✓	✓	✓	✓	E1	Vaccine arrivals	✓	✓
✓	✓	✓	✓	✓	✓	E2	Temperature management	✓	✓
✓	✓					E3	Storage and transportation capacity		
✓	✓	✓	✓	✓	✓	E4	Facility infrastructure and equipment	✓	✓
✓	✓	✓	✓	✓	✓	E5	Maintenance and repair	✓	✓
✓	✓	✓	✓	✓	✓	E6	Stock management	✓	✓
✓	✓	✓	✓	✓	✓	E7	Distribution of vaccines and dry goods	✓	✓
✓	✓	✓	✓	✓	✓	E8	Vaccine management	✓	✓
✓	✓	✓	✓	✓	✓	E9	Waste management	✓	✓
✓	✓	✓	✓	✓	✓	M1	Annual needs forecasting	✓	✓
✓	✓	✓	✓	✓	✓	M2	Annual work planning	✓	✓
✓	✓	✓	✓	✓	✓	M3	Supportive supervision	✓	✓
✓	✓	✓	✓	✓	✓	M4	iSC performance monitoring	✓	✓

A ✓ in a cell indicates that requirements are defined for that cell.

EVM2 Framework – Facility Operations & Management

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			Output	Performance
✓	✓	✓	✓	✓	✓	E1	Vaccine arrivals	✓	✓
✓	✓	✓	✓	✓	✓	E2	Temperature management	✓	✓
✓	✓					E3	Storage and transportation capacity		
✓	✓	✓	✓	✓	✓	E4	Facility infrastructure and equipment	✓	✓
✓	✓	✓	✓	✓	✓	E5	Maintenance and repair	✓	✓
	Computer	Software	Trained staff	SOPs		E6	Stock management	Stock records	Stockouts
✓	✓	✓	✓	✓	✓	E7	Distribution of vaccines and dry goods	✓	✓
✓	✓	✓	✓	✓	✓	E8	Vaccine management	✓	✓
✓	✓	✓	✓	✓	✓	E9	Waste management	✓	✓
✓	✓	✓	✓	✓	✓	M1	Annual needs forecasting	✓	✓
✓	✓	✓	✓	✓	✓	M2	Annual work planning	✓	✓
✓	✓	✓	✓	✓	✓	M3	Supportive supervision	✓	✓
✓	✓	✓	✓	✓	✓	M4	iSC performance monitoring	✓	✓

EVM2 Framework – Program Management

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Evidence, Policies & procedures	Financial resources			Output	Performance
			✓	✓		ST	Strategic planning	✓	
			✓			R1	Infrastructure management		✓
		✓	✓	✓	✓	R2	Equipment management	✓	✓
			✓		✓	R3	IT systems management	✓	✓
		✓	✓			R4	Human resources management	✓	✓
			✓			R5	Knowledge management	✓	✓
			✓			R6	Financial resources management	✓	✓

EVM2 Framework – Program Management

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Evidence, Policies & procedures	Financial resources			Output	Performance
			✓	✓		ST	Strategic planning	✓	
			✓			R1	Infrastructure management		✓
		Software	Trained staff	Policies	Funding	R2	Equipment management	Inventory	Equipment
			✓		✓	R3	IT systems management	✓	✓
		✓	✓			R4	Human resources management	✓	✓
			✓			R5	Knowledge management	✓	✓
			✓			R6	Financial resources management	✓	✓

EVM2 Framework – Program Management

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Evidence, Policies & procedures	Financial resources			Output	Performance
			NLWG	Data		ST	Strategic planning	Strategic Plan	
			✓			R1	Infrastructure management		✓
		Software	Trained staff	Policies	Funding	R2	Equipment management	Inventory	Equipment
			✓		✓	R3	IT systems management	✓	✓
		✓	✓			R4	Human resources management	✓	✓
			✓			R5	Knowledge management	✓	✓
			✓			R6	Financial resources management	✓	✓

EVM2 Framework – Supply Chain Function

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			Output	Performance
						SC	Supply Chain Function		✓

EVM2 Framework – Supply Chain Function

C1	C2	C3	C4	C5	C6			O	P
Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			Output	Performance
						SC	Supply Chain Function		Availability Quality Efficiency

Availability: each facility is always able to meet demand for vaccines and syringes

Quality: the available vaccines are in good condition (not temperature damaged, not expired)

Efficiency: vaccine wastage rates are minimal

EVM2 Framework

Program Management

C1 Infrastructure	C2 Equipment	C3 Information technology	C4 Human resources	C5 Evidence, Policies & procedures	C6 Financial resources			O Output	P Performance
			✓	✓		ST	Strategic planning	✓	
			✓			R1	Infrastructure management		✓
		✓	✓	✓	✓	R2	Equipment management	✓	✓
			✓		✓	R3	IT systems management	✓	✓
		✓	✓			R4	Human resources management	✓	✓
			✓			R5	Knowledge management	✓	✓
			✓			R6	Financial resources management	✓	✓

Facility Operations & Management

C1 Infrastructure	C2 Equipment	C3 Information technology	C4 Human resources	C5 Policies & procedures	C6 Financial resources			O Output	P Performance
✓	✓	✓	✓	✓	✓	E1	Vaccine arrivals	✓	✓
✓	✓	✓	✓	✓	✓	E2	Temperature management	✓	✓
✓	✓					E3	Storage and transportation capacity		
✓	✓	✓	✓	✓	✓	E4	Facility infrastructure and equipment	✓	✓
✓	✓	✓	✓	✓	✓	E5	Maintenance and repair	✓	✓
✓	✓	✓	✓	✓	✓	E6	Stock management	✓	✓
✓	✓	✓	✓	✓	✓	E7	Distribution of vaccines and dry goods	✓	✓
✓	✓	✓	✓	✓	✓	E8	Vaccine management	✓	✓
✓	✓	✓	✓	✓	✓	E9	Waste management	✓	✓
✓	✓	✓	✓	✓	✓	M1	Annual needs forecasting	✓	✓
✓	✓	✓	✓	✓	✓	M2	Annual work planning	✓	✓
✓	✓	✓	✓	✓	✓	M3	Supportive supervision	✓	✓
✓	✓	✓	✓	✓	✓	M4	iSC performance monitoring	✓	✓

Supply Chain Function

C1 Infrastructure	C2 Equipment	C3 Information technology	C4 Human resources	C5 Policies & procedures	C6 Financial resources			O Output	P Performance
						SC	Supply Chain		✓

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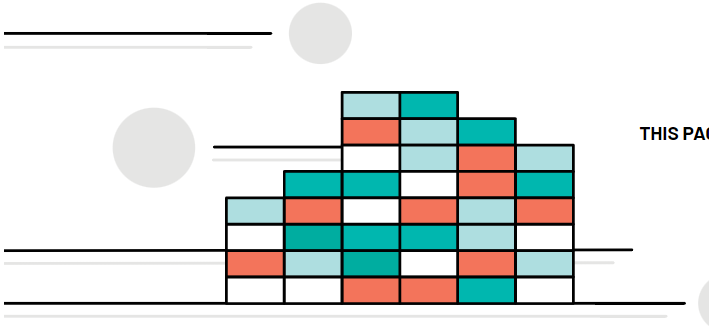
EVM2 Global Insights Website

A snapshot of iSC progress around the globe

Global insights presents a data dashboard of EVM results from every EVM assessment conducted since 2010.



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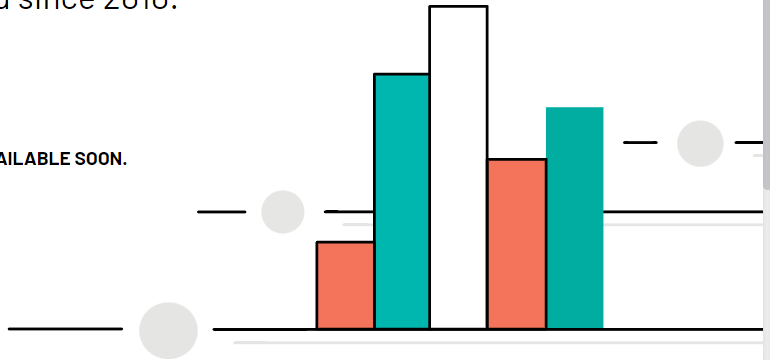

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GLOBAL INSIGHTS

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Manager

Home

Global Insights

- Home
- Heat-map
- Criteria
- Categories
- AQE
- Progress
- Comparision
- Compare overall
- Compare two years
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A snapshot of iSC progress around the globe

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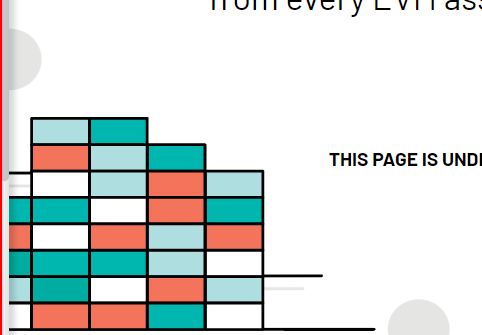

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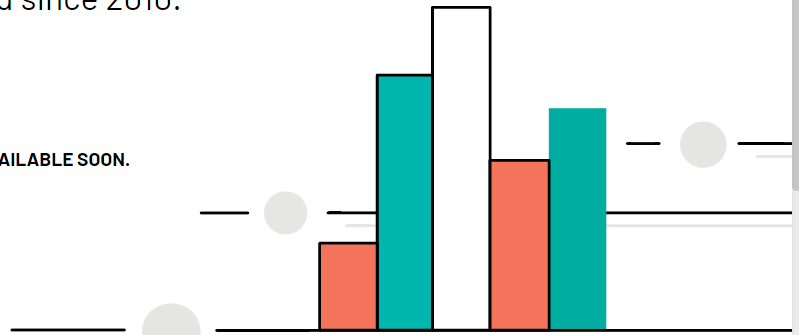

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Heat-map: This graph presents the criteria and category scores for one or more location in an assessment, or for an entire assessment. Locations to include can be defined by state, district, or supply chain level.

Includes a total of 25 assessments (from 25 countries) Region: African Region - 11; Eastern Mediterranean Region - 5; European Region - 1; South-East Asia Region - 5; Western Pacific Region - 3. Completion dates range from 2019 to 2022.

Level
All selected (4)

Region
All

Latest year
All selected (14)

Criterion type
Facility operations & m

Apply

Export

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUTS	PERFORMANCE	
Vaccine arrivals	E1			78	89	68	100	86		81
Temperature management	E2			73	84	77		64	78	74
Storage and transportation capacity	E3	90	66		93	81	93	82	99	79
Facility infrastructure and equipment	E4	75	77	87			91	79		78
Maintenance and repair	E5			45	87	74	88	67	86	77
Stock management	E6			85	86	84		72	64	78
Distribution of vaccines and dry goods	E7		96	74	72	59	89	81	93	76
Vaccine management	E8				87	82		63		84
Waste management	E9		68		80	78	91	61	90	78
Annual needs forecasting	M1				87	79		86	65	81
Annual work planning	M2				79	68	86	69	63	76
Supportive supervision	M3	99	99	77	86	83	89	67		79
iSC performance monitoring	M4			83	79	78		51		65
TOTAL		77	76	79	83	76	86	70	79	77

15°C Cloudy

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Heat-map: This graph presents the criteria and category scores for one or more location in an assessment, or for an entire assessment. Locations to include can be defined by state, district, or supply chain level.

Includes a total of 11 assessments (from 11 countries) Region: African Region - 11. Completion dates range from 2020 to 2021.

Level
SP

Region
African Region

Latest year
4 selected

Criterion type
Facility operations & m

Apply

Export

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUTS	PERFORMANCE	
Vaccine arrivals	E1									
Temperature management	E2			81	80	74		61	79	74
Storage and transportation capacity	E3		71		80	73	93	84	98	77
Facility infrastructure and equipment	E4	59	90	96			80	80		75
Maintenance and repair	E5				87	70	88	56	83	75
Stock management	E6			90	79	77		59	56	71
Distribution of vaccines and dry goods	E7		98		47	69	81	89	80	68
Vaccine management	E8				82	73		63		74
Waste management	E9		84		82	72	89	72	93	81
Annual needs forecasting	M1				80	70		80	49	70
Annual work planning	M2				75	49	69	59	48	65
Supportive supervision	M3							86		86
iSC performance monitoring	M4				74	70		39		59
TOTAL		59	80	88	78	70	71	66	79	73

Heat-map: This graph presents the criteria and category scores for one or more location in an assessment, or for an entire assessment. Locations to include can be defined by state, district, or supply chain level.

Includes a total of 11 assessments (from 11 countries) Region: African Region - 11. Completion dates range from 2020 to 2021.

Level

SP

Region

African Region

Latest year

All selected (14)

Criterion type

Facility operations & ma

Facility operations & management
AQE
Programme management

Export

		Infrastructure	Equipment	Information technology	Human resources	Policies & procedures	Financial resources			TOTAL
		C1	C2	C3	C4	C5	C6	OUTPUTS	PERFORMANCE	
Vaccine arrivals	E1									
Temperature management	E2			81	80	74		61	79	74
Storage and transportation capacity	E3		71		80	73	93	84	98	77
Facility infrastructure and equipment	E4	59	90	96			80	80		75
Maintenance and repair	E5				87	70	88	56	83	75
Stock management	E6			90	79	77		59	56	71
Distribution of vaccines and dry goods	E7		98		47	69	81	89	80	68
Vaccine management	E8				82	73		63		74
Waste management	E9		84		82	72	89	72	93	81
Annual needs forecasting	M1				80	70		80	49	70
Annual work planning	M2				75	49	69	59	48	65
Supportive supervision	M3							86		86
iSC performance monitoring	M4				74	70		39		59
TOTAL		59	80	88	78	70	71	66	79	73

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Export Back

Includes a total of 11 assessments (from 11 countries) Region: African Region - 11. Completion dates range from 2020 to 2021.

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Export Back

Requirement - Category: C4 Human resources; Criterion: E7 Distribution of vaccines and dry goods

Requirement Maximum score

5.0
4.5
4.0
3.5
3.0
2.5
2.0

A time series of criterion or category scores

Compare criterion or category scores in 2 different WHO regions

Compare criterion or category scores in all WHO regions

Compare criterion or category scores of a country or region in 2 different years

Plot criterion or category scores on a map

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Level

All selected (4)

Criterion

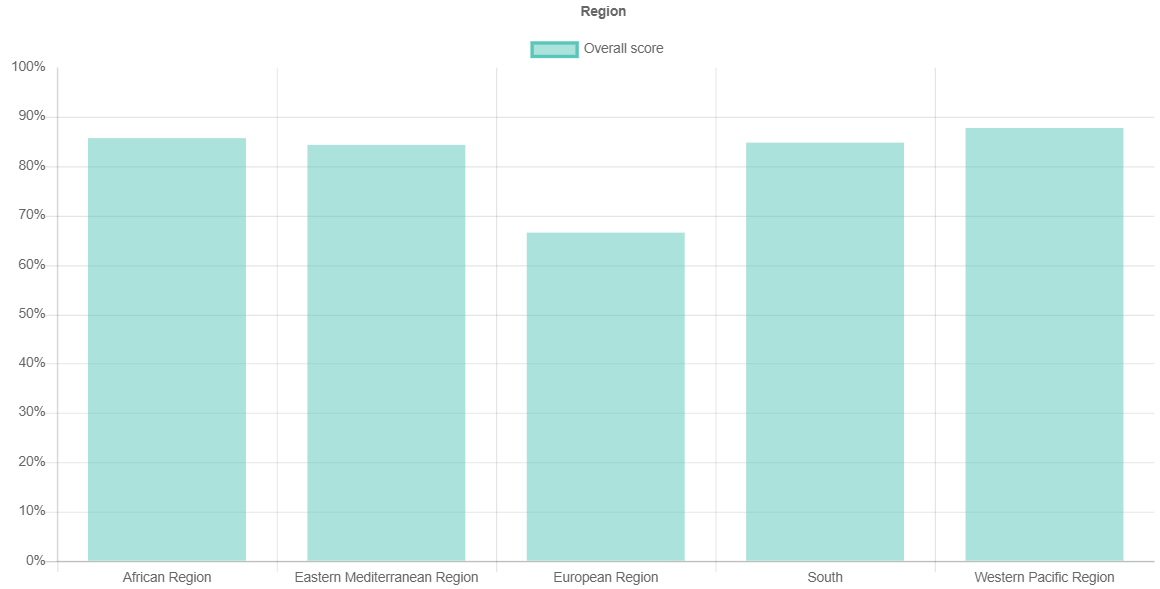
E6 - Stock managemen

Category

C3 - Information techno

Apply

Export



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EVM
Setting a standard for the vaccine supply chain

TechNet-21
The Technical Network for Strengthening Immunization Services

Thank You

EVM
Setting a standard for the vaccine supply chain

TechNet-21
The Technical Network for Strengthening Immunization Services

Backup slides

EVM1 Framework

C1	C2	C3	C4	C5	C6	C7		
Buildings	Capacity	Equipment	Management	Repairs/ Maintenance	Training	Vehicles		
✓	✓	✓	✓	✓	✓	✓	E1	Vaccine arrivals
✓	✓	✓	✓	✓	✓	✓	E2	Temperature management
✓	✓	✓	✓	✓	✓	✓	E3	Storage capacity
✓	✓	✓	✓	✓	✓	✓	E4	Buildings, Equipment & Transport
✓	✓	✓	✓	✓	✓	✓	E5	Maintenance and repair
✓	✓	✓	✓	✓	✓	✓	E6	Stock management
✓	✓	✓	✓	✓	✓	✓	E7	Distribution of vaccines and dry goods
✓	✓	✓	✓	✓	✓	✓	E8	Vaccine management
✓	✓	✓	✓	✓	✓	✓	E9	MIS & Supportive Functions

EVM1 Framework

C1	C2	C3	C4	C5	C6	C7			O	P
Buildings	Capacity	Equipment	Management	Repairs/ Maintenance	Training	Vehicles			Output	Performance
✓	✓	✓	✓	✓	✓	✓	E1	Vaccine arrivals		
✓	✓	✓	✓	✓	✓	✓	E2	Temperature management		
✓	✓	✓	✓	✓	✓	✓	E3	Storage capacity		
✓	✓	✓	✓	✓	✓	✓	E4	Buildings, Equipment & Transport		
✓	✓	✓	✓	✓	✓	✓	E5	Maintenance and repair		
✓	✓	✓	✓	✓	✓	✓	E6	Stock management		
✓	✓	✓	✓	✓	✓	✓	E7	Distribution of vaccines and dry goods		
✓	✓	✓	✓	✓	✓	✓	E8	Vaccine management		
✓	✓	✓	✓	✓	✓	✓	E9	MIS & Supportive Functions		