



USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM

TECHNICAL ASSISTANCE, NATIONAL SUPPLY CHAIN ASSESSMENT TASK ORDER

Data Analysis Plan for the Capability Maturity Model (CMM) Survey

NSCA 2.0



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INTRODUCTION

Collected data for the capability maturity model (cmm) survey are grouped into four different levels of the supply chain (as defined in the nsca 2.0 implementation guide):

At service delivery points (sdps) - health centers and district hospitals, seven 'modules' are included in the survey: - human resources, financial sustainability, policy and governance, quality and pharmacovigilance, warehousing and storage, logistic management information systems (lmis), and waste management.

At referral hospitals - up to ten modules can be included: strategic planning and management, human resources, financial sustainability, policy and governance, quality and pharmacovigilance, forecasting and supply planning, procurement and customs clearance, warehousing and storage, logistic management information systems (lmis), and waste management.

Intermediate and central warehouse- up to eleven modules can be included: strategic planning and management, human resources, financial sustainability, policy and governance, quality and pharmacovigilance, forecasting and supply planning, procurement and customs clearance, warehousing and storage, distribution, logistic management information systems (lmis), and waste management.

At the ministry of health - up to eleven modules can be included: strategic planning and management, human resources, financial sustainability, policy and governance, quality and pharmacovigilance, forecasting and supply planning, procurement and customs clearance, warehousing and storage, distribution, logistic management information systems (lmis), and waste management.

Note that across the four different levels, there are potentially differences in the questions, as well as different number of questions asked in each of the modules.

The remainder of this document describes how to assess and score survey responses after the data have been collected.

SCORING METHODOLOGY

CATEGORIES OF RESPONSES

Responses to individual questions and / or answers are classified into one of five different response categories, based on the maturity level reflected in the questions / response. The five categories are:

TABLE 1. FIVE CATEGORIES	
CATEGORY NAME	DEFINITION
Basic	These are the must have policies, structures, processes, procedures, tools, indicators, reports and resources to operate a supply chain system (e.g. a stock card as a tool for inventory management).
Intermediate	These are not must have but are important to have policies, structures, processes, procedures, tools, indicators (e.g. an excel sheet for managing inventory).
Advanced	These are nice to have policies, structures, processes, procedures, tools, indicators, reports and resources to operate a supply chain system (e.g. a specialized electronic stock management software, not linked to other systems).
State of the Art (SOA)	These are state of the art policies, structures, processes, procedures, tools, indicators, reports and resources to operate a supply chain system (e.g. an ERP system for stock management and control).
Descriptive	These are responses to describe the context or perceptions of respondents; they do not reflect the maturity of inputs, processes, etc. of the supply chain but provide information to help interpret the results and make recommendations.

TYPES OF QUESTIONS

For each module in the survey, questions and responses are classified based on the above table. Different types of questions may be 'scored' differently.

1. Binary (answer of yes or no) questions: Assigned one category.

TABLE 2. BINARY QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC)	ANSWER CATEGORY
SPM-101	Do you have an approved supply chain strategic plan?	Yes	1	Basic
		No	0	None
		I don't know	98	None

In this case, an answer of "Yes" (coded as a 1 in the database) will indicate that the item/processes is present at the facility/entity being interviewed, while an answer of 'no' (numerically coded as a 0 in the database) or 'don't know' (numerically coded as a 98 in the database) indicates that it is not present.

2. Multiple response questions: Each answer is treated as a separate question, and each answer is assigned a separate category.

TABLE 3. MULTIPLE RESPONSE QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC, WITH 1 = PRESENT)	ANSWER CATEGORY
HR-301_1	Which capacity building programs are available for staff in country?	"Classroom" training that does not provide any formal supply chain degree or certification (including stand alone classroom training or a module in a larger pharmacy or public health course)	0 or 1	Basic
HR-301_2	[MULTIPLE RESPONSES ALLOWED]	Mentorship	0 or 1	Intermediate
HR-301_3		Coaching	0 or 1	Intermediate
HR-301_4		Structured on the job training	0 or 1	Intermediate
HR-301_5		E-Learning programs in supply chain	0 or 1	Advanced
HR-301_6		Certificate Programs in supply chain	0 or 1	Advanced
HR-301_7		Diploma programs in supply chain	0 or 1	Advanced
HR-301_8		Bachelor's/undergraduate degree program in supply chain	0 or 1	SOA
HR-301_9		Master's Program in supply chain	0 or 1	SOA
HR-301_10		None of the above	0 or 1*	None of the above
HR-301_98		I don't know	0 or 1*	None

*Note because this is a multiple answer question, respondents in theory could answer 'I don't know' / 'None of the above' and select other answers; please refer to Annex 15: Data Cleaning and Quality Assurance of the NSCA 2.0 Implementation Guide for more information.

“Question No.” represents the question number, followed by an underscore, followed by the response number (which is how answers are recorded in the database). For each field, the database records a 1 (present / selected) or a 0 (not present / not selected). Each response is treated (or counted) as a separate “question”, and each “question” treated as a binary question (per #1 above).

3. Multiple response questions with partial scores for each answer: Each answer is treated as a separate question, and each answer is assigned a separate category, but each answer counts as a ‘partial’ answer.

TABLE 4. MULTIPLE RESPONSE QUESTIONS WITH PARTIAL SCORES				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC , WITH 1 = PRESENT)	ANSWER CATEGORY

TABLE 4. MULTIPLE RESPONSE QUESTIONS WITH PARTIAL SCORES

QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC , WITH 1 = PRESENT)	ANSWER CATEGORY
WS-501_1	Is the following material handling equipment available?	Shelves	0 or 1	\Basic\
WS-501_2	[MULTIPLE RESPONSES ALLOWED]	Cabinets	0 or 1	\Basic\
WS-501_3		Pallets	0 or 1	\Basic\
WS-501_4		Hand truck	0 or 1	\Basic\
WS-501_5		Trollies or carts	0 or 1	\Basic\
WS-501_6		Pallet truck or pallet jack	0 or 1	\Basic\
WS-501_7		Pallet racks	0 or 1	Intermediate
WS-501_8		Fork lifts	0 or 1	Intermediate
WS-501_9		Automatic systems (robotic)	0 or 1	SOA
WS-501_10		None of the above	0 or 1*	None

*Note because this is a multiple answer question, respondents in theory could answer 'None of the above' and select other answers; please refer to Annex 15: Data Cleaning and Quality Assurance of the NSCA 2.0 Implementation Guide for more information.

Per #2 above, for each field, the database records a 1 (present / selected) or a 0 (not present / not selected). However, for the 6 response fields marked “\Basic\”, each response is valued at 1/3rd of a basic score (note that the exact amount counted for each answer field depends on the question). This means, for this question, there are potentially points for up to 2 full basic questions.

4. Any response questions: Formulated as multiple response questions, selection of any / some / or all of the possible responses indicate that the input/process/etc. is present.

TABLE 4. ANY RESPONSE QUESTIONS

QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC, WITH 1 = PRESENT)	ANSWER CATEGORY
WS-402_1	How do you ensure consistent electric power at this facility?	Generator	0 or 1	(Basic)
WS-402_2	[MULTIPLE RESPONSES ALLOWED]	Invertors	0 or 1	(Basic)
WS-402_3		Solar Power	0 or 1	(Basic)
WS-402_4		Other	0 or 1	None
WS-402_5		No backup available	0 or 1	None
WS-402_98		I don't know	0 or 1*	None

*Note because this is a multiple answer question, respondents in theory could answer 'I don't know' and select other answers; please refer to Annex 15: Data Cleaning and Quality Assurance of the NSCA 2.0 Implementation Guide for more information.

For these types of questions, multiple responses were allowed, but having *one or more* of the responses present listed in that “Answer Category” as “(Basic)” indicates that the answer will count as present for the category listed. For this example, the maximum possible score is 1 basic (if any of the top three responses is chosen).

5. At least X response questions: Formulated as multiple response questions, selection of at least a certain number the possible responses indicate that the input/process/etc. is present, but the maximum score is capped. The number needed for the response to count as ‘present’ varies between different questions of this type.

TABLE 5. AT LEAST X RESPONSE QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC, WITH 1= PRESENT)	ANSWER CATEGORY
HR-305_1	Which of the following areas were covered under the capacity building sessions in the last 1 year?	Stores & inventory management	0 or 1	<Basic>
HR-305_2	[MULTIPLE RESPONSES ALLOWED]	LMIS	0 or 1	<Basic>
HR-305_3	Maximum score of 2 basics, if at least 2 are chosen	Ordering & reporting	0 or 1	<Basic>
HR-305_4		Waste management	0 or 1	<Basic>
HR-305_5		Medicine quality assurance	0 or 1	<Basic>
HR-305_6		Treatment Guidelines	0 or 1	<Basic>
HR-305_7		Changes in National policy	0 or 1	<Basic>
HR-305_8		None of the above	0 or 1*	None
HR-305_98		I don't know	0 or 1*	None

*Note because this is a multiple answer question, respondents in theory could answer ‘I don’t know’ / ‘None of the above’ and select other answers; please refer to Annex 15: Data Cleaning and Quality Assurance of the NSCA 2.0 Implementation Guide for more information.

For these types of questions, multiple responses were allowed, and the maximum potential score is lower than the total number of possible responses (the maximum is either two or three, depending on the question). In this example, having 1 answer selected (from any of the first seven responses) indicates having 1 basic item in place, having 2 or more answers selected indicates having 2 basic items in place (the maximum score for this example is two).

6. A minimum number of answers need to be selected: Formulated as multiple response questions, selection of certain (but multiple) answers are needed in order to ‘count’ as being present.

TABLE 6. MINIMUM NUMBER OF ANSWERS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC, WITH I = PRESENT)	ANSWER CATEGORY
WS-401_1	Which of the following utilities are in place in the warehouse / stores area?	Electric Lighting	0 or 1	Basic
WS-401_2		Telephone	0 or 1	Basic
WS-401_3		None of the above	0 or 1*	None
WS-401_98		I don't know	0 or 1*	None

*Note because this is a multiple answer question, respondents in theory could answer 'I don't know' / 'None of the above' and select other answers; please refer to Annex 15: Data Cleaning and Quality Assurance of the NSCA 2.0 Implementation Guide for more information.

In this case, both Electric Lighting and Telephone need to be checked in order to accrue the basic score.

7. One response allowed for the question, but more than 'yes/no' responses allowed, treated as a binary question:

TABLE 7. ONE RESPONSE ALLOWED				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC)	ANSWER CATEGORY
SPM-306	Considering the anticipated costs and available resources, have you documented any funding gaps?	Yes	1	Intermediate
		We have documented that there are no funding gaps	2	Intermediate
		Funding gaps have not been documented	3	None
		I don't know	98	None

In these questions, responses are divided into binary classifications. In the example above, answers 1 and 2 both indicate the input/process/etc. is present; otherwise it is not present. Thus, in the example above, an answer of 1 or 2 indicates the requirements for the "Answer Category" are met, while an answer of 3 or 98 indicates that the requirements have not been met.

8. Nested questions: The answers are structured in a hierarchical way, with different answers representing different maturity levels; selection of an answer with a higher maturity level *de facto* fulfills the requirements for the lower maturity categories also.

TABLE 8. NESTED QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC)	ANSWER CATEGORY
HR-309	What proportion of staff participated in capacity building sessions/opportunities in the last two years?	None	0	None
		Minimal (1 - 25%)	1	Basic
		Some (26-50%)	2	Intermediate
		Most (51 - 99%)	3	Advanced
		All (100%)	4	SOA
		I don't know	98	None

In this example, an answer of 1, 2, 3, or 4 fulfills the requirements for the “Basic” category; while an answer of 2, 3, or 4 fulfills the requirements for the “Intermediate” category; 3 or 4 fulfills the requirements for the “Advanced” category; and a 4 fulfills the requirements of the “State of the Art” category. An answer of “I don’t know” is treated as not fulfilling the requirements for any answer category.

9. Conditionally scored questions: Occasionally, questions are included as ‘scored’ questions only when they are relevant to a particular setting.

TABLE 9. CONDITIONALLY SCORED QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC)	ANSWER CATEGORY
FS-701	Does this site accept health insurance?	Yes	1	Descriptive
		No	0	
		I don't know	98	
FS-702	Do insurance reimbursements adequately cover costs for supplying health commodities (i.e., the commodity cost and supply chain costs)?	Yes	1	Intermediate
		No	0	None
		I don't know	98	None

In the example above, when FS-701 is “Yes”, then FS-702 will be counted as in place if the answer to FS-702 is “Yes” and FS-702 will not be counted as in place if the answer is “No” or “I don’t know”. When the answer to FS-701 is “No”, then FS-702 will not be considered in the scoring (i.e., it will not be included in either the numerator or the denominator of the scoring formula).

10. Descriptive questions are reported as the percentage of respondents answering each question/answer choice:

TABLE 10. DESCRIPTIVE QUESTIONS		
QUESTION	RESPONSE	PERCENTAGE
What are the critical barriers to supply chain management capacity building programs? [MULTIPLE RESPONSES ALLOWED]	Finances	X%
	Workload	X%
	Skilled trainers	X%
	Materials	X%
	Language	X%
	Perceptions	X%
	Lack of interest	X%
	Time	X%
	Others	X%
	No barriers to report	X%
	I don't know	X%

Note that descriptive questions do NOT contribute to the determination of maturity categories and do NOT contribute to the maturity score. Also, the percentages in the last column do not necessarily (and usually will not) add up to 100% for questions where multiple responses are allowed. For questions with only one response allowed, the answers should add up to 100% of respondents.

11. Physical verification questions: In some cases, initial questions are verified by examining a physical item. Where applicable, the physical verification is used in lieu of the question itself. That is, if an item could not be physically verified, it is not counted as being in place, even if the response to the initial (verbal) question was 'yes'.

TABLE 11. PHYSICAL VERIFICATION QUESTIONS				
QUESTION NO.	QUESTION	RESPONSE (TEXT)	RESPONSE (NUMERIC)	ANSWER CATEGORY
SPM-101	Do you have an approved supply chain strategic plan?	Yes	1	Basic (at MoH / Central & intermediate warehouse)
		No	0	None
		I don't know	98	None
SPM-701	Verify the existence of an approved supply chain strategic plan.	Physically verified	1	Basic
		Could Not be physically verified	0	None

In the example above, SPM-101 should be "Yes" AND SPM-701 should be "Physically verified" for the item to count as being in place. If SPM-101 is "Yes" and SPM-701 is "Could Not be physically verified", then the item is not counted as being in place.

The classifications of each question, by level, employed in the survey are listed separately in the CMM Survey Analysis Template.

EXCEPTIONS TO THE TYPES OF QUESTIONS

1. “Other: Specify” responses: Some multiple response questions have an ‘other’ category which then allows the respondent to state what the ‘other’ might be. Because question / answer categories are pre-defined, it is not always straightforward how to deal with these answers. Three approaches can be employed.

First, the text answers for the “other” should be assessed to determine whether or not the response is a reasonable approximation of another answer category (e.g., ‘bookshelves’ is specified, while a standard answer option is ‘shelves’). The examination should be done routinely by the assessment manager/coordinator or data manager during data collection so that clarification can be sought from the data collectors as needed. In these cases, the answer category for which the specified ‘other’ is a reasonable approximation should be considered as present.

Second, certain text answers for the “other” may be frequent, not a reasonable approximation of another answer category, *and* deemed by the assessment team to be an important input/process not captured in the survey. In these cases, a new answer response could be created for the answers that are the same/similar. If necessary, this new answer response can be assigned to an answer category (although note that the automatic calculation templates provided as part of the NSCA 2.0 will not be able to accommodate this modification).

Third, text answers for the “other” may not be a reasonable approximation of another answer category, be rare (one or two respondents only), *and/or* deemed by the assessment team to not be an important input/process/etc. In these cases, the answers may be either ignored, or treated as descriptive information.

2. “I don’t know” responses: Generally, “I don’t know” is treated as a ‘No’ or ‘Not present’ answer under the assumption that if the respondent does not know the answer then they are not using the input/process, which is the same as the input/process not being available. However, there may be cases where the respondent answers “I don’t know” for other reasons. For example, maybe the question is about an input/process that the respondent does not routinely deal with, but another staff member does and would be better able to answer the question.

During the training of the data collection teams, addressing “I don’t know” answers should be a topic of training. Data collectors should not just accept the answer in all cases, but ascertain whether or not the respondent is able to answer the question. If time permits the data collection team should attempt to find an appropriate respondent. If the appropriate respondent is not available, a note can be made at the end of the module, and this question may be removed from the scoring for this entity.

SCORING

Questions are weighted to reflect the importance of the different categories. Overall, the following table presents the contribution of each category to the overall score for a module:

TABLE II. SCORING	
CATEGORY NAME	PROPORTION OF THE TOTAL SCORE FOR A MODULE
Basic	50%
Intermediate	30%
Advanced	15%
State of the Art	5%
Descriptive	0%

Thus, all of the questions in the ‘Basic’ category contribute to 50% of the total score for a particular module. For example, if there were 5 questions classified as ‘Basic’ in a module, each question would contribute 10% to the overall score for the module; if there were 20 questions classified as ‘Basic’ in a module, each question would contribute only 2.5% to the overall score for the module. Responses are averaged across the facilities / entities visited and disaggregated by the level of the health system (e.g., health center, lower level hospital, referral hospital, intermediate warehouse, central warehouse, and MoH).

For example, suppose there were 5 ‘Basic’ questions for a particular module (as stated above, each question would contribute 10% to the overall score for the module) and 5 health centers were visited. Three health centers answered positively to 4 ‘Basic’ questions and 2 health centers answered positively to 3 ‘Basic’ questions. The average score is then

$$(40\% + 40\% + 40\% + 30\% + 30\%) / 5 = 36\%$$

The scores from the four categories in the module are then added up to calculate the total scores, for example:

$$(40\% + 40\% + 40\% + 30\% + 30\%) / 5 = \mathbf{36\% \text{ (Basic)}}$$

$$(25\% + 20\% + 15\% + 15\% + 10\%) / 5 = \mathbf{17\% \text{ (Intermediate)}}$$

$$(15\% + 15\% + 15\% + 10\% + 5\%) / 5 = \mathbf{12\% \text{ (Advanced)}}$$

$$(5\% + 2.5\% + 0\% + 0\% + 0\%) / 5 = \mathbf{1.5\% \text{ (SOA)}}$$

$$\mathbf{\text{Total score} = 36\% + 17\% + 12\% + 1.5\% = 66.5\%}$$

Note that survey weights should be applied to individual facility/entities scores as appropriate, such that the final scores are calculated as:

$$\frac{\sum_{f=1}^x \left(\left\{ \sum_{c=1}^4 \left(\frac{\sum_{q=1}^n ((q_n = \{0,1\}) \times s_n)}{\sum_{q=1}^n s_n} \right) \right\} \times w_f \right)}{\sum_{f=1}^x w_f}$$

Where c reflects the 4 categories of questions (summed as above),

q reflects the question number, up to n questions per module for category c ,

s reflects the percentage weight given to each question n in a module for category c including the 50%/30%/15%/5% breakdown for the categories,¹

w reflects the sampling weight for each entity f , and

q_n takes on a value of 1 (present) or 0 (not present).

This formula calculates the score for each entity for each module (as above for “**Total score**”). The resulting score is then multiplied by the sample weight of each entity, summed, and the results divided by the sum of the sample weights across all entities.

Annex I reports the number of questions (n) and question weights (s) for all modules and levels used in the survey.

¹ Question weights are listed in Annex 1 for each level and module.

REPORTING RESULTS

RESULTS IN AGGREGATE

Results should be presented, at least initially for review by the assessment team, by module and by level, as per the table on the following page. Each cell of the table reports the average across facilities / entities (except for central warehouse and MoH, for which there is typically only one) of the total score. For example, the average score for the human resources module for health centers is reported in the appropriate box.

Following the average score, the range of scores are reported, reflecting the minimum score and the maximum score at that level, for example at any individual health center.

While the overall average gives a sense of the maturity of the system overall, the range is important in determining whether the level of maturity is consistent across the system, or whether some areas have markedly less maturity than other areas. For example, an average score of 42%, with a range of 33 to 52% reflects general consistency in the maturity across the type of facility. An average score of 42%, with a range of 12 to 54% indicates that many facilities are at or above the average, but a few facilities have low maturity. An average score of 33% with a range of 0 to 92% indicates low maturity overall, while a few facilities have quite high maturity scores.²

The scoring system is intended to standardize the interpretation of results across the modules. For example, a score of 50% indicates, very roughly, that most 'Basic' components are in place (on average), with enough 'Intermediate', 'Advanced', and 'SOA' components to compensate (in the scoring, not necessarily in practice) for the missing 'Basic' elements. However, a score of 50% DOES NOT mean that all 'Basic' components are in place. Thus, additional tables focusing on 'Basic' components should be reported, because missing basic items should likely be prioritized for investment and improvement (while the overall score can be used to track the supply chain maturity over time).

²Some modules at the referral hospital (Policy and Governance and Quality and Pharmacovigilance) and service delivery level (Financial Sustainability, Quality and Pharmacovigilance, and Waste Management) have fewer than 20 answer/responses. The results for these modules need careful interpretation and are not directly comparable to the results from other modules.

TABLE 12. RESULTS IN AGGREGATE

MODULE	HEALTH CENTER	LOWER LEVEL HOSPITAL	REFERRAL HOSPITAL	INTERMEDIATE WAREHOUSE	CENTRAL WAREHOUSE	MOH
Forecasting and Supply Planning			X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Procurement			x% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Pharmacy and Stores Management	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Distribution				X% (Range: Y to Z)	X%	X%
Waste Management	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Strategic Planning and Management			X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Human Resources	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Financial Sustainability	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Policy and Governance			X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
Quality and Pharmacovigilance	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%
LMIS	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X% (Range: Y to Z)	X%	X%

Reporting on 'Basic' components is done in two ways. First, the scores are reported for 'Basic' components only:

TABLE 13. MATURITY SCORES: PERCENTAGE OF 'BASIC' ITEMS IN PLACE

MODULE	Average percentage in place					
	HEALTH CENTER	LOWER LEVEL HOSPITAL	REFERRAL HOSPITAL	INTERMEDIATE WAREHOUSE	CENTRAL WAREHOUSE	MOH
Forecasting and Supply Planning			X%	X%	X%	X%
Procurement			X%	X%	X%	X%
Pharmacy and Stores Management	X%	X%	X%	X%	X%	X%
Distribution				X%	X%	X%
Waste Management	X%	X%	X%	X%	X%	X%
Strategic Planning and Management			X%	X%	X%	X%
Human Resources	X%	X%	X%	X%	X%	X%
Financial Sustainability	X%	X%	X%	X%	X%	X%
Policy and Governance			X%	X%	X%	X%
Quality and Pharmacovigilance	X%	X%	X%	X%	X%	X%
LMIS	X%	X%	X%	X%	X%	X%

These scores are calculated as the percentage of questions in the 'Basic' category that are in place. For example, if there were 5 'Basic' questions in a particular module, and 3 were in place, the score would be $3/5 = 60\%$ (then averaged across facilities / entities as above). This gives a picture, across modules, of which areas have more or less of the 'Basic' components in place.

Second, the percentage of facilities with all 'Basic' components is calculated:

TABLE 14. PERCENTAGE OF FACILITIES WITH BASIC COMPONENTS

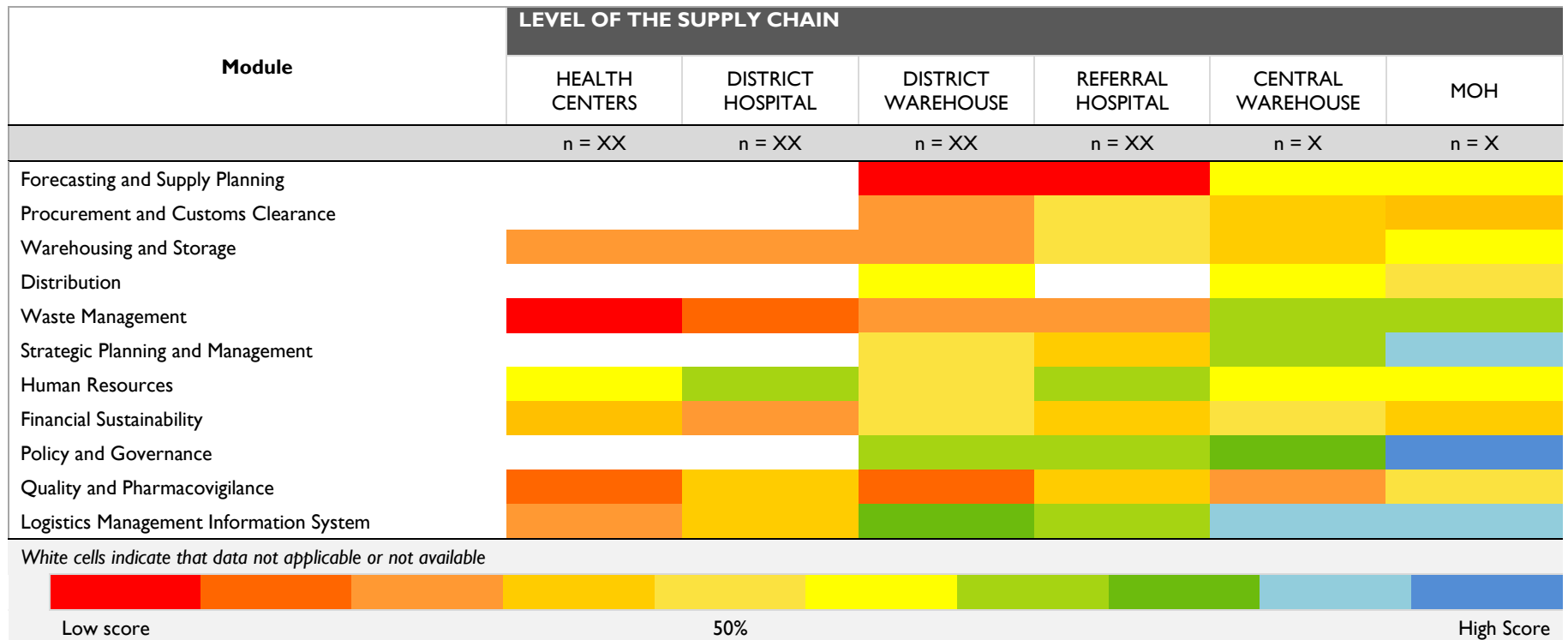
MODULE	AVERAGE SCORE (RANGE)	PERCENTAGE WITH ALL 'BASIC' ITEMS
Strategic Planning and Management	X%	X%
	X% to X%	
Human Resources	X%	X%
	X% to X%	
Financial Sustainability	X%	X%
	X% to X%	
Policy and Governance	X%	X%
	X% to X%	
Quality and Pharmacovigilance	X%	X%
	X% to X%	
Forecasting and Supply Planning	X%	X%
	X% to X%	
Waste Management	X%	X%
	X% to X%	

The percentage reported in the last column of results above (Percentage with all 'basic' items) is the number of facilities / entities which scored 100% on the 'Basic' category divided by the number of facilities / entities included in the assessment sample. Note for central warehouse and MoH, there is typically only 1 entity, so the 'Basic' components are either in place ("100%") or not ("0%"). This last column of the table gives a description of the number of facilities / entities that have fulfilled the 'Basic' components but does not give the 'distance' from having all 'Basic' components in place. That is, a facility missing one component is treated the same as a facility missing 5 components, etc.

The intent of these tables is to give a 'snapshot' or brief overview of the overall maturity of the supply chain. They also highlight areas of relative strength or weakness within the different components of the supply chain. The tables themselves do not identify specific weaknesses or actions to be taken. Thus, the individual questions should be assessed to determine areas most commonly missing across facilities. Detailed percentage responses for each question will be calculated automatically in the Capability Maturity Model Survey Analysis Template, and available to the assessment team; but these should not necessarily be reported in reports, presentations, etc., except in as much as they impact the recommendations made.

Finally, a "heat map" may also be generated based on the average maturity scores, by level and by module (Figure 1).

FIGURE 1, HEAT MAP



Without focusing on the numbers, a heat map identifies areas of relative maturity and immaturity. In the example above, dark red indicates lower scores, which is gradually shaded lighter / more (in 10% increments) yellow and then to green and then to darker green as the capability maturity scores increase for a particular module / level. Scores above 80% are shaded in blue because in typical low- and middle-income countries, it may not be expected that the supply chain achieve advanced or state of the art maturity levels. The “heat map” depicted above may also be presented as a color-coded bubble graph, as is presented in the CMM Survey Analysis Template.

RESULTS FOR INDIVIDUAL QUESTIONS

While aggregated results give a snapshot of relative maturity and immaturity, and the consistency of the results within and across levels and modules, aggregated results do not lend themselves well to identifying areas of specific achievements or gaps.

Thus, it is recommended that the results of individual questions / responses be calculated by level. Thus, for each question, a table of the percentages of respondents with the item/process in place, not in place, or ‘I don’t know’ (or other responses, as applicable) should be compiled. However, because there are hundreds of questions, reporting the results for every question in the assessment report is unlikely to be well understood (if even read) by end users of the results of the assessment.

To identify gaps, NSCA 2.0 recommends first looking at questions in the ‘Basic’ category. The first look should be to identify questions where less than 20% of facilities / entities reported having the input/process in place. The 20% threshold may be adjusted upwards or downwards if the results indicate too many (adjust downward) or too few (adjust upward) items identified as ‘gaps’ to formulate concrete / meaningful recommendations for action.

To identify achievements, a similar process should be used, but focusing on identifying questions where more than 80% of facilities / entities reported having the input/process in place (the assessment team can determine whether this should be just in the ‘Basic’ category or for all categories of responses). The 80% threshold may be iteratively adjusted as needed (as described above for ‘gaps’).

To turn the raw quantitative results into specific recommendations, it is suggested that the entire assessment team review the results of this analysis and as a group identify recommendations. This process may include other stakeholders, but it is suggested that the assessment team take the ‘first round’ of review to help interpret and triage the data and recommendations for discussion with a wider pool of stakeholders. In this phase, it is also important to review the results for the ‘Descriptive’ questions and utilize these results to help inform and interpret the results from the portions of the survey that are scored. Not all questions / answers defined by this method need be included in the final report of the assessment (although this is possible), but may focus on specific indications/questions when it is relevant for the gap / achievement / recommendation presented in the report.

ANNEX I: NUMBER OF RESPONSES AND RESPONSE WEIGHTS, BY MODULE AND LEVEL

The tables in this Annex list the number of possible responses and corresponding weight per response for each module in the CMM survey, and by maturity level within each module. A separate table is presented for the CMM survey at each health system level.

TABLE 15. AI.I SDP LEVEL								
MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		STATE OF THE ART (5%)	
	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT
Human Resources	18	2.8%	14	2.1%	7	2.1%	3	1.7%
Financial Sustainability*	7	7.1%	11	2.7%	6	2.5%	4	1.3%
Quality & Pharmacovigilance	4	12.5%	3	10.0%	4	3.8%	1	5.0%
Warehousing and Storage	48	1.0%	29	1.0%	13	1.1%	7	0.7%
LMIS*	15	3.3%	17	1.8%	8	1.9%	4	1.3%
Waste Management	4	12.5%	7	4.3%	5	3.0%	1	5.0%

*The number of questions and the question weighting for these modules is variable because it includes some conditionally scored questions; figures presented here assume all conditions are met and all questions are included.

Note that interpretations of the scoring, and discussions of ‘differences’ in the scores, need to be cognizant of the weights of individual responses. For example, a difference in the Quality and Pharmacovigilance (or Waste Management) score of 12.5% may reflect a difference in only one basic response between the entities being compared (although at this level, likely the number in the sample may mitigate the impact of one question to some degree); a difference in the Quality and Pharmacovigilance score of 10% may reflect a difference in only one intermediate response. On the other hand, a difference in score of 12.5% in the Warehousing and Storage module would require a change in 13 basic responses. Thus, a difference of 12.5% between entities on ‘Warehousing and Storage’ will necessarily reflect more individual item differences (e.g., 13 basic responses) than a difference of 12.5% between entities on ‘quality and pharmacovigilance’ (where there are only 12 responses in total).

TABLE 16. A2.2 REFERRAL HOSPITAL

MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		STATE OF THE ART (5%)	
	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT
Strategic Planning & Management	30	1.7%	18	1.7%	9	1.7%	2	2.5%
Human Resources	21	2.4%	17	1.8%	8	1.9%	3	1.7%
Financial Sustainability*	7	7.1%	11	2.7%	7	2.1%	4	1.3%
Policy & Governance	9	5.6%	1	30.0%	1	15.0%	1	5.0%
Quality & Pharmacovigilance	5	10.0%	8	3.8%	4	3.8%	1	5.0%
Forecasting & Supply Planning	22	2.3%	26	1.2%	12	1.3%	3	1.7%
Procurement & Customs Clearance	20	2.5%	33	0.9%	16	0.9%	4	1.3%
Warehousing and Storage	53.3	0.9%	30	1.0%	13	1.2%	6	0.8%
LMIS*	14	3.6%	18	1.7%	8	1.9%	4	1.3%
Waste Management	4	12.5%	10	3.0%	6	2.5%	2	2.5%

*The number of questions and the question weighting for these modules is variable because it includes some conditionally scored questions; figures presented here assume all conditions are met and all questions are included.

Interpretation of the scores for some modules must be done with care because the number of responses varies across modules and maturity levels; see note under Table A1.1 for more details.

TABLE 17. A2.3 INTERMEDIATE AND CENTRAL WAREHOUSE

MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		STATE OF THE ART (5%)	
	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT
Strategic Planning & Management	36	1.4%	13	1.2%	6	2.5%	1	5.0%
Human Resources	23	2.2%	27	1.1%	10	1.5%	6	0.8%
Financial Sustainability	14	3.6%	11	2.7%	7	2.1%	4	1.3%
Policy & Governance	12	4.2%	4	7.5%	2	7.5%	1	5.0%
Quality & Pharmacovigilance	7	7.1%	9	3.3%	8	1.9%	3	1.7%
Forecasting and Supply Planning	20	2.5%	7	4.3%	14	1.1%	3	1.7%
Procurement & Customs Clearance*	23	2.2%	41	0.7%	18	0.8%	6	0.8%
Warehousing and Storage	74.7	0.7%	37	0.8%	14	1.1%	5	1.0%
Distribution*	21	2.4%	43	0.7%	17	0.9%	7	0.7%
LMIS*	20	2.5%	24	1.3%	14	1.1%	4	1.3%
Waste Management	4	12.5%	10	3.0%	6	2.5%	2	2.5%

*The number of questions and the question weighting for these modules is variable because it includes some conditionally scored questions; figures presented here assume all conditions are met and all questions are included.

Interpretation of the scores for some module must be done with care because the number of responses varies across modules and maturity levels; see note under Table A1.1 for more details.

TABLE 18. A2.4 MOH/CENTRAL

MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		STATE OF THE ART (5%)	
	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT	# RESPONSES	RESPONSE WEIGHT
Strategic Planning & Management	36	1.4%	21	1.4%	10	1.5%	1	5.0%
Human Resources	16	3.1%	24	1.3%	9	1.7%	6	0.8%
Financial Sustainability	7	7.1%	12	2.5%	7	2.1%	4	1.3%
Policy & Governance	19	2.6%	8	3.8%	5	3.0%	1	5.0%
Quality & Pharmacovigilance	11	4.5%	15	2.0%	14	1.1%	3	1.7%
Forecasting and Supply Planning	21	2.4%	27	1.1%	14	1.1%	3	1.7%
Procurement & Customs Clearance*	23	2.2%	44	0.7%	20	0.8%	6	0.8%
Warehousing and Storage	9.3	5.4%	5	6.0%	2	7.5%	1	5.0%
Distribution*	12	4.2%	38	0.8%	13	1.2%	6	0.8%
LMIS*	42	1.2%	22	1.4%	14	1.1%	4	1.3%
Waste Management	10	5.0%	5	6.0%	3	5.0%	2	2.5%

*The number of questions and the question weighting for these modules is variable because it includes some conditionally scored questions; figures presented here assume all conditions are met and all questions are included.

Interpretation of the scores for some module must be done with care because the number of responses varies across modules and maturity levels; see note under Table A1.1 for more details.