

# The Chinese version of monitoring and evaluation system strengthening tool for human immunodeficiency virus (HIV) capacity building: Development and evaluation

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**Summary** Monitoring and evaluation (M&E) for human immunodeficiency virus (HIV) capacity building has become a significant step for HIV prevention and control. The M&E system strengthening tool published by the United Nations Joint Programme on HIV/AIDS (UNAIDS) was intended to be the most authoritative assessment tool internationally. Facing the fact that the M&E system in China did not function at an optimum level, we considered taking the international standards for reference. By linguistic validating and different stages' discussions and revisions, we came up with the Chinese version of the capacity diagnosis tool with at least 12 components and tested its validity and reliability. The tool turned out to have a sufficiently linguistic validation and proved to be a scientific and feasible instrument which was suitable for China's national conditions.

**Keywords:** Monitoring and evaluation, capacity building, reliability and validity, HIV/AIDS, China

## 1. Introduction

The human immunodeficiency virus (HIV) epidemic remains a major public health challenge globally (1,2). Case reporting data show that there were a reported 437,000 people living with HIV and a reported 136,000 deaths at the end of 2013 in China (3). With the rapid scale-up of resources investment, M&E has become a significant step for HIV prevention and control. In China, the government had already developed a national framework and an operational manual in 2007 and 2008 which symbolized that China had entered a new phase with more scientific and standardized management for HIV M&E system (4,5).

However, the following midterm evaluation of the "China Action Plan for HIV Prevention and Control (2006-2010)" showed that the framework did not function at an optimum level (6,7). The barriers have seriously hindered the progress of China's national

HIV M&E system. China has to rearrange the relevant information as a whole and use the international standards for reference.

The "Organizing Framework for a Functional National HIV/AIDS M&E System" was published by UNAIDS in 2008 (8). It described 12 main components of a multi-sectoral HIV M&E system, formed the basis for M&E system assessments, and guided capacity development for M&E systems (9-12). The following "12 Components M&E System Strengthening Tool" provided further clarification about the individual questions in the 12 components (13).

The M&E system strengthening tool consists of 12 components for 3 domains. The first part is composed of 6 components, which are "A multi-sectoral HIV M&E system including organizational structures with HIV M&E functions", "Human capacity for HIV M&E", "Partnerships to plan, coordinate and manage the M&E System", "National, multi-sectoral HIV M&E Plan", "Annual, costed, national HIV M&E work plan", "Communication, advocacy and culture for HIV M&E". It is the outer ring which includes individuals, organizations, functions/actions, and the organizational culture that are fundamental to improve and sustain M&E system performance. The second part is composed of 5 components, which are "Routine HIV

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programme monitoring", "Surveys and surveillance", "National and sub-national HIV databases", "Supportive supervision and data auditing", "HIV evaluation and research agenda". It is the middle ring that focuses on the mechanisms through which data are collected, verified and analyzed. The third part is the component "Data dissemination and use" and it is the center which represents the primary purpose of the M&E system, *i.e.*, using data for decision-making (12).

This tool was the product of a comprehensive review and consolidation of existing assessment tools. It could not only provide a comprehensive assessment of the 12 components of a national HIV M&E system, but also replace the multiple assessment tools with the same intent, thereby reducing redundancy and standardizing the assessment for independent departments (12,14). It had been endorsed by the global M&E Reference Group (MERG) and intended to be the most authoritative assessment tool internationally for HIV M&E system to enhance their performance (14). Until now, no Chinese version has been put forward or tested in the current research.

In order to make an accurate and appropriate assessment of relevant research, an attempt was made in this study to perform a linguistic validation of the tool, to develop the Chinese version of M&E system strengthening tool and to examine the reliability and validity according to China's HIV epidemic situation, prevention and control environment as well as the M&E operating mechanism. We hope to provide measuring tool and theoretical reference for China's national HIV M&E system and to ensure effective and specific strategies for HIV M&E capacity building.

## 2. Materials and Methods

### 2.1. Linguistic validation

A well-established 3-phase linguistic validation procedure was used after obtaining approval for translation from UNAIDS.

*Phase 1:* Two bilingual Chinese translators, both of whom understood the content and purpose of the tool perfectly, collaborated to translate the original UNAIDS version from English into Chinese and avoided errors in the forward translation. An agreement on the forward-translated version of the tool in Chinese was reached during a committee between the two translators and another bilingual Chinese who had prior experience of linguistic and health policy (15).

*Phase 2:* Followed the suggestions of Diane *et al.* (16,17), this first translation was sent separately to two bilingual native-English-speaking translators who were specialists in health policy and had not seen the original tool. Once the two back-translations were completed, another meeting was held with the same committee members to discuss the discrepancies among the

forward-translated version (Chinese), the back-translated version (English) and the original UNAIDS version.

*Phase 3:* We invited 5 experts to comment on the questionnaire items and instructions. Revisions were made accordingly to ensure the translation did not differ conceptually from the original UNAIDS version.

After the 3-phase linguistic validation procedure, we obtained the first version of the tool.

The research group, at the same time, determined 12 agencies/departments for our study at different levels preliminarily. Specifically, there were HIV working committee office, member units, Centers for Disease Control (CDC) and social organizations at the provincial level, HIV working committee office, CDC, medical institutions, social organizations at the municipal level, HIV working committee office, CDC, community health service institutions and social organizations at the district level.

### 2.2. Focus group interviews

The interviews were divided into 3 rounds with 15 experts in each group and facilitated by the principal researcher in our study group who had rich host experience and had participated in group interviews before. During the interviews, experts discussed the objects, the components and the questionnaires according to their working experience. These 45 experts, chosen from national, provincial, municipal and district levels, were specialists on HIV prevention and treatment system in theory and practice, which guaranteed the credibility and objectivity of the research. We got the second version of the tool after further adjustments and revisions with the experts.

### 2.3. Pilot study

To identify potentially misleading words or questions and to verify that the tool would be perfectly understood, a pilot study was conducted using the second version of the tool. We chose Fuyang city in Anhui province conveniently because the AIDS epidemic of the city is relatively serious throughout the province (18) and their AIDS prevention and treatment agencies kept good relationships with our research group. We selected 2 key informants respectively in HIV working committee office, CDC, social organizations and 4 key informants in the member units. During the implementation of this pilot study, any possible doubts were answered and recorded. Then we had further modification about the questionnaire and obtained the final version of the tool.

### 2.4. Field trial study

We numbered all the 31 provinces of mainland China and randomly selected one province in the lower-level epidemics and one province in the higher-level epidemics

according to the lower and higher level epidemics distribution in China (19,20). Then we numbered all the cities in the two provinces and randomly selected one city in each province. After that, we selected one district in each city randomly based on the same method (21,22). After rigorous sample selection, we chose Anhui and Hunan province, and selected Hefei city and its Luyang district, Hengyang city and its Zhuhui district as our study sites. On the principle of convenience sampling, we then selected 2 key informants in HIV working committee office, CDC, social organizations and 4 key informants in the member units at each level. From December 2012 to February 2013, we sent questionnaires to all the 72 participants and 70 questionnaires were collected. 66 of them were valid questionnaires and the effective recovery rate was 91.7%. There were several invalid questionnaires because of incomplete filling or option leakage.

### 2.5. Analysis

All data were input using the EpiData (version 3.0) with double entry verification and statistical analyses were performed through the SPSS statistical package (Windows version 11.5, SPSS Inc., Chicago, Illinois, USA). Construct validity was established by principal component analysis with a varimax orthogonal rotation. Beforehand, Kaiser-Meyer-Olkin (KMO) and Bartlett tests were performed as measures of sampling adequacy. Criteria used to determine the components were

minimum eigenvalues > 1.00 or cumulative variance > 70% (23). Internal reliability was calculated through examination of Cronbach's Alpha. Reliability would be considered good if Cronbach's Alpha ranged between 0.7 and 0.9 (24,25).

## 3. Results

### 3.1. Development of the final Chinese version of the tool

After different stages' discussions and revisions, we came up with the final Chinese version of the tool. Table 1 showed revisions in different versions and the process of changing we have been through. During the linguistic validation, 12 components with 127 questions for 12 different agencies/departments formed the first version of the tool. After the focus group interviews, we deleted medical institutions and community health service institutions and added member units at municipal and district levels as our assessment. We also cut several components and questions for some agencies/departments and got the second version comprised of 12 components with 97 questions for 12 different agencies/departments. The following pilot study gave us a further modification about the questionnaires. We deleted 4 questions that were repetitive or expressed the same meaning and deleted the "Not at all" option in 5-point scale and "Not Applicable" option in 3-point scale. After revisions about the answering formats, we developed the final Chinese version of the tool.

**Table 1. Revisions in different versions of the tool**

Revisions	The Original Version	The First Version	The Second Version	The Final Version
Assessment Agency				
National Level	National AIDS coordinating authority; Ministry of health AIDS control programme, etc.	/	/	/
Sub-National Level	Local government authority/ AIDS coordinating authorities; Health facilities; Other implement of HIV services	Provincial level: HIV working committee office, CDC, member units and social organizations; Municipal level: HIV working committee office, CDC, medical institutions, social organizations; District level: HIV working committee office, CDC, community health service institutions, social organizations	HIV working committee office, CDC, member units and social organizations at provincial level, municipal level and district level separately.	HIV working committee office, CDC, member units and social organizations at provincial level, municipal level and district level separately.
Components	12 for all the agencies	12 for all the agencies	12, but different agencies contained different components	12, but different agencies contained different components
Numbers of Questions	127	127	97	93
Response Formats	A 5-point scale; A 3-point scale; Numerical responses	A 5-point scale; A 3-point scale; Numerical responses	A 5-point scale; A 3-point scale; Numerical responses	A 4-point scale; A 2-point scale; Numerical responses

**Table 2. Components and contents in the final Chinese version of the tool**

No.	Component	Content
1	A multi-sectoral HIV M&E system including organizational structures with HIV M&E functions	There is an M&E unit/professional within the entity. The number of full-time and part-time M&E posts, <i>etc.</i>
2	Human capacity for HIV M&E	There are written plans to support capacity building. M&E capacity is being built through on-the-job training and routine examination, <i>etc.</i>
3	Partnerships to plan, coordinate and manage the M&E system	There are clearly responsibility descriptions for M&E technical working group. Multi-sectors are well coordinated with M&E institutions/departments, <i>etc.</i>
4	National, multi-sectoral HIV M&E plan	There are entity-specific and timely-update M&E framework and plans. The feasibility of the M&E plans has been well tested, <i>etc.</i>
5	Annual, costed, national HIV M&E work plan	There are annual working plans and cost budgeting for M&E programmes. There are clearly time schedules for planning implementation, <i>etc.</i>
6	Communication, advocacy and culture for HIV M&E	There are advocacy activities to support M&E within the agency/organization, <i>etc.</i>
7	Routine HIV programme monitoring	Guidelines and related databases are well performed for M&E. Mechanisms/ procedures are in place to provide data reports and systematic feedback, <i>etc.</i>
8	Surveys and surveillance	There are survey and surveillance conducted for M&E, <i>etc.</i>
9	National and sub-national HIV databases	There is a functional integrated database for data capturing and storing. IT equipment, supplies and human resources are available for maintaining the database, <i>etc.</i>
10	Supportive supervision and data auditing	There are guidelines, tools and plans for supportive supervision. Supportive supervision results have been recorded and feedback are provided to supervises, <i>etc.</i>
11	HIV evaluation and research agenda	There are demand survey, program planning, financial planning for HIV evaluation. There are joint HIV program reviews during annual reporting, <i>etc.</i>
12	Data dissemination and use	HIV stakeholder information needs have been assessed. There are guidelines to support the analysis, presentation and use of data, <i>etc.</i>

In the final version, the assessment agencies were HIV working committee office, CDC, member units and social organizations at the provincial, municipal and district levels. The assessment participants were key informants in the HIV prevention and treatment system. The response formats were 4-point scale, 2-point scale and numerical responses. There were 12 components with at least 93 questions and the specific component and its contents were shown in Table 2.

In the meantime, different agencies/departments involved with different numbers of components and questions were shown in Table 3. For example, all the 12 components were contained for HIV working committee office at provincial level. Social organizations and member units at district level, however, deleted component 3, 4, 6, 7, 10, 11 and contained only 6 components.

### 3.2. Field trial results

#### 3.2.1. Sample description

66 respondents' age mainly ranged from 30 to 50 years old, and most of them had bachelor degree (Table 4). Participants distributed averagely at the provincial, municipal and district levels. Most participants' technical post levels were middle-level or advanced-level. Besides,

the number of part-time professionals was more than the full-time ones. A full description summary of the respondents was provided in Table 4.

#### 3.2.2. Internal reliability

Examination of internal reliability results revealed a Cronbach Alpha reliability coefficient of 0.826 and the results of each component at provincial, municipal and district level varied from 0.631 to 0.924.

#### 3.2.3. Construct validity

In this study, the KMO value of the variables was 0.918, which was much higher than the acceptable threshold of 0.5 (26). The Bartlett's test of sphericity result was high enough ( $\chi^2 = 19714.718$ ) with significance  $p < 0.01$  (27-29). The results confirmed that the data were acceptable for factor analysis. Then we used the criteria of cumulative variance  $> 70\%$  and 3 common factors were extracted by principal component analysis, explaining 71.808% of the total variance. Rotated component matrix was revealed in Table 5. Specifically, factor 1 comprised components 1, 2, 3, 5, 6, 10 and could be defined as the layer of basic conditions. Factor 2 comprised components 4, 7, 8, 9 and could be defined as the layer of basic function. Factor 3 comprised components 11, 12

**Table 3. Numbers of components and questions in different agencies/departments**

Assessment Agency	Numbers of Components Involved	Deleted Components' No.	Numbers of Questions
<b>Provincial Level</b>			
HIV working committee office	12	/	93
CDC	10	3, 4	77
Member units and social organizations	7	3, 4, 6, 7, 10	49
<b>Municipal Level</b>			
HIV working committee office	10	3, 10	75
CDC	9	3, 4, 10	67
Member units and social organizations	7	3, 4, 6, 7, 10	49
<b>District Level</b>			
HIV working committee office	9	3, 10, 11	66
CDC	8	3, 4, 10, 11	58
Member units and social organizations	6	3, 4, 6, 7, 10, 11	42

**Table 4. Characteristics of the study participants (n = 66)**

Variables	No. (%)	Variables	No. (%)
<b>Age Group</b>		<b>Agency</b>	
20-29 years	2 (0.030)	HIV working committee office	11 (0.167)
30-39 years	<b>24 (0.364)</b>	CDC	12 (0.182)
40-49 years	<b>24 (0.364)</b>	Member units	22 (0.333)
≥ 50 years	16 (0.242)	Social organizations	21 (0.318)
<b>Education Level</b>		<b>Technical Post</b>	
High school or under	4 (0.061)	Advanced	<b>16 (0.242)</b>
Junior college	8 (0.121)	Middle	<b>16 (0.242)</b>
Undergraduates	<b>42 (0.636)</b>	Primary	6 (0.091)
Graduates or above	12 (0.182)	Others	28 (0.424)
<b>Agency Level</b>		<b>Nature of Work</b>	
Provincial	22 (0.333)	Full-time	24 (0.364)
Municipal	24 (0.364)	Part-time	<b>42 (0.636)</b>
District	20 (0.303)		

**Table 5. Rotated component matrix**

No.	Items	Component		
		1	2	3
1	A multi-sectoral HIV M&E system including organizational structures with HIV M&E functions	<b>0.798</b>	0.059	0.056
2	Human capacity for HIV M&E	<b>0.689</b>	0.251	0.132
3	Partnerships to plan, coordinate and manage the M&E system	<b>0.735</b>	0.392	0.274
4	National, multi-sectoral HIV M&E plan	0.033	<b>0.807</b>	0.348
5	Annual, costed, national HIV M&E work plan	<b>0.772</b>	0.095	0.249
6	Communication, advocacy and culture for HIV M&E	<b>0.788</b>	0.218	0.102
7	Routine HIV programme monitoring	0.315	<b>0.756</b>	0.102
8	Surveys and surveillance	0.082	<b>0.605</b>	0.042
9	National and sub-national HIV databases	0.339	<b>0.603</b>	0.189
10	Supportive supervision and data auditing	<b>0.818</b>	0.313	0.328
11	HIV evaluation and research agenda	0.155	0.318	<b>0.511</b>
12	Data dissemination and use	0.228	0.135	<b>0.609</b>

and could be defined as the layer of core purpose.

#### 4. Discussion

Although it was the first attempt to translate the M&E system strengthening tool invented by UNAIDS into Chinese and to use it to gather data from M&E

professionals in China, it showed great scientificity during the process of its development.

During the linguistic validation, we chose the provincial, municipal and district levels as our study sites rather than the national level because the Chinese version of the tool was special for sub-national evaluation in China. And the assessment agencies/departments we

chose were the current key positions for AIDS prevention and control system in China. Specifically, HIV working committee office was the chief mechanism for each site's coordination while member units helped build the multi-sectoral HIV M&E system. CDC provided business and technical guidance for different departments, and social organizations gave assistance for resources integration. Besides, medical institutions and community health service institutions were the specific service providers.

In order to make sure the tool was more suitable for the national conditions and specific HIV situation, we conducted focus group interviews. In this stage, experts helped us get a deeper and better understanding of HIV M&E system.

Firstly, we deleted medical institutions and community health service institutions because they were not familiar with M&E system and only responsible for antiviral therapy for AIDS patients. We also added member units at municipal and district levels at the same time because they could also provide sectoral assistance for M&E.

Secondly, unlike the UNAIDS version choosing all the components for all the agencies/departments, we selected the components and questions that were suitable for each agency/department and deleted the immeasurable ones because some agencies/departments did not contain all human and technical resources. For example, we deleted component 3 and 10 at both municipal and district levels because they were only responsible for data submitting and knowledge publicity and did not contain enough human and technical resources for the AIDS prevention and control system.

Thirdly, the number of questions was far less than the original UNAIDS version. On the one hand, we deleted some questions that were only suitable for national conditions because the original version partly developed for national level's evaluation. For example, one question in component 3 is "International development partners actively participate in the National M&E Committee coordinated by National AIDS Coordinating Authority (NACA)", which was not applicable at the provincial, municipal and district levels we assessed. On the other hand, we deleted some questions that were not fit for China's specific situation. For example, one question in component 2 is "M&E human capacity relative to the M&E system is being built through colleges, universities or technical schools". There were no majors or related courses specialized for students or colleges currently and we offered on-the-job training for capacity building in China.

In the stage of pilot study, we deleted 4 questions that were repetitive or expressed the same meaning to make the tool more readable and deleted the "Not at all" option in 5-point scale and "Not Applicable" option in 3-point scale because we found that all the questions could get corresponding answers during pilot study stage.

In the field trial study stage, we tested the validity

and reliability to find out whether these adjustments above were reasonable for the tool. All the Cronbach's Alpha reliability coefficients met the requirements of surveying and demonstrated good internal reliability of the questionnaire (30). Construct validity results also illustrated balance of resolution for each common factor. The three layers we defined were close to the UNAIDS version's expression. Specifically, the layer of basic conditions was corresponding to the outer ring which provided fundamental to improve and sustain M&E system performance, while the layer of basic function was corresponding to middle ring which guaranteed data collecting and analyzing. And the layer of core purpose was corresponding to the center domain which represented the purpose of the M&E system (8,12).

This study has some limitations that should be mentioned. Firstly, the sample size was not large enough owing to limitations of time and funds which would seriously affect the stability and reliability of the results to some extent. Secondly, during the field trial study, we selected only 12 agencies/departments which might also limit the representation of the samples. We need larger sample size and better revisions about the tool considering the changes of the AIDS epidemic trends and practical application situations in the following researches.

In summary, this study was the first attempt to translate and develop the national HIV M&E capacity diagnosis tool in China. After multi-stage's discussion and modification, we selected some key components and questions to monitor and evaluate different agencies/departments. Based on our findings, it reflected great scientificity and feasibility during the process of its development and was found to be a reliable and valid tool. However, HIV M&E turned out to be a systematic project and the development of the diagnose tool was just a basic step. We should therefore consider the assessment time, the assessment subject, the operating methods as well as the data analysis and feedback as a whole in the follow-up studies to ensure effective and specific guidance for HIV M&E capacity building in China.

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