



Stanley Thomas Johnson Foundation

DIGITAL SYSTEM FOR BETTER MANAGEMENT OF REFUGEE HEALTH CARE (SYSREF)

Summary of the results of the user satisfaction
study



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I. SysRef in short

The “Digital System for Better Management of Refugee Health Care” (SysRef) project aimed to improve the quality of health care for refugees and displaced people in Chad living in refugee camps.

The digital solution that was implemented within the framework of SysRef consists of four elements. The most important is the digital clinical decision support tool (CDSS) which is based on symptoms derived algorithms to provide clinical and therapeutic advice to health professionals (nurses, midwives and doctors). Other tools include electronic registries of pre- and postnatal consultations (PPC) integrating a CDSS covering certain frequent complications during and after pregnancy, an electronic vaccination registry for women and children and an epidemiological database (DHIS2 dashboard) which makes it possible to monitor trends in infections with epidemic potential and notifiable diseases as well as key project indicators.

The project included 4 implementation stages spread over four and a half years from January 2019 to June 2023. The stages were partially superimposed in a circular process of development, evaluation, adaptation and redeployment. This process with the different stages and their specific activities are described in Figure1 which constituted the conceptual framework of the project. The project was implemented by the Swiss Tropical and Public Health Institute (Swiss TPH) in partnership with the Centre de Support en Santé Internationale (CSSI), the Ministry of Public Health and Prevention (MPHP) and the United Nations Refugee Agency (UNHCR).

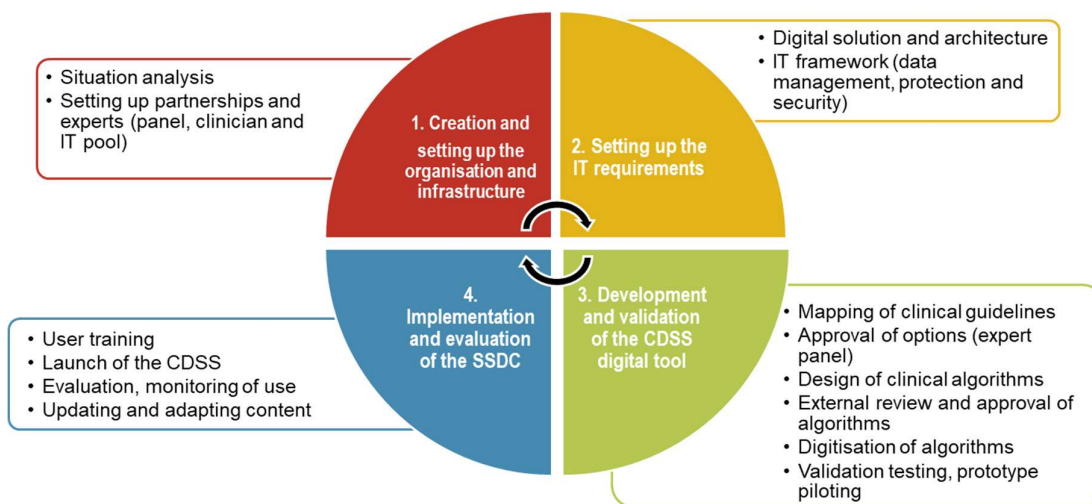


Figure1: Conceptual framework of the development stages and implementation of the CDSS

The digital system was tested and implemented in three health centers (HC) in the Goré district, southern Chad, situated on the border with the Central African Republic. The three HC are supported by the UNHCR and serve a refugee population. SysRef was therefore a pilot project in a humanitarian context. The implementation of the CDSS was structured into 4 digital tools and 3 algorithm packages constituting the CDSS itself (Table 1). The packages were made available gradually during the implementation of the project according to their respective design and validation duration.

Table 1: Overview of the digital solution integrating the 4 tools: Digital clinical decision support tool (CDSS), electronic vaccination registers (eVaccination registry), pre- and postnatal consultation (PPC) and DHIS2.

TARGET POPULATION	TOOL	MODULE (package)	PHASE	OUTPUT
Children 2m-5a	CLINICAL DECISION SUPPORT SYSTEM	Integrated management of childhood illnesses	●	JUNE 21 MAY 22
Adolescents and adults		Integrated management of adolescent and adult illness (including mental health)	●	
Pregnant women		Management of pre- and post-natal complications	●	JULY 22
Pregnant women	ELECTRO- NICAL REGISTER	Pre- and postnatal consultations Vaccination	●	JULY 22 JUNE 22
Children 0-11m		Vaccination	●	JUNE 22
Data generated	DHIS2	Epidemiological (surveillance) database	●	JULY 21

● Use ● Validation

II. Objectives of the user satisfaction study

The development and implementation of the digital tool was part of an iterative participatory process. User feedback was collected through regular supervisory visits to HCs by the local team. In addition to this, a specific user satisfaction study was conducted during the implementation process. The study focused on the expectations and benefits identified by users and their satisfaction with the CDSS tool.

The results of the study were used to feed the project success indicators and to contribute to the improvement of the tool through recommendations from users. On a larger scale, the study aimed to contribute to the evidence base to inform investments in CDSS with the aim to strengthen primary care, particularly in developing countries.

The specific objectives of the study were to:

- Identify the applicability in terms of obstacles, difficulties and added values of using the CDSS tool.
- Determine adoption and sustainability of CDSS use.
- Collect suggestions directly from users to improve the CDSS tool.
- Compare the results of the two surveys and evaluate the improvement in satisfaction.

III. Methodological approach

For the study design, we followed the example of a similar study published by Muhindo et al.(2021), which assesses five elements of successful CDSS implementation including adaptation, adoption, feasibility, acceptability and sustainability (Table 1).

We planned two in-depth surveys to measure user satisfaction over time. With the two-phase study design, we left room for co-design. Based on the user feedback, we were able to make changes to the tool and consequently increase its adoption and usage over time.

The mixed approach relies on the collection of data by means of an individual semi-quantitative questionnaire, mainly based on the evaluation of the elements described above

on a Likert scale (Robinson, 2014). This questionnaire is supplemented by qualitative data collected through focus group discussion (FGD).

Table 1: Operational definition of satisfaction variables

Variables	Operational definitions
Satisfaction	Fulfillment of user demands, expectations or needs
Adoption	Measuring initial usage rate or intention to use
Adaptation	Adaptation to context (workflow, health system, health issues, etc.)
Sustainability	The extent to which use of the CDSS is maintained throughout the study period, frequency of technical problems, technical monitoring, willingness to integrate the tool into routine service in the long term
Acceptability	Measuring end-user satisfaction with the different components of the CDSS (content, complexity, navigation, ease of use and general experience)
Feasibility	Actual usefulness of the CDSS (materials needed to follow CDSS guidelines, time to use the CDSS, technical knowledge of health staff needed, support from colleagues, supervisors and administration)

IV. Study participants

We collected information from all end-users of the CDSS tool who are state-certified nurses, technical health agents, state-certified midwives and attending physicians in the three HC of the SysRef project. In addition, we collected information from a number of healthcare workers who do not directly use the CDSS for care, but who work in these HCs or assist end-users and who are therefore potentially affected by the implementation of the new tool. These so-called indirect users include community health workers, healthcare assistants and pharmacists at HC level. A subgroup of indirect users were asked to complete a self-administered questionnaire, but were not targeted for FGDs. These are members of the HC coordination, including the chief district medical officer and other relevant supervisory authorities (e.g. CSSI, UNHCR).

V. Study planning and implementation

The first survey (S1) was conducted in January 2022, 6 months after the implementation of the first CDSS package which includes childhood illnesses for the age group 2 months to 5 years. The second survey (S2) was conducted in October 2022, 16 months after the introduction of the first package and 3 months after the introduction of the electronic registry for vaccinations of children and pregnant women and the PPC electronic registry. Consequently, the first survey only concerned satisfaction with the pediatric package, while the second survey also included data on satisfaction with the electronic registries that were added.

Interviews and FGD were carried out by four investigators recruited, trained and closely supervised by the local team and the study coordinator. Each survey lasted 3 weeks. Interviews were conducted in the first week, followed by FGDs in the second week and transcription of the discussions in the third week. For the FGDs, the participants were grouped by user category, by HC and if the number of participants permitted it, a distribution by gender was made. Managers of the three health centers and supervisors participated in a

separate FGD. Data analysis was carried out by the study coordinator using Stata IC16 for quantitative data and MaxQDA for qualitative data. The analysis of the responses with the Likert scale was based on a score ranging from +2 to -2. Zero points were awarded for a “don’t know/no opinion” response. This analysis covers 4 of the 5 satisfaction sections. The adoption of digital tools by staff was assessed by qualitative data including the self-reported frequency of use.



Figure 3: The focus group with women direct users of the Beureuh health center.

VI. Results

General information about participants

The respondent target was reached for both surveys at the HC level. Only the target group of indirect users at coordination level did not reach the desired number of respondents. Table 2 below gives the overall view of respondents by survey, user category and HC. Table 3 shows the number of FGDs per HC and survey and the respective number of participants.

Table 2: Summary of participants by user category, health center and survey

		Beureuh	Doholo	Dosseye	Total
Survey 1	End-users	16 (40%)	10 (25%)	14 (35%)	40
	Indirect users	3 (16%)	8 (42%)	8 (42%)	19
	Coordination	N / A			3
Survey 2	End-users	14 (40%)	6 (17%)	15 (43%)	35
	Indirect users	5 (33%)	5 (33%)	5 (33%)	15
	Coordination	N / A			2

Table 3: Distribution of focus group discussions by health center with the characteristics and number of participants per group.

Health centers	FGD description	No. S1 participants	No. S2 participants
All	HC managers and supervisors, mixed gender	5	5
Beureuh	Male end-users	2	4
	Female end-users	7	9
	Indirect users, mixed gender	8	5
Doholo	Male end-users	4	3
	Female end-users	5	0*
	Indirect users, mixed gender	4	3
Dosseye	Male end-users	3	4
	Female end-users	7	4
	Indirect users, mixed gender	10	4
Total	All groups	55	41

*The two women end-users of Doholo are included in the FGD of women end-users from Dosseye

The gender distribution among end-users was balanced with 52.5% of respondents being male and 47.5% female. As for indirect users, there were significantly more men (66%) compared to women (34%) among the respondents. The average age of respondents was 37 for end-users and 41 for indirect users. The average years of experience was comparable among the two categories and was around 9 years. Regarding the general perception and experience of new technologies assessed through the interview, we find that the use of devices such as Android phones and internet access was lower in the group of indirect users at HC level. This is likely due to their lower socio-economic status which makes it more difficult to purchase such devices or access the internet. Acceptance and positive perception of new technologies in general were high across all groups, particularly regarding easier communication and improved access to information. Among the end-users all but two participants (5%) in survey one and six (17%) in survey two were able to benefit from at least one of the three training courses organized by SysRef during the project. The increase in the percentage of participants without training can be explained by an exceptional turnover of HC staff between the two surveys. Indirect users were brought together for a briefing before the introduction of a new module.

Quantitative results

Overall satisfaction with the CDSS tool was good across all user categories, as shown in Figure 1. In-depth analysis of the Likert scale responses shows the differences between 4 of the 5 satisfaction sections (Figure). Generally speaking, we see that adapting the tool to the context was considered more difficult among end-users compared to indirect users. On the other hand, acceptability is slightly lower among the latter. Sustainability received the highest score among all variables followed by feasibility.

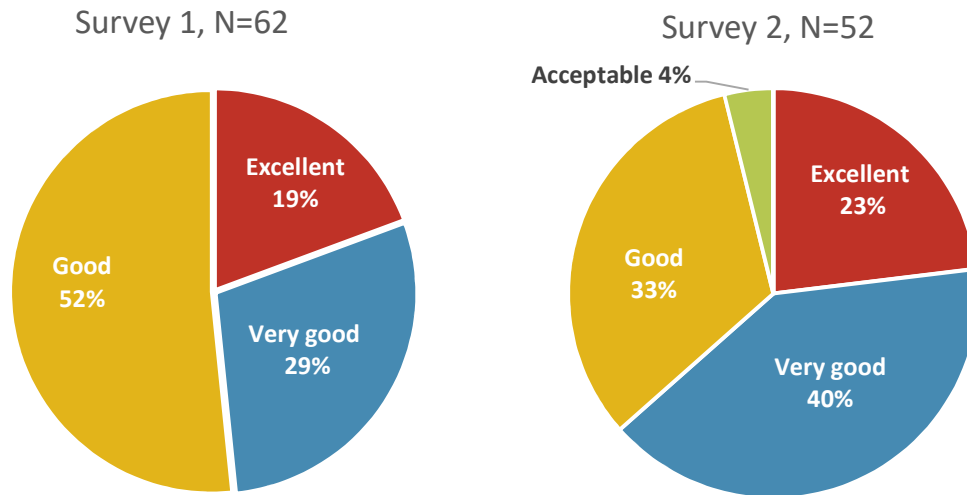


Figure 2: Pie chart of overall satisfaction with the CDSS tool 6 months (survey 1) and 16 months (survey 2) after implementation. None of the participants chose the answer “poor” or “no opinion”.

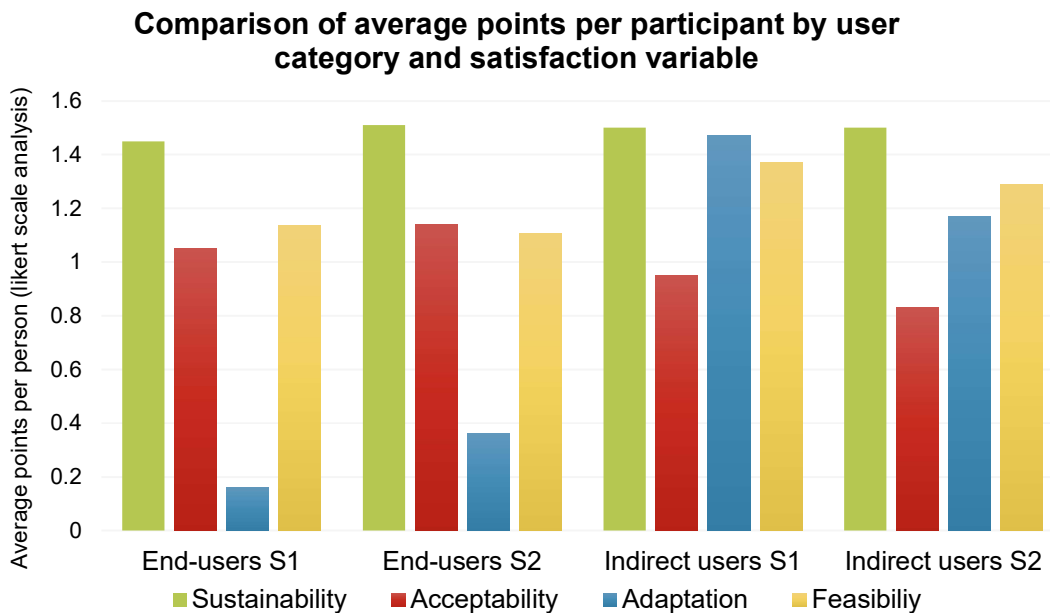


Figure 3: Comparison of the average points by satisfaction variable between the two surveys and by user group (S1=first survey, S2=second survey)

Regarding adoption, only seven end-users (17.5%) responded that they use the CDSS for almost all consultations in S1. In S2, 28 end-users (80%) said they use the CDSS for almost all consultations. However, the effective monthly proportion of consultations made with the CDSS recorded between July 2021 and April 2023 do not show a clear trend of increase or decrease in use over time. The qualitative data for this satisfaction variable presented below even indicate a decrease in the use of the tool for curative consultations during the project due to lack of staff.

Qualitative results

Adaptation of the tool was the satisfaction element on which the project team had the most influence through design, preparation and monitoring. Overall, the efforts prior to the implementation of the CDSS such as the preparatory visits to the HCs before the introduction of the tool and the training are well appreciated. The monitoring by the local team and help in case of problems were also rated positively by users. In the second survey the majority of participants felt that most of their recommendations made during the first survey had been taken into account. The fragile context of insecurity and poverty in which the project area is located constitutes a challenge for adaptation.

*"It is as if SysRef is replacing the air that blows here, every time they're around."
Vaccination agent, Dosseye, S2*

*"Sometimes there is a shortage in our pharmacies, each time the CDSS recommends to reference, but references are expensive."
Nurse, Doholo, S1*

The main difficulties encountered were the lack of certain medico-technical tools to carry out the clinical examinations suggested by the CDSS and the shortage of rapid diagnostic tests and medications recommended by the CDSS. This led to an increase in the number of referrals to the district hospital. Since these references are expensive, there is an annual quota that should not be exceeded.

Users would like the advice provided by the tool to be more detailed for certain cases to support care at the HC level. The problem of lack of medicines is partially solved by offering different alternative products. However, the increase in attendance at HCs during the project aggravated the situation of drug stock shortages.

The most relevant remark on the adaptation was linked to the lack of compatibility between the CDSS and the ordinary registry of the HC in terms of the age ranges of the children (2 months to 5 years for the CDSS and 0 to 5 years for the ordinary registry). This caused problems for reporting indicators.

Acceptability of the tool was very good and increases during the project. Among the most motivating factors for using the tool are easier consultation and increased respect for good medical practices. Users also appreciate the better patient monitoring and data backup. The good acceptance of patients was palpable through the anecdotes shared by caregivers during the FGDs.

*"The mothers are very happy. They say that their child's illness appeared in the device and they are reassured by the treatment. »
Midwife, Doholo, S1*

Confidence in the advice of the CDSS is very high among consultants but also among patients and carers. Many users also said that using the CDSS allowed them to increase clinical knowledge. Through better adequacy of advice and prescriptions from health workers and better adherence of clients to treatment, the tool increases access to care and improves the relationship between patients and nurses. A negative aspect reported is the double effort required for documentation, which increases the time per consultation. This especially applies in the event of a lack of staff and high attendance at the centers.

*"It helps us to have a treatment consistent with the age of the child or patient in front of us"
Technical health agent, Doholo, S1*

Adoption is directly linked to acceptability. The motivation to try the tool was good. After a period of familiarization on the part of nurses but also the community, the frequency of use of the CDSS has gained momentum. The good acceptance of the tool by the community increased the attendance of HCs, but at the same time the staff of the centers were reduced during the project due to lack of funding. According to feedback from end-users this decreased the frequency of use of the CDSS between the first and second survey due to lack of capacity.

“There is not one person who does not want this tool, in fact everyone likes working with the CDSS» Technical health agent, Dosseye, S1

Despite the good confidence in the tool, users are also well aware that the CDSS does not yet include all pathologies and it is therefore always necessary to think beyond the proposed diagnoses.

Strong indications of change in practice are initiated by the use of the CDSS, for example concerning the structuring of the consultation, prescriptions, compliance with vaccination schedules and the best triage when registering a patient. With experience, these good practices are also applied in cases where the CDSS is not used.

“Attendance at the health centers using the CDSS increases. For example, people leave TIMBERI to come here, (...) everyone wants to be consulted with the help of the CDSS » Nurse; Dosseye, S2

Feasibility is influenced positively by acceptance, but negatively by factors linked to the scarcity of resources both at the level of health services and in the population. A specific challenge for feasibility is the regular and sufficient supply of electricity to charge the tablets. This was anticipated by the project by the provision of solar panels and power banks. During the first survey users deplored a lack of availability of tablets which was resolved by increasing the number of devices and improving the availability of energy to charge the batteries.

Feasibility is also influenced by the level of clinical competence of the healthcare staff which must be reinforced through training before using the tools and through good monitoring during implementation. High mobility of health personnel also poses a challenge to feasibility and poses a demand for additional training throughout implementation. The importance of community awareness for successful implementation is highlighted by many users. This awareness raising is a considerable burden which is added to the other tasks of the HC staff and which takes enough time to bear fruit. One of the users' recommendations was better support for this activity, particularly in terms of project visibility such as vests, T-shirts or caps.

“We prepare the minds of patients such as when a patient arrives and you handle the CDSS he understands. On the other side if he does not understand its necessity, he will feel abandoned.» Supervisory nurse, S2

“Parents say they don't have the money. For example, honey and lemon juice all that. They say: “where can we find the money to pay?”» Midwife, Dosseye, S1

The good score of the **sustainability** element in the quantitative part is reflected by the results of the qualitative part. Support from colleagues and superiors for using the tool was reported to be very positive. This is particularly evident in the evidence of peer learning found in FGDs. A good sign for sustainability is also the good acceptance by patients and caregivers, which is particularly evident in the fact that they are disappointed when the CDSS is not used for their child's consultation. However, one of the biggest problems observed

is the lack of medicines in HC pharmacies coupled with parents' lack of means to purchase these products elsewhere.

A positive factor for continued use is the fact that the extension of the project to other HCs or even the entire country is strongly desired by the participants in our study. The reasons given are the positive impact on the quality of care, the sharing of data between the different HCs and the continued use of the tool in the event of assignment to another HC.

During the second survey, users shared recommendations for this implementation in other HCs. Among these are the involvement of the management committees of the HCs, the designation and training of a focal person and the identification of a dedicated room to protect the technical equipment.

"How come things like this will stop at our level here? It has to be on a national level. » Nurse, Dosseye, S1

VII. Conclusions

Our study highlights the importance of training, supervision and awareness raising before and after the introduction of a CDSS tool. These activities require a long-term commitment to lead to lasting appropriation of the new tool in routine services. The SysRef team made enormous efforts to consider these factors during the project. Furthermore, during the development and validation of the tool, particular attention was paid to adaptation to the local context. Co-creation continued throughout the project. Together with the right preparation, this was probably one of the success factors that led to the high acceptance of the tool.

According to HC staff, acceptance is also good among patients, who are the final beneficiaries of such a tool. It is particularly positive that the CDSS has the potential to improve health worker knowledge and patient compliance. These two effects in turn lead to better confidence among nurses and patients, better quality of service and finally better health coverage.

The continuation and expansion of use is a strong wish of all study participants. To achieve this, sustained commitment from local decision-makers, national government and external donors is essential.

"When we consult a patient and we find a good diagnosis with a good treatment it means that it meets their needs and if it meets their needs that means it is really top notch. » Nurse, Dosseye, S1

VIII. Literature

Muhindo, M., Bress, J., Kalanda, R., Armas, J., Danziger, E., Kanya, MR, Butler, LM, Ruel, T., 2021. Implementation of a Newborn Clinical Decision Support Software (NoviGuide) in a Rural District Hospital in Eastern Uganda: Feasibility and Acceptability Study. JMIR mHealth and uHealth 9, e23737.

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