Argus evaluation kit

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1. Introduction

1.1 Purpose of the document

Before implementing Argus in the whole country to assist with public health surveillance, it is strongly recommended that a pilot phase be conducted in a restricted area to evaluate the relevance and performance of Argus in the context of the country. The following criteria may guide the choice of districts or areas to be included in the pilot phase:

- low completeness and timeliness in previous reporting;
- high number of cases of priority public health events in the previous years.

All healthcare facilities in selected districts or areas should be included in the pilot phase. The pilot phase should last sufficiently long enough to provide sound results for completeness and timeliness of data reporting and to detect possible challenges to the project scale-up. A six-month period is considered an appropriate timeframe for running the pilot phase, but each country should decide what is most suitable for the local context.

This document provides an evaluation protocol and tools (in annex) to be used to assess the functioning and usefulness of the Argus solution for public health surveillance in a country.

1.2 Argus solution for public health surveillance

The World Health Organization (WHO) has developed Argus an open source IT tool to support public health surveillance for early detection and response. It uses Short Message Service (SMS) technology for the transmission of information between the local healthcare facilities and all levels of the public health surveillance system via a mobile application (Figure 1). A web platform complements the application for data management and analysis (Figure 2).

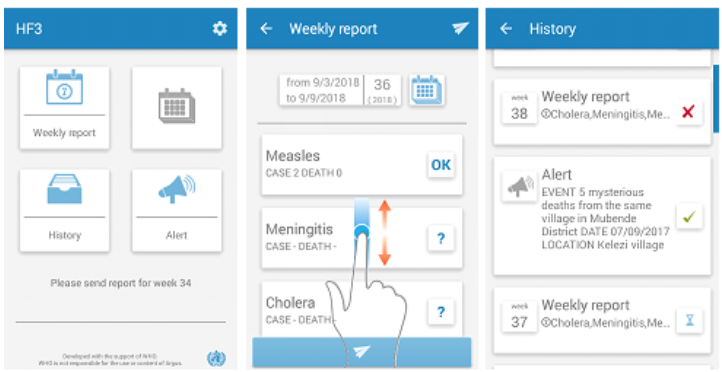

Figure 1. Argus Android Client for mobile phones

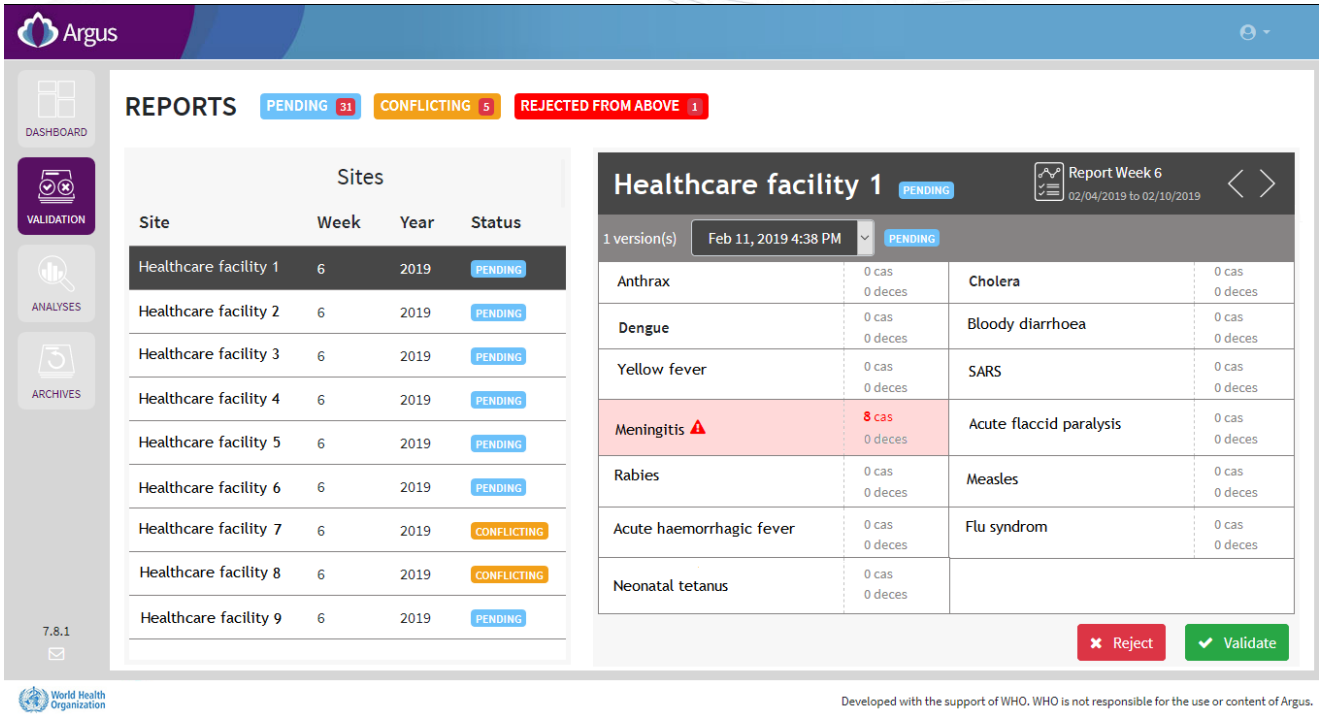

Figure 2. Argus web platform

Argus improves routine reporting quality and speed by reducing dependency on paper forms. It allows administrators to easily set up the public health events to be under surveillance, the variables to be collected, and the different levels of the public health surveillance system in charge of data validation and data analysis.

Argus is mainly designed to manage aggregated weekly reports of priority public health events. It also manages aggregated monthly reports of public health events, and alerts of unexpected public health events.

In practice, a central server located in the country collects the data sent by the healthcare facilities through SMS. The central server returns SMS to the healthcare facilities to acknowledge the reception of the data and posts the information on the internet through the Argus web platform for data management and analysis. When an alert of an unexpected public health event is received, this alert is forwarded to the personal mobile phone of a pre-specified list of contacts.

The main structure within the Argus system is based on a tree hierarchy of “sites”. This hierarchy typically represents the geographical and/or administrative subdivisions within the country (Figure 3):

- Report and alert data are sent from healthcare facilities at the bottom of the hierarchy (peripheral sites).
- Data then flow up through the upper level sites (e.g. first through the district, then the region, then it reaches the central level).

- At each level of the system, data from weekly or monthly reports are aggregated and validated. For example:
  - The district will validate or reject reports from its "child" healthcare facilities (i.e. healthcare facilities in its area of responsibility).
  - An aggregated report for the district is created and is to be validated or rejected by the parent region (i.e. the region in charge of the district).
  - An aggregated report for the region is created and is to be validated or rejected by the central level.

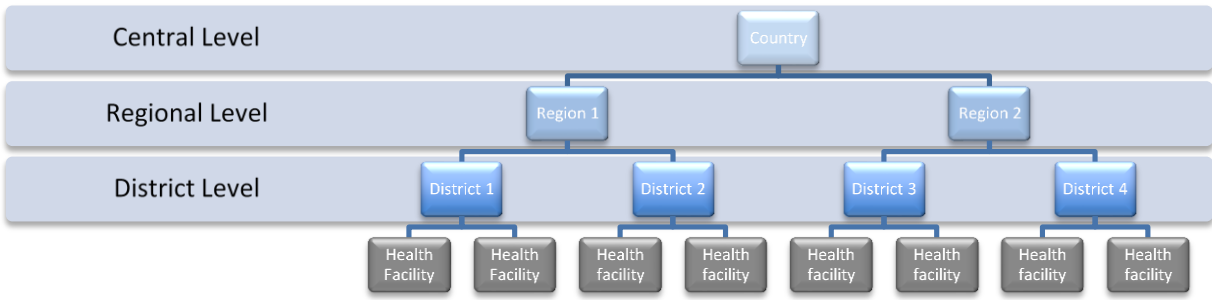

Figure 3. Example of structure of the Argus system

The number of levels in the system is not limited. The peripheral sites (usually healthcare facilities) are in charge of sending alerts and weekly or monthly reports through SMS using the Argus Android Client application.

The sites at the levels above healthcare facilities are in charge of:

- validating or rejecting received reports from their child sites (for example in Figure 3 District 1 and District 2 are the child sites of Region 1);
- reviewing the data analyses for their area of responsibility to check if there is any epidemiological threat requiring a rapid response.

2. Evaluation objectives

The main objective is to evaluate the usefulness of Argus in the context of the country through the evolution of the completeness and timeliness of data reporting by the healthcare facilities.

The secondary objectives are to evaluate:

- The usefulness for detecting public health events.
- The quality of the reported data.
- Completeness and timeliness of data validation by the intermediate and central levels of the surveillance system.

- The frequency of data analysis at the intermediate and central levels.
- The users' satisfaction.
- The easiness of use.
- The costs of deployment and maintenance.
- The reliability and technical issues.
- The evolution of the number of cases of diseases within the regions using Argus, and between the regions using Argus and not using Argus.

The evaluation will also provide information on potential improvements to be made to Argus.

3. Evaluation indicators

Usefulness for data transmission:

- evolution of completeness of data reporting by healthcare facilities;
- evolution of timeliness of data reporting by healthcare facilities.

Usefulness for detecting public health events:

- use of the Argus web platform to identify public health events;
- crossed epidemiological thresholds identified by the system;
- number of investigations triggered from the data collected by Argus (weekly reports and alerts);
- number of alerts received.

Quality of reported data:

- concordance of the received data with the collected data.

Completeness and timeliness of data validation by intermediate and central levels:

- evolution of completeness of data validation at each level;
- evolution of timeliness of data validation at each level.

Data analysis at the intermediate and central levels:

- use of Argus web platform to view and analyse the data;
- use of Argus web platform for team meetings.

Users' satisfaction:

- opinion on the general appearance of Argus Android Client used at the healthcare facilities;
- opinion on the available documentation for Argus Android Client used at the healthcare facilities;

- opinion on the general appearance of Argus web platform used at intermediate and central levels;
- opinion on the available documentation for Argus web platform used at intermediate and central levels;
- opinion on the usefulness of Argus Android Client used at healthcare facilities for data reporting;
- opinion on the usefulness of Argus web platform used at intermediate and central levels for data validation;
- opinion on the usefulness of the Argus web platform used at the intermediate and central levels for data analysis.

Easiness of use:

- opinion on the overall simplicity of use of Argus Android client at healthcare facilities;
- opinion on the simplicity of use of Argus Android client for data reporting;
- time required by a user at healthcare facilities to report data with Argus Android client;
- opinion on the overall simplicity of use of Argus web platform at intermediate and central levels;
- opinion on the simplicity of use of Argus web platform for data validation;
- opinion on the simplicity of use of Argus web platform to detect a public health event (e.g. an outbreak);
- opinion on the simplicity of use of Argus web platform to monitor the system (e.g. completeness and timeliness of data reporting).

Costs of deployment and maintenance:

- cost of setting up Argus;
- cost of operating and maintaining Argus per month.

Reliability and technical issues:

- percentage of uptime of the Argus web platform;
- technical problems on Argus.

Evolution of the number of cases of diseases within the regions using Argus and between the regions using Argus and not using Argus:

Proposed improvements:

- improvement suggestions to Argus Android Client used at healthcare facilities;
- improvement suggestions to Argus web platform used at intermediate and central levels.

4. Data collection

Different sources of information will be used:

- Data stored in the Argus database.
- Data on the use and reliability of the system.
- Epidemiological data from previous years and other regions made available by the Ministry of Health.
- Focus groups with users.
- Questionnaires filled in by users (see below for modalities of data collection).
- Measurement of the time required to fill and report data by users.
- If available, paper forms used by healthcare facilities to prepare the report of data.
- Invoices paid for setting up and running the system.

Data collection will be done during an evaluation mission. During this mission, different types of meetings will be organized with the users of the system (all users or a representative sample):

- A workshop with the authorities in charge of public health surveillance to present the objectives of the evaluation and to understand the characteristics and use of Argus, as well as the procedures used in the country for public health surveillance (half a day to one day).
- Workshops bringing together users of Argus at healthcare facilities (2 to 4 hours):
    - completion of the satisfaction questionnaire (available in **Annex 1**);
    - focus group discussion (questions available in **Annex 3**);
    - measurement of the time needed to report data for the whole or for a sample of users (a pre-filled paper form will be presented to each user and the time taken to enter and send the data with Argus Android Client application will be recorded).
- Workshops with users of the Argus web platform at each intermediate level and at the central level:
    - completion of the satisfaction questionnaires (available in **Annex 2**);
    - focus group discussion (questions available in **Annex 4**).

During the mission, it is of interest to compare the healthcare facility data (present in the facilities registries or on paper forms) with the data reported by Argus (present in the Argus database). The collection of the healthcare facility data can be done either during the meetings with the users at the healthcare facilities by asking them (if relevant) to bring the paper forms containing the information entered in the system, or during visits to the healthcare facilities.

5. Data analyses

The formulas to compute the evaluation indicators based on the collected data are presented in **Annex 5**.

Annexes

Annex 1. Satisfaction questionnaire - Healthcare facility level

Questionnaire date: _ _ / _ _ / 20 _ _

1. What is your health district/area?	_____

2. Full name of the healthcare facility	_____

3.a) Did you use Argus on the phone?		☐ Yes ☐ No
If YES	**From 1 (worst) to 5 (best), please give a score for:**	
	3.b) The general appearance of Argus	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3.c) The documentation available to use Argus	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3.d) The overall simplicity of use of Argus	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3.e) The simplicity of use for data reporting	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3.f) The usefulness of Argus for data reporting	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3.g) The feedback received after reporting data	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	Which problems have you faced with Argus for:	
	3.h) reporting data? ☐ No problem faced OR description of the problem(s):	
	3.i) What are your suggestions for improving the system? ☐ No suggestions OR improvement suggestion(s):	

Thank you

Annex 2. Satisfaction questionnaire – Intermediate and central levels

Questionnaire date: _ _ / _ _ / 20 _ _

1. In which structure are you working?	_____

2.a) Did you use the Argus web platform?		☐ Yes ☐ No
If YES	**From 1 (worst) to 5 (best), please give a score for:**	
	2.b) The general appearance of the Argus web platform	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2.c) The documentation available to use Argus web platform	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2.d) The overall simplicity of use of Argus web platform	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2.e) The simplicity of Argus web platform for data validation	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Don't know
	2.f) The usefulness of Argus web platform for data validation	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Don't know
	2.g) The simplicity of Argus web platform to detect public health events	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Don't know
	2.h) The simplicity of Argus web platform to monitor the completeness and timeliness of data reporting	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Don't know
	2.i) The usefulness of Argus web platform for data analysis	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Don't know
	Which problems have you faced with the Argus web platform for:	
	2.j) visualizing and validating data? ☐ No problem faced OR description of the problem(s):	
	2.k) analysing data ☐ No problem encountered OR description of the problem(s):	

	2.l) What are your suggestions for improving the Argus web platform? ☐ No suggestions OR improvement suggestion(s):

In general, how often do you use Argus web platform to:			
3.a) validate data? ☐ once a week ☐ once every two weeks ☐ once a month ☐ once per quarter ☐ once per semester ☐ once per year ☐ never ☐ other, specify:			
3.b) view and analyse data? ☐ once a week ☐ once every two weeks ☐ once a month ☐ once per quarter ☐ once per semester ☐ once per year ☐ never ☐ other, specify:			
3.c) identify public health events? ☐ once a week ☐ once every two weeks ☐ once a month ☐ once per quarter ☐ once per semester ☐ once per year ☐ never ☐ other, specify:			

4.a) Did you use data collected by Argus web platform to trigger an investigation?		☐ Yes ☐ No ☐ Don't know
If YES	4.b) How many investigations were triggered by Argus web platform?	_ _ _

5) Do you use the analyses results produced by Argus web platform during team meetings?	☐ Yes ☐ No ☐ Don't know

6.a) Do you use Argus web platform to provide feedback to below levels and healthcare facilities?		☐ Yes ☐ No ☐ Don't know
If YES	6.b) How?	

Thank you

Annex 3. Focus group questions – Healthcare facilities

Date of the focus group: _ _ / _ _ / 20 _ _

Attendees:

What are the main benefits of Argus to support you in performing public health surveillance?

What are the main shortcomings of Argus to support you in performing public health surveillance?

What problems did you encounter with Argus?

What improvements could be made to improve Argus?

Annex 4. Focus group questions – Intermediate and central levels

Date focus group: _ _ / _ _ / 20 _ _

Attendees:

What are the main benefits of Argus to support you in performing public health surveillance?

What are the main shortcomings of Argus to support you in performing public health surveillance?

What problems did you encounter with Argus?

What improvements could be made to improve Argus?

Annex 5. Evaluation indicators

	Indicators	*Calculation method*	*Performance threshold*	*Data requirements*	*Method of data collection*
Usefulness for data transmission					
	Evolution of completeness of data reporting by healthcare facilities.	(No. of reports received from healthcare facilities / No. of reports expected from healthcare facilities)*100.	Average of 80% during the evaluation period. Stability over time.	Number of reports sent per week for each healthcare facility.	Data from Argus database.
	Evolution of timeliness of data reporting by healthcare facilities.	(No. of reports received on time from healthcare facilities/ No. of reports expected from healthcare facilities)*100.	Average of 80% during the evaluation period. Stability over time.	Number of reports sent per week for each healthcare facility. Reception date of reports for each healthcare facility.	Data from Argus database.
Usefulness for detecting public health events					
	Use of the system to identify public health events.	By level: (No. of respondents reporting using Argus web platform once a week to identify public health events / No. of respondents)*100.	From the first intermediate level (e.g. district level): 80%	Number of respondents reporting using Argus web platform once a week to identify public health events	Specific questionnaire at intermediate and central levels.
	Crossed epidemiological thresholds identified by the system.	No. of crossed epidemiological thresholds.	/	Number of crossed epidemiological thresholds.	Data from Argus database.
	Number of investigations triggered from the data collected Argus (weekly reports and alerts).	No. of investigations triggered from the data collected by Argus.	/	Number of investigations triggered from the data collected by Argus.	Specific questionnaire at intermediate and central levels.

	Number of alerts received.	No. of alerts received.	/	Number of alerts received.	Data from Argus database.
Quality of reported data					
	Concordance of the received data with the collected data.	(No. of data having the same value in the system and on the paper forms) / (No. of data collected in the system)*100.	90%	Data on paper forms	Copy of paper forms used to send weekly reports.
				Data collected with Argus	Data from Argus database.
Completeness and timeliness of data validation by intermediate and central levels.					
	Evolution of completeness of data validation at each level.	By level: (No. of validated or rejected reports / No. of reports received)*100.	Average of 80% during the evaluation period. Stability over time.	Number of validated or rejected reports per week for each level.	Data from Argus database.
				Number of reports received per week for each level.	Data from Argus database.
	Evolution of timeliness of data validation at each level.	By level: (No. of reports received and validated or rejected on time / No. of reports received on time)*100.	Average of 80% during the evaluation period. Stability over time.	First validation or rejection date of reports.	Data from Argus database.
				Reception date of reports.	Data from Argus database.
Data analysis at the intermediate and central levels					
	Use of Argus web platform to view and analyse data.	By level: (No. of respondents reporting using Argus web platform once a week to view and analyse data / No. of respondents)*100.	From the first intermediate level (e.g. district level): 80%.	Number of respondents reporting using Argus web platform each week to view and analyse the data.	Specific questionnaire at intermediate and central levels.

	Use of Argus web platform for team meetings.	By level: (No. of respondents reporting using the analyses results produced by Argus web platform during team meetings / No. of respondents)*100.	From the first intermediate level (e.g. district level): 80%.	Number of respondents reporting using the analyses results produced by Argus web platform during team meetings.	Specific questionnaire at intermediate and central levels.
Users' satisfaction					
	Opinion on the general appearance of Argus Android Client at healthcare facilities.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire healthcare facilities.
	Opinion on the available documentation for Argus Android Client used at healthcare facilities.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire healthcare facilities.
	Opinion on the general appearance of Argus web platform at intermediate and central levels.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the available documentation for Argus web platform at intermediate and central levels.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the usefulness of Argus Android Client used at healthcare facilities for data reporting.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire healthcare facilities.
	Opinion on the usefulness of Argus web platform for the data validation at intermediate and central levels.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the usefulness of Argus web platform for data analysis at intermediate and central levels.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
Easiness of use for the users					
	Opinion on the overall simplicity of use of Argus Android client used at healthcare facilities.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire healthcare facilities.

	Opinion on the simplicity of use of Argus Android client for data reporting.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire healthcare facilities.
	Time required by a user at healthcare facilities to report data with Argus Android client.	/	/	Time required to report a predefined weekly report.	Measurement of the time required to report a predefined weekly report.
	Opinion on the overall simplicity of use of Argus web platform at intermediate and central levels.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the simplicity of use of Argus web platform for data validation.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the simplicity of use of Argus web platform to detect a public health event.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
	Opinion on the simplicity of use of Argus web platform to monitor the completeness and timeliness of data reporting.	Sum of ratings assigned by respondents (from 1 to 5) / No. of respondents.	4	Score given by respondents.	Specific questionnaire at intermediate and central levels.
Costs of deployment and maintenance					
	Cost of setting up Argus.	Sum of the costs related to the implementation of Argus.	/	Costs related to the implementation of Argus.	Invoices paid for the project.
	Cost of operating and maintaining Argus per month.	Sum of the costs related to the operation and maintenance of Argus.	/	Costs of running and maintaining Argus.	Invoices paid for the project.
Reliability and technical issues					
	% of uptime of the Argus web platform.	(time with the Argus web platform online and available to users / total time since Argus is used)*100.	90%	Periods during which Argus web platform was operational.	Specific monitoring (e.g. through specialized websites or other means).

Technical problems on Argus.	/	/	List of technical problems reported.	List of technical problems reported. Specific questionnaires at healthcare facilities, intermediate and central levels. Focus groups at healthcare facilities, intermediate and central levels.
Evolution of the number of cases of diseases within the regions using Argus and between the regions using Argus and not using Argus				
Evolution of the number of case of diseases within the regions using Argus and between the regions using Argus and not using Argus.	/	/	Number of cases of each disease within the regions per week before and after starting using Argus.	Data from the Ministry of Health. Data from Argus database.
	/	/	Number of cases of each disease within the regions not using Argus per week.	Data from the Ministry of Health.
Proposed improvements				
Improvements suggestions to Argus Android client used at healthcare facilities.	/	/	Suggestions for improvements.	Specific questionnaire healthcare facilities. Focus group healthcare facilities.
Improvements suggestions to Argus web platform used at intermediate and central levels	/	/	Suggestions for improvements	Specific questionnaire intermediate and central levels. Focus groups at intermediate and central levels.