MediLabSecure Situation Analysis on integrated surveillance (MeSA) Study

REPORT on SITE VISIT TO GEORGIA

(12-16 December 2016)

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Acknowledgement

This study was possible thanks to the collaboration and availability of the relevant staff of the Institutions involved in the Surveillance of CCHF in Georgia who generously shared their experiences and discussed the lessons learned.

A special thanks to the National Center for Disease Control and Public Health of Giorgia (NCDC), which coordinated and supported the site visit with professionalism and enthusiasm.

Prof. Francesco Bolici (OrgLab, University of Cassino, Italy) participated in the site visit to explore applicability of business processes modeling to integrated surveillance systems of arboviral diseases. The results of the BPM analysis presented in this report (5.B) are the outcome of a collaborative effort with Nello Augusto Colella (OrgLab, University of Cassino, Italy).

Maria Grazia Dente and Flavia Riccardo have drafted this report with the collaboration of Silvia Declich.

It was finalized and consolidated with the support of Khatuna Zakhashvili, Irine Kalandadze, Giorgi Chakhunashvili, Giorgi Babuadze, Nana Mamuchishvili, Paata Imnadze, Gvantsa Chanturia, Ekaterine Adeishvili (National Center for Disease Control and Public Health), Lasha Avaliani, Lena Ninidze, Natia Kartskhia (National Food Agency), Ana Gulbani, Maka Kokhreidze, Marina Donduashvili, Anna Kekelidze (Laboratory of the Ministry of Agriculture).

Stakeholders involved in the Study (Debriefing Meeting, NCDC Tbilisi, 15 December 2016)

1. BACKGROUND

This report describes the Situation Analysis on integrated surveillance conducted in Georgia in the framework of the MediLabSecure Project (the MeSA Study).

MediLabSecure [1] aims at increasing health security in the Mediterranean and Black Sea Regions by enhancing and strengthening preparedness to common health threats. The activities focus on emerging viruses with vector transmission.

The MeSA Study has been designed and implemented by the ISS Team (Maria Grazia Dente, Flavia Riccardo and Silvia Declich) that is leading the WP5-Public Health Working Group of MediLabSecure [2].

Public health activities aim at reinforcing preparedness of the MediLabSecure Network by investigating and improving the standard methods of surveillance of arboviral diseases towards *integrated surveillance, integrated risk assessment and early case detection* in the framework of *One Health*. The strategies adopted rely also on the experience and lessons learned gained with the implementation of EpiSouth and EpiSouth Plus Projects [3, 4].

For this Study, the definition of One Health Surveillance provided by K.D.C. Stärk et al. [5] has been adopted: "*One Health Surveillance consists of the systematic collection, validation, analysis, interpretation of data and dissemination of information collected on humans, animals and the environment to inform decisions for more effective, evidence- and system-based health interventions*".

One Health surveillance should lead to faster disease detection, more efficient disease control and tangible financial savings when formally compared against separated surveillance streams [5, 6].

While there seems to be consensus about the value of One Health in published studies, there is an evident lack of metrics and associated methods to estimate One Health benefits in a systematic way [7].

The MeSA study can support the evaluation of the One Health benefits. It is the end-point of a study process, in the framework of MediLabSecure project, which identified common criteria to consistently describe and compare how arbovirus surveillance integration occurs in countries, document the impact of the One Health strategy in a national context and assess the level of integration between relevant sectors/disciplines.

The above-mentioned study process had a stepwise approach as per the following scheme:

- Scoping Review – Step 1
- Survey with MediLabSecure members – Step 2

- Situation analysis (MeSA Study) – Step 3

The description of the studies related to the first two steps (Scoping Review, Survey with MediLabSecure members) are available in other documents [8, 9] .

The results of these studies will be reported and discussed in the ***Strategic document on integrated surveillance and risk assessment of arbovirosis in Mediterranean and Black Sea Regions*** (including Network's recommendations on future actions aimed at strengthening preparedness and response in the framework of One Health).

2. THE MESA STUDY

The MediLabSecure Situation Analysis (MESA) on integrated surveillance of arboviruses in the Mediterranean and Black Sea Region is a qualitative situational analysis study involving the human, animal and entomology sectors of vector borne disease surveillance in three countries of the Mediterranean and Black sea region participating to the MediLabSecure Project.

General Objective

- Contribute to the integration of laboratory/clinical human, animal and entomological surveillance of arboviruses in the Mediterranean and Black Sea region and encourage inter-sectoral collaboration.

Specific objectives

- Describe how the collection, analysis and dissemination/exchange of information is organized within and between human, animal and entomological surveillance of arboviruses in three countries of the MediLabSecure network,
- Identify formal procedures, informal practices and legal constraints for integrated surveillance and inter-sectoral collaboration in these three countries,
- Discuss main challenges and success stories in establishing a functional inter-sectoral collaboration and integration of surveillance between the human, animal and entomological sectors in these three countries.

The Study is structured in four phases:

1. Selection: selection of three countries to involve in the study ("participating countries");
2. Country Portfolios: development of study tools and collation for each country, in advance of the site visit, of available data/documents to build a country portfolio including a specific checklist;
3. Site Visits: conduction of a site visit in each participating country to investigate processes, procedures and performance in the field of arbovirus surveillance integration between human, animal and entomological sectors in the framework of One Health;

4. Reporting: preparation of a country report for each visited country and distillation of main findings in a strategic document on inter-sectoral integration in the field of arbovirus surveillance.

For further details on the study design please refer to the Annex I- Study Design

3. THE MESA STUDY IN GIORGIA: CRIMEAN-CONGO HAEMMORRHAGIC FEVER/VIRUS (CCHF/V) SURVEILLANCE ACROSS THE HUMAN, VETERINARY AND ENTOMOLOGICAL SECTORS

The MeSA Study in Georgia developed on the following steps:

i) First feedback on the experience of Georgia in intersectorial surveillance of CCHF from the MediLabSecure Survey 2014 [8]
ii) Consultations and final agreement to participate in the MediLabSecure MeSA Study, June 2016
iii) Preparation of Study Portfolio and tools (including stakeholders table), October-November 2016
iv) Site Visit to Georgia, 12-16 December 2016
v) Preparation of the Report, February-March 2017

During the visit the following activities have been performed:

a. Present the country situation
b. Visit all stakeholders involved in CCHF surveillance (at least one per each sector: human virology, animal virology, medical entomology, public health) and explore the effectiveness of the surveillance process and communication mechanisms in place between the sectors
c. Debriefing meeting with all the stakeholders involved to discuss and consolidate the information, data, procedures, lessons learned etc., collected through the documentation provided and through the interviews conducted during the visit.

For further details on investigation team, duration and scope of the activities, etc. refer to Annex II - Portfolio of Georgia and its annexes.

4. THE ORGANIZATION OF THE GEORGIAN SURVEILLANCE SYSTEM

Georgia has undergone a profound social and demographic changes since its independence from USSR in 1991.

According to a 2009 WHO Health system analysis [10] the population has shrunk by nearly a fifth to 4.4 million, with an estimated *de facto* resident population of 3.9 million due to intense out-migration. According to National Statistics Office of Georgia, the population of Georgia (as of January 1, 2016) was estimated at 3,720,000[1]. Following the conflicts in Abkhazia and South Ossetia, two regions now largely beyond the jurisdiction of the central Georgian authorities, the population

[1] Source - http://geostat.ge/index.php?action=0&lang=eng

comprises a large number of internally displaced persons (IDPs). Current administrative division of Georgia, by region/district that are under control of Georgian government, includes 11 regions and 63 districts.

Following independence, Georgia faced a state of economic collapse. The economy improved after 1994 with widening social inequalities. Then, following the Rose Revolution in 2003, the government led a radical change in the economic policy based on government deregulation of financial transactions (to reduce corruption) and trust in market mechanisms. With the National Health Policy, developed in 1999, Georgia has made a significant effort to adapt health policy and the health system to the new social, political and economic environment.

The Georgian Health System transited from a pre-independence Soviet-type Semashko model [11] (a system completely state-controlled and owned where healthcare was free for everybody), to a strongly market-oriented system characterized by privatisation, heavy public budget cuts and decentralization [12].

Today, nearly all health care providers are private actors, independent of the State [13].

Private insurance coverage for households living below the poverty line is paid from public funds, but all other individuals are expected to purchase cover on their own initiative.

Out-of-pocket payments remain the main source of funding for the health system in Georgia, which reduces access for much of the population to services and to pharmaceuticals. Overall, health system regulation is rather weak, particularly when compared with the challenges it faces [13].

The Governmental Commission for Health and Social Reforms, the State Minister of Public Reforms, and Ministry of Labor, Health and Social Affairs (MoLHSA) developed 'Main Directions in Health 2007–2009', which outlined the 3-year health sector transformation. It focused on ensuring affordability, quality, accessibility and efficiency on health services. It also introduced market-based principles to health care management. About 80% of the hospitals were sold to the private sector for redevelopment as modern and in most cases as multi-profile hospitals.

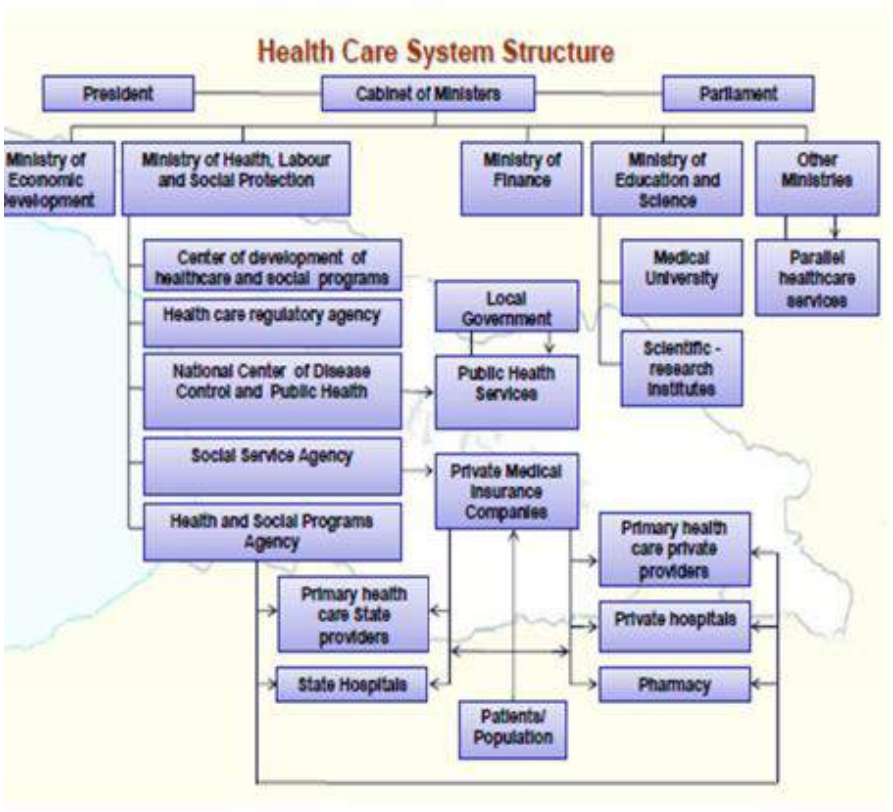


Figure 1 - Structure of Georgian Health System [13]

Regardless of the complexity of Figure 1, three main closely linked fields can be identified within the Georgian health care system:

1. Public health
2. Primary care setting
3. Hospital sector

The introduction of epidemiologic surveillance into the public health system started in 1996 and the Georgian law 'on Public Health' adopted in 2007 refers specifically to communicable disease surveillance.

Since 2009, for surveillance purposes, Center and public health municipal units are using the Electronic Integrated Disease Surveillance System (EIDSS)[2] IDSS provides real-time biosurveillance throughout Georgia and is being used as a registration, notification, and reporting system for the notifiable diseases/conditions of human cases, and also for veterinary diseases (by the respective structural units of the Ministry of Agriculture).

The EIDSS has 190 data entry points that constitute the Public Health Network of Georgia (Figure 2) 72 notifiable diseases are under surveillance within the system.

[2] http://www.ncdc.ge/en-US/ProgramsAndProjects/EIDSS

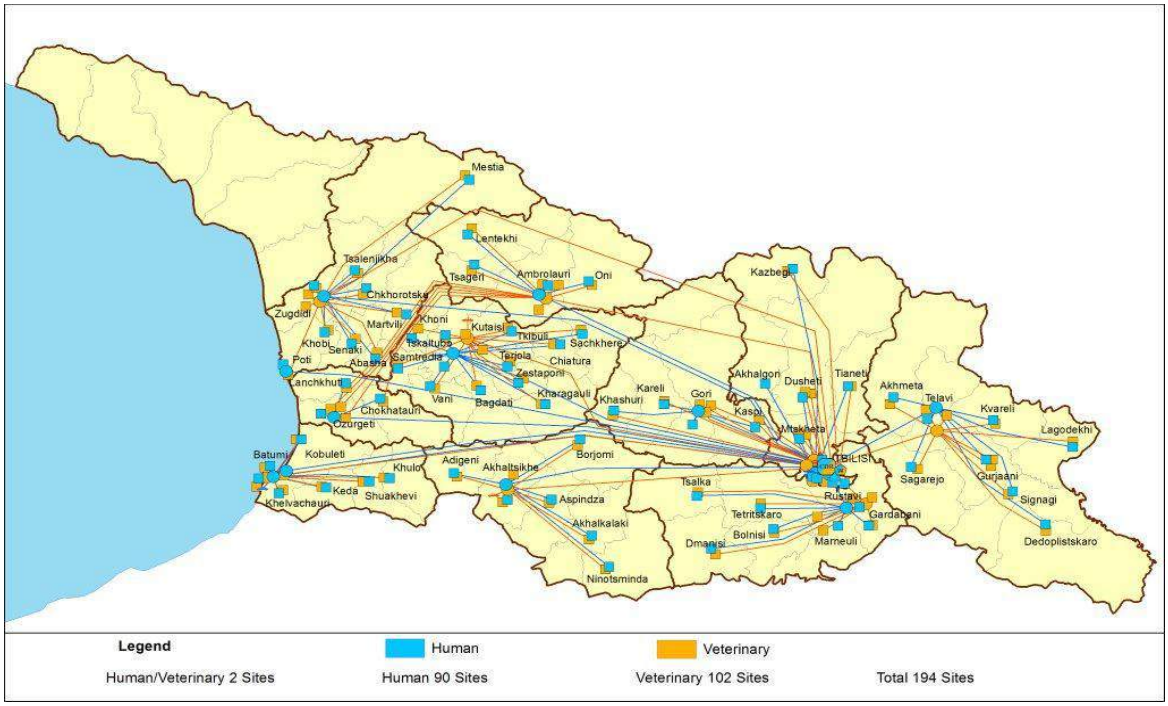


Figure 2 - EIDSS Data Entry Points

5. THE HISTORY OF CCHFV TRANMISSION IN GEORGIA AND EVOLUTION OF THE SURVEILLANCE SYSTEMS AND THEIR INTEGRATION

CCHF passive surveillance started in Georgia in 2009, when the disease reporting tool, the EIDSS, was established nationally.

The surveillance system is based on the "One World – One Health" approach and the integration is implemented also at laboratory level (Figure 3).

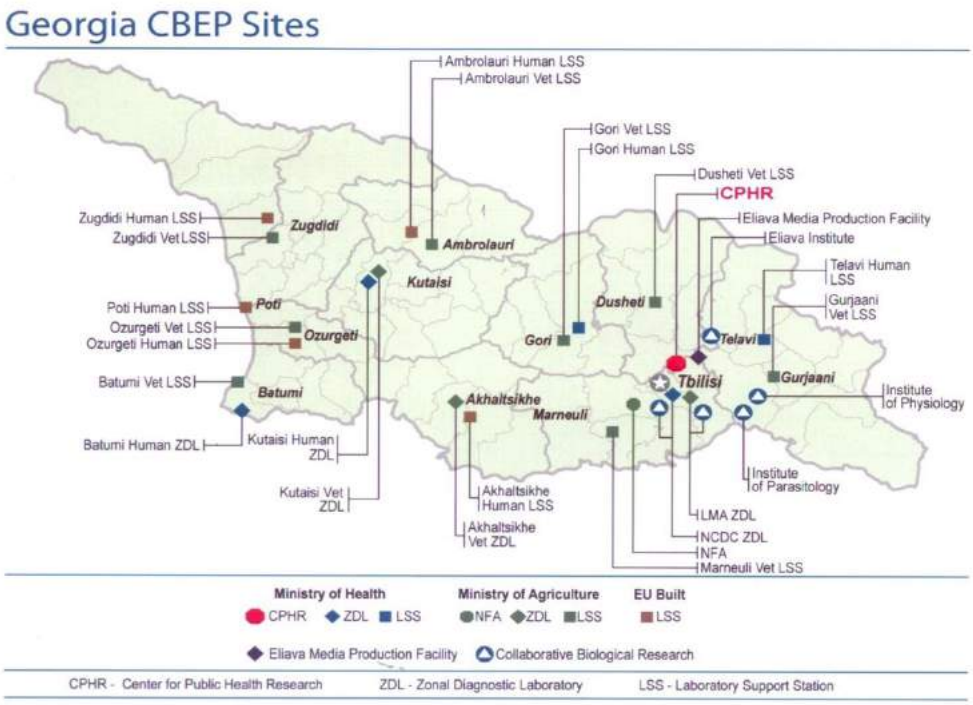


Figure 3 - Laboratory surveillance system based on "One World – One Health" approach [3]

Human surveillance

CCHF reporting occurs when physicians at Georgian healthcare facilities suspect a patient of having CCHF and report this through EIDSS, which alerts the National Center for Disease Control and Public Health (including a telephone call to stress the urgency). EIDSS detected a median of one CCHF case per year (range: 0–13 cases) from 2009 to 2013, totaling 15 cases during that time period. A case was defined as fever (temperature >100.4°F [>38°C]), one or more hemorrhagic signs (petechial or purpural rash, bleeding, or thrombocytopenia) and laboratory confirmation (i.e. a positive test for CCHF nucleic acid or anti-CCHF IgM).

[3] Cooperative Biological Engagement Program (**CBEP**) - http://www.ncdc.ge/en-US/ProgramsAndProjects/EIDSS

In 2014 the surveillance system detected 24 cases of CCHF, the highest annual case count since surveillance began in 2009 (Figure 4.) [14]

In July 2016 the first nosocomial case of CCHF was reported.

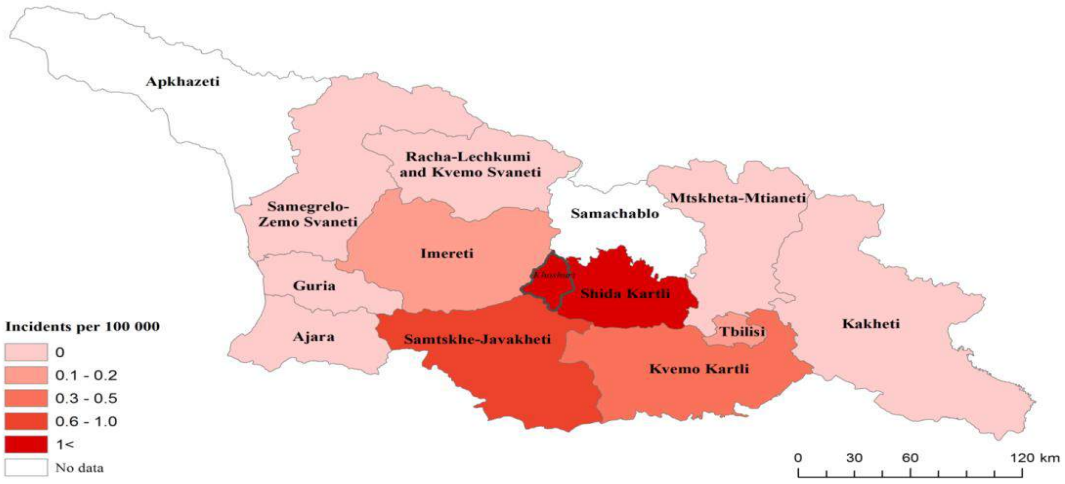


Figure 4 - Incidence of Crimean-Congo hemorrhagic fever in Georgia by Region in 2014. Source: NCDC of Georgia 2014 (GIS)

Presently suspected CCHF cases are notified to NCDC and samples are sent to the Laboratory of the Lugar Center within 24 hours. Onset time guides the type of laboratory test to be carried out.
At the Lugar Laboratory the following diagnostic capacities are available:

From 2nd to 5th day from symptom onset:

- virus isolation

– The test has a low sensitivity (high viremia needed)

Up to the 7th day from symptom onset:

- Viral RNA sequence real time polymerase chain reaction (RT-PCR)

– Specific, sensitive

- Viral antigen detection
- Detection of antibody (IgG and IgM) by ELISA

From 5th to 7th day of from symptom onset:

IgM (7 days to 4 months) and IgG (7 days to 5 years)

- Immunohistochemically staining
- serum neutralization

Animal Surveillance

Animal surveillance is not conducted routinely for CCHFV. During the 2014 epidemic in humans, NFA state veterinarians collected samples from the cows of infected owners. LMA did PCR on 2221 collected sampleswhich resulted all negative.. Tests for serology were, and are, not available.
State veterinary surveillance includes clinical inspection of animals at slaughterhouses but does not include sample collection and laboratory analysis of animals.

Animal samples for pathogens are generally sent from the NFA to the LMA. Due to biosafety issues, CCHF represents an exception. In case of suspected CCHF, NFA can send samples directly to the Lugar

Center, the only BLS 3 lab facility in the country, where also staff of the LMA can operate prior booking.

Entomological surveillance

The Entomology Department of Lugar Center is in charge for vector monitoring:

a) seasonal monitoring of ticks (early spring - late summer) as per the field surveillace plan prepared by NCDC and approved by MoLSA. In endemic areas, ticks are tested for CCHFV.

b) *Ad hoc* monitoring*:* during outbreak investigations triggered by any CCHF human case.

Following the 2009 outbreak, Hyalomma distribution maps are being produced to identify the most at risk areas (Figure 5).

Figure 5 - Distribution of *Hyalomma marginatum* in Georgia 2016

Vector control

The Entomology Department of Lugar Center is in charge of:

-entomological investigations of outbreaks of vector-borne diseases in the country and recommends appropriate vector control measures;

-assessment for potential of vector borne diseases and their control;

-evaluation and recommendation for use of various insecticides against vectors of public health importance;

- a reference collection museum of preserved specimens of some medically important arthropods to facilitate identification of the collected material;
-conduction of various ad-hoc and regular training courses on vector-borne diseases and their control among entomologists in the Country
- studies on taxonomy, ecology and biology of vector arthropod species and dynamics of disease transmission.
-support to the monitoring and evaluation of indoor insecticidal spray under taken for the control of VBD in different regions together with NFA
-provision of all necessary equipment for vector collection in the regions

Control plans are developed by NFA with support of the MoA.
Vector control actions are implemented in case of human infection as well as in villages where human cases were notified the previous year. Villages at risk and villages with human cases in the previous years, to avoid re-emergence, are the target each year.

Establishment of an intersectorial Committee

In 2012, a multisectoral team was established to control Anthrax outbreaks. In 2013 it was consolidated as a "One Health" team, including the National Center for Disease Control and Public Health (NCDC), the National Food Agency (NFA), the Laboratory of the Ministry of Agriculture (LMA), Ministry of Agriculture (MoA) and relevant international agencies, to control Brucellosis, Anthrax, Rabies and CCHF. The team meets quarterly or for urgent *ad hoc* sessions.
Following the 2014 CCHF epidemic, this committee was supported by a Government Decree in 2015 on integrated surveillance for dangerous pathogens and on One Health strategy (after the 2014 CCHF epidemic). Following this epidemic, also a joint action plan (governmental decree) to control CCHF was developed under the coordination of MoLHSA. The plan is not updated yearly. Presently a generic preparedness plan is under development.
LMA is involved only in the case of outbreaks.

Dissemination

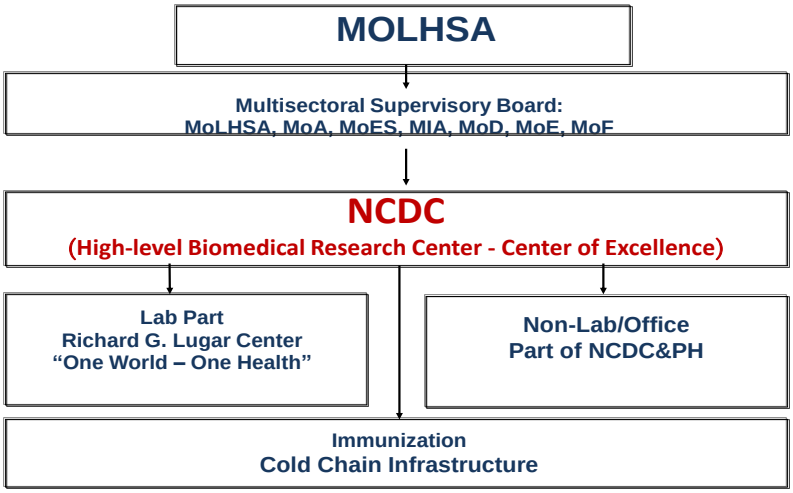
NCDC reports to MoLSHA on weekly basis (internal brief report).
Data on CCHF surveillance are included in the monthly and annual reports which are available also on the NCDC website.
Formal minutes are drafted during the One Health meetings.
Data are also used to produce informative brochures and to communicate with the general public. Usually dissemination is carried out by NCDC, on behalf of the other sectors/institutions, but NFA also distributes leaflets/posters for diseases including CCHF.

5.A INSTITUTIONS INVOLVED IN CCHF SURVEILLANCE IN GEORGIA MET DURING THE SITE VISIT [4]

National Center for Disease Control and Public Health of Georgia (NCDC) - http://www.ncdc.ge/
Laboratory of Lugar Center of NCDC (virology and entomology department)- http://www.ncdc.ge/en-US/LaboratoryNetworksAndBS
National Food Agency of Georgia (NFA) - http://nfa.gov.ge/en/
Laboratory of the Ministry of Agriculture - http://www.lma.gov.ge/index.php?lang=en&Itemid=107 http://www.moa.gov.ge/En/

NATIONAL CENTER FOR DISEASE CONTROL AND PUBLIC HEALTH OF GEORGIA (NCDC)

The National Center for Disease Control & Public Health (NCDC) is the leading agency in the field of public health in Georgia. The history of the agency began as back as in 1937, date when the Plague Station was established. After the independence in 1992, the Georgian Plague Control Station was transformed into the Research Center for Extremely Dangerous Diseases, and after the reforms carried out in the sanitary and epidemiological system in 1995, this Center was established with the status of the National Center for Disease Control (NCDC). In 2003-2007, the Center underwent a large-scale reorganization, which ended up in assuming functions of the Medical Statistics Center and the Public Health Department. In 2013, the Richard Lugar Center for Public Health Research was functionally integrated into the NCDC.



[4] For details on the Institutes involved, see related websites, portfolio and presentations in annex III.

Figure 6 – Governance and functions of NCDC

The NCDC, as a Legal Entity under Public Law, is accountable to MoLHSA and is financed with dedicated budgetary allocations from the State Budget. The Center is a leading agency in the prevention and control of communicable and non-communicable diseases at national level. The Center establishes national standards, guidelines, contributes to the improvement of the public health, carries out epidemiological surveillance, immunization programmes, laboratory work and research, provides consultations and responds to public health emergencies. The NCDC maintains health care statistics to facilitate the process of monitoring of the population's health status and to elaborate relevant policies [15].

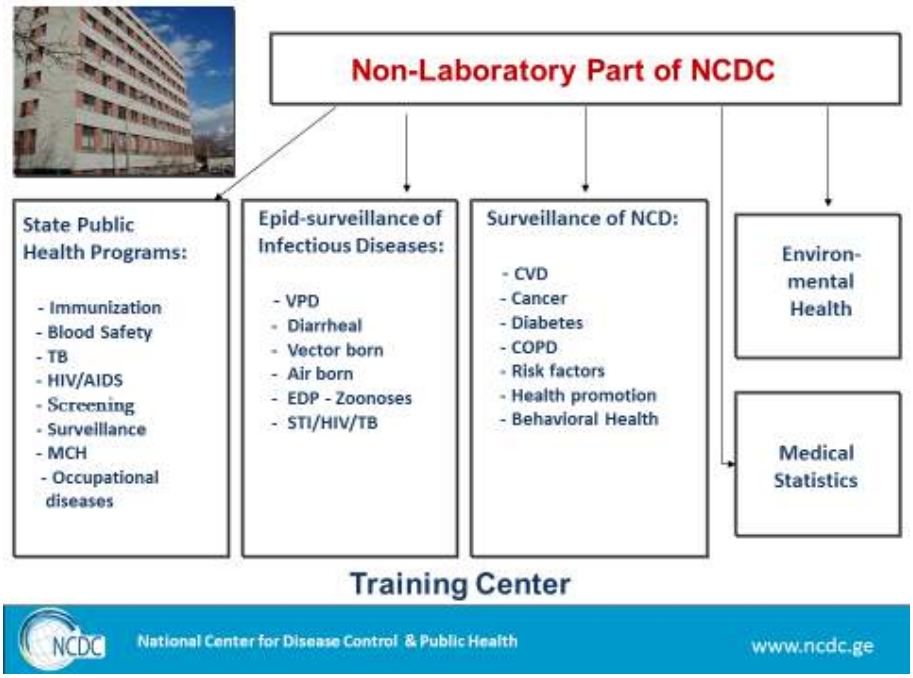


Figure 7 – Non-Laboratory Part of NCDC

There are 2 Zonal Diagnostic Laboratories (ZDLs) in Kutaisi and in Batumi, and 7 Local Surveillance Stations (LSSs) in Georgia. These Centers and laboratories are structured to provide regional coverage (not district). Region is a bigger entity and consists of several districts (the number varies over the different regions).

RICHARD LUGAR CENTER FOR PUBLIC HEALTH RESEARCH

The Richard Lugar Center for Public Health Research, which became operational in August 2013, is a new facility of the National Center for Disease Control and Public Health (NCDC). The Lugar center is the top-tiered institution in NCDC's laboratory network and serves as a reference laboratory of the Georgia's public health system.

The facility was established as part of a project started in 2004, after a USA – Georgia Umbrella Agreement was signed in 1997 and after a USA – Georgia Implementing Agreement was signed (DoD/MoD) in 2002 on "Cooperation in the Area of Prevention of Proliferation of Technology, Pathogens and Expertise Related to the Development of Biological Weapons".

The Lugar Center has a BSL3 laboratory that is used by different Institutions in Georgia, including the MoA. A BLS 4 facility is required to handle live CCHFV, however no BLS 4 facilities are available in Georgia. For this reasons, currently all diagnostics on this pathogen are run after samples neutralization at the Lugar BSL3 Laboratory.

Figure 8 – Laboratory part of NCDC

NATIONAL FOOD AGENCY OF GEORGIA

This agency (NFA) falls under the MoA and it is divided in three departments: Food Safety, Animal Health and Plant Protection.

With the Government Decree of 2015, following the 2014 CCHF epidemic, vector control actions have been obliged to the NFA. Since 2015, vector control takes place two times by year: in spring and in autumn. The Veterinary Department (animal health Department) under NFA planes and monitors yearly activities that are conducted by regional offices one in each region of the country. NFA Regional offices are staffed with State veterinarians, usually two per district, all directly under the responsibility of NFA.

About six hundred and ten (610) private veterinaries, paid by NFA, are also available for field activities and provided with Standard Operating Procedures for vector control.

The LMA was established in 1907, as a veterinarian laboratory. The facility was reconstructed by the U.S. Defense Threat Reduction Agency (DTRA) in 2007 with a BSL2+ laboratory.

Currently the laboratory is organised in Departments following the same design of the NFA: Animal Health, Food Safety and Plant Protection.

LMA has 2 Zonal Diagnostic Laboratories (ZDLs) in Kutaisi and in Akhaltsikhe plus 8 regional veterinary laboratories (Figure 9) that are operational and inter-connected. All the laboratories (144 staff) can access EIDSS.

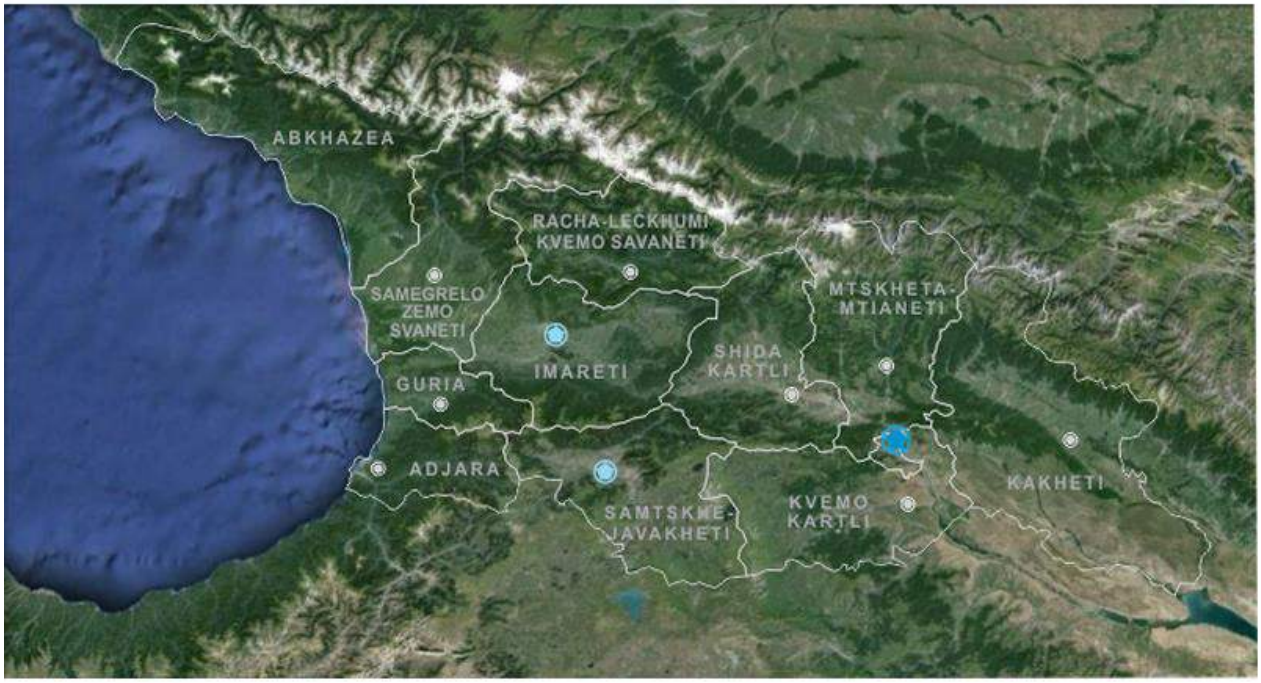


Figure 9 - Laboratories of Network of the Ministry of Agriculture in Georgia with the three ZDL

(source MoA http://www.lma.gov.ge/index.php?option=com_map&view=map&Itemid=290&lang=en)

Testing on samples can be requested by NFA or by privates. Only PCR tests are available, not kits for serology. As already reported, CCHF samples are tested at Lugar Center.

5.B ANALYSIS OF SURVEILLANCE PROCESSES (INTRA/INTER SECTORIAL)

This analysis was carried out considering the surveillance processes implemented currently and in 2014 when, during the outbreak, surveillance of CCHF involved more extensively all the sectors. More specifically, at the time of the MESA study site visit (December 2016), veterinary surveillance

for CCHF was not operational. However actors referred that, in case of need, it would stepped up following the same processes set up during the 2014 outbreak.

5.B.1 GLOBAL VIEW OF THE INTEGRATED SYSTEM: FOCUS ON PROCESSES MODELLING

The surveillance processes and their inter and intra sectoral connections have been mapped thanks to the support of OrgLab, using the Business Process Modelling Notation (BPMN) methodology, and customized colour coding for each sector (Figure 10).

Why focusing on processes?

The aim of mapping organizational processes is to identify:

i. the set of activities that an organization (or a unit) performs;

ii. the process owner (the person or unit accountable of each activity);

iii. the connections among activities (both inter and intra-unit).

The first step, to understand how a complex system works, is to design a detailed map of all the processes performed by the organization, including their interactions and the task-owners. The process analysis allows us to identify the areas for improvement, as for example overlapping tasks (multiple owners claiming responsibility over a specific activity), or activity gap (when an activity does not formally have an owner, or when two activities that should cooperate do not have a shared way to work together).

What is Business Process Modelling (BPM)?

Business Process Modeling (BPM) is a representational framework designed to visually "describe how businesses conduct their operations" and typically involve "graphical depictions of at least the activities, events/states, and control flow logic that constitute a business process" (Curtis et al., 1992). A process is defined as a set of activities executed in a predefined, sequential or parallel, order by a pre-determined number of organizational actors or entities sharing the collective goal of reaching organizational objectives (Chinosi and Trombetta, 2012). The term "business process modeling" and its related representation methodologies are not necessarily limited to the business environment but can be used in any scenario in which organizations are structured in a complex net of tasks and their interactions. In fact, BPM was developed for those processes that are so complex and distributed (as in the case of infectious diseases identification, early warning and response), that require a standardized and refined representation system to be effectively transmitted and clearly understood by a broad variety of individuals and units. BPM methods have been increasingly in vogue among analysts and organizational specialists, used both to create AS-IS representations of current practices, aiming at knowledge transfer, as well as to serve as an analytical tool to improve the efficiency or effectiveness of the analysed processes (TO-BE).

What is Business Process Modelling Notation (BPMN) standard?

Among the many BPM standards, Business Process Modelling Notation (BPMN) has become increasingly popular among both practitioners and scholars, because provides a comprehensive and easy to read visual modelling methodology. Indeed, BPMN's shared representation techniques and symbols are specifically aimed at allowing a better analysis, understanding and diffusion of complex processes (Birkmeier & Overhage, 2010; Chinosi & Trombetta, 2012). In particular, BPMN provides a series of constructs aimed at facilitating a precise and understandable visual representation of events, processes and logical connections between them. These include, among others: graphical depiction of process participants (swimming lanes), data management and exchange (information and message flows, databases), activity markers (sub processes, loops, and parallelization) and time or condition-based event constrains (Figure 10).

Considering the informative power of the approach, and on the basis of previous successful experiments of using BPMN to represent health-related processes (e.g. Müller & Rogge-Solti, (2011) for multidisciplinary hospitals; Rolòn et al. (2010) for hospital management processes; Lang et al. (2007) in radiology workflows; Huang, Tseng, Hsu, Lee, & Chu (2015) for multi-functional units involved in diagnostic processes), we find BPMN to be the most appropriate approach for the task of creating a visual representation of integrated infectious diseases surveillance, early warning and response processes.

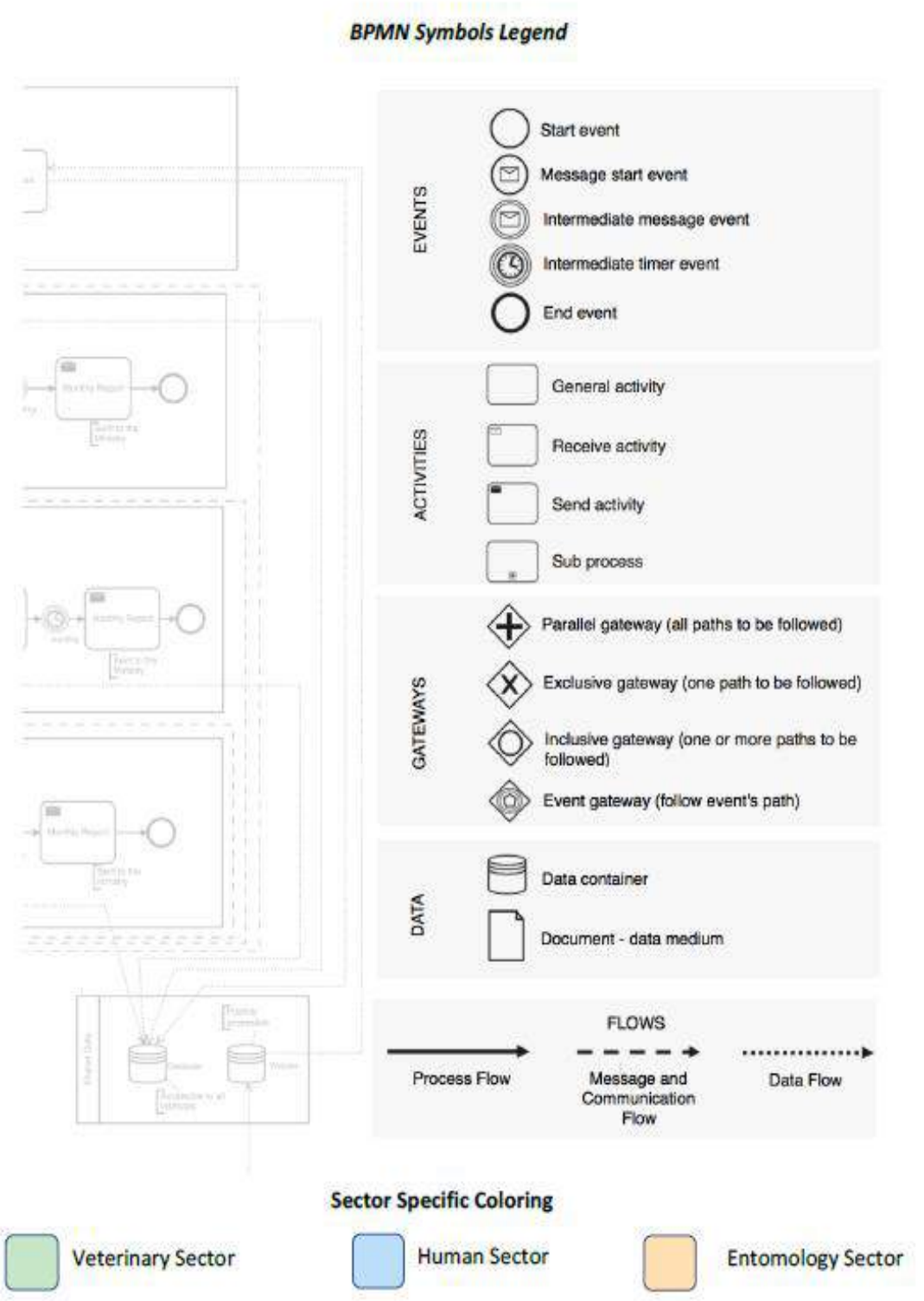
BPM methodology and data collection in the Georgian surveillance system

The BPM was performed in three phases:

i. written material about Georgian surveillance system were studied to reach a general understanding of the involved organizations;
ii. data collection was performed during the site visit in Tbilisi interviewing the actors involved in the processes. A first round of interviews was conducted with each unit (multiple experts belonging to the same unit were interviewed together, in order to facilitate the representation of the process as commonly perceived and understood by the whole unit). During the interviews, a first provisional sketch of the process was drawn and the Georgian experts were asked to check if the representation would embed their understanding of the process. If the graphical representation was not detailed enough, the BPM analyst described verbally the process to check that he accurately understood the process as described by the members of the unit. After each meeting the BPM analyst and the ISS experts checked that the process-models were accurate also from the specific domain under study (surveillance). A second crucial step was to meet all the Georgian experts in the same room, projecting the whole process (combination of the processes of several units) and describing the processes to them. In this way we were able to identify possible misunderstanding and to correct them, but even more important we were able

to let different experts belonging to different units to compare their idea of working process also in relationship with the work performed by other units.

iii. after the site visit, the processes have been detailed following BPMN2.0 standards and also described in textual form. The inter-sectorial connections have been designed and analysed as well as the intra-unit processes.



- **Intra-sectorial** message and communication flows are given the sector specific color and identified by the first letter of the sector name together with a number (e.g. H1 for human).

- **Cross-sectorial** message and communication flows are in **red** color and identified by an X (cross), the first letter of the destination sector and a number (e.g. XV3: third cross sectorial communication flow to veterinary sector)

Figure 10 – Legend for the interpretation of the surveillance process diagrams

Overall, the surveillance system comprises three sectors: the entomological sector (orange), the veterinary sector (green) and the human surveillance sector (blue), with increasing levels of complexity as shown by the number of recognized lanes (each with a different involved actor) and numerous inter and intra connections (Figure 11). The cross sectorial communication flows are indicated as follows:

- **XV1** – First cross sectorial communication flow to Veterinary Sector. From PHC (Human Sector) to Veterinary Regional Office
- **XV2** – Second cross sectorial communication flow to Veterinary Sector. From NCDC Epidemiologist (Human Sector) to National Food Agency.
- **XV3** – Third cross sectorial communication flow to Veterinary Sector. From NCDC Epidemiologist (Human Sector) to National Food Agency (process as it was in 2014).
- **XH1** – First cross sectorial communication flow to Human Sector. From National Food Agency (Veterinary Sector) to NCDC Epidemiologist.
- **XE1** – First cross sectorial communication flow to Entomology Sector. From NCDC Epidemiologist (Human Sector) to Lugar Entomology.
- **XE2** – Second cross sectorial communication flow to Entomology Sector. From Lugar Center BLS3 (Human Sector) to Lugar Entomology.
- **XH2** – Second cross sectorial communication flow to Human Sector. From Lugar Entomology to Lugar Center BLS3.

Index of BPMN (Business Process Model Notation) representations:

System Overview: interactions among different units and areas (Fig.11)

Overview Zoom – Part 1 – Human Sector (Fig.11a)

Overview Zoom – Part 2 – Veterinary Sector (Fig. 11b)

Overview Zoom – Part 3 – Entomology Sector (Fig. 11c)

In-detail text descriptions of each sector's processes BPMN representation

Human Sector:

Human SECTOR process summary

Fig. 12 - Human Sector Overview

Fig. 13 - Human Sector Zoomed part 1

Fig. 14 - Human Sector Zoomed part 2

Veterinary Sector:

Veterinary SECTOR process summary

Fig. 15 - Veterinary Sector Zoomed

Entomology Sector:

Entomology SECTOR process summary

Fig. 16 - Veterinary Sector Zoomed

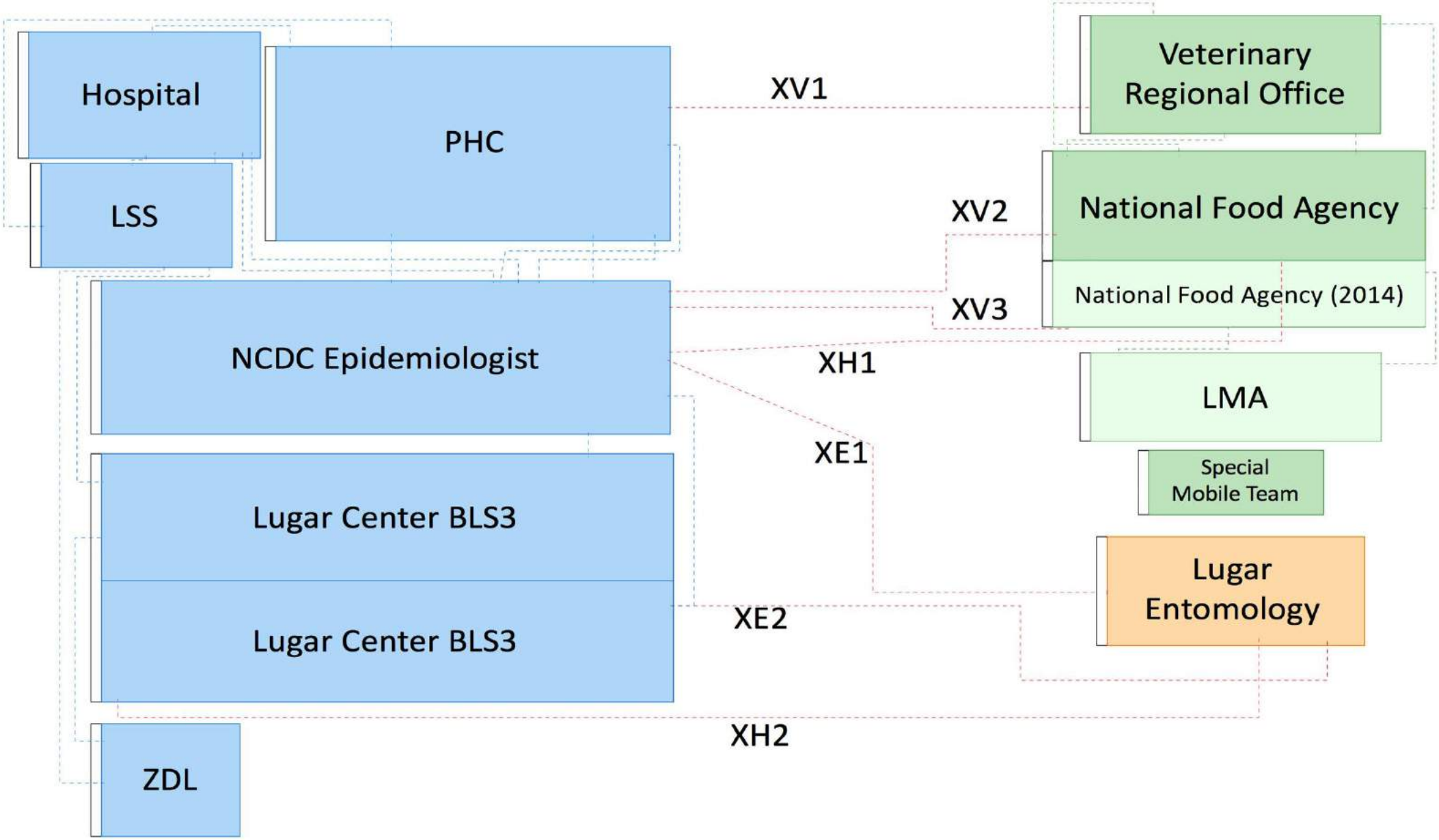


Figure 11 – Overview of the interactions among different units

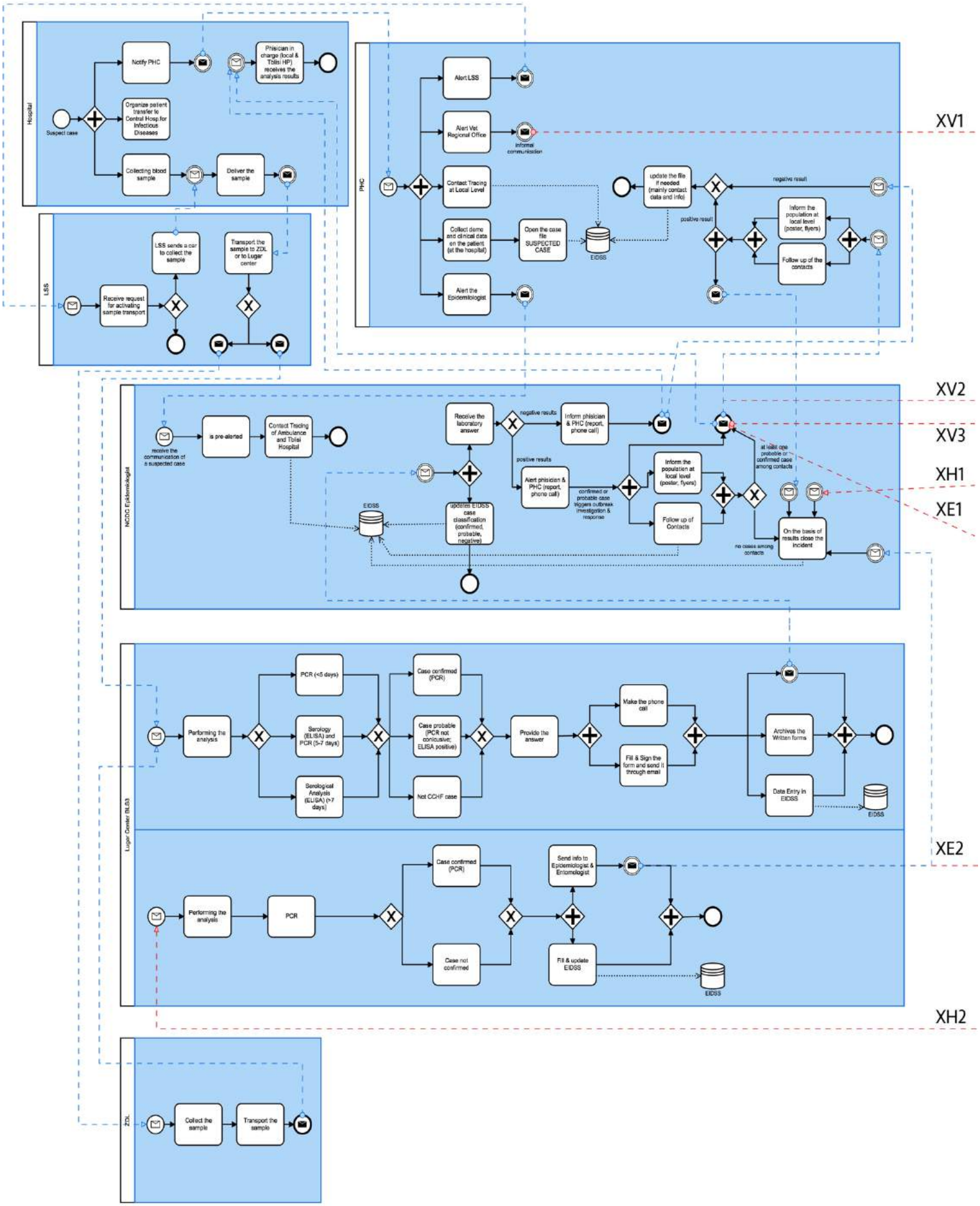


Figure 11a – Overview Zoom – Part 1 – Human Sector

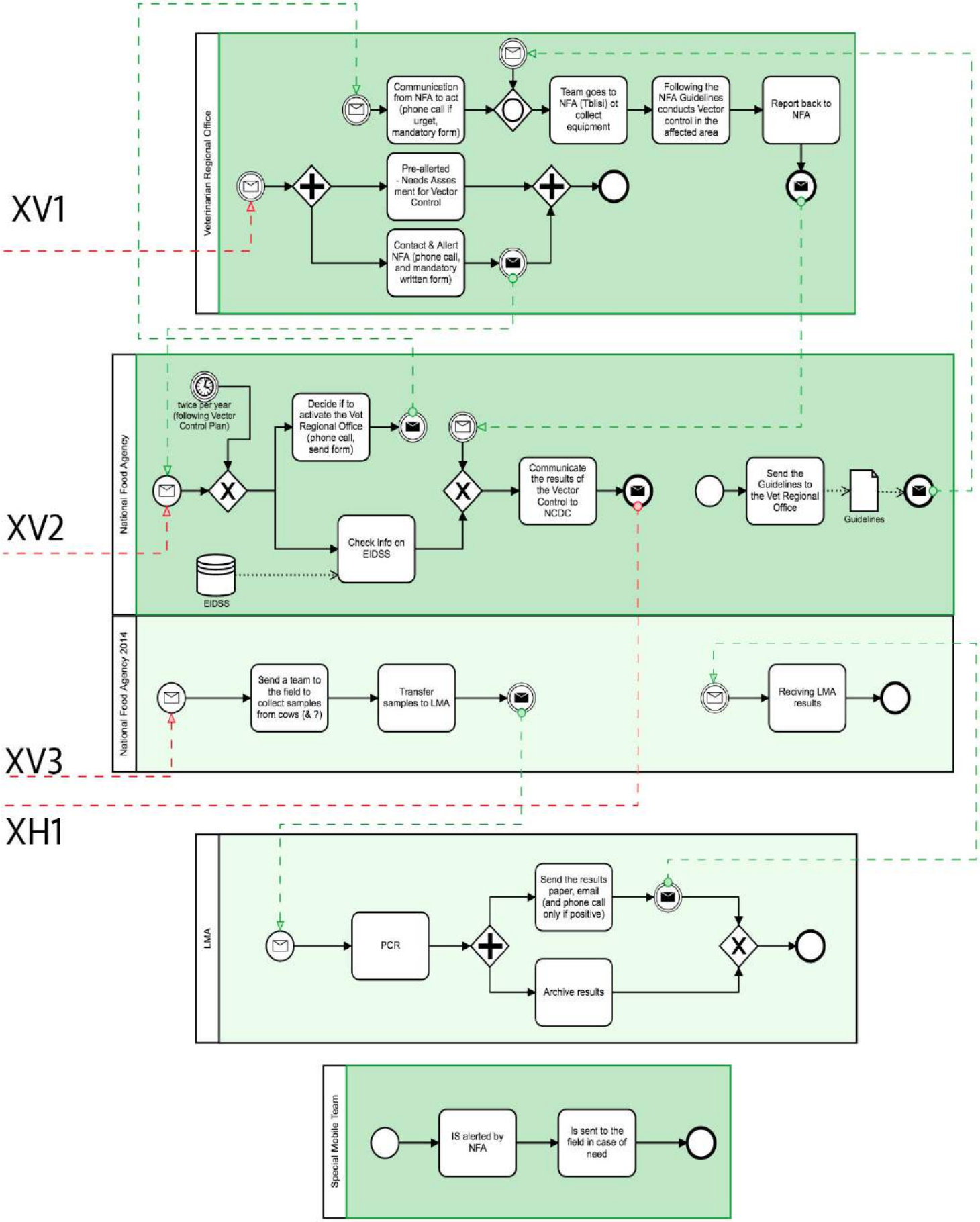


Figure 11b – Overview Zoom – Part 2 – Veterinary Sector

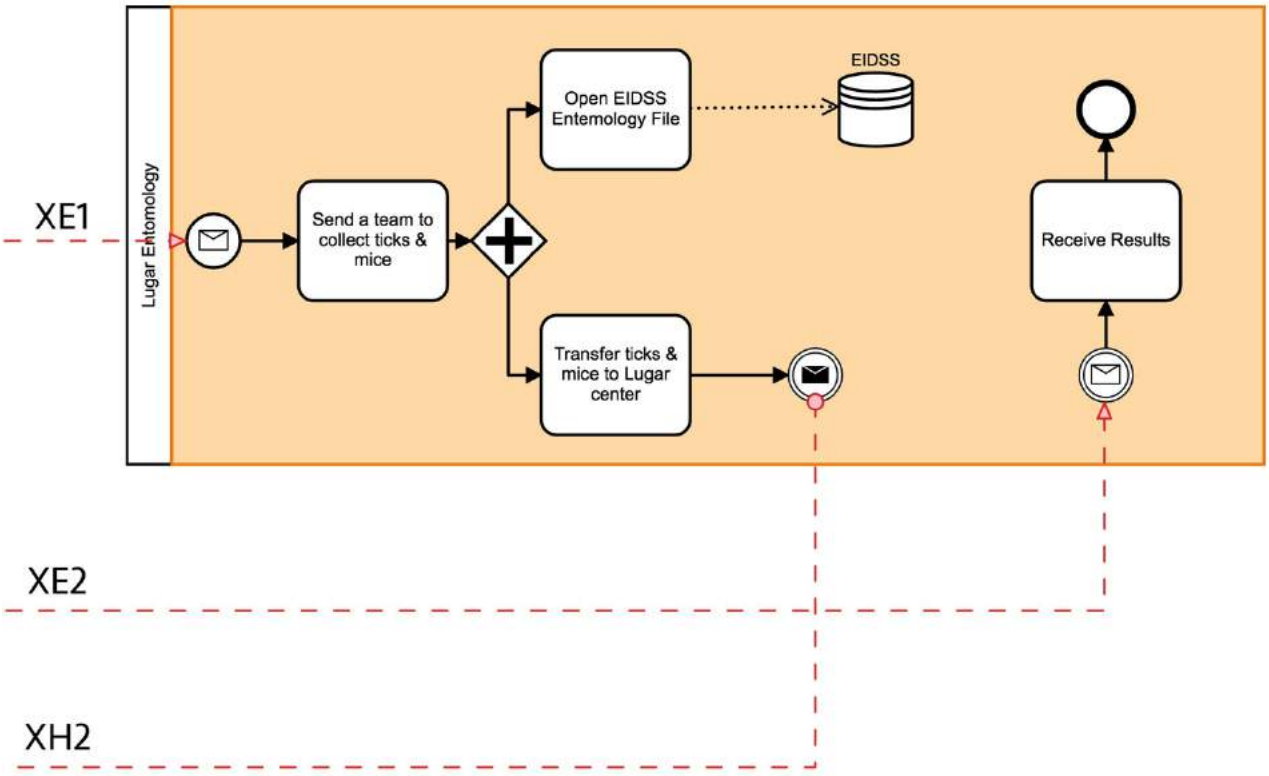


Figure 11c – Overview Zoom – Part 3 – Entomology Sector

5.B.2 HUMAN SECTOR

The Human Surveillance Sector was described through interviews conducted at the NCDC and Lugar Centre and integrated with documentation and comments provided during the debriefing meeting at the NCDC.

The Human Surveillance Sector is the largest sector of the integrated surveillance system. This is in line with the fact that CCHF is perceived as a health issue only for humans, because animals do not show symptoms of infection. We identified 8 lanes comprising the following clinical, laboratory and public health actors (Figure 12-14): Hospital, Primary Health Care (PHC); Local (LSS) and Zonal (ZDL) health authorities, NCDC Epidemiologists, Lugar Centre.

The following section provides a brief process description by lane.

5.B.2.1 HUMAN SECTOR PROCESS SUMMARY

Hospital Lane

1. Process starts when a suspect case is identified

2. The parallel gateway that follows indicates that hospitals proceed to:

a) Send notification to the PHC

b) Organize the patient transfer to the Central Hospital for Infectious Diseases

c) Collect blood samples from the patient, wait for the LSS's car and, when it arrives, deliver the sample.

PHC Lane - 1

1. The process starts upon receiving hospital's notification of suspect case.

2. The subsequent parallel gateway indicates that PHC proceed to:

a. Alert LSS

b. Alert Veterinary Regional Office (*XV1* information flow)

c. Contact Tracing – To database

d. Collect clinical data on the patient (performed at the Hospital) which is then added to the newly opened

suspected case file.

e. Alert the epidemiologist.

LSS Lane

1. The process starts upon receiving the alert from PHC.

2. After receiving the alert, if needed, a car is sent to collect the blood samples from the hospital

3. Upon receiving the samples, these will either:

a. Be transported to Lugar Center BLS3

OR

b. Be transferred to ZDL which will collect the sample and transport it to Lugar Center BLS3

NCDC Lane – 1

1. The process starts upon receiving the communication of suspect case from PHC.

2. Contact tracing (among people involved in the transport of the patient – Ambulance- and at and Tblisi Hospital) is performed and related data is added to EIDSS.

Lugar Center BLSS3 Lane - 1

1. The process starts upon receiving the patient's sample from either from ZDL or LSS.

2. Analysis is performed. Depending on the number of days passed it can be done with: PCR; Serology AND PCR; Only Serology

3. The case can be: Confirmed; Probable; Not CCHF case

4. When the answer has been provided, proceed to make the phone call and fill and sign the form then send it by e-mail to Epidemiologist.

5. The last step involves 1 event and 2 processes:

a. E-mail to epidemiologist sent

b. Archive the written forms

c. Add the data to the EIDSS Database

NCDC Lane – 2

1. E-mail from Lugar Center is received and EIDSS database is updated.

2. If results are negative both physician and PHC are informed.

3. If results are positive: both physician and PHC are alerted via phone call, then

a. Veterinary and entomology sectors are informed (*XV2, XV3* information flows).

b. Population is informed

c. Follow up of contacts is performed and database is updated

4. If at least one confirmed or probable case is detected, Veterinary and entomology sectors are informed (*XV2, XV3* information flows).

5. If no cases are detected among contacts the database is updated with results.

Lugar Center BLSS3 Lane – 2

1. Process starts when ticks and mice samples are received from Lugar entomology (*XH2* information flow)

2. PCR is performed and results are sent back to Lugar entomology (*XE2* information flow) and added to the EIDSS database.

PHC Lane – 2

1. Positive results' report-phone call is received from epidemiologist

2. Population is informed and follow up of the contacts is performed

3. EIDSS database is updated.

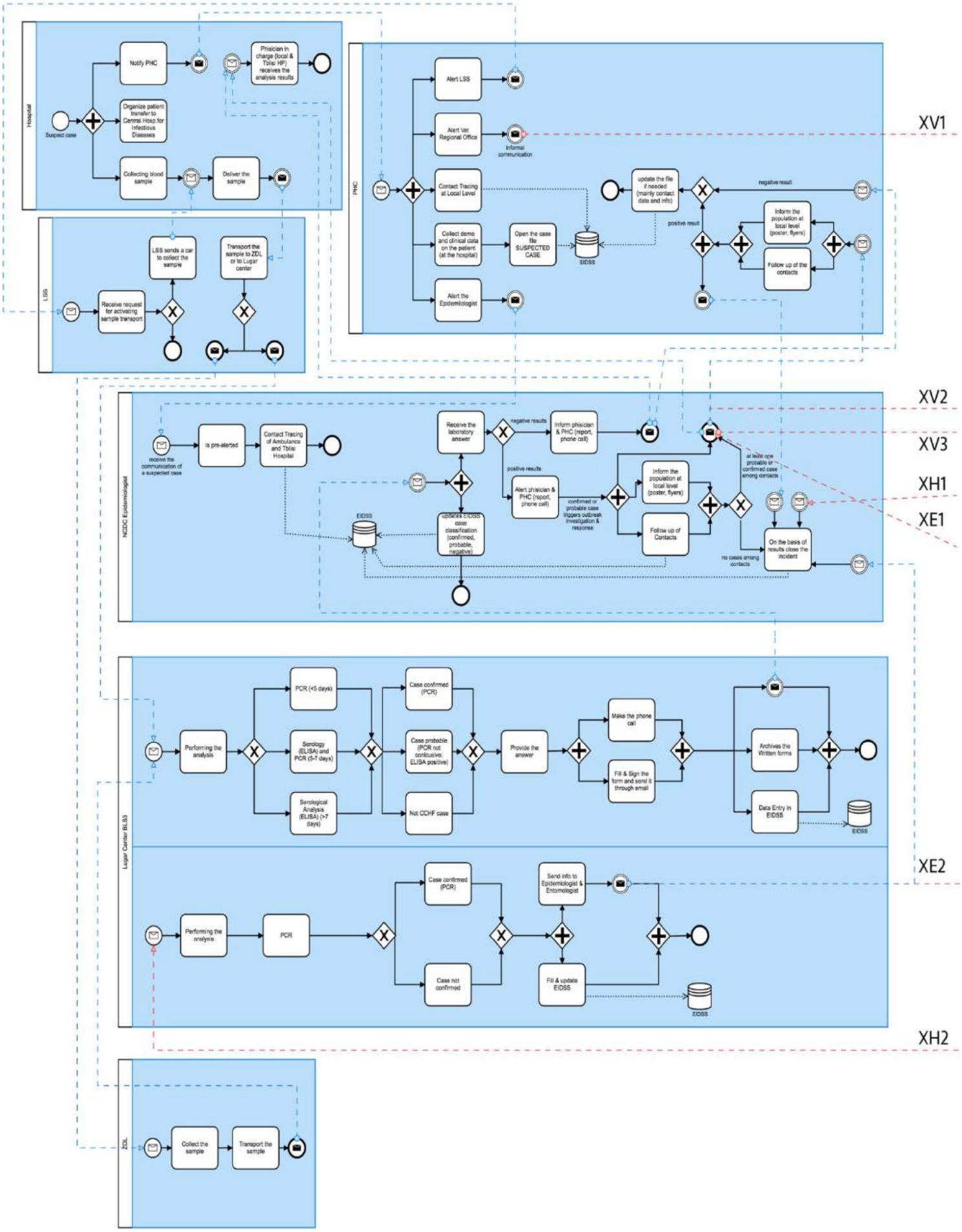


Figure 12 – CCHF surveillance process in Georgia, Human sector overview

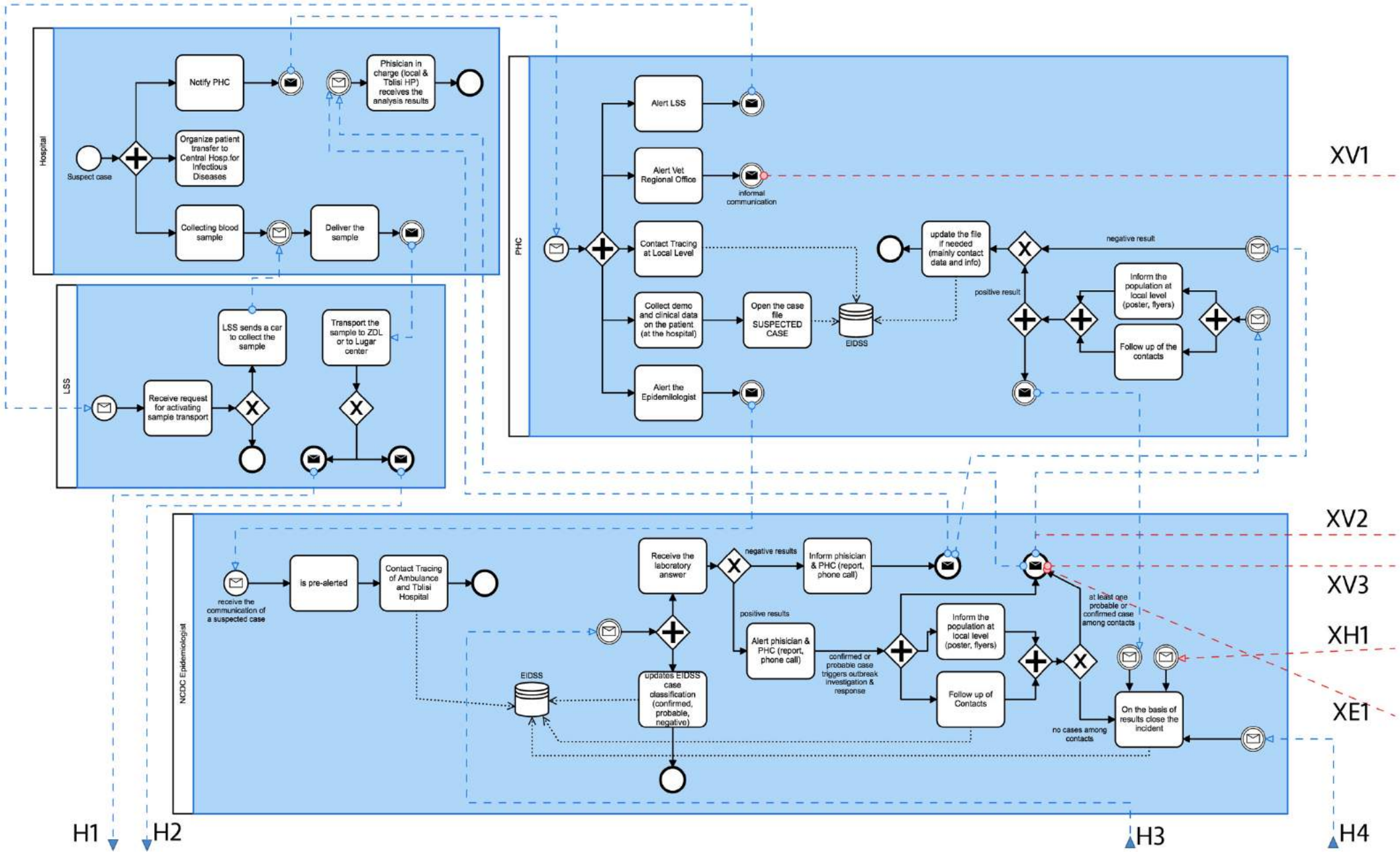


Figure 13 - CCHF surveillance process in Georgia, Human sector detail, part 1

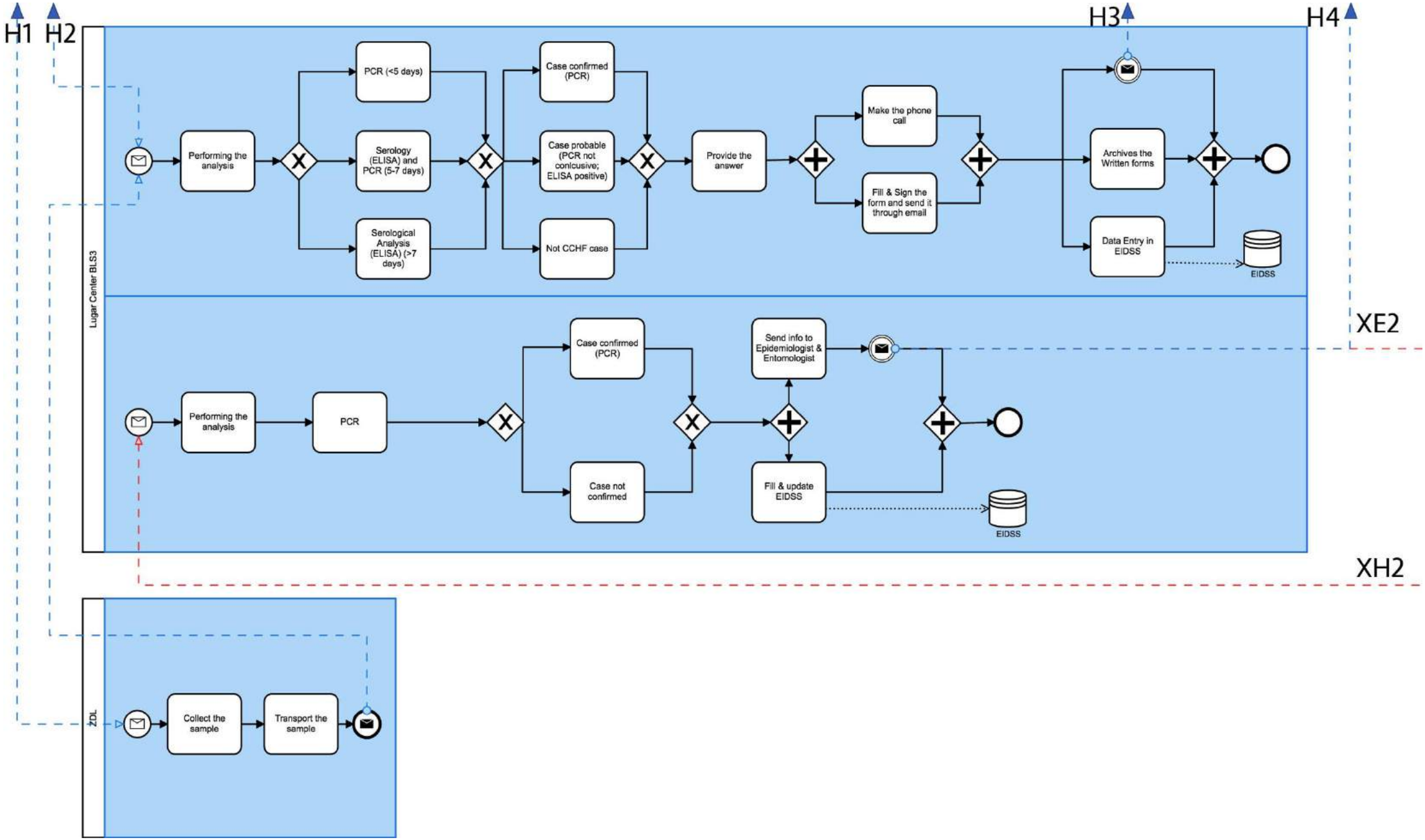


Figure 14 - CCHF surveillance process in Georgia, Human sector detail, part 2

5.B.3 VETERINARY SECTOR

The Veterinary Surveillance Sector was described through interviews conducted at the National Food Agency of Georgia and at the Laboratory of the Ministry of Agriculture, and integrated with documentation and comments provided during the debriefing meeting at the NCDC.

In this sector, we identified 4 lanes comprising the following clinical, laboratory and animal public health actors: the National Food Agency (NFA) central office, the Laboratory of the Ministry of Agriculture (LMA) and the NFA Veterinary Regional Office.

The following section provides a brief process description by lane**:**

5.B.3.1 VETERINARY SECTOR PROCESS SUMMARY

Veterinary Regional Office - 1

1. Process starts upon receiving the alert from PHC (*XV1* information flow)

2. After the alert is received a need assessment for vector control is performed and NFA central office is contacted and alerted

with a phone call and a mandatory written form.

National Food Agency- Veterinary Dept.

1. Process starts when:

a. Notification from veterinary regional office or human sector's epidemiologist (*XV2* information flow) is received

OR

b. Twice per year according to vector control plan

2. NFA activates veterinary regional office (phone call and send form)

3. When results from veterinary regional office are received, these are communicated to NDCC (*XH1* information flow).

4. Guidelines are sent to Veterinary Regional Office

Veterinary Regional Office – 2

1. When activated by NFA the team goes to NFA to collect equipment

2. Vector control is performed, following the eventually received guidelines, in the affected area.

3. Reports back to NFA

National food Agency 2014

The process labelled as “National food Agency 2014” (in light green) represents the specific activities that have been implemented only to deal with the emergency crisis in that year. These specific processes are not currently active.

1. Process starts when alert from human sector’s epidemiologist is received (*XV3* information flow)
2. Central level Team is sent to collect samples
3. Samples are transferred to LMA
4. When results are received from LMA the process ends

LMA

1. Process starts when samples arrive from NFA
2. PCR is performed on samples
3. Results are sent to NFA and archived

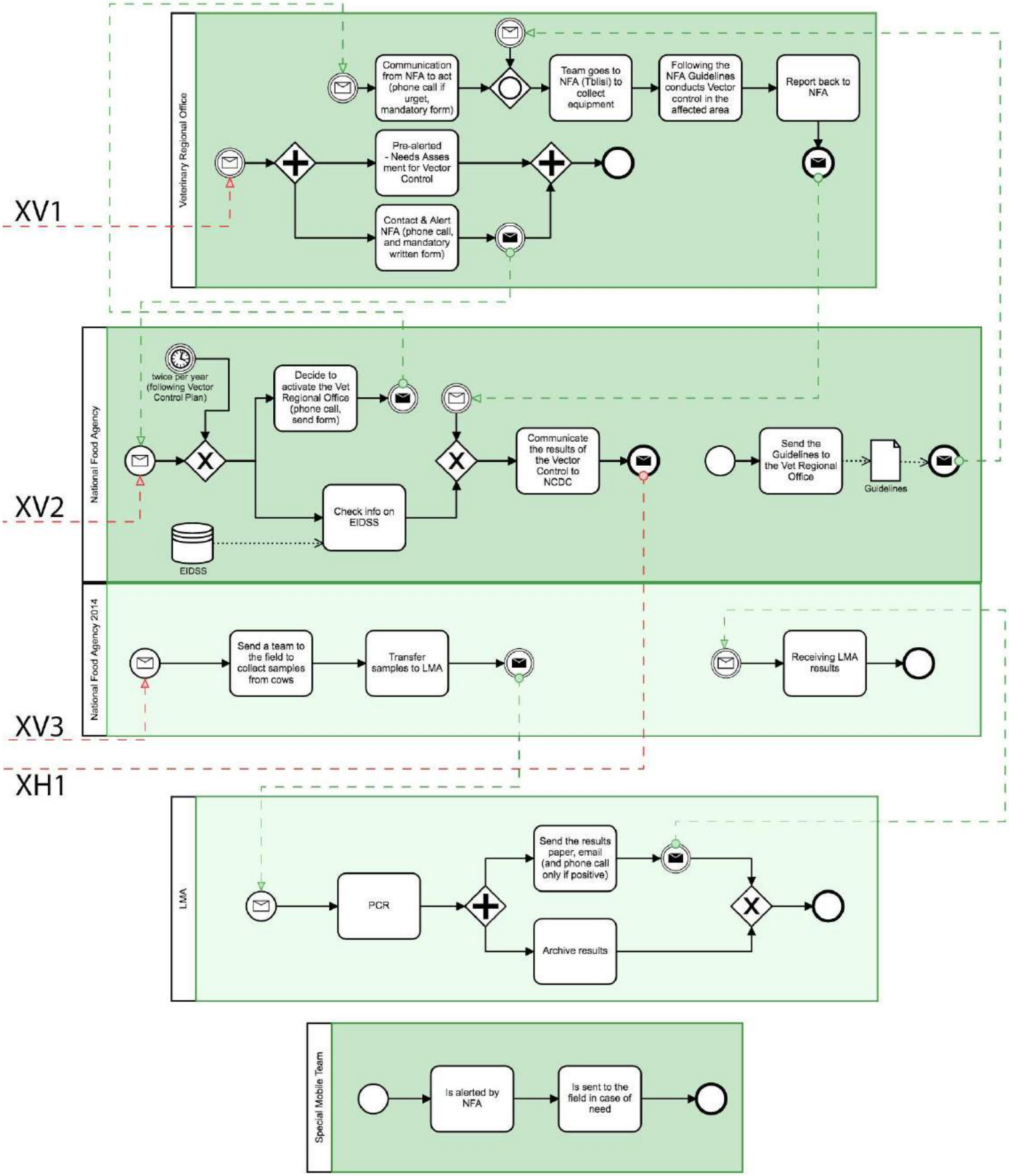


Figure 15 - CCHF surveillance process in Georgia, Veterinary sector overview. Current processes in darker green, processes during the 2014 outbreak in lighter green.

5.B.4 ENTOMOLOGY SECTOR

The Entomology Sector was described through interviews conducted at the Lugar Centre and integrated with documentation and comments provided during the debriefing meeting at the NCDC. The following section provides a brief process description by lane**.**

5.B.4.1 ENTOMOLOGY SECTOR PROCESS SUMMARY

1. Process starts upon receiving alert from human sector epidemiologist (XE1 information flow)

2. A team is sent to collect ticks and mice.

3. Subsequent processes are performed in parallel:

a. An entomology file is opened on the EIDSS database

b. Mice and ticks are transferred to Lugar center (*XH2* information flow)

4. Results are received from Lugar center (XE2 information flow).

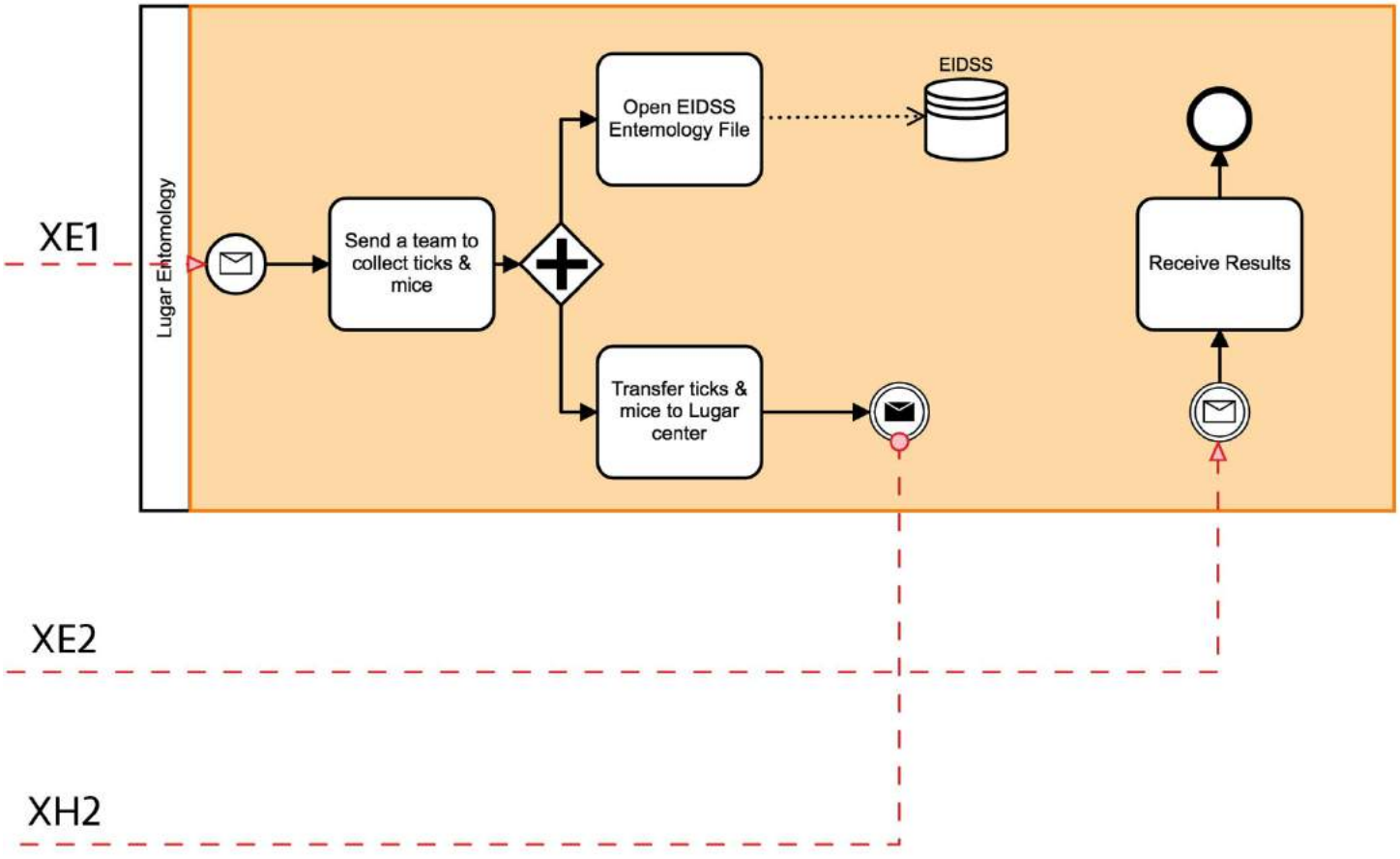


Figure 16 - CCHF surveillance process in Georgia, Entomology sector overview.

6. DISCUSSION

The Georgian surveillance system of infectious disease has, since many years, a robust approach towards integration between sectors and the One Health strategy. This is proved by the institution of the ***EIDSS network and the EIDSS reporting tool*** in 2009. It includes 190 sites (90 sites represent MoLHSA facilities, 97 represent MoA facilities, and 3 are shared by the two Ministries), that share data and information through an single national system used by over 350 public health facility employees. On MoA side, EIDSS is used by the NFA regional, district and central veterinarians, as well as the LMA and its subordinate regional branches. EIDSS is currently used as one of the means of information exchange between MoLHSA and MoA.

Sectors integration was enhanced by the establishment, in the 2012, of a multisectoral team to control Anthrax outbreaks. In 2013 this team was consolidated as a "***One Health" team*** to control Brucellosis, Anthrax, Rabies and CCHF. All the sectors agree that the consolidation of the multisectoral team can help also with other relevant issues in need for integrated approach, like the Antimicrobial resistance (AMR).
Moreover, governmental decrees may promote *ad hoc* collaborations between sectors in case of needs.

Specifically for CCHF, the mutisectoral approach (including the One Health Team) seems be operationally oriented more towards response than early warning. Presently, early warning based on veterinary or entomological surveillance is not available and the control and response measures are triggered by the first human case.
It is mainly for this reason that the NCDC is the leading institution in the CCHF surveillance and has a relevant role in the integration and within the One Health Team.
However, considering its potential in monitoring vectors (presence/absence and infection), the entomology department at the Lugar Centre can provide relevant support for early warning by identifying at risk areas ahead of human cases. Currently at risk areas for CCHF are identified on the basis of the presence of the vectors or human cases in the previous years.
EIDSS has been conceived also as an early warning tool, with "alert" messages sent automatically to and from all the sectors involved. The EIDSS Entomological section has been described as currently rudimental and in need of development in line with this early warning potential.

The working context is conducive to interaction, all the stakeholders are motivated and not many referents to be consulted.
Notwithstanding the above, some challenges have been reported and discussed:

- The collaboration with the veterinary sector is not always easy, due to the almost absent impact on the animals, the information is often missing or inaccurate;

- Coordination and collaboration on vectors monitoring and control between NFA and the Entomology Department at the Lugar Center should be enhanced;
- Lack of collaboration between public and private hospitals in Tbilisi, especially during outbreaks, could hamper the impact of public health actions.

From the analysis of the surveillance processes, and their inter and intra sectoral connections mapped using the BPMN methodology, emerged, as expected, that the Human sector is in charge of the majority of the activities and it has a central role. Focusing on the cross-sectorial communication flows (represented in the graph with the letter X) we notice that most of the exchanges happen between the Human sector and one of the other areas (Veterinarian or Entomological). This is coherent with the main purpose to preserve as much as possible human lives and thus to always reach a certain level of coordination with such units. Looking more in details, we can also notice that connection both inter and intra units have mainly two actors involved: NCDC Epidemiology and Lugar Center BLS3. These two units are acting *de-facto* as coordination brokers since most of the tests are performed in the Lugar Center BLS3 and a consistent part of time-sensitive actions and decisions are taken between the NCDC Epidemiology and the BLS3. The role of coordination brokers of these two units is also stressed by the consideration that there is a certain number of not formalized information exchange embedded in the processes, especially in case of a positive confirmation of infection. As emerged by the interviews, the Georgian experts expect that informal communication (mainly as direct phone calls) would happen in case of time-sensitive information.

Another interesting aspect emerging from the analysis is the consideration that the NFA in 2014, during the CCHF epidemic, was able to set and run a specific pattern of activities needed to respond to the contingent emergency, showing the ability to be flexible to unexpected needs. In 2017, the same processes are not performed because there is no need, but the members of the unit explicitly explain that they will be ready to resume the same processes even in a more efficient way in case of emergency, because now “they know how to do it”. This shows the importance to preserve those competencies and knowledge that may not be of immediate use in the short term, but that can save time and improve the results if and when an emergency will rise.

7. CONCLUSIONS

Georgia has been experimenting intersectorial surveillance integration for CCHF disease, both with intra-sectorial and inter-sectorial collaboration processes, for several years.

The analysis reported in the previous chapters are based on the information collected during the interviews, guided by the study’s check list (see in annex II of the Portfolio), with key stakeholders working at the Institutions involved in CCHF surveillance in Georgia.

The information, data, procedures, lessons learned etc. collected were preliminary elaborated during the site visit by the ISS/OrgLab team and presented and consolidated during the debriefing meeting, with all the relevant stakeholders, held in the last day of the mission (15 December) at the NCDC (see annex IV).

In order to assess and document the level of integration between sectors, we identified possible criteria [8], proposed on the basis of an existing operational protocol and procedures [17].

The current levels where inter sectorial integration of CCHF surveillance has been implemented in Georgia, in accordance with the identified criteria, is reported in Table 1.

Table 1. Levels of intersectorial CCHF surveillance integration, Georgia, 2016

Level of integration	**Sublevels of integration**	**The Georgian example**
Policy and institutional level	Policy level	Legislation issued by the Government (2015) has created the One Health intersectorial committee at national level NCDC covers the Human Health and Entomology and refers to the Ministry of Health Presence of formal institutional collaboration mechanisms within other sectors (as during the 2014 outbreak)
	Institutional level	Presence of informal collaboration mechanisms (across sectors and within the human health sector) Presence of a strategic plan developed after CCHF epidemic in 2014 which is presently being developed in a generic preparedness plan
Data collection and analysis level	Interoperability mechanisms at data collection level	EIDSS Electronic Integrated Disease Surveillance System across all sectors
	Interoperability mechanisms at data analysis level	Potential with the EIDSS, but presently used across human epi and virology
Dissemination level		Information and reports are shared across sectors during the One Health Meetings every 3 months

The main criteria related to integration in place, seem to be fulfilled in the Georgian surveillance system.

Considering that, as anticipated in background, the One Health surveillance should lead to faster disease detection, more efficient disease control and tangible financial savings when formally compared against separated surveillance streams [5,6], further studies are needed to evaluate the impact of these surveillance plans to systematically quantify the costs and benefits of this integration .

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Annexes

Annex I

MediLabSecure

Situation analysis on integrated surveillance of arboviruses in the Mediterranean and Black Sea Region

MeSA Study Design

The MeSA Study was designed by Flavia Riccardo (ISS), Maria Grazia Dente (ISS) and Silvia Declich (ISS).

MediLabSecure is a continuation of the “EpiSouth plus” project (2010-2013). The project is funded by the European Union DEVCO/EuropeAid (Contract Number: IFS/2013/330 961). The Project is led by the Institut Pasteur and counselled by an Advisory Board composed by international experts.

CONTENTS

Sommario

1. Introduction

1.1 THE MEDILABSECURE PROJECT

Countries of the Mediterranean and Black Sea regions have common sea borders and, as a result, share common public health issues and threats. MediLabSecure is a European project (2014-2017) that aims at consolidating a Public Health and Laboratory Network on emerging zoonotic vector borne viruses.

It represents a cluster for awareness, risk assessment, monitoring and control of these vector borne diseases. This cluster pursues the interaction of four sub-networks, one laboratory network for human health, one laboratory network for animal health, one laboratory network for entomology and one network for public health reinforcement. The MediLabSecure network includes partner countries around the Mediterranean and Black Sea Regions (19 non-EU countries).

1.1.1 General objectives

- Create a framework for collaboration to improve surveillance and monitoring of emerging vector borne viral diseases (arboviruses)
- Provide training in participating countries to increase the communicable disease control in the Mediterranean and Black Sea region.
- Promote knowledge development and transfer of biosafety best laboratory practices

1.1.2 Specific objectives

Prevent spread of viruses and concerned vectors (mosquitoes):

- Prevent outbreaks of zoonotic viruses with an existing identified or potential risk in the region (West Nile, Dengue, Chikungunya, Yellow Fever, Rift valley fever, …)
- Improve integrated surveillance (animal, human, entomological)
- Provide risk assessment of the different emerging viruses (transmission, spread, human impact…)
- Recommend and implement public health measures for control where possible

For more information, visit http://www.medilabsecure.com/project.html

1.1.3 WP5- Public Health

Public health activities will reinforce the laboratories' consortium by investigating and improving where possible the standard methods of surveillance towards integrated surveillance, risk assessment and early case detection. The harmonization of methods for epidemiological surveillance in the three areas of human and animal virology and medical entomology will facilitate data exchange and data management, which ultimately will improve prevention and control.

In particular, the WP5 aims at assessing the current national situations in terms of **integrated surveillance**: which kind of links/procedures exists in the countries involved between the animal virology, human virology and medical entomology entities and the central national surveillance system.

These links/procedures will be verified and described through a national situation analysis (MeSA Study) to be carried out in a pool of three countries. The identified gaps and needs will inform the other WPs and the identified relevant case studies and lessons learned will be shared with all the countries involved in order to enhance inter-sectoral integration of surveillance.

The design of this study is based also on the experiences gathered during the conduction of the EpiSouth Plus National Situation Analysis of coordination of surveillance between Points of Entry and National Health Systems [1].

1.2 OBJECTIVES OF THE MESA STUDY

The MediLabSecure Situation analysis on integrated surveillance of arboviruses in the Mediterranean and Black Sea Region (MeSA Study) is a qualitative situational analysis study involving human, animal and entomology sectors of vector borne disease surveillance in three countries of the Mediterranean and Black sea region participating to the MediLabSecure Project.

1.2.1 General Objective

The goal of The MeSA study is to:

> Contribute to the integration of laboratory/clinical human, animal and entomological surveillance of arboviruses in the Mediterranean and Black Sea region and encourage inter-sectoral collaboration.

1.2.2 Specific objectives

1. Describe how the collection, analysis and dissemination/exchange of information is organized within and between human, animal and entomological surveillance of arboviruses in three countries of the MediLabSecure network,
2. Identify formal procedures, informal practices and legal constraints for integrated surveillance and inter-sectoral collaboration in these three countries,
3. Discuss main challenges and success stories in establishing a functional inter-sectoral collaboration and integration of surveillance between the human, animal and entomological sectors in these three countries.

1.3 MESA SITUATION ANALYSIS INVESTIGATORS

The national situation analysis will be guided and performed by a team of investigators (hereby Situation Analysis investigators) comprising MediLabSecure Focal Points of participating countries, the WP5 leaders and subject matter experts. The PH Focal Points of participating countries will participate in all the study phases.

1.4 PHASES OF THE MESA STUDY

The MeSA study is structured in four phases:

1. **Selection**: Selection of three countries to involve in the study (hereby called “participating countries”).

2. **Country Portfolios:** Development of study tools and collation for each country, in advance of the site visit, of available data/documents to build a country portfolio including specific scenarios/check lists.

3. **Site Visits:** Conduction of a site visit in each participating country to investigate processes, procedures and performance in the field of arbovirus surveillance integration between human, animal and entomological sectors in the framework of One Health.

4. **Reporting:** Preparation of a country report for each visited country and distillation of main findings in a strategic document on inter-sectoral integration in the field of arbovirus surveillance.

2. Relevant background information

2.1 SURVEY ON THE LEVEL OF INTEGRATION BETWEEN THE ANIMAL VIROLOGY, HUMAN VIROLOGY AND MEDICAL ENTOMOLOGY ENTITIES WITH THE CENTRAL NATIONAL SURVEILLANCE

In order to assess and document the level of integration between the animal virology, human virology and medical entomology entities with the central national surveillance system we identified criteria, reported in table 1., proposed on the basis of existing operational protocols and procedures [2, 3, 4] and assessed with a scoping literature review [5].

Table 1 – Proposed criteria to describe existing levels of integration between human/animal/entomological surveillance for a specific exposure

Level of integration	Sublevels of integration	Criteria
Policy and institutional level	Policy level	1. Existence of a National policy addressing integrated surveillance for this specific exposure 2. Existence of a policy addressing integrated surveillance for this specific exposure at subnational level
	Institutional level	3. Existence of agreements among the institutions involved in human/animal/entomological surveillance for the specific exposure, 4. Existence of a coordination mechanisms among the institutions involved, 5. Existence of identified focal points for each of human/animal/entomological surveillance for the specific exposure
Data collection and analysis level	Interoperability mechanisms at data collection level	6. Existence of integrated data collection tools 7. Existence of activation mechanisms of human surveillance based on signals from animal/entomological surveillance 8. Other interoperability mechanisms at data collection level

	Interoperability mechanisms at data analysis level	9. Presence of DB exchange/merging/other mechanisms to facilitate joint analysis among sectors. 10. Performance of joint/integrated data analysis among the different surveillance sectors 11. Other interoperability mechanisms at data analysis level
Dissemination level	-	12. Existence of joint result dissemination mechanisms (e.g. bulletins, reports, papers, media reports, websites …)

On the basis of the three critical levels reported in the table, we designed a survey targeting all the contact points of the project that could explore:

1) the existence of a national policy addressing integrated surveillance;

2) the existence of coordination mechanisms among the institutions involved;

3) the existence of integrated data collection tools and

4) the existence of joint result dissemination mechanisms such as bulletins, reports, papers, media reports and/or websites.

We then assessed the level of surveillance integration in the 19 countries of the project splitting them in three regions (Table 2.).

Table 2 - Countries and regions involved

Balkans	Black Sea	North Africa and Middle East
Albania	Armenia	Algeria
Bosnia and Herzegovina	Georgia	Egypt
Kosovo	Moldova	Jordan
Montenegro	Ukraine	Lebanon
Serbia		Libya
The Former Yugoslav Republic of Macedonia		Morocco
Turkey		Palestine
		Tunisia

We performed a frequency analysis for all categorical variables, and the proportions of responses were calculated on the basis of the number or respondents for each question.

Fifty-six contact points (CP) from laboratories (animal virology, human virology and medical entomology) and 19 contact points (CP) from Public Health Institutes (PHI)/Ministries of Health (MoH) (human epidemiology) from the 19 countries were invited to participate in the survey between December 2014 and July 2015.

We obtained responses from 51 laboratories (51/56; 91%) and 12 PHI/MoH (12/19; 63%), of whom: 14 were from the Black Sea, 26 from North Africa and the Middle East and 23 from the Balkans.

Human virology laboratories (19/63; 30%) were the most represented, followed by animal virology laboratories (18/63; 29%), medical entomology laboratories (14/63; 22%), and human epidemiology experts (12/63; 19%).

2.1.1 Main findings of interest for the MeSA Study:

Thirty-four responders (34/63; 54%), of 17 countries, reported the availability of a ***National policy addressing integrated surveillance*** in their countries. When considering the result by sub-regions we found national policies to be available for 57% (8/14) of the Black Sea respondents, 62% (16/26) of North Africa and Middle East respondents and 43% (10/23) of Balkan responders.

Positive replies were given by 50% (9/18) of all animal virology respondents, 42% (8/19) of human virology respondents, 50% (7/14) of medical entomology respondents and 83% (10/12) of human epidemiology respondents.

Thirty-one respondents (49%), of 16 countries, reported the ***existence of coordination mechanisms*** among the institutions involved, of whom 57% (8/14) of the Black Sea respondents, 54% (14/26) of North Africa and Middle East respondents and 39% (9/23) of Balkan respondents. Positive replies were given by 56% (10/18) of all animal virology respondents, 47% (9/19) of human virology respondents, 29% (4/14) of medical entomology respondents and 67% (8/12) of human epidemiology respondents.

Integration mechanisms in data collection were reported by 29% (18/63) of all respondents, of 11 countries. This response was positive among 29% (4/14) of all the Black Sea respondents, 27% (7/26) of North Africa and Middle East respondents and 30% (7/23) of Balkan respondents. Positive replies were given by 11% (2/18) of all animal virology respondents, 32% (6/19) of human virology respondents, 21% (3/14) of medical entomology respondents and 58% (7/12) of human epidemiology respondents.

Thirty-four respondents (34/63; 54%), of 16 out of 19 countries, reported the availability of ***joint results dissemination mechanisms*** in their countries. This response was positive among 43% (6/14) of all the Black Sea respondents, 69% (18/26) of North Africa and Middle East respondents and 43% (10/23) of Balkan respondents. Positive replies were given by 44% (8/18) of all animal virology respondents, 58% (11/19) of human virology respondents, 57% (8/14) of medical entomology respondents and 58% (7/12) of human epidemiology respondents.

Table 3 – Inter-sectoral integration reported by region

				N Respondents reporting integration

Level of integration	Sublevels of integration	Number of countries reporting integration (N 19)	Number of respondents reporting integration (N 63)	Balkans (N 23)	Black Sea (N 14)	NA & ME (N 26)
Policy and institutional level	Policy level	17	54% (34)	43% (10)	57% (8)	62% (16)
	Institutional level	16	49% (31)	39% (9)	57% (8)	54% (14)
Data collection and analysis level	-	11	29% (18)	30% (7)	29% (4)	27% (7)
Dissemination level	-	16	54% (34)	43% (10)	43% (6)	69% (18)

For further details on the study, see [6]

2.2 EXERCISE ON WEST NILE VIRUS RISK ASSESSMENT DURING THE MEDILABSECURE MID-TERM MEETING

During the mid-term Meeting of the MediLabSecure Project (15-17 December 2015), the Multisectorial Exercise on Risk Assessment was organised and conducted. This exercise was designed to foster small group discussion on surveillance integration in the framework of One Health, on the status of West Nile Virus surveillance in the region also in relation to what proposed in the ECDC tool and on the applicability of the ECDC tool in a non EU context (report available at http://www.medilabsecure.com/documents/site/report_midterm_meeting_web.pdf).

During this exercise, each country table (including participants from the same country and different professional sectors) conducted a SWOT analysis on the basis of a predefined template looking at:

- Strengths in the country in relation to surveillance in place and the risk level assessed.
- Weaknesses in the country in relation to surveillance in place and the risk level assessed.
- Opportunities in the use of the ECDC tool in their context
- Challenges in using the tool in their context.

Findings were then discussed in the whole group and summarized in a single subregional SWOT output that was included in the last restitution slide.

Recurring strengths that were mentioned in relation to WNV surveillance included:

- The existence of consolidated surveillance systems for WNV infection including entomological surveillance, animal surveillance and human surveillance,
- Existing laboratory capacity and expertise, and
- In some countries, the existence of multisectorial collaboration mechanisms across disciplines was also mentioned.

The most recurring mentioned weaknesses were:

- The need to strengthen intersectorial collaboration,
- The need to strengthen laboratory capacity for differential diagnosis and confirmation of WNV, and
- The need to strengthen surveillance systems (e.g. through active surveillance).

Some countries reported that WNV is not considered a priority for public health. These participants highlighted a lack of awareness of WNV among authorities/physicians/general public and of political commitment in supporting targeted preparedness activities.

3. MeSA phase 1: Selection

The MeSA study aims to analyse success stories in integration of arboviral disease surveillance across the human, animal and entomological sectors. To this end, the selection builds on the findings of the survey conducted by the MediLabSecure project, as well as on country discussions held during the Midterm project Meeting (15-17 December 2015).

Coordination complexity among stakeholders involved in surveillance activities across the human, animal and entomological sectors both in laboratories and in the National Surveillance System could vary according to the size of the country and its type of health system.

What is seen in large countries and a more federal organization with many intermediate levels of competency, may not reflect the situation in smaller settings where functions are aggregated with fewer levels of competence and where the same professionals cumulate many functions and have more chances of interacting routinely. These considerations will also be taken into account in the selection phase.

For this reason enrolment criteria are designed to select three countries with reported experience in inter-sectoral integrated surveillance, that reflect the demographic, geographical and governmental diversity of the Mediterranean and Black Sea Region (Box 1).

The success of the MeSA study will depend also on the commitment of the MediLabSecure PH Focal Points of participating countries. In fact, these Focal Points will be charged of organizing the site visits in their Ministry of Health and in other relevant Ministries and Institutions, of planning all internal travel and of organizing meetings with the most appropriate actors and informants. For this reason, we drafted terms of reference (Annex1) that were discussed in a dedicated side meeting of Mid Term project meeting.

This allow countries through the PH Focal Points to be aware of the amount of work required before deciding whether or not to agree to participate in the study.

Candidate countries will be identified for each group based on their relevant national know-how. The selection process will be aimed at identifying a rose of candidate countries with experiences and lessons learned that, if shared, could be useful to network participants in strengthening integration of surveillance in the framework of One Health.

3.1 THE SELECTION PROCESS

Based on the objectives of the MeSA study pre-selection criteria were identified (Box 1).

BOX 1: NATIONAL SITUATION ANALYSIS PRE SELECTION CRITERIA FOR COUNTRY PARTICIPATION

- The three countries should reflect the diversity Region (i.e. large/small countries, centralized/decentralized countries, countries of Balkans/Middle East & North Africa/ Black Sea)
- The level of integration of surveillance in the selected country is known to be high (according to the survey)
- The PH Focal Point considers the sharing of lessons learned and experiences matured nationally to be useful for the network
- There is internal national capacity to meet the study's terms of reference requirements

During the Mid Term MediLabSecure project meeting, the WP5 held a side meeting in which the MeSA study objectives, process and selection criteria were discussed with members of the PH network of the project.

On the basis of the background knowledge gathered through the survey, initial expressions of interest are being collected from candidate countries. Countries expressing interest were further contacted and invited to participate in the study.

4. MeSA phase 2: Development of a Country Portfolio

With the objective of providing the investigators in advance of each site visit with a document containing key information on the country that would be visited and tools to guide discussions, a country specific portfolio will be assembled. This will include details on the visit duration, aims and agenda as well as a stakeholder table and checklist for each environment to be visited . The national SWOT analysis performed during the exercise on West Nile Virus risk assessment held during the MediLabSecure mid-term meeting will also be used to enrich the country portfolio (see 2.2).

All the investigators involved in the MeSA study will discuss and jointly develop the study tools. These will include:

1. a stakeholder table, and
2. a comprehensive checklist

4.1 IDENTIFICATION OF IN-COUNTRY PARTICIPANTS TO INVOLVE IN THE STUDY AND DEVELOPMENT OF STAKEHOLDER TABLES

Each Participating Country's Public Health Focal Point will be in charge of identifying and involving concerned actors and informants that could provide information and insights on the processes, procedures and performance of integration of laboratory/clinical human, animal and entomological surveillance of arboviruses in his/her country.

To aid this process, stakeholder tables will be developed in agreement with all the investigators, one for each sector studied.

All participating countries will be asked to involve, among others, the following informants:

- At least one actor in charge of the chosen disease surveillance in each sector to be visited as appropriate (e.g. human virology laboratory, animal virology laboratory, human public health, veterinary public health, entomological surveillance),
- Relevant national, intermediate and/or local level operators of the surveillance system of the chosen disease.

4.2 THE SITUATION ANALYSIS CHECKLIST

A semi structured check list will be developed to guide interviews with actors and informants during the site visit.

This tool will be developed by the investigators in advance and circulated ahead of the site-visit to informants to enable them to understand better the scope of the study and the type of information that would be requested.

The aim of the checklist is to provide a guide to follow in analysing the procedures and processes in place for integration/coordination of laboratory/clinical human, animal and entomological surveillance of arboviruses.

The checklist will be developed in English. In countries where English is not a used language, Public Health Focal Points will be in charge of explaining and, if needed, translating the checklist in advance of the visit to facilitate the work of the investigators.

The checklist might be structured in two separate sections directed specifically either to national actors involved in surveillance or to intermediate/local administrative levels (if appropriate).

5. MeSA phase 3: Site visits

The MediLabSecure project foresees site visits of the MeSA study to take place **between July and December 2016**. Selected participating countries will be asked to define, at their earliest convenience, the week in which to plan the situation analysis.

During each visit, the members of the MeSA study investigation team will be asked to:

- Visit the office in charge of national human surveillance of the selected arbovirus (MoH, central level) meeting with key informants and conduct a briefing,
- Visit the office in charge of national human laboratory, veterinary Public Health and lab, and entomological surveillance, as appropriate, of the arbovirus (central level) meeting with key informants,
- Visit, if possible, key informants across sectors in charge of the surveillance of the selected arbovirus at intermediate/local administrative levels,
- Discuss a real life events with key informants in each sector to explore the procedures, processes and performance of two way communication between laboratory/veterinary/entomological sectors and the NHS on aspects related to the surveillance of the selected arbovirus,
- Conduct a debriefing meeting with all the stakeholders involved to discuss and consolidate the information, data, procedures, lessons learned etc., collected through the documentation provided and through the interviews conducted during the visit.

The country portfolio and the checklist will be used to guide discussions.

The Public Health Focal Point of each participating country will be in charge of organizing the site visits in the Ministry of Health and in all relevant Sectors, of planning all internal travel and of organizing meetings with the most appropriate actors and informants.

6. Reporting

After each site visit a country report will be developed in collaboration with all the investigators involved.

The surveillance processes and their inter and intra sectoral connections will be mapped with the support of OrgLab (University of Cassino), using the Business Process Modelling Notation (BPMN) methodology, and customized colour coding for each sector.

Business Process Modeling (BPM) is a representational framework designed to visually "describe how businesses conduct their operations" and typically involve "graphical depictions of at least the activities, events/states, and control flow logic that constitute a business process" (Curtis et al., 1992). A process is defined as a set of activities executed in a predefined, sequential or parallel, order by a pre-determined number of organizational actors or entities sharing the collective goal of reaching organizational objectives (Chinosi and Trombetta, 2012). The term "business process modeling" and its related representation methodologies are not necessarily limited to the business environment but can be used in any scenario in which organizations are structured in a complex net of tasks and their interactions. In fact, BPM was developed for those processes that are so complex and distributed (as in the case of infectious diseases identification, early warning and response), that require a standardized and refined representation system to be effectively transmitted and clearly understood by a broad variety of individuals and units. BPM methods have been increasingly in vogue among analysts and organizational specialists, used both to create AS-IS representations of current practices, aiming at knowledge transfer, as well as to serve as an analytical tool to improve the efficiency or effectiveness of the analysed processes (TO-BE).

After a revision phase, the report will be shared with the MediLabSecure Coordination Team and cleared for publication in the MediLabSecure Website.

All the activities performed by WP5, including the results of the MeSA Study, will be the knowledge basis upon which this team will elaborate a "Strategic Document" that will analyse findings from a Mediterranean and Black Sea regional perspective.

7. References

1. EpiSouth Plus [website] The EpiSouth Plus National Situation Analysis on coordination of surveillance between Points of Entry and National Health Systems (ENSA) available at http://www.episouthnetwork.org/content/episouth-plus-national-situation-analysis-coordination-surveillance-between-points-entry-and (accessed 2 February 2016)
2. World Health Organization. Monitoring & evaluation Indicators for Integrated vector management. WHO/HTM/NTD/VEM/2012.4. ISBN 978 92 4 150402 7. Available from: http://apps.who.int/iris/bitstream/10665/76504/1/9789241504027_eng.pdf; last visited 12/10/2015.
3. WHO-FAO-OIE Four-Way Linking Project for Assessing Health Risks at the Human-Animal Interface, 2013
4. Simona Forcella, Nasr El-din El Tantawy, Jobre Yilma, Amira AbdelNabi2,Filip Claes, Gwenaelle Dauphin & Elizabeth Mumford *The development of a four-way linking framework in Egypt: an example of the FAO, OIE and WHO joint activities to facilitate national risk assessment*. Veterinaria Italiana 2015, **51** (1), 45-50. doi: 10.12834/VetIt.220.680.1

5. Maria Grazia DENTE, Flavia RICCARDO, Jean-Claude MANUGUERRA, Camille ESCADAFAL, Miguel Angel JIMENEZ-CLAVERO, Elisa PEREZ RAMIREZ, Vincent ROBERT, Marie PICARD, Lobna GAAYEB, Kathleen VICTOIR, Silvia DECLICH on behalf of the MediLabSecure Network Strengthening preparedness to arbovirus infections in Mediterranean and Back Sea Countries: towards common criteria to assess and report on One Health strategy. Abstract accepted at the MEdiPIET Annual Scientific Conference 2016
6. M. G. Dente, F. Riccardo, G. Nacca, A. Ranghiasci, J-C. Manuguerra, C. Escadafal, M. A. Jimenez-Clavero, E. Perez Ramirez, V. Robert, M. Picard, F. Cherblanc, L. Gaayeb, K.Victoir, S. Declich on behal of the MediLabSecure Network Strenghtening integrated surveillance for arboviruses in the Mediterranean and Black Sea regions in the framework of the One Health approach. QUADERNI DELLA SOCIETÀ ITALIANA DI MEDICINA TROPICALE E SALUTE GLOBALE N. 1, 2016 http://www.simetweb.eu/Page/WebObjects/PageSimet.woa/wa/displayPage?name=Pubblicazioni

Annex II

MediLabSecure Situation Analysis on integrated surveillance (MeSA) Study

SITE VISIT TO

GEORGIA

(12-16 December 2016)

CONTENTS

Confirmed Co-Investigators participating in the site visit

- ***Istituto Superiore di Sanità***: Maria Grazia Dente and Flavia Riccardo
- ***NCDC:*** _Khatuna Zakhashvili, Irine Kalandadze, Giorgi Chakhunashvili, Giorgi Babuadze, Nana Mamuchishvili _____
- ***NFA*** – Lasha Avaliani, Lena Ninidze, Natia Kartskhia
- ***LMA***_Ana Gulbani, Maka Kochreidze
- ***Università di Cassino:*** *Francesco Bolici*

programme

12 December: Arrival of ISS team in Georgia

13 December: meeting at the **NCDC**, public health and disease surveillance in humans

1 4 December: **NCDC's laboratory at the R. Lugar Center** and animal laboratory at the **LMA**, human virology and vector control-related issues;

15 December: meeting with **NFA**, animal surveillance. Final debriefing meeting.

16 December: Departure of ISS team from Georgia

BACKGROUND INFORMATION

THE GEORGIAN HEALTH SYSTEM AND CCHF SURVEILLANCE

Is the health system in Georgia centralized or de-centralized?

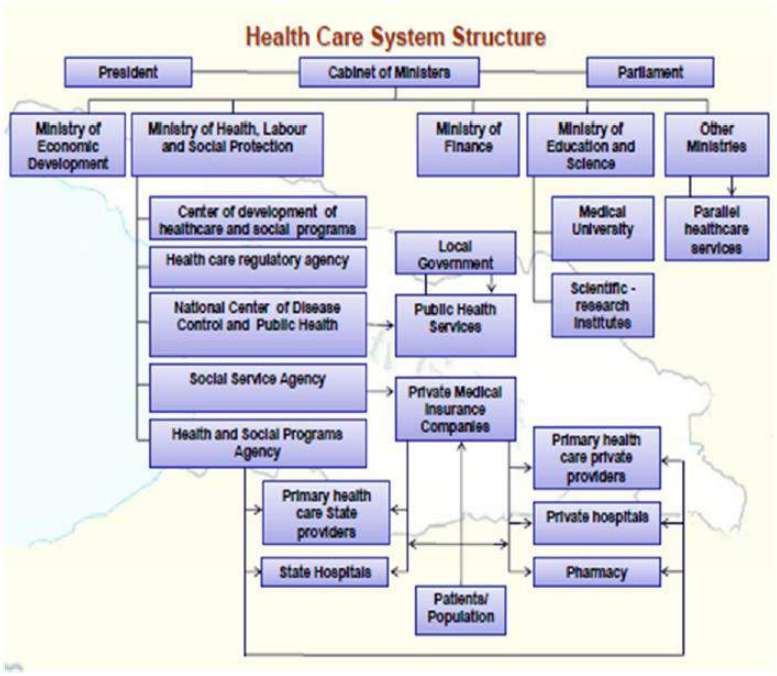


Figure 2 Health care system structure in Georgia by 2009. Adapted from Chanturidze et al. [2] and Kordzaia [21].

What are the main administrative levels of the health care system? Could you please include an organigram of the relevant actors?

1. HUMAN CCHF SURVEILLANCE

- **When CCHF was first detected in Georgia?**

  In 2009

  - **Is CCHF disease a notifiable disease in Georgia? (please mention relevant legal references and currently used case definitions)**

    Yes, we use national case definition.

  - **How and where is laboratory confirmation of human cases of CCHF conducted?**

    By PCR and ELISA in Lugar Centre at NCDC

  - **Who has responsibility for human CCHF surveillance and who for response in case of outbreaks?**

    NCDC, Communicable Disease Division

  - **Could you please describe the CCHF surveillance system?**

- **How many staff are involved in collecting and transmitting CCHF surveillance data?**

  At central level (from NCDC) – 5 person, one epidemiologist from each PHC (62 PHC in Georgia)

- **What are the data sources?**

  Electronic Integrated Disease Surveillance System (EIDSS)

- **How are the data collected (forms, number of variables, individual and/or aggregated, paper and/or electronic)? Individual Electronic forms.**

- **How is data analysis conducted? By EIDSS**

- **How are data transmitted out. To whom, in what format? Electronic, by EIDSS.**

- **Was the CCHF surveillance system evaluated? No**

  - **If so, Is it possible to share a copy of this evaluation with the investigator team?**

- **Is data shared with other sectors (animal health entomology)? For what purpose (early warning, surveillance …). Yes, in One Health framework.**

- **Is feedback received from other sectors? In what format: Informal communication, regular official reports, Other (specify). Informal communication**

- **Can official documents pertaining human CCHF surveillance procedures be made available to the team during the site visit?** Yes.

2. ANIMAL VIROLOGY AND VETERINARY PUBLIC HEALTH

What institution is in charge for animal virology and veterinary public health?

NFA (National Food Agency) is responsible for veterinary public health and LMA (Laboratory of the Ministry of Agriculture) – for animal virology.

- **Is a veterinary surveillance system in place for CCHFV?**

  <u>There is no veterinary surveillance for CCHF in Georgia.</u>

- **Could you please describe the veterinary CCHFV surveillance system? (target species, active/passive surveillance etc.)**

- **How many staff are involved in collecting and transmitting CCHFV surveillance data?**

- **What are the data sources?**

- **How are the data collected (forms, number of variables, individual and/or aggregated, paper and/or electronic …)?,**

- **How is data analysis conducted?**
- **How are data transmitted out. To whom, in what format?**
- **Was the veterinary CCHFV surveillance system evaluated?**
    - **YES or NO**
    - **If so, is it possible to share a copy of this evaluation with the investigator team?**
- **Is data shared with other sectors (human health/ entomology)? For what purpose (early warning, surveillance …)**
- **Is feedback received from other sectors? In what format: Informal communication, regular official reports, Other (specify)**
- **Can official documents pertaining veterinary CCHFV surveillance procedures be made available to the team during the site visit?**

3. MEDICAL ENTOMOLOGY

What institution is in charge for medical entomology? NCDC

- **Could you please describe the entomological CCHFV surveillance system? (target species, active/passive surveillance etc.)**

  Active
- **How many staff is involved in collecting, identifying tick pools?**

  4 person
- **Do you have maps of distribution of potential CCHFV vectors in your country?**

  Yes
- **Do you monitor PCR CCHFV positivity in tick pools?**

  Yes
- **How are the data collected? By paper record**
- **How are data transmitted out? To whom, in what format?**

  Collected data are kept in common data base as Excel format.
- **Is data shared with other sectors (human health/ animal health)? For what purpose (early warning, surveillance …)**

  Data are shared with NCDC laboratory and epidemiologists

- **Is feedback received from other sectors? In what format: Informal communication, regular official reports, Other (specify) N/A**

  Please go to our webpage: www.ncdc.ge and see the structure of our institution.

- **Can official documents pertaining entomological CCHFV surveillance procedures be made available to the team during the site visit?**
  Yes

4. POLICY/INSTITUTIONAL LEVEL INTERSECTORAL AGREEMENTS

Are there formal collaboration mechanisms between the animal virology and veterinary public health and the human sector (ministerial decree, legislation or other formal documents) that impact CCHFV surveillance?

Decree of the government of Georgia "Infectious diseases, including the especially dangerous pathogens diseases, integrated national surveillance system for approval of the rules of operation".

Are there formal collaboration mechanisms between the medical entomology sector and the human sector (ministerial decree, legislation or other formal documents) that impact CCHFV surveillance?

Medical entomology sector is a part of NCDC.

Are there Memorandum of understandings or other formal agreements between the institutions involved in CCHFV surveillance from the human, animal and entomological sectors?

Decree of the government.

Are there informal agreements of collaboration between the mentioned institutions?

No.

---

5. INTERSECTORAL COLLABORATION AT DATA COLLECTION/ANALYSIS LEVEL

Is there interoperability between data collection mechanisms of human surveillance, animal surveillance and medical entomology monitoring for CCHFV?
Electronic Integrated Disease Surveillance System (EIDSS) database and reporting system was launched in Georgia, that supports monitoring and prevention of diseases within One Health concept by integrating veterinary, human and vector surveillance.

Is there interoperability between data analysis mechanisms of human surveillance, animal surveillance and medical entomology monitoring for CCHFV?

EIDSS supports data analysis.

Is regular exchange of information occurring across sectors involved in CCHFV surveillance regardless of full interoperability of the data collection and analysis systems?

Yes.

---

6. INTERSECTORAL COLLABORATION AT DATA DISSEMINATION LEVEL

Are CCHFV joint surveillance reports issued that include data on human surveillance, animal surveillance and medical entomology monitoring?

There are joint on human surveillance and medical entomology monitoring

Is there a two way communication in place between public health and other sectors involved in CCHFV surveillance?

Yes.

7. CONCRETE EXAMPLES

When were CCHFV outbreaks described in Georgia?

Could these real life experiences be used to describe the intersectoral collaboration mechanisms in place during the site visit?

If so, we would kindly ask you to describe the outbreaks and provide any publication you deem relevant in allowing the investigators to prepare in advance of the visit on the topic.

NCDC and local PHC epidemiologists conduct a case study to establish the risk factors, contacts, infection ways. Then entomologists collect ticks and rodents from the place of exposure. NCDC send the official request to NFA for control measures and NFA uses acaricides against ticks in domestic animals and farmhouses.

DEBRIEFING MEETING WITH ALL THE STAKEHOLDERS INVOLVED

The site visit will involve all sectors responsible for **CCHFV** surveillance.

The information, data, procedures, lessons learned etc., collected through the documentation provided and through the interviews conducted during the visit with all the stakeholders involved, will be discussed and consolidated during a meeting to be organized in the last day with all the stakeholders.

Stakeholders table (as per Institution to be visited) – add please rows as needed

National Center for Disease Control and Public Health of Georgia (NCDC) - http://www.ncdc.ge/
Laboratory of Lugar Center of NCDC (virology and entomology department)- http://www.ncdc.ge/en-US/LaboratoryNetworksAndBS
National Food Agency of Georgia (NFA) - http://nfa.gov.ge/en/
Laboratory of the Ministry of Agriculture - http://www.lma.gov.ge/index.php?lang=en&Itemid=107 http://www.moa.gov.ge/En/

CHECKLIST

It will be drafted by ISS with the aim of facilitating the interviews and the meetings to note, share and discuss relevant aspects of the surveillance system in place in the Country.

MedilabSecure

WP5 - Public Health

The MediLabSecure Situation analysis on integrated surveillance of arboviruses in the Mediterranean and Black Sea Region (MeSA Study)

Check List for the site visit

6 December 2016

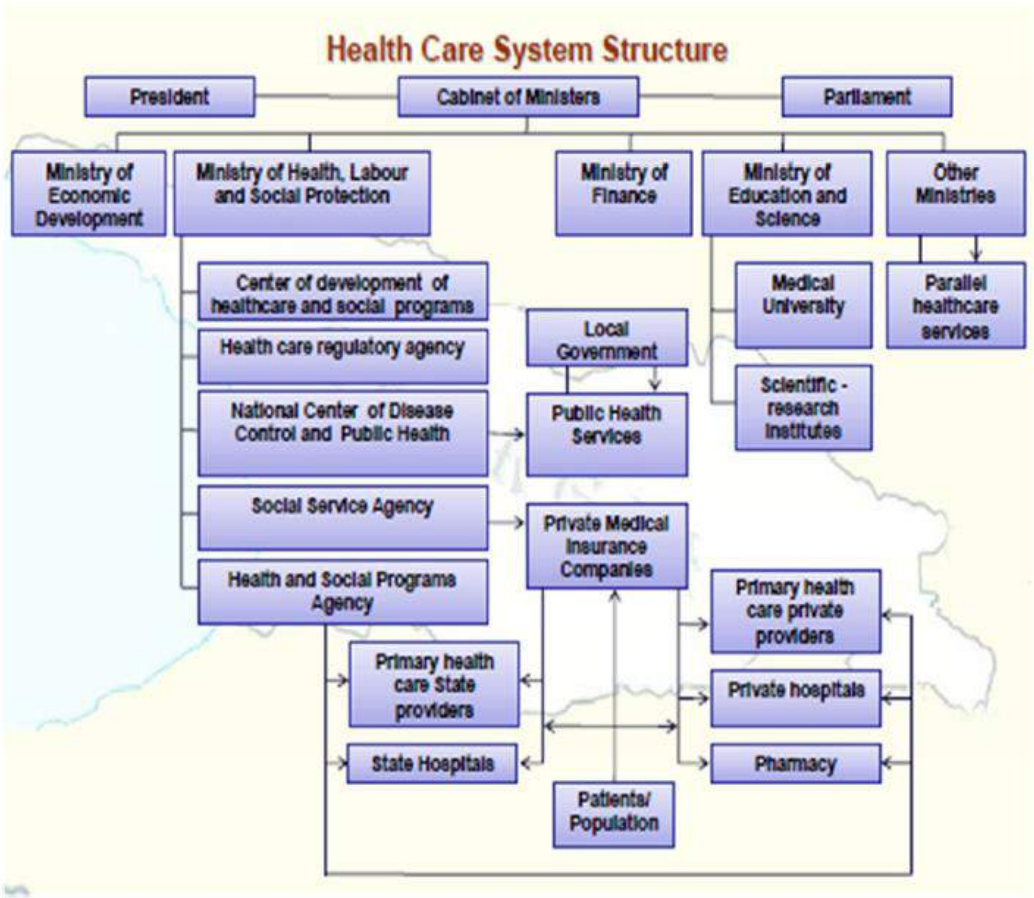


Figure 2 Health care system structure in Georgia by 2009. Adapted from Chanturidze et al. [2] and Kordzaia [21].

FIGURE 1. Map of Georgia with the geographic distribution of CCHF and hantavirus cases.

Source: Kuchuloria T, Imnadze P, Chokheli M, et al. Viral hemorrhagic fever cases in the country of Georgia: Acute Febrile Illness Surveillance Study results. Am J Trop Med Hyg 2014;91:246–8.

Checklist's Rationale:

- Consistency with the objectives of the Study (see study design)
- Consistency with the approaches and criteria adopted during the implementation of WP5 (including the Lit Review and Survey)
- Present Focus: Crimean Congo Hemorrhagic Fever (CCHF) and Crimean Congo Hemorrhagic Fever Virus (CCHFV)
- The same checklist for all the sectors (human virology, animal virology, entomology, human public health) involved

- **Filled in during the meeting with: _____**
- **Medilabsecure contact point: YES NO**
- **Sector: _____**
- **Institution:_____**
- **Country: _____**
- **_____**

1. Level of integration: Policy and Institutional

i. **Is the Aim** of **CCHF/V integrated** surveillance in your Country stated somewhere? :

YES NO

a. **If YES:** stated where?

ii. Is a ***National multisectoral steering committee*** in place for the surveillance of arboviruses and/or for CCHF in particular ?

YES NO

a. If YES
   i. Role: _____

ii. Members: _____

iii. frequency of ordinary meetings: _____

iv. reasons for extraordinary meetings: _____

v. ways of communication between members: _____

vi. ……..

iii. Is a ***National coordinating multisectoral unit*** in place for the surveillance of arboviruses and/or for CCHF in particular ?

YES NO

a. If YES

i. Role: _____

ii. Members: _____

iii. frequency of ordinary meetings: _____

iv. reasons for extraordinary meetings: _____

v. ways of communication between members: _____

vi. ……..

iv. Is there a ***coordinated plan for distribution of human resources*** dedicated to surveillance among the different sectors? YES NO

v. Is a **plan** for CCHF Integrated/multisectoral surveillance available?

YES NO

If YES, is it prepared on annual basis? YES NO

If YES, is the 2016 plan available? (to be provided if available) YES NO

vi. Are **types and targets** of surveillance identified in the plan? YES NO

vii. Are Endemic and not-endemic areas identified ? YES NO

2. Level of integration: Data collection and analysis

Human surveillance

Starting of the CCHF surveillance in the Country: **2009**

If YES:

- Seasonal
- Permanent

- Is the surveillance in accordance with Endemic and not-endemic areas ?
  YES NO

- If YES, specify

Who is in charge for the surveillance (institution, Dept. etc): _____

who does the analysis (institution, Dept. etc): _____

to whom are the confirmed cases reported (institution/s, Dept/s. etc) : _____

timing : _____

way/s: _____

- Studies? YES NO

If YES,

Type of studies and references

_____

_____

Animal surveillance

CCHF surveillance in animals **YES** **NO**

If YES:

- Seasonal
- Permanent

- Is the surveillance in accordance with Endemic and not-endemic areas ?
  YES NO

- If YES, specify

Who is in charge for the surveillance (institution, Dept. etc): _____

who does the analysis (institution, Dept. etc): _____

to whom are the confirmed cases reported (institution/s, Dept/s. etc) : _____

timing : _____

way/s: _____

- Studies? YES NO

If YES,

Type of studies and references

_____

_____

Entomological Surveillance

CCHFV in ticks YES NO

If YES:

- Seasonal
- Permanent

- Is the surveillance in accordance with Endemic and not-endemic areas ?

  YES NO

- If YES, specify

Who is in charge for the surveillance (institution, Dept. etc): _____

who does the analysis (institution, Dept. etc): _____

to whom are the confirmed cases reported (institution/s, Dept/s. etc) : _____

timing : _____

way/s: _____

- Studies? YES NO

If YES,

Type of studies and references

_____

_____

- **<u>Early Warning – Risk Assessment-Response-Communication</u>**

Is there any early warning system, which actives human health measures based on animal and /or entomological surveillance? YES NO

If YES, can you describe your role (organizer, participant, etc.) in the process as per the table below? Is the procedure formally developed and available? YES NO

Steps of the Process	**EW**	**Risk assessment**	**Response/Public Health Actions**	**Risk Communication**
How does the process start? or What event triggers the process to start?				
You provide info to (Institution/s; Dept/s)				
Type of info				
how soon/periodicity				
Info are provided to you by (Institution/s; Dept/s)				
Type of info				
how soon/periodicity				
Multisectorial meetings (periodicity)				
report exchange (periodicity)				

- Please describe the most recent early warning case and provide available documents

- **<u>USE of data for PUBLIC HEALTH ACTIONS</u>**

Is a national database available for surveillance data? YES NO

If YES, is this database including all the surveillance data (animal, entomological, human) YES NO

If NO, which kind of database are available?

Are they accessible to other sectors involved in the surveillance? YES NO

If YES,

- specify the sector/s: _____
- type of access: ☐ consultation ☐ data management ☐ .....

3. Level of integration: Dissemination

Is a communication dept. /officer available? YES NO

If YES, is this connected/coordinated with the other relevant sectors? YES NO

Is a National bulletin/newsletter jointly prepared by all the relevant sectors available?

YES NO

If YES:

Frequency:_____

Target/s: _____

Is a dedicated website jointly managed by all the relevant sectors available? YES NO

Is the Evaluation of the integrated WNV plan performed? YES NO

If YES, is this available? YES NO

Consulted Documents:

- WHO Monitoring and evaluation indicators for integrated vector management WHO, 2012 ISBN 978 92 4 150402 7
- WHO-FAO-OIE **Four-Way Linking Project for Assessing Health Risks at the Human-Animal Interface, 2013**
- Simona Forcella, Nasr El-din El Tantawy, Jobre Yilma, Amira AbdelNabi2,Filip Claes, Gwenaelle Dauphin & Elizabeth Mumford *The development of a four-way linking framework in Egypt: an example of the FAO, OIE and WHO joint activities to facilitate national risk assessment*. Veterinaria Italiana 2015, **51** (1), 45-50. doi: 10.12834/VetIt.220.680.1
- WHO Georgia country profile
- Tamari Rukhadze An overview of the health care system in Georgia: expert recommendations in the context of predictive, preventive and personalised medicine The EPMA Journal 2013, 4:8
- http://www.epmajournal.com/content/4/1/8
- Ashley L. Greiner, MD1,2, Nana Mamuchishvili3, Stephanie J. Salyer2, DVM, Kendra Stauffer4, DVM, Marika Geleishvili, MD4, Khatuna Zakhashvili, MD3, Juliette Morgan, MD4 Increase in Reported Crimean-Congo Hemorrhagic Fever Cases — Country of Georgia, 2014 MMWR / March 6, 2015 / Vol. 64 / No. 8 http://www.cdc.gov/mmwr/pdf/wk/mm6408.pdf
- Kuchuloria T, Imnadze P, Chokheli M, et al. Viral hemorrhagic fever cases in the country of Georgia: Acute Febrile Illness Surveillance Study results. Am J Trop Med Hyg 2014;91:246–8.
- S. Dreshaj et al. Current situation of Crimean-Congo hemorrhagic fever in Southeastern Europe and neighboring countries: a public health risk for the European Union? Travel Medicine and Infectious Disease (2016) 14, 81e91

Annex III

Annex III- List of Participants to the debriefing Meeting - NCDC, 15 December 2016

#	Name	Institution	Position	E-mail
1.	Paata Imnadze	NCDC	Research Director	pimnadze@ncdc.ge
2.	Irine Kalandadze	NCDC	Communicable Disease Division, Epidemiologist	Irinekal7@yahoo.com
3.	Khatuna Zakhashvili	NCDC	Head of Communicable Disease Division	episurv@ncdc.ge
4.	Nana Mamuchishvili	NCDC	Communicable Disease Division, Epidemiologist	nanamamuchishvili@yahoo.com
5.	Giorgi Chakhunashvili	NCDC	Communicable Disease Division	gio.ncdc@gmail.com
6.	Archil Navdarashvili	NCDC	Communicable Disease Division, Epidemiologist	a.navdarashvili@gmail.com
7.	Ekaterine Adeishvili	NCDC	Head of Lugar center for Public Health Research	e.adeishvili@ncdc.ge
8.	Gvanca Chanturia	NCDC	Lugar center for Public Health Research, head of Virology and Molecular Biology Division	romail28@gmail.com
9.	Giorgi Babuadze	NCDC	Lugar center for Public Health Research, Virology and Molecular Biology Division	gbabuadze@ncdc.ge
10.	Nikoloz Tsertsvadze	NCDC	Lugar center for Public Health Research, Medical Zoo-Entomology Division	nikoncdc@mail.ru
11.	Marina Donduashvili	LMA	Head of laboratory	marina.donduashvili@lma.gov.ge
12.	Maka Kokhreidze	LMA	Laboratory staff	maka.kokhreidze@lma.gov.ge

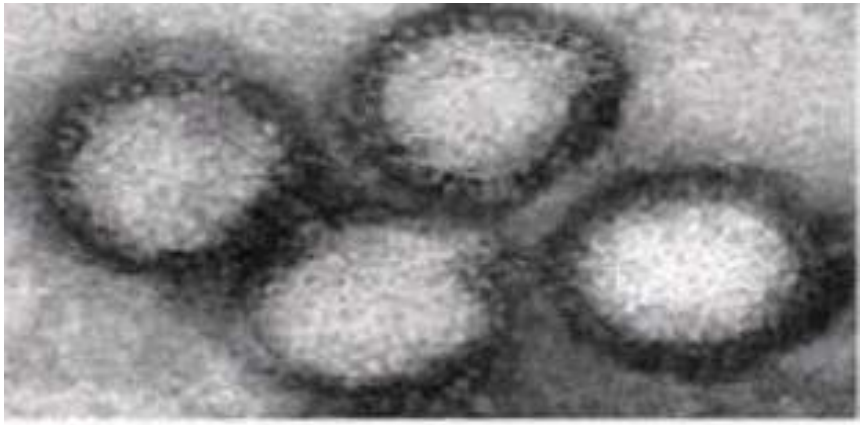
13.	Anna Kekelidze	LMA	Biosafety officer	Ana.kekelidze@lma.gov.ge
14.	Lasha Avaliani	NFA	Head of Veterinary Department	lasha.avaliani@nfa.gov.ge
15.	Lena Ninidze	NFA	Veterinary Department, Epidemiologist	lena.nindze@nfa.gov.ge
16.	Natia Kartskhia	NFA	Veterinary Department , Epidemiologist	Natia.kartskhia@ nfa.gov.ge

Annex IV

Epidemiology of Crimean-Congo Hemorrhagic Fever in Georgia

Nana Mamuchishvili MD., PhD.

Genus - Nairovirus
Family - Bunyaviridae



Cases and mortality rate of CCHF by age group

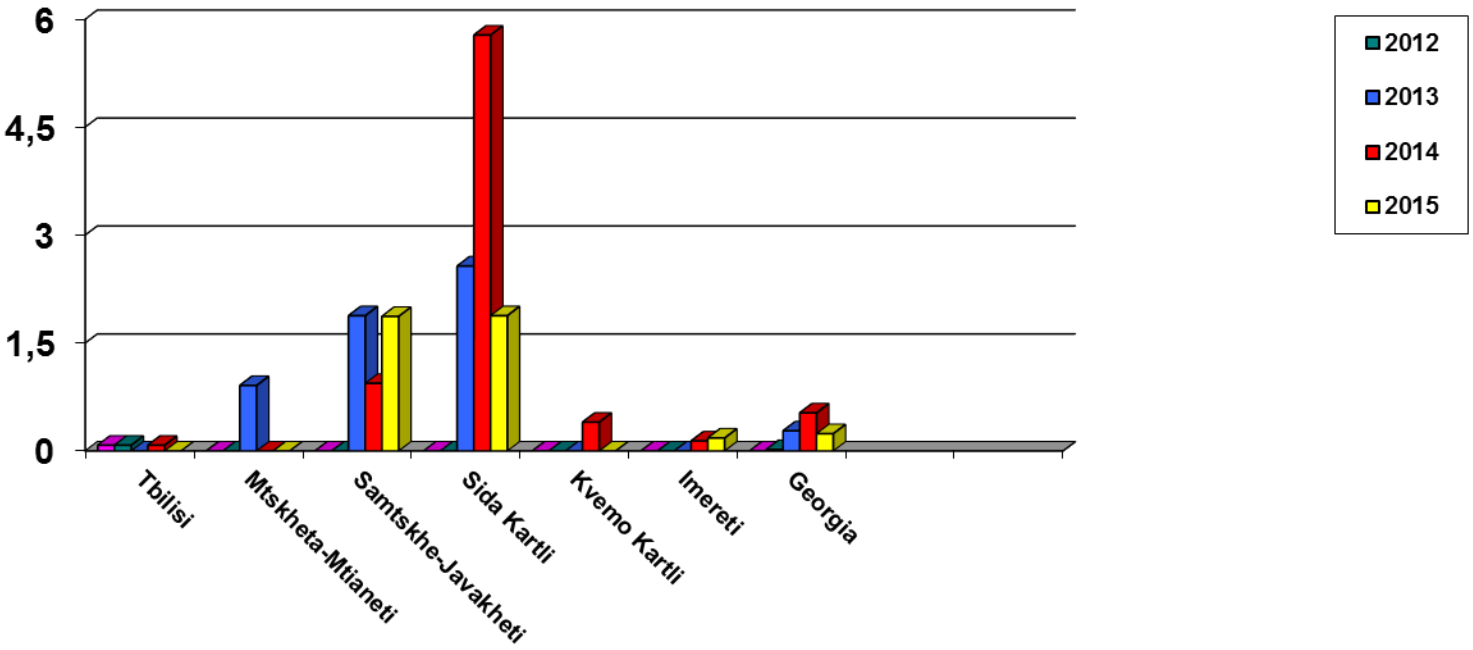
2009-1; 2012-1; 2013-13; total 54 cases.

Age Group	2016 1-11 month		2015		2014	
	Cases	Mortality rate (%)	Cases	Mortality rate %	Cases	Mortality rate %
1-4	0	0	0	0	1	0
15-19	0	0	0	0	1	0
20-29	1	0	0	0	3	0
30-39	2	2	2	0	3	1/33.3
40-49	1	0	0	0	6	2/33.3
50-59	1	0	2	0	5	0
60-69	1	0	4	0	3	0
70<	0	0	1	1	2	1/50.0
სულ	6	2/33.3	9	1/11.1	24	4/16.6

Incidence CCHF in Georgia by Region

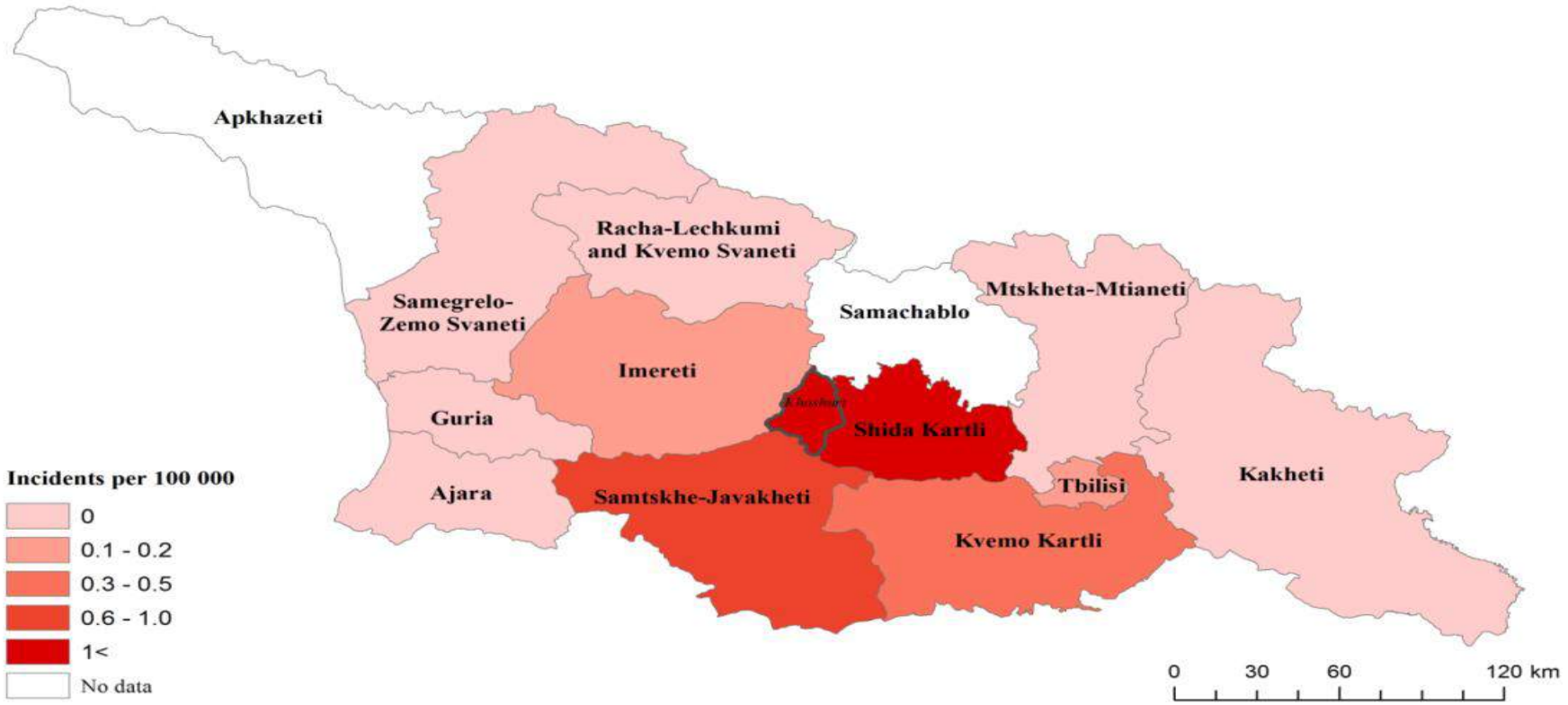
2012-2015

Incidence Rate per 100 000, NCDC of Georgia



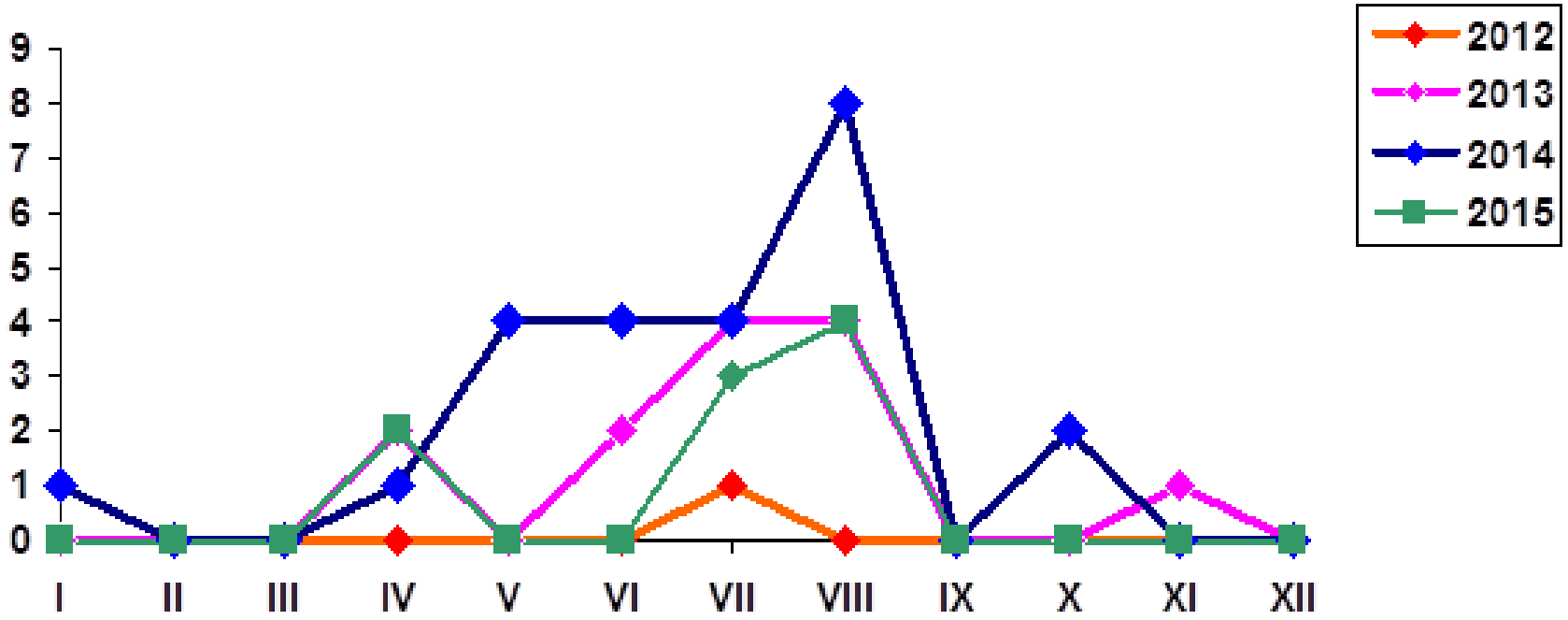
Incidence of Crimean-Congo hemorrhagic fever in Georgia by Region

Source: NCDC of Georgia 2014 (GIS)



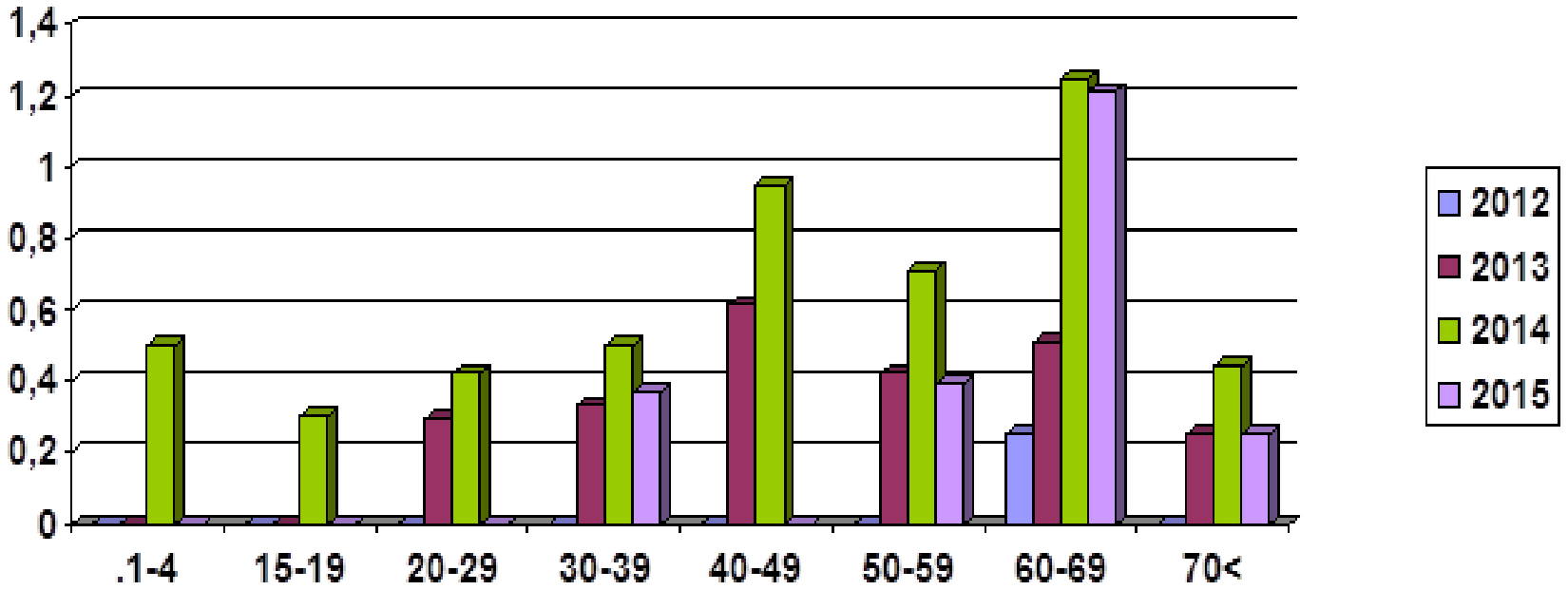
Seasonality of CCHF

2012–2015



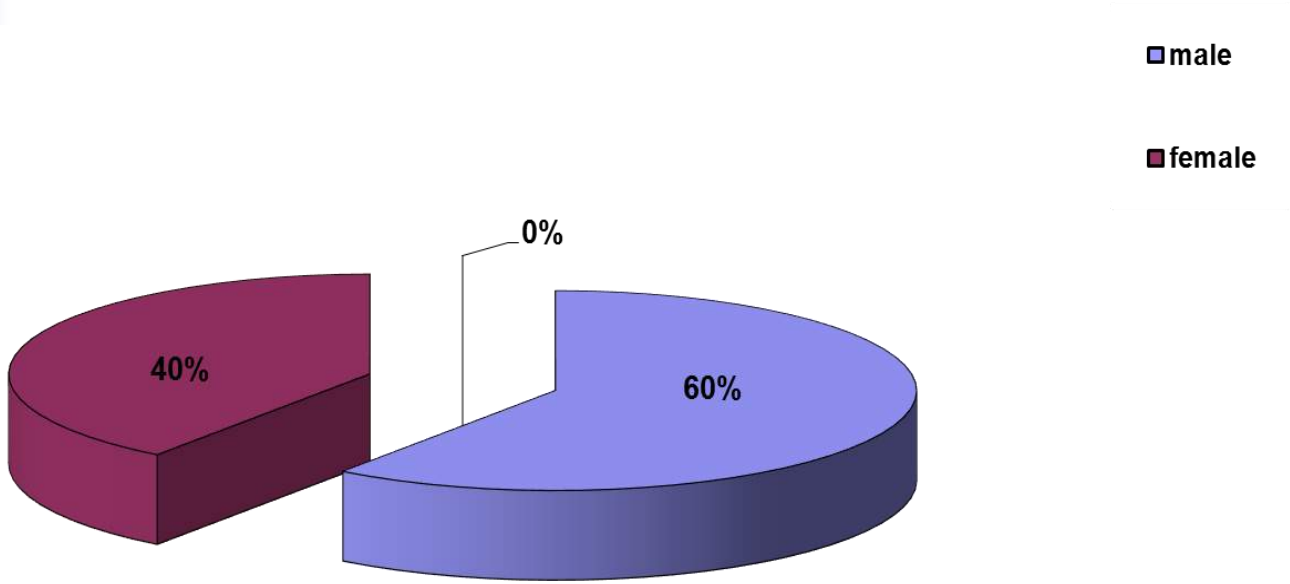
Insidence of CCHF by age group

2012–2015



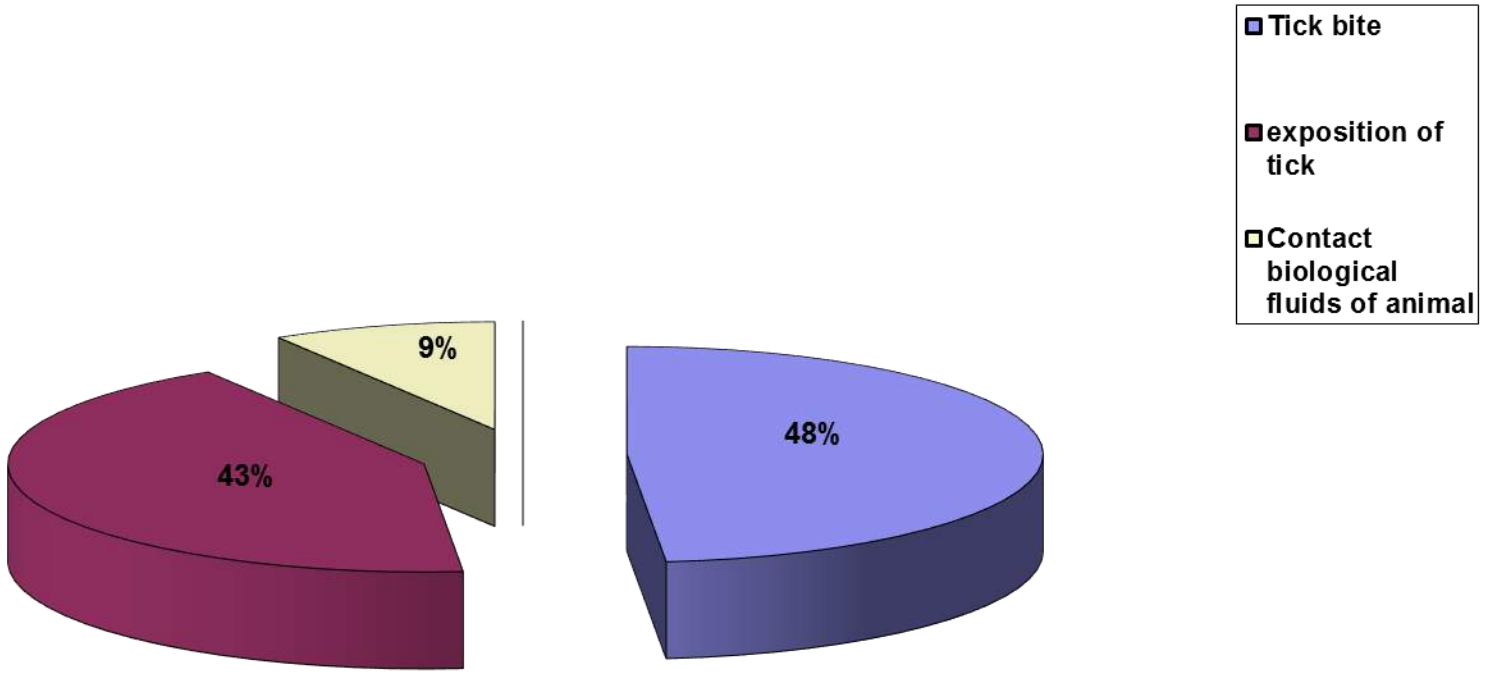
CCHF by Gender

2012–2015



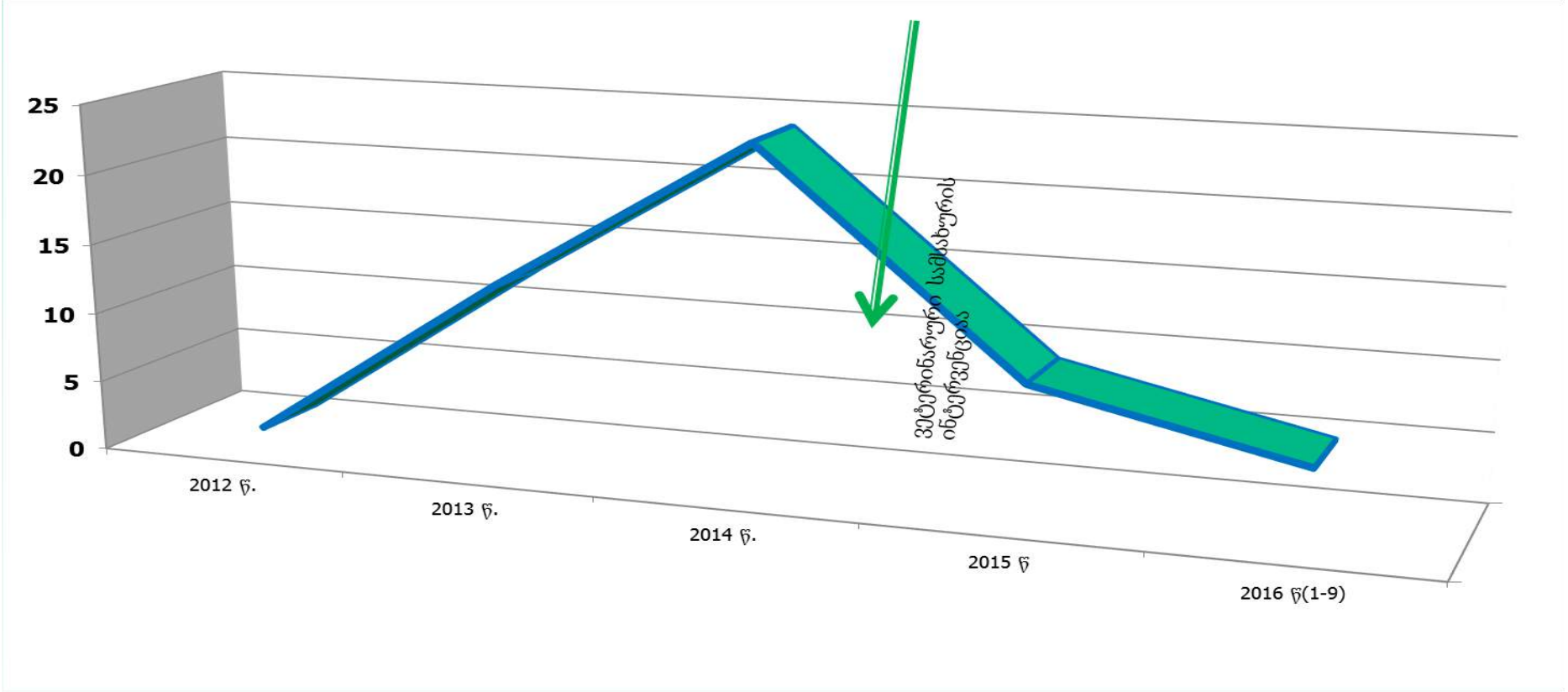
CCHF - Risck faqtors

2009 –2015



Insidence of CCHF by years

01.01.2012-01.10.2016



Surveillance of CCHF with contact persons

- The total number of contact persons– 395

- family member– 244
- Neighbor – 33
- Medical workers –118

- ***For the first time in Georgia a case of nosocomial transmission of CCHF at a hospital was described in July 2016.***
- ✓ 2 people were positive from a contact person
- ✓ recorded 2 autbreak by 2 cases in Oshora (Aspindza) and in Dviri (Borjomi)

Laboratory diagnostic of CCHF

- **virus isolation**
  - 2-5 day
  - The test has a low sensitivity (high viremia only fixes)
- **Viral RNA sequence real time polymerase chain reaction (RT-PCR)**
  - Specific, sensitive, fast, 1-7 day
- **Viral antigen detection**
- **Detection of antibody (IgG and IgM) by ELISA**

From 5th to 7th day of Onset of symptoms of the disease

IgM (7 days to 4 months) and IgG (7 days to 5 years)

- **Immunohistochemical staining**
- **serum neutralization;**

CCHF - Georgia

Crimean-Congo haemorrhagic fever Clinical signs (EIDSS)

Simptoms WHO	%	Simptoms Georgia	%
Fiver	43-85	Fiver	86
Bleeding	29-48		
Hepatomegaly	30-43	Bleeding	50
Lymphadenopathy	13-40		
Macula-papular rash	29-57	Haemorrhages	43
Petechiae and ecchymosis	30-46		
Lung damage	4-28		
Splenomegaly	14-23	Petechiae and ecch ymosis	36
Peritoneal irritation	12-21		
Conjunctivitis	11-50		
Heart damage	1-11	Thrombocytopenia	93
Neck stiffness	11		
Jaundice	1-12		
Thrombocytopenia	99		

Monitoring of CCHF

- **Contact with the biological fluids, monitoring for 14 days of last contact, by measuring the temperature twice a day**

- If a person develops a temperature of 38^0C or more, headache and muscle pain, be considered possible cases

→ Hospitalization and Ribavirin

Thank you for your attention!

National Center for Disease Control and Public Health

Amiran Gamkrelidze

NCDC

is a central public health and research institution under the authority of MoLHSA

Established in 1995 on the basis of CDC / Atlanta

Structure

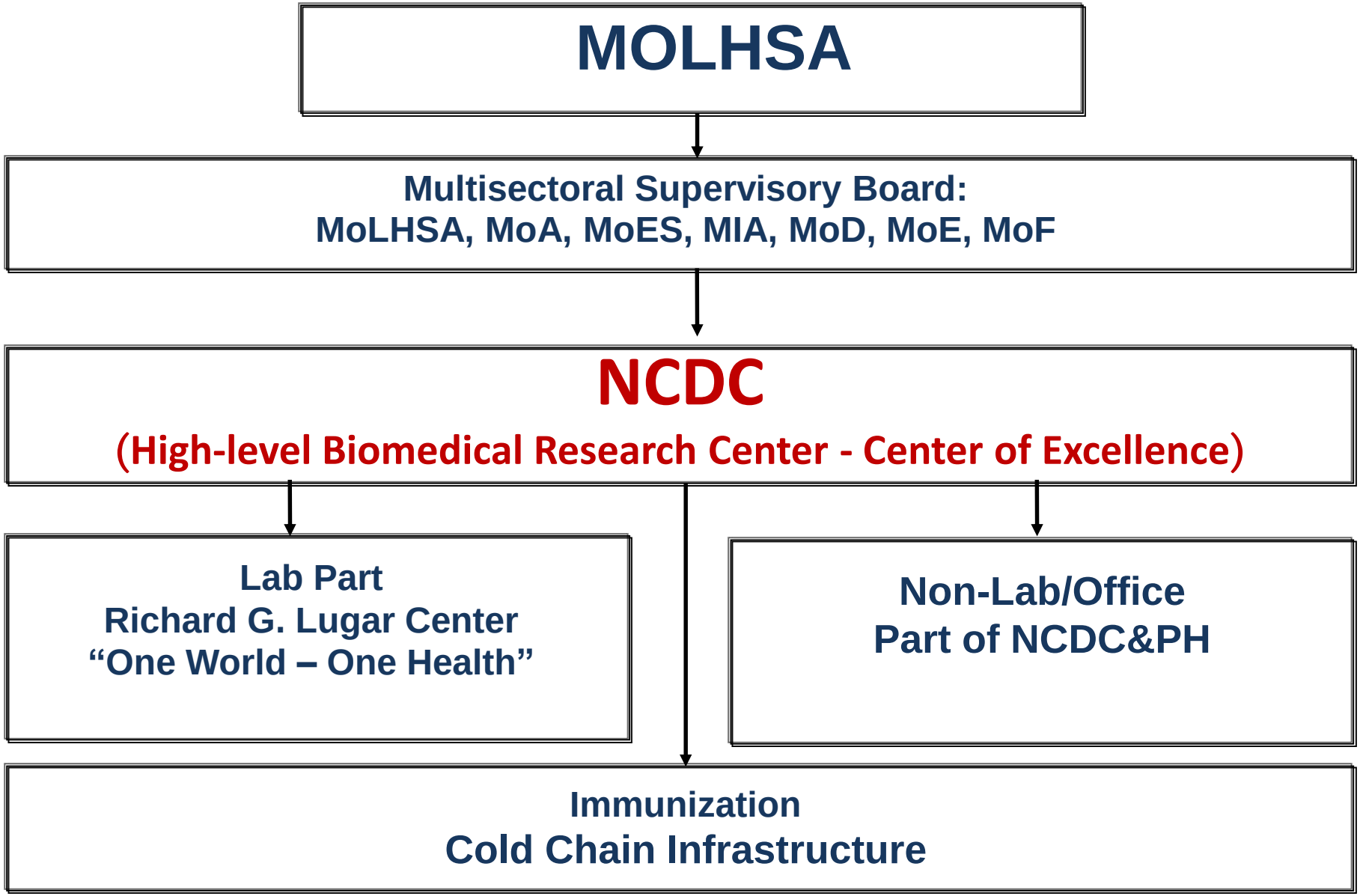
1937 Establishment of the Anti-Plague Station in Georgia

1992 Research Center of Especially Dangerous Pathogens (EDPs)

1995 National Center for Disease Control

2004-2007 As a result of large-scale reorganization: Integration of Medical Statistics Center and Public Health Department into the NCDC

2013 Integration of R. Lugar Center for Public Health Research (CPHR) into the NCDC


MOLHSA
Multisectoral Supervisory Board:
MoLHSA, MoA, MoES, MIA, MoD, MoE, MoF
NCDC
(High-level Biomedical Research Center - Center of Excellence)
Lab Part
Richard G. Lugar Center
“One World – One Health”
Non-Lab/Office
Part of NCDC&PH
Immunization
Cold Chain Infrastructure

Vision: Our Knowledge – for Public Health

Mission: Protection and improvement of the health of Georgia's population through scientific evidence-based prevention of diseases, preparing for and timely responding to threats of public health

Strategic Priorities

- Decrease of Morbidity, Disability and Mortality caused by Communicable Diseases
- Decrease of Morbidity, Disability and Mortality caused by Non-Communicable Diseases
- Assessment and correction of environmental hazards and behavioral risk-factors for improvement of health in population
- Development of applied and fundamental bio-medical and bio-technological scientific research potential

Laboratory Part of NCDC - Lugar Center

- Genomic Center
- Repository of EDP
- Bacteriology
- Serology
- Molecular Biology
- Virology
- Parasitology
- Cell Cultures
- Entomology
- Vivarium
- CDC/GDD Lab
- WRAIR Lab
- BSL3 designated area for LMA & MES

3 Zonal Diagnostic Laboratories - ZDLs
7 Local Surveillance Stations - LSSs

3 Labs Accredited by WHO

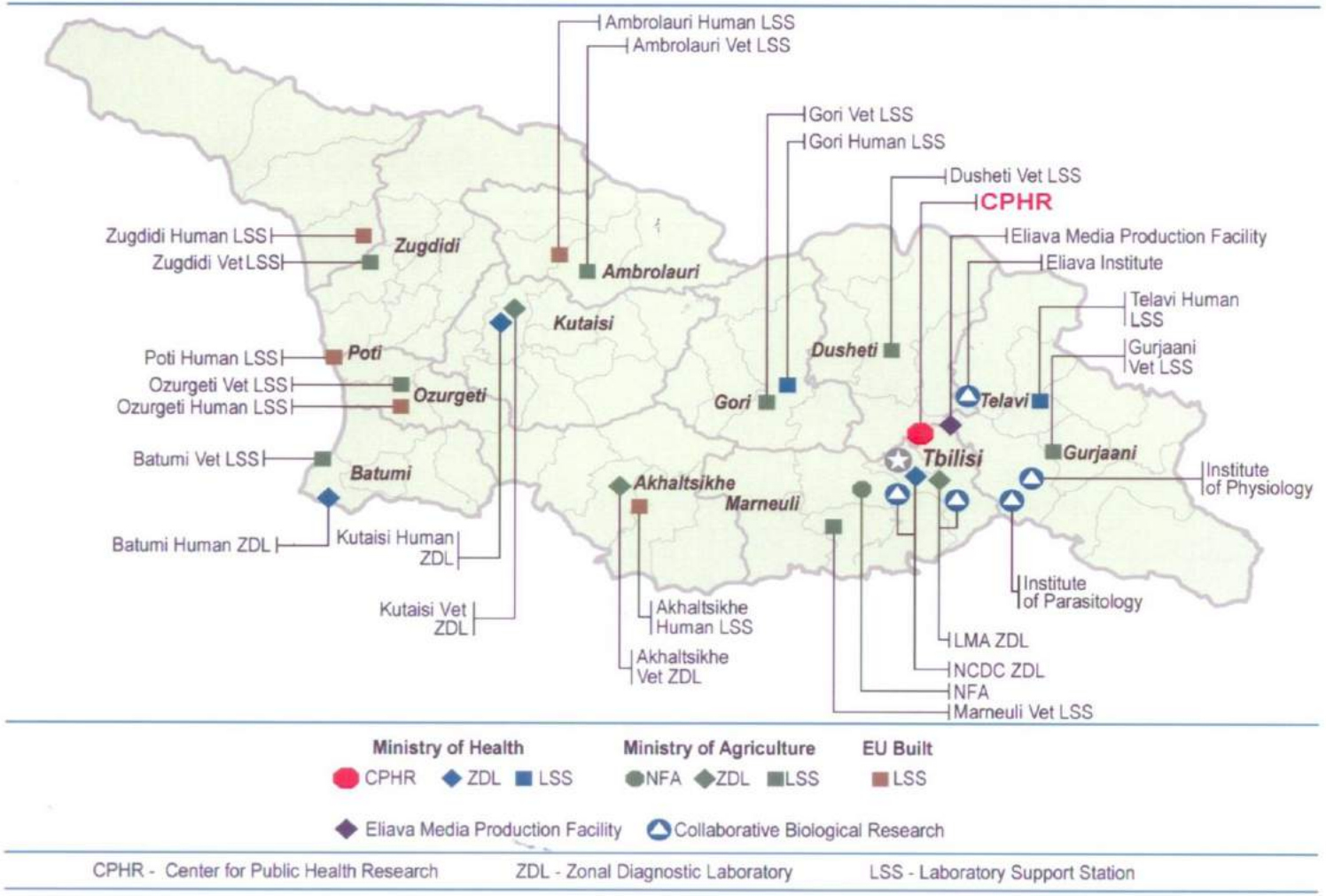
- Polio
- Influenza
- Measles/Rubella

4 Labs Connected to WHO Lab Network

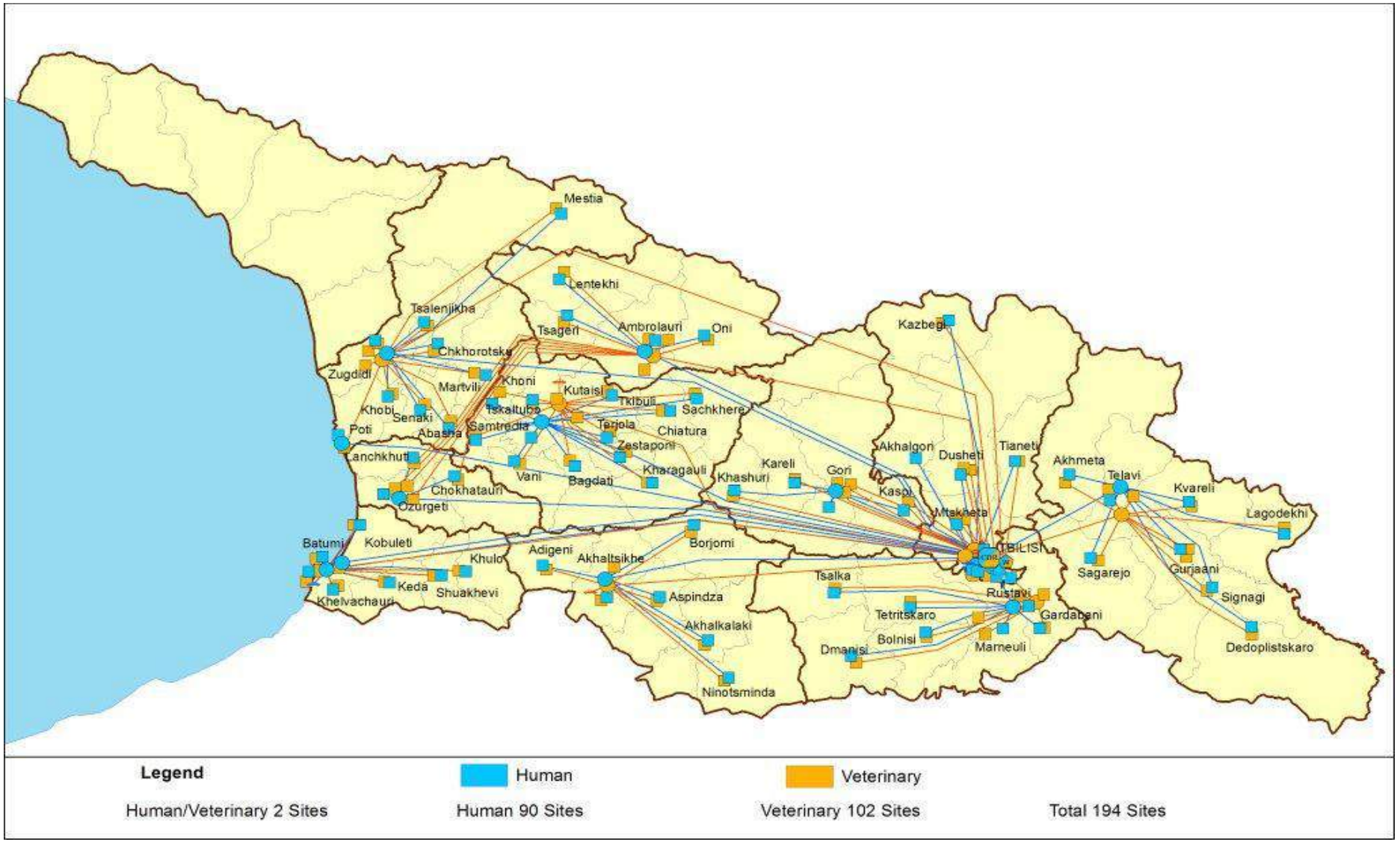
- Rota
- Invasive Meningitis
- Malaria
- Salmonelosis

NCDC / Lugar Center is in a process of applying for the status of WHO Collaborating Center for Emerging Infections

Lab surveillance system based on "One World – One Health" approach



EIDSS Data Entry Points



Non-Laboratory Part of NCDC

State Public Health Programs:

- Immunization
- Blood Safety
- TB
- HIV/AIDS
- Screening
- Surveillance
- MCH
- Occupational diseases

Epid-surveillance of Infectious Diseases:

- VPD
- Diarrheal
- Vector born
- Air born
- EDP - Zoonoses
- STI/HIV/TB

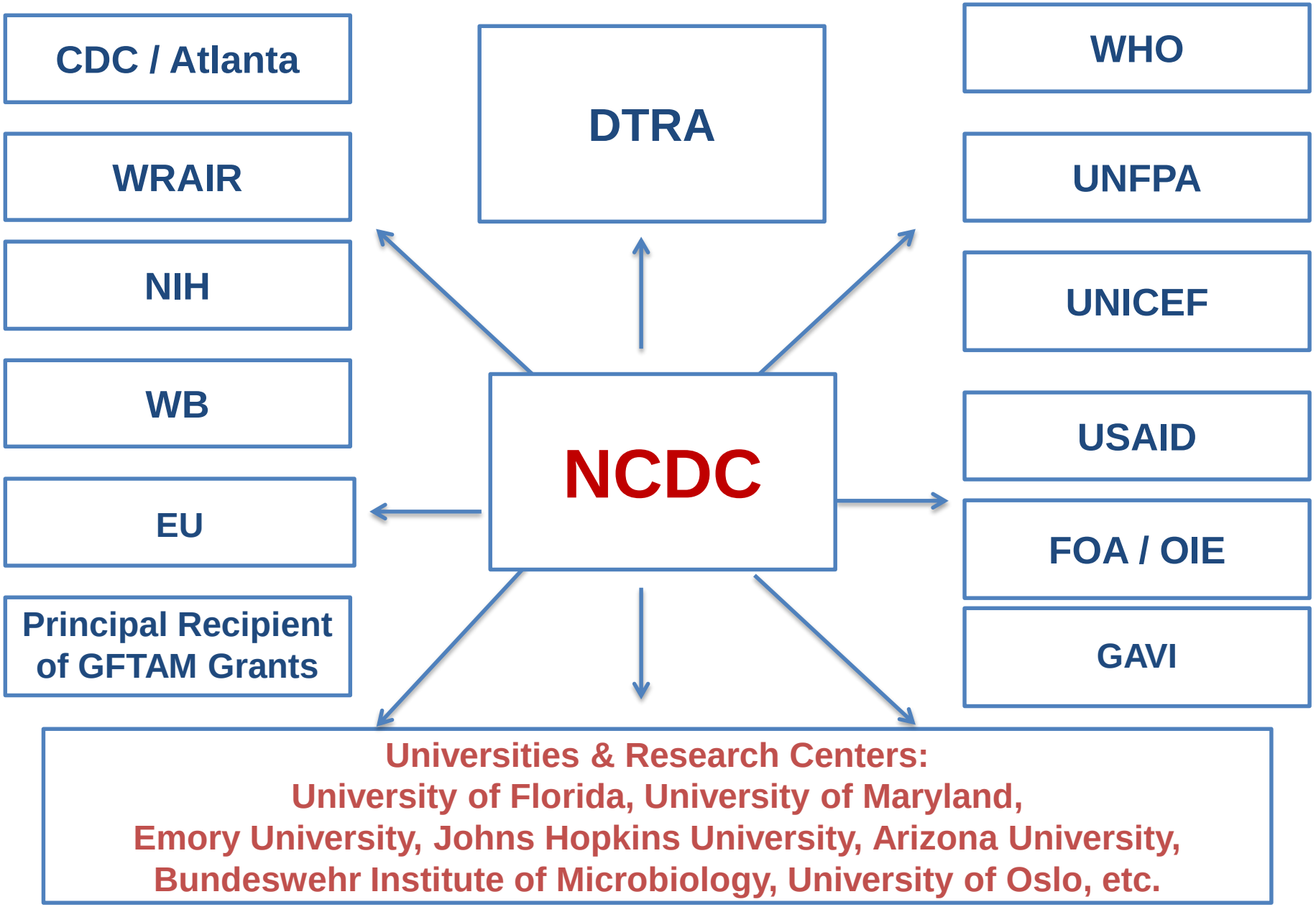
Surveillance of NCD:

- CVD
- Cancer
- Diabetes
- COPD
- Risk factors
- Health promotion
- Behavioral Health

Environ-mental Health

Medical Statistics

Training Center


CDC / Atlanta
WRAIR
NIH
WB
EU
Principal Recipient of GFTAM Grants
DTRA
NCDC
WHO
UNFPA
UNICEF
USAID
FOA / OIE
GAVI
Universities & Research Centers:
University of Florida, University of Maryland,
Emory University, Johns Hopkins University, Arizona University,
Bundeswehr Institute of Microbiology, University of Oslo, etc.

Research Projects of Public Health Importance at NCDC

NCDC within USD 23 000 000 implemented more than 160 international projects and research grants in the field of public health, including:

- Malaria Prevention and Control;
- Surveillance and Response to Avian and Pandemic Influenza;
- Tularemia Epidemiology and Ecology in Georgia;
- Prevention of Amebiasis in Georgia;
- Enforcement of 100% Smoke-free Policy in Health Care Institution and Secondary Schools of Georgia;
- Reproductive Health Survey (2000, 2005, 2010);
- Non-communicable Diseases Risk - factors Survey (STEPS);
- US CDC / GDD:
    a. South Caucasus Field Epidemiology and Laboratory Training Program (FELTP);
    b. Acute Febrile Disease Surveillance;
    c. Epidemiology and Control of Nosocomial Infections, etc.

Ongoing Research Projects at NCDC

- Project “Biological threat reduction integrating program”, DTRA
- Project GG-19 "Epidemiology and Ecology of Tularemia in Georgia", DTRA
- Project “Sustaining Influenza Surveillance Networks and Response to Seasonal and Pandemic Influenza by National Health Authorities outside the United States, CDC/ Atlanta
- Project “Global Disease Detection – GDD”, CDC/ Atlanta
- Project "A-multi-task investigation on the human immune response to anthrax aimed at developing more effect vaccines", NATOSFPP 984208
- Project " Field Epidemiolology and Laboratory Training program (FELTP)", CDC/ATLANTA
- Project "Establishment of Regional Training and Resource Centre in Biosafety, Biosecurity and Laboratory Management in the South Caucasus“, B1&C4, EU/UNICRI

Ongoing Research Projects at NCDC

- Project " Enforcement of 100% smoke-free policy in healthcare institutions and secondary schools of Georgia ", International Union of Tuberculosis and Lung Diseases, The Union-North America
- Project " Development of Surveillance System and Control Strategy for Leishmaniasis in Georgia by means of Epidemiological and Strengthening of Laboratory capacities “, ISTC/BTEP NIH / NIAID
- Project " Biology and control of vector-borne infections in Europe", FP7-HEALTH-2010-single-stage EDENext
- Project "Transmission of zoonotic influenza between humans, pigs and poultry", Florida State University, USA; University of Guelph, Canada; STCU
- Project " Epidemiology of *Clostridium difficile*-associated disease in Georgia", ISTC/BTEP
- Project "Tobacco Survey in Georgia ", Emory University Rollins School of Public Health *etc.*

Upcoming Research Projects (already negotiated)

- Project GG-21 "Human Disease Epidemiology and Surveillance of Especially Dangerous Pathogens in Georgia ", DTRA CBEP

- Project GG-23 "Creation of Sustainable Immunodiagnostics", DTRA

- Project "Reducing the burden of tuberculosis in Georgia by sustaining universal access to quality diagnosis and treatment of all forms of tuberculosis including M/XDR-TB", Global Fund

- Project "Sustaining and scaling up the existing national responses for implementation of effective HIV/AIDS prevention activities, improving survival rates of people with advanced HIV infection by strengthening treatment and care interventions in Georgia", Global Fund

Upcoming Research Projects (already negotiated)

- Project "Reproductive-age Mortality Survey", John Snow Institute, USAID
- Project "New and Under-Used Vaccine Introduction Grant - Pneumococcal (PCV10) vaccine", GAVI
- Project "Tobacco Survey in Georgia", Emory University Rollins School of Public Health
- Project "Establishment of a Southwest-Asian network for biosecurity and diagnosis of dangerous infectious diseases", Bundeswehr Institute of Microbiology, Munich, Germany
- Project "Population-based Survey for Prevalence Hepatitis C Virus Infection in the Country of Georgia"

Thank you for your attention!

One-health concept Implementation and zoonosis control in Georgia

Irine Kalandadze,
K.Zakhashvili, A.Navdarashvili
NCDC

Tbilisi, Georgia, 2016

One Health

is the collaborative effort of multiple disciplines – working locally, nationally and globally – to attain optimal health of humans, animals and our environment.

Zoonotic diseases control difficulties

- lack of intersectoral collaboration
- Gaps in control measures
- Increase of number of zoonosis cases and outbreaks

NCDC Initiative

Implementation of One Health concept

- Legislation
- One-health team set up
- Work jointly
- Process expanding and different services involving

One Health concept

Legislation:

- In 2010, the Ministry of Labor, Health and Social Affairs of Georgia (MoLHSA) and Ministry of Agriculture signed a joint order about the regulation of the information exchange between the detection of the disease
- 2014 - a decree of the government of Georgia ,,On measurements to be implemented for prevention of rabies in 2014-2018“
- 2015 - a decree of the government "Infectious diseases, including the especially dangerous pathogens diseases, integrated national surveillance system for approval of the rules of operation"

One Health concept

Electronic Integrated Disease Surveillance System (EIDSS)

- Share information between MoA and MoH
- Provides veterinary, human and vector surveillance for each new case

One Health concept

In 2013 - One Health Team - National Animal Health Program Steering Group

- NFA
- LMA
- NCDC
- International agencies

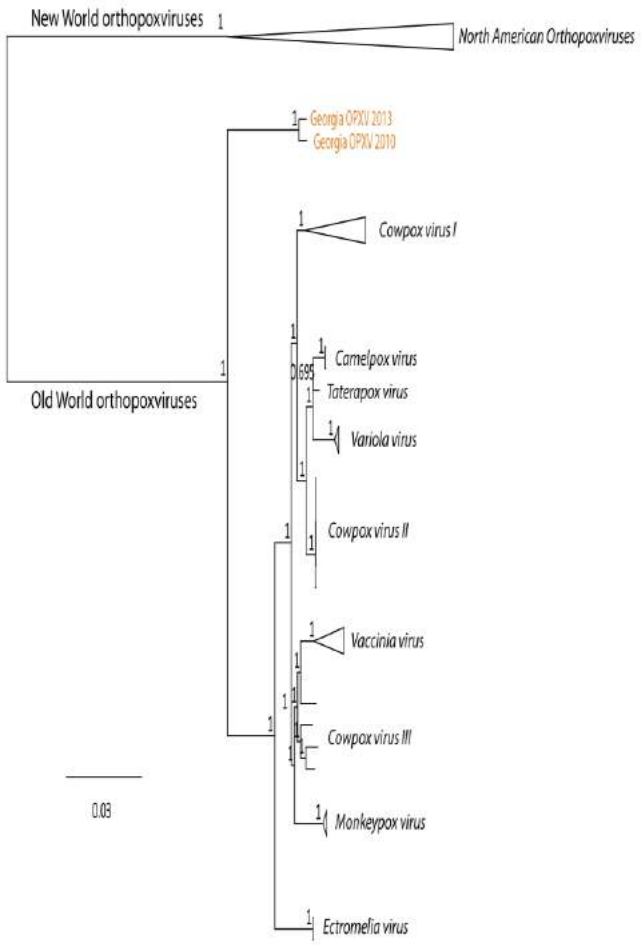
One Health- Activities

- Since 2013 - **Anthrax** vaccination have been conducting by the NFA
  - ✓In 2014-2015, incidence of human and animal cases were reduced by 40%.

- 2014-2015 - Massive anti **Rabies** vaccination was conducted in domestic animals by the NFA
  - ✓ After vaccination in dogs laboratory confirmed cases were reduced by 43.5%.
  - ✓ For the first time since 1990, there were no human rabies cases in 2015-2016.

One Health- Activities

2013 - In Georgia was first identified a new genotype Orthopoxviruses - **Akhmeta virus**.



➢NCDC and the MoA will partner with CDC Poxvirus Team (U.S.) and CDC-Georgia in the development of a long term research project based on One Health concepts, to enhance capacity for case detection and diagnosis of febrile zoonotic-related cutaneous lesions in and to further characterize the new OPXV found in Georgia.

One Health- Activities

2014 – **Brucellosis**

- Active surveillance program was conducted by the NFA. The study revealed high prevalence of brucellosis in animals.

- NCDC carried out work in the most affected areas.
  - ✓Blood was taken from patients with suspected Brucellosis,
  - ✓Training was conducted for the primary healthcare doctors
  - ✓Awareness raised in general population

One Health- Activities

The highest rate of **CCHF** was reported in 2014 in Georgia.

- In the same area where human cases were reported, NFA used acaricides against ticks in domestic animals and farmhouses.
- This action lead us to positive result and in 2015-2016 cases of CCHF were reduced.

One Health- Activities

2013-2015,
an educational campaign was conducted,
during which educational materials on zoonosis diseases were distributed among the population in Georgian, Armenian and Azerbaijani languages.

One Health- Activities

In 2014 – 2015, two one-health master classes were conducted for re-emerging diseases surveillance and response

- GIPA
- GRDD
- CDC Atlanta

- MoH
- NCDC
- MoA
- Ministry of Environment and Natural Resources Protection of Georgia
- LEPL Emergency Management Agency of MIA of Georgia

Recommendations/Problems

- Minimize the negative impacts from human-animal-environment interactions
- Address gaps in the capacities of countries to comply with tenets of good governance
- Strengthen work to implement OH concept at district and regional levels
- Strengthening Interco operation between the human-environment:
  - ✓ Zoonotic infections detection, including water and food transmitted.
  - ✓ Detection and reduction of pollution impact

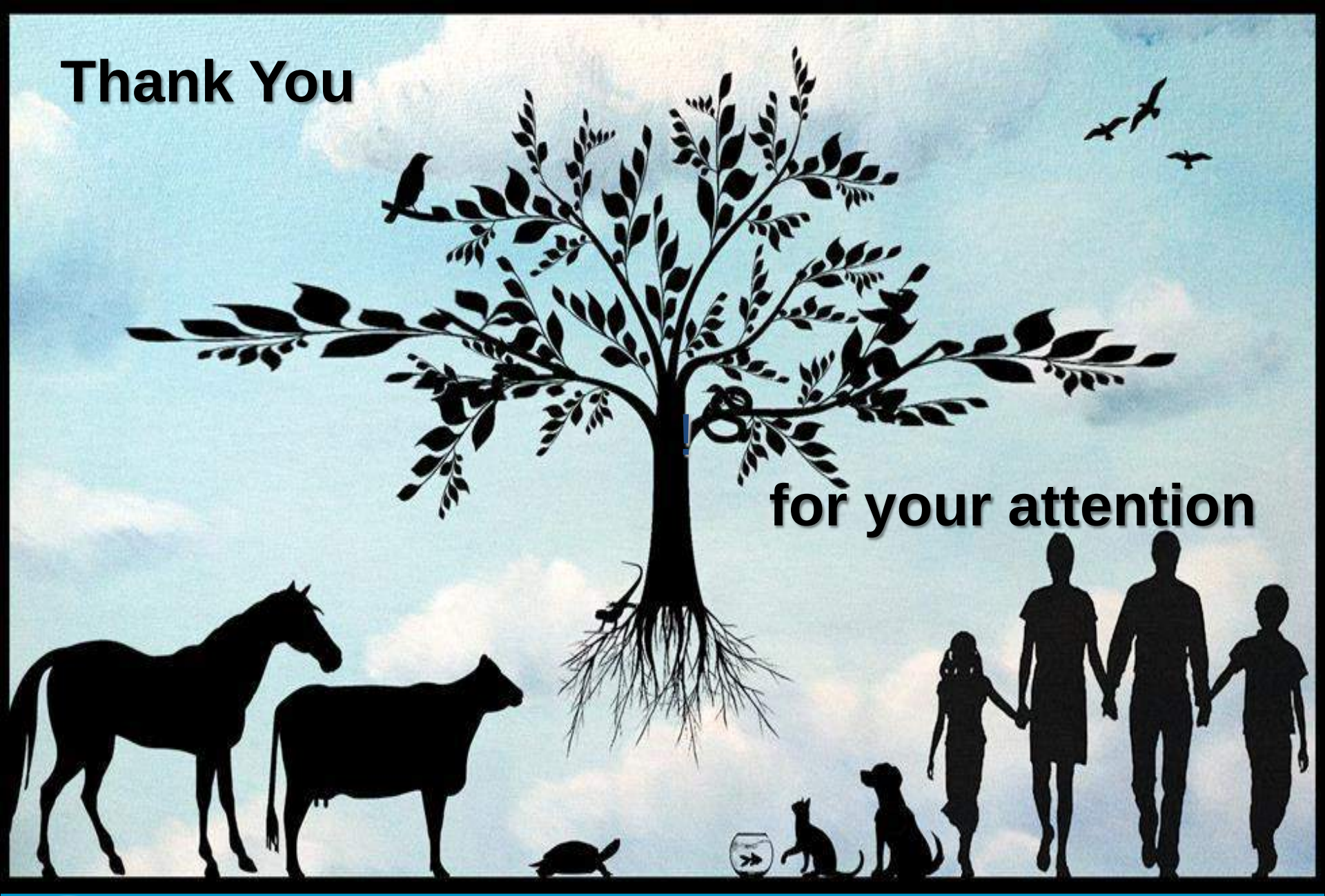
Working with an OH approach is effective, provides results, saves time and

Is cost-effective

One Health

Brings Us All Together

Thank You



for your attention

Experiences in intersectorial surveillance integration

Flavia Riccardo and Maria Grazia Dente
Istituto Superiore di Sanità, Rome, Italy
Francesco Bolici
Cassino University, Italy

MeSA Study

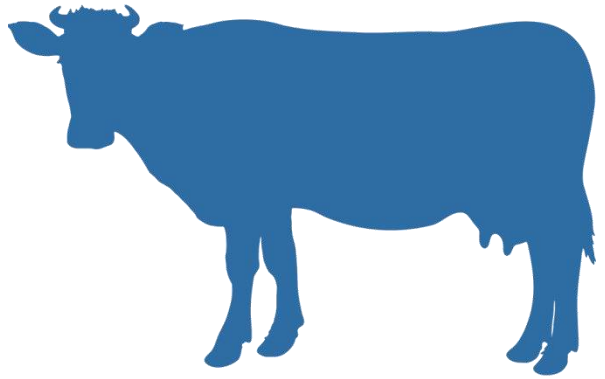
Georgia

13-15 December 2016

Debriefing meeting, 15 December 2016

Outline

- Mesa Study in Georgia focussing on CCHF surveillance
  - timeline and process
- Main Preliminary Findings for discussion
  - Comments, suggestions, integrations and corrections
- Structure of the study report
- Next steps



Timeline

- First feedback on the experience of Georgia in intersectorial surveillance (MedilabSecure Survey 2014)
- Consultations during the MediLabSecure Mid Term Meeting (December 2015)
- Agreement to participate in the MediLabSecure MeSA Study (June 2016)
- Site Visit to Georgia (December 2016)
- Follow up activities (2017)

During three days we asked different actors involved in CCHF surveillance across the human, veterinary and entomological sectors :

To Describe how the collection, analysis and dissemination/exchange of information is organized within and between human, animal and entomological surveillance of arboviruses in three countries of the MediLabSecure network,

To Highlight the formal procedures, informal practices and legal constraints for integrated surveillance and inter-sectoral collaboration,

To Discuss main challenges and success stories in establishing a functional inter-sectoral collaboration and integration of surveillance between the human, animal and entomological sectors.

Agenda

- on 13th of December: meeting at the **NCDC**, public health and disease surveillance in humans;

- on 14th of December: **NCDC's laboratory at the R. Lugar Center** and animal laboratory at the **LMA**, human virology and vector control-related issues;

- on 15th of December: meeting with **NFA**, animal surveillance;

- on 15th of December: final debriefing meeting.

Methodology of provisional findings presentation and discussion

How will we proceed?

- Presentation of the general picture we have captured using **Business Process Modelling** methodology

- Collection of your comments, corrections and integrations in general and for each sector diagram as appropriate

Intersectorial integration in the Georgian CCHF surveillance system

Level of integration	**Sublevels of integration**	**The Georgian example**
Policy and institutional level	Policy level	Legislation issued by the Government (2015) has created the One Health intersectorial committee at national level (regional/local level ?) NCDC covers the Human Health and Entomology and refers to the Ministry of Health Presence of formal institutional collaboration mechanisms within other sectors (as during the 2014 outbreak)
	Institutional level	Presence of informal collaboration mechanisms (across sectors and within the human health sector) Presence of a strategic plan developed after CCHF epidemic in 2014 which is presently being developed in a generic preparedness plan
Data collection and analysis level	Interoperability mechanisms at data collection level	EIDSS Electronic Integrated Disease Surveillance System across all sectors
	Interoperability mechanisms at data analysis level	Potential with the EIDSS, but presently used across human epi and virology
Dissemination level		Information and reports are shared across sectors during the One Health Meetings every 3 months

Lessons learned

- One Health Committee operatively discuss priorities (Anthrax,Brucellosis, CCHF and Rabies) and emerging priorities (e.g. Antimicrobial resistance)
- CCHF Strategic Plan helps the development of Generic Preparedness Plan
- The Georgian context is conducive for intersectoral collaboration (small country, all the stakeholders can be informally in contact , high motivation)
- As CCHF is a human problem , the human health sector is the main driver for the actions
- EIDSS is a tremendous tool that is being used across sectors (repository of data, data analysis, source of updated information accessible across sectors)
- Additional potentialities of the EIDSS could be developed:
  - Early Warning function could be strengthened
  - Entomological sector described as rudimental
  - Integrated analysis of the data collected with the system across sectors
  - Use of the system to encourage integrated dissemination?

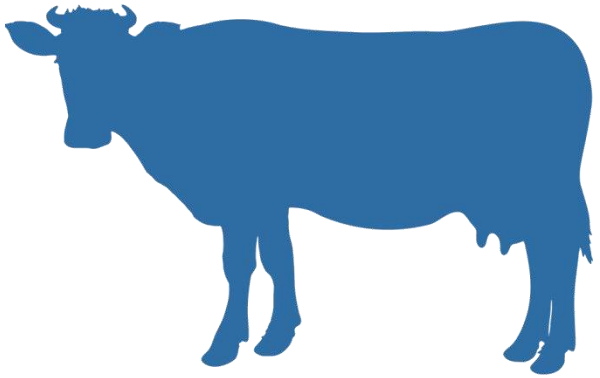
Presumptive structure of the study report

- Introduction on the organization of the Georgian surveillance system
- Introduction on the history of CCHF transmission in Georgia and evolution of the surveillance systems and their integration
- Analysis of surveillance and response processes (intra/inter sectorial) possibly using Business process modelling
- Conclusions
- Annexes: portfolio, checklists, list of interviewed actors.

Next Steps

- Draft study report (to be tentatively sent for your feedback first months of 2017)
- Finalization of the report
- Use of the findings (survey, scoping review, 3 MeSA Studies) to formulate a Strategic Document (2017)

გმადლობთ!



Thank you for your warm welcome to your beautiful country, for the knowledge you shared with us and for all the patience you had with all of our questions!