REPUBLIC OF LEBANON
MINISTRY OF PUBLIC HEALTH
Epidemiology Surveillance Program

Guideline for
Laboratory-based Surveillance

2015

ممول من الاتحاد الأوروبي
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طبع هذا الدليل بدعم من الاتحاد الأوروبي ومنظمة الصحة العالمية
بالشراكة مع مفوضية الأمم المتحدة العليا لشؤون اللاجئين وذلك في إطار مشروع بإدارة وزارة الصحة العامة.
إن وزارة الصحة العامة هي الجهة الوحيدة المسؤولة عن محتوى هذا الدليل ولا يمكن اعتباره بأي
حال من الأحوال على أنه يعكس وجهة نظر الاتحاد الأوروبي.

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This guideline was prepared by the Epidemiology Surveillance Program
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www.moph.gov.lb - (→ prevention → surveillance)

Reference: MOPH circular no. 19 (2015)

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Introduction

الدليل الوطني للترصد المخبري

المقدمة

يتميّز ترصد الامراض الانتقالية بتعدد مصادر البيانات والمعلومات وتنوع مستوياتها، تباعا لحالة المريض. حيث يمكن للانسان الذي يعاني من مرض انتقالي بالمكوث في المنزل دون اللجوء الى طبيب او التوجه الى مركز صحي او مستوصف او عيادة خاصة للمعاينة الطبية، وقد تجرى له ايضا فحوصات مخبرية. وقد تستدعي حالته الدخول الى المستشفى، وربما يتوفي من جراء المرض. ان استعمال مصادر متنوعة في الترصد يسمح بالحصول على صورة متكاملة واكثر وضوحا ما يتيح فرص التعرف بشكل افضل على وبائيات الامراض داخل المجتمع.

في العام 2006، اطلقت وزارة الصحة العامة نظام الترصد المخبري في شمال لبنان. واظهرت الدراسة ان الكشف عن الانذارات الوبائية من نظام الترصد المخبري يسبق الانذارات الوبائية في النظام الاساسي. وفي العام 2013، تم تعميم نظام الترصد المخبري على كافة المحافظات اللبنانية.

عند قراءة هذا الدليل، سيتعرف القارئ على ركائز نظام الابلاغ من المختبرات، من الفحوص المستهدفة، الى طرق الابلاغ، وتحديد المؤشرات ومقارنتها مع مصادر اخرى.

نشكر كافة المختبرات الحكومية والخاصة، العاملة ضمن او خارج المستشفيات، التي تلتزم بالابلاغ الاسبوعي المخبري.

كما ننوه بمن قام باعداد هذا الدليل من قبل برنامج الترصد الوبائي، وترجمته وطباعته من قبل منظمة الصحة العالمية بدعم من الاتحاد الاوروبي بالشراكة مع مفوضية الامم المتحدة العليا لشؤون اللاجئين.

مدير عام وزارة الصحة العامة

الدكتور وليد عمّار

Contents

A. Generalities

1. Context

Laboratory-based surveillance system was launched by the Ministry of Public health in 2006 as pilot in the North mohafaza, and generalized in 2013 to all Lebanon. Based on routine clinical laboratory tests, this system provides real-time early warning information to decision makers about infectious diseases. It is a tool to monitor the trends of communicable diseases, to detect outbreaks and to implement effective control measures.

2. Framework and regulations

The MOPH circular no. 104 dated on the 4th September 2006, requested all laboratories in North Lebanese mohafaza to report on weekly basis the number and results of laboratory tests related to certain infectious diseases. Results of the reported data revealed that this system was able to early detect alerts of infectious diseases 2 weeks prior to classical surveillance system.

In 2013, the MOPH decision no. 315/2 dated on the 16th March 2013 (Annex 1) requests all laboratories in Lebanon to be part of the new surveillance system and to report on a weekly basis the number of total, positive and negative required tests. The decision specifies the objectives of the system, the target tests, the reporting data flow, and the terms of reference of different key players.

3. Objectives of laboratory surveillance system

The main objectives of the laboratory-based surveillance system are to:

- Measure and monitor weekly laboratory indicators
- Detect alerts and identify outbreaks
- Assist decision makers on proper control measures.

Other specific objectives are to:

- Compare results of laboratory-based surveillance with the classical communicable diseases surveillance systems
- Complement the other operational communicable diseases surveillance systems.

4. Objectives and target audience of this guideline

This guideline aims to provide laboratories and MOPH staff an easy tool to:

- Operate the laboratory-based surveillance system
- Monitor positive laboratory tests and disease trends in order to identify alerts.

At the end of this guideline, the audience will:

- Know the objectives of laboratory-based surveillance system
- Know the terms of reference of key players
- Know the target laboratory tests and target diseases
- Able to compute epidemiological laboratory indicators
- Able to early detect alerts.

B. Information systems

1. Data sources

The data sources are all laboratories in Lebanon, in public and private sectors, in-hospitals and outside hospitals.

2. Collected data

Data is collected through an aggregated-based laboratory form (Annex 2).

The form is divided into the following categories:

- Laboratory general information
- Bacteriological culture
- Other stool analysis
- Serology
- Influenza
- Notes

Table 1: Laboratory form categories and variables

Categories	Variables
Laboratory general information	- Laboratory name - Director name - Laboratory register number - Identification of the week, starting on Monday
Bacteriological culture	- Bacteriological culture in CSF, blood, stool and respiratory specimen: total done, total negative, total positive - Total positive for the following: Brucella, Campylobacter, Cholera, E. Coli, Haemophilus influenza, Listeria , Neisseria meningitidis, Salmonella, Shigella, Streptococcus pneumonia, Streptococcus and others
Other stool analysis: direct exam and rapid test	- Direct stool exam: total done, total negative, and total positive - Total positive for: Entamoeba histolytica, Giardia lamblia and others - Stool EIA Rotavirus antigen detection: total done, total negative and total positive

Serology	- Specific serological tests for hepatitis A virus, Measles, & Rubella: total done, total negative and total positive
Influenza	- Influenza rapid test, in particular for A and B: total done, total negative, and total positive - PCR Influenza test, in particular for Influenza A, B A(H1), A(H3), A(H5) and others
Notes	- Remarks - Name and signature - Date

3. Data flow

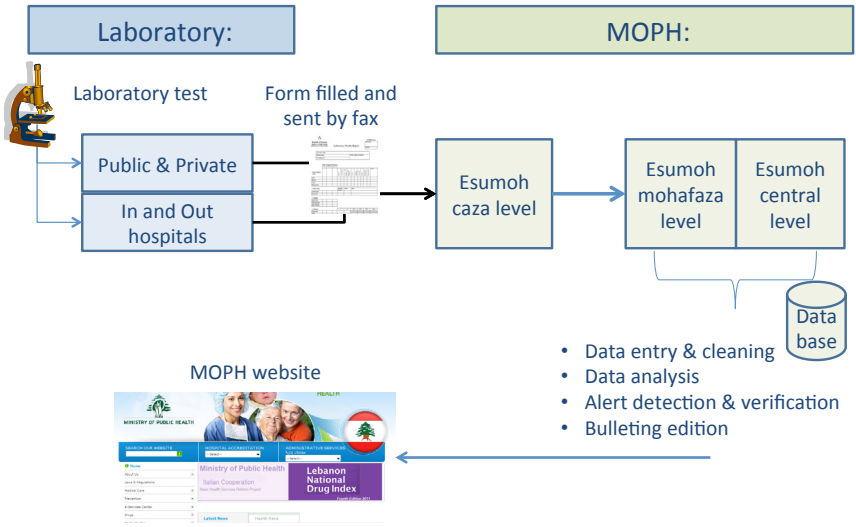
The data flow can be summarized as follow (figure1):

a) On weekly basis, the laboratory registers the numbers of total, negative and positive tests in the laboratory surveillance form. By the end of the week, forms are sent on weekly basis, by fax, to the MOPH caza team. In Beirut, forms are sent directly to the MOPH/Esumoh in Beirut.

b) The MOPH caza team receives the form. Data is checked and sent to the MOPH mohafaza or central team, on weekly basis.

c) The MOPH mohafaza/central team receives the forms and enter them in specific laboratory database. At this level, data is cleaned and analyzed. Regular summary bulletin is generated for each mohafaza and posted on the MOPH website.

Figure 1: Laboratory-based surveillance data flow



4. Data management

Upon reception of the forms, there are several steps in managing the data.

4.1. Checking forms

At the caza level, forms are checked for the following points:

- The identification of the laboratory
- The specified date for starting the week is filled and is a Monday
- The number of laboratory tests done, positive and negative are well filled
- The sum of positive and negative tests is not exceeding the reported total number.

In case of error or missing data, the MOPH caza team contacts the laboratory.

4.2. Data entry

A specific application is developed by Esumoh to enter and analyse data related to laboratory-based surveillance system. It allows data storage and automatic analysis. Data entry is done at mohafaza and central level.

For data entry, 2 screens are available:

1) Screen related to enter laboratory's information:
   - For each laboratory, the following variables are specified: the name, the code (local code), the registration number, the address (mohafaza, caza, city/village), the name of the director, the name of the contact person and the contact's details (telephone, fax, email address)
   - Such screen is entered once a year per laboratory, and updated when needed.

2) Screen related to laboratory weekly surveillance form:
   - The screen replicates the form. For each laboratory, the total laboratory tests, positive and negative results are entered
   - Such screen is entered for each laboratory for each week.

4.3. Data cleaning

Data cleaning searches for duplication, missing and incorrect data. It is performed by the MOPH/Esumoh at mohafaza and central levels.

Duplication is defined as entering many forms for the same laboratory and same week. In this case, forms are verified. If there is error in data entry, the data is corrected in the database. If there is true duplication, the additional forms are deleted.

Missing and incorrect data may interfere with data analysis, in particular if the laboratory's name, and the week identification are missing. In this case, the laboratory is contacted to correct the information.

Incorrect data may also interfere in particular if the sum of positive and negative tests is exceeding the reported number of total tests done. Laboratories are contacted to correct the information; otherwise the incorrect records are dismissed from analysis

4.4. Data analysis

Once the database is updated and cleaned, data analysis is performed at MOPH/Esumoh mohafaza and central levels.

Several indicators are generated. In addition, the outputs are transferred to excel sheet to generate graphs.

The indicators are:

a) Completeness of reporting

Weekly completeness is the proportion of laboratories who reported for a specific week among the total number of laboratories in a specific mohafaza.

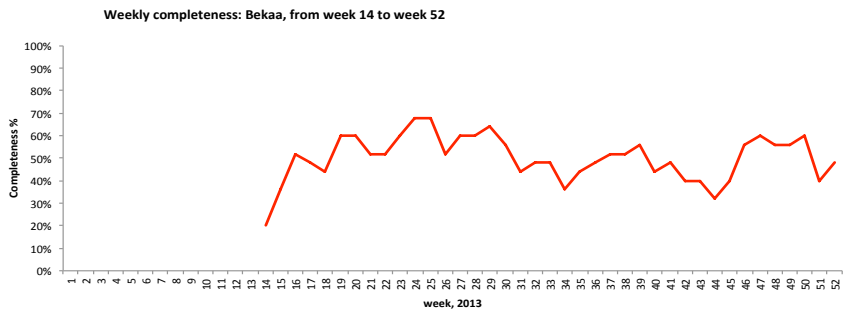
$$\text{Weekly Completeness} = \frac{\text{Number of received forms from laboratories for a specific week} \times 100}{\text{Number of expected forms from all laboratories for a week}}$$

Cumulative completeness is the proportion of received forms among the total number of expected forms from laboratories for a period of time. It can be annual.

The completeness is computed for the caza, mohafaza and national levels. Also, it is computed for public, private laboratories and both.

The completeness indicator is a proportion, presented in %. The target of good reporting is to reach at least 80% of completeness. An example is provided in Annex 3.

Figure 2: Bekaa laboratory-based surveillance, 2013 - Weekly completeness



Source : Lebanon, MOPH, Esumoh, 2014

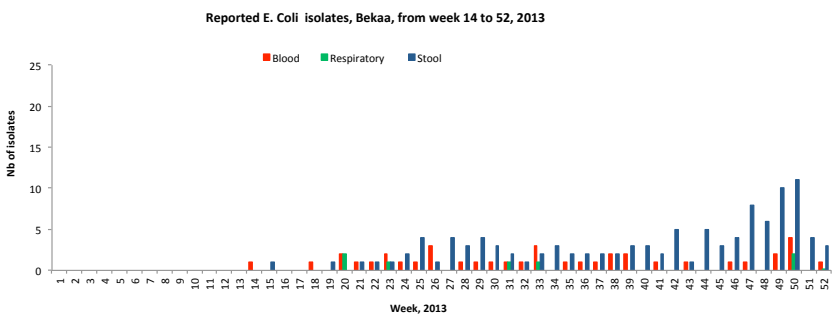
b) Weekly count of isolated infectious agents

The weekly count refers to the number of positive isolated agents, in particular for:

- Bacterial agents: Brucella, Campylobacter, Cholera, E. Coli, Haemophilus influenza, Listeria, Neisseria meningitidis, Salmonella, Shigella, Streptococcus pneumonia, Streptococcus
- Parasite agents: Entamoeba histolytica, Giardia lamblia...

Those counts are monitored on weekly basis, at mohafaza and national levels. Also, the counts of isolated bacterial agents are monitored by source of specimens (CSF, blood, stool, and respiratory specimens).

Figure 3: Bekaa laboratory-based surveillance, 2013 - Weekly counts for reported isolates of E. coli



Source : Lebanon, MOPH, Esumoh, 2014

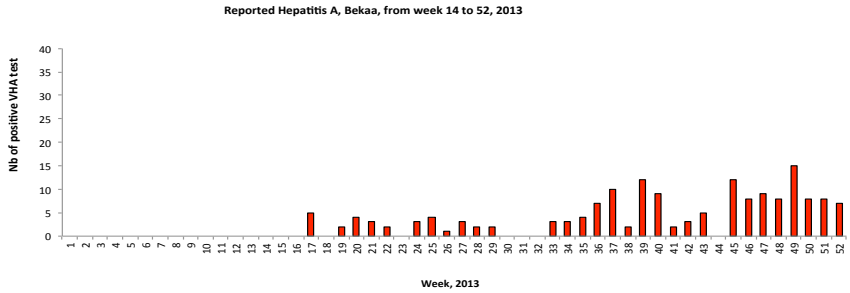
c) Weekly count of positive detection tests

The weekly count refers to the number of positive serological and PCR tests, in particular for:

- Antigen detection for Rotavirus
- IgM serology for HAV, measles, and rubella
- Influenza tests: rapid test and PCR test.

Those counts are monitored on weekly basis, at mohafaza and national levels.

Figure 4: Bekaa laboratory-based surveillance 2013 - Weekly counts for positive HAV serology test



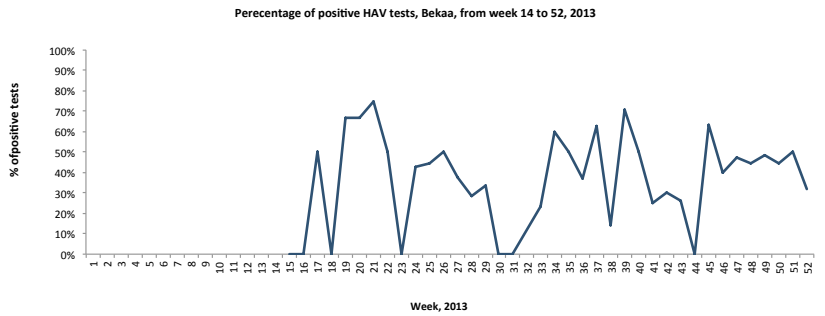
Source : Lebanon, MOPH, Esumoh, 2014

d) Weekly positive percentage

Weekly positive percentage refers to the proportion of positive results among the total number of tests done.
An example is provided in Annex 4.
It can be computed for all types of laboratory tests.

$$\text{Weekly positive \%} = \frac{\text{Number of positive results for a specific test} \times 100}{\text{Number of total specific test done}}$$

Figure 5: Bekaa laboratory-based surveillance, 2013 - Percentage of positive tests per week for HAV serology



Source : Lebanon, MOPH, Esumoh, 2014

4.5. Data comparison

a) Counts and percentages

It is useful to compare the counts of positive tests with the percentages of positive tests.

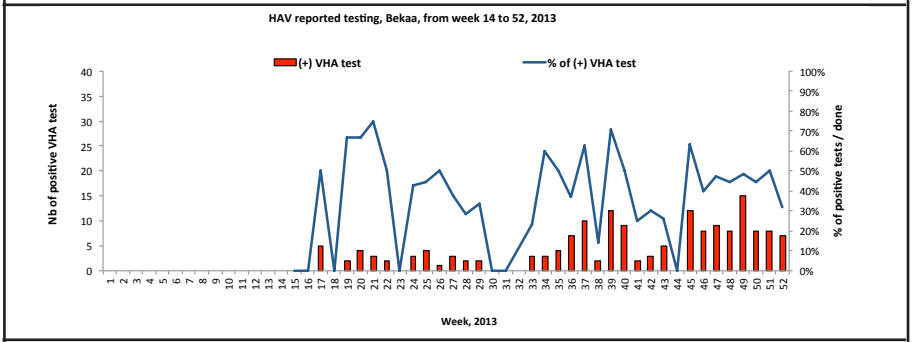
The counts of positive tests may increase for two reasons:

- Increase in the number of cases
- Increase in the number of conducted tests.

In case of true increase of cases, the counts of cases and the percentages of cases should be increasing.

When the count is less than 5, cautions are needed in interpreting the results.

Figure 6: Bekaa laboratory-based surveillance, 2013 - Comparison between counts and percentages of positive cases of HAV.



Source : Lebanon, MOPH, Esumoh, 2014

b) Reported individual cases

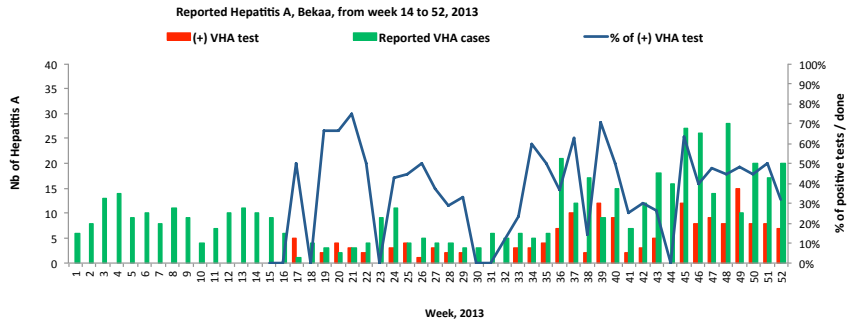
Results provided by the laboratory-based surveillance are compared with the results provided by the classical reporting surveillance system, where cases are reported via individual case reporting form.

The classical surveillance system includes suspected, probable and confirmed cases. Also, cases are displayed by place of residence.

The laboratory-based surveillance system includes only confirmed cases. And cases are displayed by place of laboratory testing.

The comparison between the laboratory-based surveillance and the classical surveillance is useful to double check the value of the alerts. However, cautions need to be considered.

Figure 7: Bekaa laboratory-based surveillance, 2013 - Comparison with the classical surveillance system for HAV cases.



Source : Lebanon, MOPH, Esumoh, 2014

4.6. Alert Generation

When the laboratory-based surveillance system reaches a threshold, it will generate an alert. Alert is a signal of a potential outbreak that necessitates verification to confirm or discard.

Three types of thresholds are used:

- Threshold fixed by MOPH
- Threshold based in cluster of cases
- Threshold based on relative increase via comparison with previous weeks.

Table 2: Laboratory-based surveillance sytem thresholds		
Indicator	**Agents**	**Alert threshold**
Counts	**Bacteria**	
	Campylobacter	Cluster of cases
	Cholera	1 case
	Salmonella	Cluster of cases and/or relative increase
	Shigella	Cluster of cases
	E. Coli	Cluster of cases and/or relative increase
	Listeria	Cluster of cases and/or relative increase
	Streptococcus	Cluster of cases and/or relative increase
	Haemophilus Influenza	1 case
	Neisseria meningitidis	1 case
	Streptococus pneumonia	Cluster of cases and/or relative increase
	Brucella	Cluster of cases and/or relative increase
	Virus	
	Measles	1 case
	Rubella	1 case
	Influenza	Cluster of cases and/or relative increase
	Hepatitis A virus	Cluster of cases and/or relative increase
	Parasite	
	Giardia lamblia	Cluster of cases and/or relative increase
	Entamoeba histolytica	Cluster of cases and/or relative increase

1. Verification

In case of alerts, 3 steps are performed:

- Internal verification: verify the presence of any error in the database
- Source-based verification: contacting the laboratory to verify the results
- Cross-checking: comparing the information provided by the laboratories with the other surveillance systems in place (classical, medical centers, schools…)

Once the alert has been verified to be a true outbreak, investigation is launched.

2. Investigation steps

Classical outbreak investigation includes ten steps which can be simultaneously undergone:

1) Confirming the outbreak
2) Confirming the disease
3) Establish a case definition
4) Search for cases via passive or active methods
5) Describe cases by time, place and person
6) Generate hypothesis
7) Test hypothesis by carrying out additional studies
8) Document the investigation
9) Recommend control measures
10) Continue surveillance.

Depending of the outbreak, investigation may need collecting the bacteriological isolates in order to determine the types and subtypes in reference laboratories.

Outbreak investigation is conducted by the MOPH/Esumoh teams (caza, mohafaza and central levels).

3. Principles of response

According to the disease, the control measures will vary:

- Case management: It refers to adequate case management of patients in health care settings or in the community.

- Infection control: It aims to reduce the risk of disease transmission in health care settings.

- Contact tracing: It aims to identify individuals who had close contact with infectious cases, and who are therefore at risk of developing the disease themselves, with the potential for further transmission to others. Contacts are usually screened for the duration of the incubation period. Breaking the chain of transmission aims to identify those persons and apply preventive measures.

- Environmental control measures: They aim at reducing the transmission of the disease whenever an environmental source or vector is involved.

- Mass prevention: Some outbreaks require mass prevention to stop the spread as mass vaccination...

- Social mobilization: For many outbreaks, social mobilization is essential to the containment of the outbreak. It ensures that the public understands the prevention and the control measures implemented and complies with them.

- Communication: To provide necessary information including consistent facts and figures about the extent of the outbreak, and prevention and control measures being implemented:
  - For the official MOPH spoke-person in charge to handle communication with the media
  - For the health education department in charge of public awareness in order to address the fear of the public about the risks for the community.

D. Terms of reference of key players

1. Laboratory focal point

The laboratory or the hospital designates one person as the laboratory focal point.

The terms of reference of the laboratory focal point are to:

- Collect and gather information on laboratory tests
- Fill the weekly laboratory surveillance form and send it by fax to the MOPH caza level (or central level for Beirut)
- Coordinate with the MOPH for verification and investigation.

2. MOPH caza team

The MOPH caza team contributes to the laboratory-based surveillance system. The team is in charge of:

- Receiving weekly laboratory forms
- Checking the form information
- Following up with non-compliant laboratories
- Sending the forms to the MOPH /mohafaza and central levels, on weekly basis
- Conducting verification and investigation.

3. MOPH mohafaza team

At the mohafaza level, the MOPH/Esumoh team is in charge to manage and operate the laboratory-based surveillance system. Usually, for each mohafaza, one person is designated to ensure necessary follow up. The terms of reference are to:

- Receive the forms from the caza teams
- Perform data entry
- Perform data cleaning
- Perform data analysis
- Monitor indicators
- Detect alerts
- Verify alerts
- Conduct necessary investigation
- Edit mohafaza epidemiological bulletin
- Send a copy of the local database to the MOPH central team.

4. MOPH central team

At the MOPH central level, the Esumoh team ensures necessary support to operate the laboratory-based surveillance system. The terms of reference are, in addition to those specified for mohafaza teams, to:

- Develop the specific database
- Conduct necessary training for data entry, data cleaning and data analysis
- Conduct necessary training sessions for laboratories
- Receive copies of local databases and merge them in the national database
- Identify needed indicators
- Set thresholds to generate alerts
- Ensure referral of isolates to reference laboratories
- Revise the bulletins and upload them at the MOPH website
- Evaluate the indicators and the system.

1. Brucella

Generalities	Bacteria causing systemic infection "Brucellosis", undulant fever. Four bacteriological agents are identified: a) Brucella abortus b) Brucella melitensis c) Brucella suis d) Brucella canis.
Classification	Gram negative cocci or small rods, aerobic, non-motile, urease positive.
Incubation period	1-2 months (may be 5-60 days).
Communicability	No evidence of communicability from person-to-person.
Reservoir	a) Brucella abortus: cows b) Brucella melitensis: sheep and goats c) Brucella suis: pigs d) Brucella canis: dogs.
Modes of transmission	a) Direct contact of infected tissue or body fluids with broken skin or conjunctivae b) Inhalation of infected aerosols c) Ingestion of unpasteurized dairy products or raw infected meat.
Clinical presentation	Fever, chills, headache, arthralgia, prostration, malaise, swollen lymph nodes…
Specimen to be collected	Blood and serum.
Tests	- Confirmatory tests: culture and PCR - Other tests: Wright and Rose Bengal

2. Campylobacter

Generalities	Bacteria causing intestinal infection “campylobacteriosis”. Two etiological agents are responsible: a) Campylobacter jejuni b) Campylobacter coli.
Classification	Microaerobic, non-spore forming, gram-negative bacteria of the Campylobacteraceae family. They form motile, spiral shaped rods.
Incubation period	Typically 2-5 days (range 1-10 days).
Communicability	Throughout the course of infection.
Reservoir	Domestic animals (cats, dogs), livestock (pigs, cattle, sheep), birds (poultry), polluted water.
Modes of transmission	a) Oral ingestion of bacteria through contaminated food or drinking water or raw milk b) Contact with animals and their feces c) Person-to-person: uncommon.
Clinical presentation	Diarrhea (often bloody), abdominal pain, nausea, vomiting, malaise, fever.
Specimen to be collected	Stool and rectal swabs.
Test	Culture.

3. Vibrio Cholera

Generalities	Bacteria causing acute watery diarrhea.
Classification	Bacteria: Vibrio cholera, serogroup O1 (biotype classical or El Tor, subtype Ogawa or Inaba), or serogroup O 139. Enterotoxin producer.
Incubation period	2-5 days (can be few hours).
Communicability	As long as the bacteria is excreted in feces, up to few days after recovery.
Reservoir	Humans, brackish waters and estuaries.
Modes of transmission	a) Consumption of contaminated water b) Consumption of contaminated food by water, human feces, by soiled hands; or consumption of raw or undercooked seafood c) Person-to-person: fecal-oral route.
Clinical presentation	- Acute abundant watery diarrhea, rice-water stool - Asymptomatic infection is common - Complication: dehydration and death. Case fatality can reach 5% if untreated, and is <1% if treated.
Specimen to be collected	Stool and rectal swabs in Carry Blair media.
Test	Culture and identification of the serogroup.

4. Entamoeba histolytica

Generalities	Obligate parasite causing intestinal infection “amoebiasis”.
Classification	Protozoan with 2 forms: - Trophozoite form: 12-50 µm in diameter, microaerophilic with granular, vacuolated endoplasm and clear ectoplasm with pseudopods - Cyst form: 10-15 µm in diameter.
Incubation period	Usually 2-4 weeks.
Communicability	During the period of cyst passing and may continue up to several years.
Reservoir	Humans (chronically ill or asymptomatic cyst passer).
Modes of transmission	a) Ingestion of fecally contaminated water and food (raw vegetables) b) Person-to-person: oral-anal sexual contact.
Clinical presentation	- Fever, severe abdominal cramps, profuse bloody diarrhea and tenesmus - Complications: hemorrhage, peritonitis, amebomas and liver abscesses.
Specimen to be collected	Stool.
Test	Stool direct exam.

5. Esherichia coli

Generalities	Bacteria causing intestinal infection. Four types of E. Coli are identified: a) E.Coli Enteropathogenic (EPEC) b) E.Coli Enterotoxigenic (ETEC) c) E.Coli Enteroinvasive (EIEC) d) E.Coli Enterohaemorrhagic (EHEC) or verocytotoxin-producing E. coli (VTEC) or referred to as Shiga-toxin producing E. coli (STEC).
Classification	Gram negative rod, motile, aerobic, facultative anaerobic.
Incubation period	a) EPEC : 1 to 6 days b) ETEC: 1 to 3 days c) EIEC: 1 to 3 days d) EHEC: 3 to 8 days.
Communicability	Communicable for duration of fecal excretion.
Reservoir	- Humans are the main reservoir for EPEC, ETEC, EIEC - Cattle for EHEC.
Modes of transmission	a) Ingestion of contaminated food (undercooked hamburger meat, unpasteurized milk) b) Person-to-person transmission: fecal-oral transmission.
Clinical	Severity of clinical syndrome different with E.Coli's type as the following: a) EPEC: watery diarrhea, nausea, fever, vomiting and abdominal pain b) ETEC: watery diarrhea, nausea, vomiting, coma, severe abdominal pain, may leading to dehydration and shock

	c) EIEC: watery diarrhea, nausea, vomiting and severe abdominal pain d) EHEC: bloody diarrhea and severe abdominal pain, may cause Hemolytic Uremic Syndrome.
Specimen to be collected	Blood, stool...
Test	Culture.

6. Giardia lamblia

Generalities	Protozoa responsible of intestinal infection “giardiasis”
Classification	Flagellated enteric protozoan parasite, with two forms: - Trophozoite form (motile and vegetative which resides in the small intestine and causing disease manifestations) - Cyst form (infective resistant form responsible for disease transmission).
Incubation period	7 to 10 days (may be 3-25 days).
Communicability	During the entire period of infection.
Reservoir	Humans (principal reservoir) and animals.
Modes of transmission	a) Ingestion of contaminated food and water b) Contaminated swimming pools c) Person-to-person transmission: fecal-oral route d) Person-to-person transmission: sexual contacts.
Clinical presentation	Nausea, chills, low grade fever, epigastric pain and sudden onset of watery diarrhea.
Specimen to be collected	Stool.
Test	Stool direct exam.

7. Haemophilus influenza type b

Generalities	Bacteria responsible of childhood invasive infection as meningitis, epiglottitis, pneumonia…
Classification	Gram negative coccobaccilus, non-motile and non acid-fast, aerobic, able also to grow in facultative anaerobic conditions.
Incubation period	2-4 days.
Communicability	As long as the agent is present. Non-communicable within 24-48 hours of starting adequate antibiotherapy.
Reservoir	Humans.
Modes of transmission	Person-to-person transmission: contact with droplet and discharge from nose and throat during infectious period. The portal of entry is most commonly the nasopharynx.
Clinical presentation	a) Infection with Haemophilus influenza b can cause meningitis (50% of all cases), epiglottitis (17%), pneumonia (15%), septic arthritis (8%), cellulitis (6%), osteomyelitis (2%), or generalized bacteremia (2%) b) Asymptomatic infections: 0.5-3% of children.
Specimen to be collected	CSF and blood...
Test	Bacteriological culture, and soluble antigen detection (CSF).

8. Influenza viruses

Generalities	Virus responsible of acute respiratory infection "flu". Three types are identified: a) Type A: several subtypes, causing seasonal and pandemic influenza b) Type B: epidemics c) Type C: localized outbreaks, sporadic cases.
Classification	Members of the Orthomyxoviridae family, segmented, negative sense, single-stranded RNA viruses.
Incubation period	1-3 days.
Communicability	3-5 days from clinical onset in adults, up to 7 days in young children.
Reservoir	Humans, birds, mammalians (swine, horse…).
Modes of transmission	a) Person-to-person transmission: direct and indirect contact with infected droplets b) Person-to-person transmission: airborne spread among crowded populations in enclosed spaces; or during aerosol generating health maneouvres c) Animal-to-person transmission: rare.
Clinical presentation	- Acute viral disease of the upper respiratory tract characterized by fever, chills, headache, myalgia, weakness, runny nose, mild sore throat and cough - Complications: viral and bacterial pneumonia - Case fatality: generally low, except in those with chronic medical conditions.
Specimen to be collected	Respiratory specimens mainly (and serum).
Test	Virological culture, PCR.

9. Listeria monocytogenes

Generalities	Bacteria responsible of systemic infection "listeriosis". Various serorars are identified.
Classification	Gram-positive, rod-shaped coccobacillus, facultatively anaerobic.
Incubation	3-70 days (median: 3 weeks).
Communicability	- Mothers of infected newborn infants may shed the agent in vaginal discharges and urine for 7-10 days after delivery - Infected individuals can shed organism in the stool for several months.
Reservoir	Soil, forage, water, mud and silage, wild and domestic animals, and infected people.
Modes of transmission	a) Ingestion of contaminated food: raw or contaminated milk, soft cheeses, vegetables, and ready-to-eat meat b) Direct contact with infected materials c) Transmission from mother to fetus.
Clinical presentation	- In adults and new-borns: meningo-encephalitis and/or septicemia - In pregnant women: fever and abortion.
Specimen to be collected	Blood, CSF.
Test	Bacteriological culture.

10. Measles

Generalities	Virus causing systemic infection and febrile rash. Measles may lead to severe complications and can cause death.
Classification	Measles virus, member of the genus Morbillivirus of the family Paramyxoviridae.
Incubation	10 days (7-18 days, may be to 21 days).
Communicability	From 4 days before rash up to 4 days after rash onset.
Reservoir	Humans.
Modes of transmission	a) Person-to-person: contact with droplets via mainly direct person contact, and rarely via indirect contact b) Person-to-person: airborne if confined place
Clinical presentation	- Febrile maculo-papular rash - Complications: otitis media (7-9%), pneumonia (1-6%), gastro-enteritis (8%), blindness, convulsions (1/200), encephalitis (1/1000) - Long term complication: sub-acute sclerosing pan-encephalitis (SSPE), 7 years or more after onset (1/25000 case, and 1/8000 if onset under 2 years old) - Case fatality: 3-6% in developing countries, 1-3/1000 in developed countries, 2/1000 in Lebanon.
Specimen to be collected	Serum, urine, oral fluid, dried blood, and throat swab.
Test	- IgM: 1-28 days from rash onset (serum, oral fluid, urine and dried blood) - PCR: 1-7 days from rash onset (oral fluid and dried blood) - Virological culture: 1-5 days from rash onset (urine and throat swab).

11. Neisseria meningitidis

Generalities	Bacteria causing meningitis infection and/or septicemia. At least 12 serogroups are identified. The groups A, B, C, W135 and Y are the most frequently causing invasive disease.
Classification	Gram negative diplococcic, intra or extra-cellular.
Incubation	Commonly 3-4 days (may be 2-10 days).
Communicability	Until live meningococci are no longer present in the respiratory discharge. Neisseria meningitidis usually disappears within 24 hours of adequate antibiotherapy.
Reservoir	Humans.
Modes of transmission	Person-to-person: by direct contact with droplets and discharges from nose and throat of infected persons.
Clinical presentation	- Meningitis - Septicemia, with petechial rash, delirium and coma - Case fatality: 50% without treatment, less than 10% with adequate treatment - Sequellae: 10% of patients who recover have permanent neurologic disability, limb loss, or hearing loss.
Specimen to be collected	Blood and CSF.
Test	Bacteriological culture, soluble antigens detection, PCR.

12. Rotavirus

Generalities	Virus causing infantile intestinal infection.
Classification	Member of Rotavirus genus within the Reoviridae family. Rotavirus is non-enveloped, with a diameter of about 70 nm, and has a wheel-like appearance.
Incubation	1 to 3 days.
Communicability	During the acute phase.
Reservoir	Humans.
Modes of transmission	Person-to-person: usually fecal oral route.
Clinical presentation	Fever, watery diarrhea and vomiting.
Specimen to be collected	Stool.
Test	Antigen detection in stool samples via various assays: ELISA and latex agglutination …

13. Rubella

Generalities	Virus causing mild infection characterized by febrile maculo-papular rash starting on the face and gradually spreading to the feet. Rubella is highly contagious.
Classification	Togaviridae family, Rubivirus genus.
Incubation	14-17 days with a range of 14-21 days.
Communicability	From 7 days before rash onset up to 4 days after rash onset. Infants with Congenital Rubella Syndrome may shed the virus for months after birth.
Reservoir	Humans.
Modes of transmission	a) Person-to-person: direct/indirect contact with droplets and nasopharyngeal secretions b) Mother to foetus.
Clinical presentation	- Febrile maculo-papular rash. - Complications: thrombocytopenia (1/3000), post-infectious encephalitis (1/6000), rarely chronic arthritis - Congenital rubella syndrome (CRS) up to 90% of infants born to women infected with rubella during the first trimester of pregnancy.
Specimen to be collected	Serum, urine, oral fluid, dried blood, or throat swab.
Test	- IgM: 1-28 days from onset (serum, oral fluid, urine, or dried blood) - PCR: 1-7 days from onset (oral fluid or dried blood) - Virological culture: 1-5 days from onset (urine or throat swab).

14. Salmonella enterica subsp. enterica serovar Typhi and serovar Paratyphi (former Salmonella typhi & paratyphi)

Generalities	Bacteria causing systemic infection typhoid fever and paratyphoid fever. The serovar Paratyphi includes var. A and B.
Classification	Enterobacteriaceae family, gram negative rod, motile, aerobic and facultatively anaerobic.
Incubation	- Typhi: 8-14 days - Paratyphi: 1-10 days.
Communicability	Communicable as long as the agent persists in excreta (1 week for thyhi and 1-2 weeks for paratyphi). 2-5% will become chronic carriers.
Reservoir	Humans, rarely domestic animals for paratyphi.
Modes of transmission	a) Ingestion of food and water contaminated by feces and urine of infected persons or carriers b) Ingestion of food contaminated by flies.
Clinical presentation	Systemic bacterial disease with fever.
Specimen to be collected	Blood.
Test	Bacteriological culture as confirmatory test.

15. Salmonella enterica subsp. enterica (former Salmonella non typhi)

Generalities	Bacteria responsible of intestinal infection “salmonellosis”. There are more than 2000 serotypes capable of causing disease. The most frequent are: serovar Typhimuruim and serovar Enteritidis.
Classification	Enterobacteriaceae family, gram negative rod, motile, aerobic and facultatively anaerobic.
Incubation	12-36 hours (may be 6-48 hours).
Communicability	- Communicable as long as the agent is excreted in feces, commonly 1-2 weeks after recovery, - If chronic carriers: may persist for years.
Reservoir	Humans, domestic and wild animals.
Modes of transmission	a) Person-to-person: fecal oral transmission b) Ingestion of contaminated food from infected animals or that were contaminated by hands of a carrier or cross-contamination during preparation, or flies c) Ingestion of contaminated water and drinks.
Clinical presentation	Diarrhea, nausea, fever, abdominal pain and maybe dehydratation.
Specimen to be collected	Blood and stool.
Test	Bacteriological culture.

16. Shigella

Generalities	Bacteria causing intestinal infection called “shigellosis”. The infectious dose for humans is low (10-100 bacteria). Four serogroups are listed: a) Serogroup A: S. dysenteriae b) Serogroup B: S. flexneri c) Serogroup C: S. boydii d) Serogroup D: S. sonnei
Classification	Enterobacteriacae family, Gram negative rod, non-motile, non-encapsuled and facultatively anaerobic.
Incubation	1-3 days, up to 1 week for S. dysenteriae.
Communicability	Communicable as long as the organisms are present in excrement (usually within 4 weeks after illness without treatment).
Reservoir	Humans and higher primates.
Modes of transmission	a) Ingestion of contaminated food or water b) Person-to-person contact: fecal oral route c) Contamination of food by flies.
Clinical presentation	Abdominal pain, vomiting, fever, diarrhea ranging from watery (S. sonnei) to dysenteric with bloody stools, mucus and pus (S. dysenteriae and, to a lesser extent S. flexneri and S .boydii).
Specimen to be collected	Stool, rarely in blood.
Test	Culture.

17. Streptococcus

Generalities	Several groups of Streptococcus bacteria, each one of them have special clinical spectrum. The main groups are: a) Group A Streptococci: over 130 serological types responsible of skin, respiratory infection, rheumatic fever, toxic shock-like syndrome … Ex: Streptococcus pyogenes b) Group B Streptococci (Streptococcus agalactiae): responsible of sepsis of the newborn c) Alpha-hemolytic: Streptococcus pneumonia and the Viridans group.
Classification	a) Group A: beta hemolytic, aerobic, gram-positive extracellular bacterium b) Group B: beta hemolytic, facultative anaerobic, gram-positive bacterium.
Incubation	a) Group A Streptococci (Beta hemolytic): 1-3 days b) Group B Streptococci: less than 7 days for early onset.
Reservoir	a) Group A Streptococci (Beta hemolytic): humans b) Group B Streptococci: humans and cattle.
Modes of transmission	a) Group A Streptococci (Beta hemolytic): person-to-person transmission through direct and indirect contact with droplets b) Group B Streptococci: in-utero or during delivery for early onset; hand-to-mouth and aerosol transmission for late onset.

Clinical presentation	a) Group A Streptococci (Beta hemolytic): tonsillitis, pharyngitis, otitis media, acute glomerulonephritis, acute rheumatic fever, pyoderma, impetigo, scarlet fever, cellulitis, puerperal fever, toxic shock syndrome… b) Group B Streptococci: sepsis, pneumonia, meningitis… Two forms are described: at early onset (1-7 days after birth) or late onset (1-3 months after birth).
Specimen to be collected	Blood, CSF, respiratory specimens…
Test	Bacteriological culture.

18. Streptococcus pneumonia

Generalities	Bacteria causing community-acquired pneumonia, otitis and meningitis. Around 90 serotypes are identified, but 11 serotypes are causing at least 75% of invasive diseases.
Classification	Member of the Streptococcaceae family, a Gram-positive encapsulated oval/lancet-shaped coccus, often arranged in pairs (diplococcus).
Incubation period	1-3 days.
Communicability	During active phase.
Reservoir	Humans.
Modes of transmission	Person-to-person transmission: via direct or indirect contact with droplet and respiratory discharges.
Clinical presentation	- Acute lower respiratory infection with chills, high fever, and cough producing pink to rusty colored sputum. - Other manifestations: sinusitis, endocarditis, arthritis, peritonitis, and septicemia.
Specimen to be collected	a) Respiratory specimens: sputum, nasal or throat swabs b) Non-respiratory specimens: blood and cerebrospinal fluid.
Test	Bacteriological culture, soluble antigen detection, PCR.

19. Hepatitis A virus

Generalities	HAV, virus causing acute hepatitis. It is not associated with chronic liver disease.
Classification	Hepatitis A virus HAV, a 27-nanometer (positive-strand RNA virus), member of the Picornavirus family.
Incubation	28-30 days (15-50 days).
Communicability	During the second half of the incubation period, and up to one week after jaundice onset.
Reservoir	Humans, rarely chimpanzees and other primates.
Modes of transmission	a) Person-to-person transmission: fecal oral route b) Ingestion of contaminated food: food contaminated by food handler, or raw or undercooked molluscs harvested from contaminated water, or produce irrigated with contaminated water c) Ingestion of contaminated water or drinks d) Drug use (in particular intra-venous).
Clinical presentation	- Febrile jaundice - Usually asymptomatic in childhood - Case fatality: 0.1-0.3 % (1.8% for >50 years).
Specimen to be collected	Serum
Test	HAV IgM serology.

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Abbreviations

CSF	Cerebral Spinal Fluid
E. coli	Escherichia coli
EIA	Enzyme Immunosorbent Assay
ELISA	Enzyme-Linked Immunosorbent Assay
Esumoh	Epidemiological Surveillance Program
HAV	Hepatitis A Virus
MOPH	Ministry of Public Health
PCR	Polymerase Chain Reaction

Annex 1: MOPH decision related to laboratory-based surveillance

الجمهورية اللبنـانيـة
وزارة الصحة العامة
المديرية العامة

رقم المحفوظات:2/4
بيروت في 16 اذار 2013

قرار رقم 2/315
يتعلق بالابلاغ الاسبوعي من المختبرات التحاليل الطبية العاملة على الاراضي اللبنانية

إن مدير عام الصحة،
بناء على المرسوم رقم 3654 الصادر بتاريخ 18 حزيران 1993،
بناء على المرسوم الاشتراعي رقم 8377 الصادر بتاريخ 30 كانون الاول 1961 (تنظيم وزارة الصحة العامة)،
وفي اطار تعزيز الكشف المبكر عن الفاشيات،
وحيث ان الانذارات الوبائية الصادرة من المختبرات تظهر قبل الانذارات الصادرة من المستشفيات والمراكز الصحية،

يقرر ما يلي:

المادة الأولى: تعتمد مختبرات التحاليل الطبية العاملة في لبنان الابلاغ الاسبوعي لوزارة الصحة العامة، اضافة الى الابلاغ عن الامراض المعدية (قانون الامراض المعدية في لبنان الصادر عام 1957).

المادة الثانية: يشمل الابلاغ عن تحليل الزرع الجرثومي، فحص البراز المباشر، فحص لفيروس Rotavirus ، الفحص المصلي لالتهاب الكبد الفيروسي الالفي، الحصبة والحصبة الالمانية، الفحص السريع لفيروس الانفلونزا، وفحص PCR لفيروس الانفلونزا.

المادة الثالثة: يتم ابلاغ وزارة الصحة العامة عبر ملء استمارة غير اسمية "استمارة الابلاغ الاسبوعي من المختبرات" (مرفق). ترسل الاستمارات من المختبرات الى قسم الصحة العامة في القضاء. في بيروت، ترسل الاستمارات الى الوحدة المركزية للترصد الوبائي.

المادة الرابعة: تجمع الاستمارات لدى فريق الترصد الوبائي في اقسام الصحة العامة في الاقضية، حيث يتم تدقيقها، مراجعة المختبرات لاستكمال وتوضيح المعلومات اللازمة، ومن ثم ترسل الى فريق الترصد الوبائي في المحافظات. وفي المحافظة، يتم مكننة المعلومات، اعداد جداول اولية للكشف عن الانذارات الوبائية المحلية، و ترسل نسخة عن قاعدة البيانات اسبوعيا الى الوحدة المركزية للترصد الوبائي. في بيروت، يتم تحليل البيانات للكشف عن الانذارات الوبائية الوطنية.

المادة الخامسة: يبلغ هذا القرار حيث تدعو الحاجة%

مـدير عـام وزارة الصحـة العامـة

الدكتور وليد عمـار

Republic of Lebanon
Ministry of Public Health
Epidemiological Surveillance Program

Laboratory Weekly Report

For MOPH use only

Received on:
Form ID:

Laboratory name:	
Director name:	Week starting on Monday:
Lab register no.:	

	Total	Negative	Positive	Brucella	Campylobacter	E. coli (pure culture)	Haemophilus influenza	Listeria	Neisseria meningitidis	Salmonella	Shigella	Streptococcus pneumoniae	Streptococcus	Vibrio cholera	Others
1.Bacteriological culture															
CSF															
Blood															
Stool															
Respiratory															

2. Direct exam				Entamoeba histolytica	Giardia	Others
Stool direct						
Rotavirus						

3. Serology

IgM VHA			
IgM Measles			
IgM Rubella			

4. Influenza				A	B	A(H1)	A(H3)	A(H5)	Others
Rapid test									
PCR									

5. Remarks:

Name and signature: Date:

Annex 3: Completeness of reporting

Laboratories	Week 1	Week 2	Week 3	Week 4
Laboratory A	Received	Received	Received	Received
Laboratory B	Received	Received	Received	Received
Laboratory C	Received	Received	Received	Received
Laboratory D	Received	0	Received	Received
Laboratory E	Received	0	Received	0
Laboratory F	0	Received	Received	0
Laboratory G	Received	Received	0	0

$$\text{Weekly completeness, \%:} = \frac{\text{Number of received forms from laboratories} * 100}{\text{Number of expected forms from all laboratories}}$$

1) Total number of laboratories = 7
2) For week (1):
    a. Six forms were received,
    b. The weekly completeness is = received *100/ expected = 6*100/7 = 79%
3) Compute the weekly completeness for
    a. Week (2)
    b. Week (3)
    c. Week (4)

Annex 4: Weekly percentage of positive tests

Week	**HAV total done**	**HAV negative**	**HAV positive**
Week 46	20	12	8
Week 47	19	10	9
Week 48	18	10	8
Week 49	31	16	15
Week 50	18	10	8
Week 51	16	8	8
Week 52	22	15	7

$$\text{Percentage of positive tests} = \frac{\text{Number of positive tests} * 100}{\text{Number of total tests done}}$$

1. For week (46)
    a. The number of total tests done for VHA = 20
    b. The number of positive tests for VHA = 8
    c. The percentage of positive tests for VHA = 8 * 100 / 20 = 40%

2. Compute the percentage of positive tests for VHA for the following weeks:
    a. For week 47 =
    b. For week 48 =
    c. For week 49 =

الجمهورية اللبنانية

وزارة الصحة العامة – برنامج الترصد الوبائي

Laboratory surveillance system
Bekaa Mohafaza
Week 8 of 2014 from 17 to 23 February

نظام الابلاغ المخبري الأسبوعي
محافظة البقاع
الأسبوع الثامن من ١٧ لغاية ٢٣ شباط ٢٠١٤

Context and objectives

The laboratory surveillance system aims to early detect the outbreaks in order to prompt rapid response. The generated information is compared with results of the classical surveillance system for the Mohafaza (as place of residence).

Methodology

Laboratories report on weekly basis on the numbers and results of specific tests related to specific communicable diseases, using an aggregated form sent by fax or email. The starting week for data analysis for this system is the week 14 of year 2013.

Results for the latest week

Seventeen reports were received and the completeness of reporting was 65% for the hospital laboratories.

Bacteriological culture results

- One isolate of E. coli was reported in blood, three in respiratory excretion and three in stool.
- One isolate of Streptococcus was reported in respiratory excretion.

Direct stool exam results

- 29 positive tests of E. Histolityca were reported. The percentage is 11% over total done.
- 8 positive tests of Giardia were reported. The percentage is 3% over total done.
- 3 positive tests of Rotavirus were reported. The percentage is 17% over total done.

Serology results

- 7 positive VHA test were reported. The percentage is 35% over total done.

الإطار و الأهداف

يهدف نظام الإبلاغ المخبري إلى الكشف المبكر عن الفاشيات بغية الإستجابة السريعة لها والحد من انتشارها. كما تتم مقارنة النتائج مع تلك الصادرة عن نظام الإبلاغ عن الأمراض الانتقالية في المحافظة.

المنهجية

تقوم المختبرات بالإبلاغ الاسبوعي عن عدد التحاليل الطبية ونتائجها المتعلقة بأمراض انتقالية معينة وذلك من خلال تعبئة استمارة خاصة ترسل عبر الفاكس أو البريد الإلكتروني. اعتمد الاسبوع ١٤ من العام ٢٠١٣ لبداية عرض نتائج هذا النظام.

النتائج الاسبوع الاخير

تم استلام ١٧ استمارة وبلغت نسبة الابلاغ ٦٥% من قبل مختبرات المستشفيات.

نتائج الزرع الجرثومي

- أظهرت نتائج الزرع الجرثومي وجود سلالة واحدة الاشيريكية الكولي في الدم و ثلاثة في الافرازات التنفسية وثلاثة في البراز.
- كما اظهرت وجود سلالة واحدة من العقديات في الافرازات التنفسية.

نتائج فحص البراز المباشر

- بلغ عدد الفحوصات الايجابية للمتحولة الأميبية ٢٩ وهي تمثل ١١% من مجموع الفحوصات.
- بلغ عدد الفحوصات الايجابيةGiardia للجيارديةة ٨ وهي تمثل ٣% من مجموع الفحوصات.
- بلغ عدد الفحوصات الإيجابية لفيروس الروتا ٣ ، وهي تمثل ١٣% من مجموع الفحوصات.

نتائج الفحص المصلي

- اظهرت النتائج وجود ٧ فحوص ايجابية للالتهاب الكبدي الفيروسي الالفي، وهي تمثل ٣٥ % من مجموع الفحوصات .

Figure (A1) Weekly completeness of receiving reports

رسم بياني (A1) نسبة استلام الاستمارات الاسبوعية

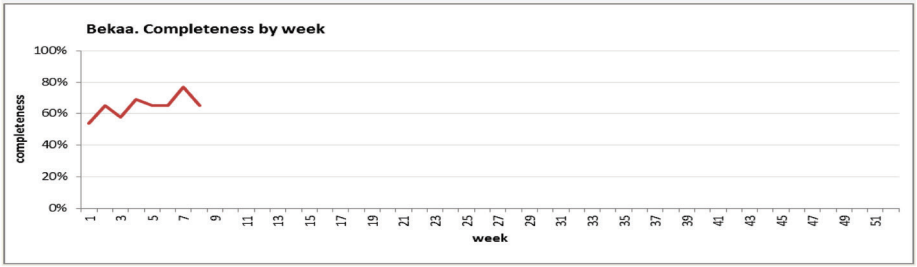


Figure (A2) Positive E.coli isolates by week

رسم بياني (A2) نتائج زرع الإشيريكية الكولونية حسب الاسابيع

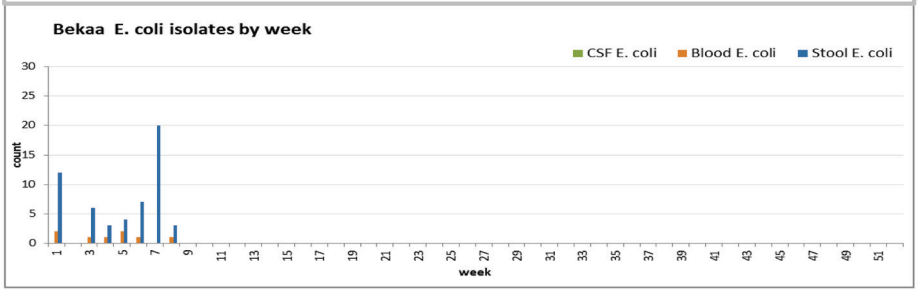
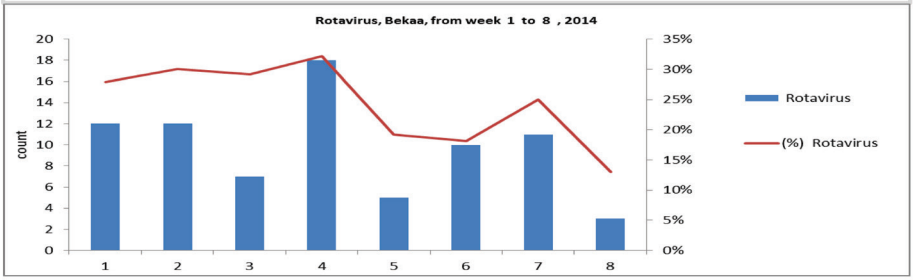


Figure (A3) Rotavirus tests results in stool by week

رسم بياني (A3) نتائج فحص فيروس الروتا حسب الاسابيع



Notes

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