

Ministry of Health, Jordan Public Health Surveillance

May - December 2014



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Prepared by Ministry of Health, Jordan

KEY RESULTS

4,373

cases reported between May –
December 2014

158

alerts generated between May –
December 2014

JORDAN PUBLIC HEALTH SURVEILLANCE

The Ministry of Health Jordan, with the support of WHO, implemented two phases of a pilot public health surveillance project between May and December 2014.

The project introduced case-based, integrated disease surveillance of mental health, non-communicable and communicable disease, and is programmed using mobile technology and an online framework.

The combined results of the two pilot phases are presented in this report, with conclusions and recommendations to inform future implementation of public health surveillance in Jordan.



Figure 1. Map of 54 clinics that participated in the public health surveillance project between May – December 2014 (indicated by red dots)

SUMMARY

More than 622,384 Syrian refugees were registered in Jordan up to 7 January 2015, comprising approximately 10% of the entire Jordanian population. Communicable diseases remain of public health concern in Jordan and little to no information is known of the burden of mental health and non-communicable disease among displaced populations.

There is a need to strengthen national public health surveillance in Jordan in order to monitor the epidemiology of priority public health diseases, conditions and events. A pilot public health surveillance project was initiated in Jordan in May 2014 that introduced case-based, integrated disease surveillance of mental health, non-communicable disease and communicable disease, and was programmed using mobile technology and an online framework. The clinician used the system within the consultation, which introduced clinical-decision support (of case definition, signs and symptoms, risk factors and laboratory advisories) as well as real-time reporting of information. This information was made available within one hour via an online framework with automated generation of SMS and email alerts, support for mapping and reporting functions, and could be accessed at all levels of MOH.

The pilot project was implemented in two phases. In Phase 1, from May – November 2014 (Epidemiological weeks 22 – 46) case-based reporting of communicable disease was introduced using 49 mobile devices, across 49 sites in three directorates of Jordan (Irbid, Mafraq and Zarka). During Phase 2, between November – December 2014 (Epidemiological weeks 48 – 52) case-based reporting and clinical decision support of communicable disease, non-communicable disease and mental health conditions was introduced using 87 mobile devices, across 54 sites in three directorates of Jordan (Irbid, Mafraq and Zarka). The combined results of the two pilot phases are presented in this report, with conclusions and recommendations to inform future implementation of public health surveillance in Jordan.

1) Mobile information technology enables standardised, coded data to be collected, analysed and reported in real-time.

The pilot project demonstrated the feasibility of collecting, analysing and reporting disease surveillance information using mobile tools in real time. This is the first time mobile tools have been applied to national public health surveillance. Data were entered electronically using mobile tools and uploaded in real-time for data analysis and reporting.

2) Implementation of integrated, case-based surveillance using mobile tools is feasible.

4,373 cases of mental health, non-communicable and communicable disease were reported from 87 mobile devices across 54 sites between May – December 2014, including:

- 24 new cases of type 2 diabetes and 9 new cases of type 1 diabetes (in November – December 2014).
- 41 new cases of hypertension (in November – December 2014).
- 61 cases of Hepatitis A
- 48 cases of Meningitis
- 16 cases of Mumps
- 9 cases of Measles
- 6 cases of Acute Flaccid Paralysis

3) Alerts can be generated in real-time via SMS and Email to inform decision-making.

158 automated real-time notifications and alerts were generated, by SMS and email, within one hour of reporting to inform outbreak investigation and response at the appropriate level of decision-making.

4) Use of clinical decision support within consultations can provide additional data to inform decision-making.

Additional information was presented to the clinician when using the system, including standardised case definition and laboratory advisories. Further information was also collected and reported during the consultation including signs and symptoms, risk factors and laboratory results, providing additional data to inform decision-making, notably:

- Mean blood pressure was 160 / 90 among reported hypertension cases (in November – December 2014).
- Mean BMI was 31.6 among 62 laboratory results recorded (in November – December 2014).
- Mean HbA1C was 9.6% among reported diabetes patients (in November – December 2014).

5) Analysis of disease burden among refugee populations can inform decision-making and resource allocation

Refugee populations have 1.4 and 1.5 times higher odds of reported hypertension and acute diarrhoea respectively, compared to Jordanian nationals. Further data collection and analysis will facilitate a more detailed understanding of the burden of disease among host communities and displaced populations.

6) An online interactive framework has been developed for data visualisation and reporting.

A password protected, online framework was updated every hour to inform decision-making and planning and included the following functionality:

- charts, maps and tables of anonymised data, disaggregated by gender, status, nationality, disease and epidemiological week or year.
- data drilled from national to directorate to clinic level.
- individual disease information, including epidemiological curve, classification, source, alert threshold, case definition, risk factors, signs/symptoms and laboratory diagnostics.
- a line list of alerts and notifications automatically updated each hour.
- individual alert information, including clinic, reporting date, investigation date and outcome of investigation.

A demonstration of the online framework used for Jordan public health surveillance (using dummy data) can be accessed via the following link:

<https://emro.info/demo>

username: demo

password: A1qGrJwp

7) Future national scale-up and implementation of public health surveillance is feasible and cost-effective

The estimated cost for the first phase of national scale-up over 12 months is USD\$185,650, covering 293 sites in Jordan (including primary and comprehensive care facilities, hospital, prisons and mental care facilities). Subsequent support and system costs are approximately USD\$60,000 per year.

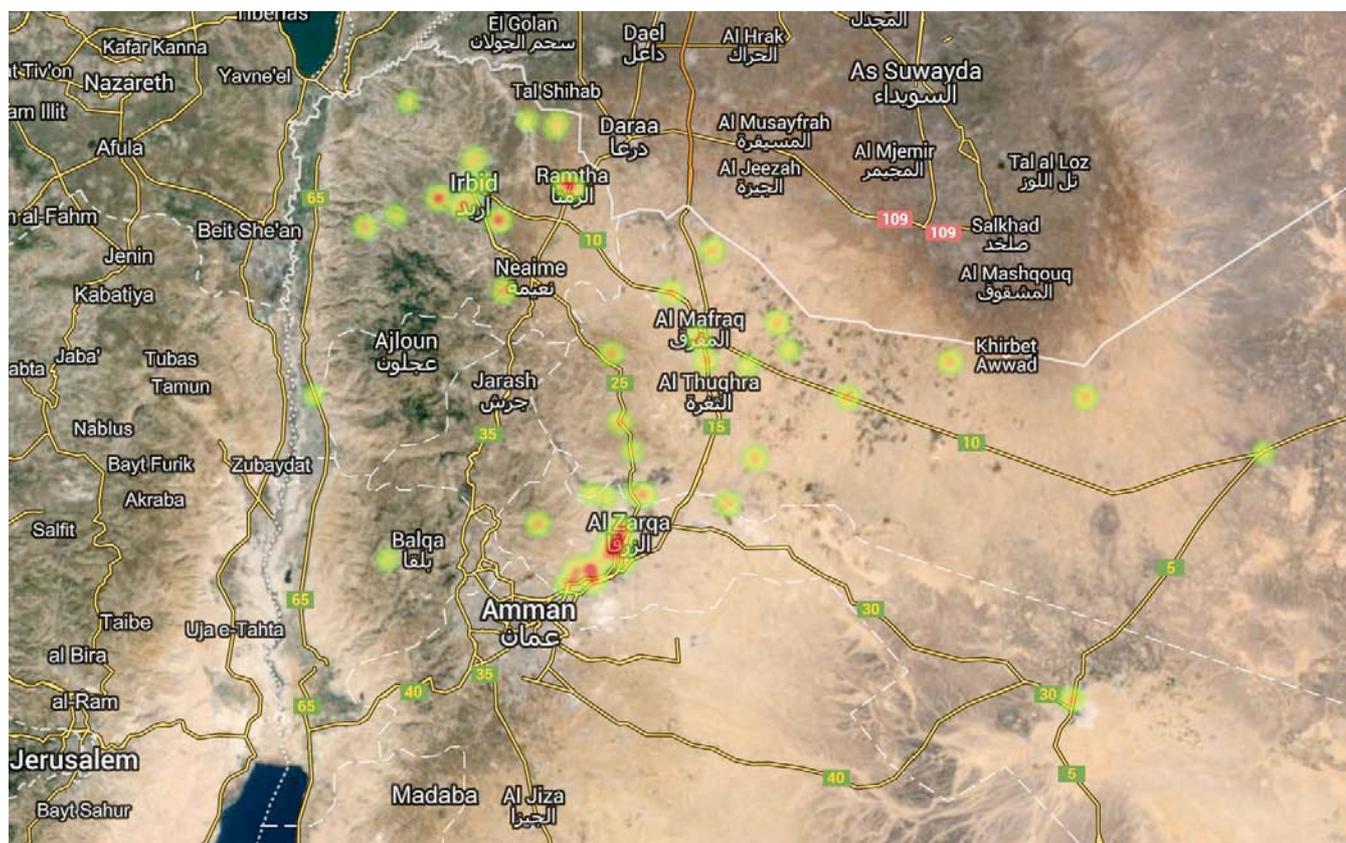


Figure 2. Heatmap showing the locations of cases reported through the public health surveillance system between May – December 2014 (red colour and radius of areas represent higher density of clustering of reported cases).

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INTRODUCTION

The humanitarian situation in the Syrian Arab Republic (Syria) and Iraq is of increasing concern, with growing domestic, regional, and international consequences. As the conflict in Syria enters its fifth year, insecurity and violence continue to force the people to seek safety and protection elsewhere. The current Iraq crisis began in early June 2014, when the extremist group Islamic State (IS), which already controls parts of Syria, seized much of northern Iraq, including the major city of Mosul. With no immediate prospect for peace, the combination of conflict, deteriorating economic opportunities, and shrinking social services are likely to generate further levels of displacement within Syria, Iraq and the region.

More than 622,384 Syrian refugees were registered in Jordan up to 7 January 2015, comprising approximately 10% of the entire Jordanian population. While health services inside the refugee camps are primarily supported by international agencies, 80% of refugees reside in non-camp settings and are placing an increasing burden on the national health infrastructure. Communicable diseases remain of public health concern and little to no information is known of the burden of mental health and non-communicable disease among displaced populations.

There is a need to strengthen national public health surveillance in Jordan in order to monitor the status and functioning of the national health system and to ensure it can provide health services to meet the basic needs of both displaced populations and host communities. There is also a need to monitor the epidemiology of priority public health diseases, conditions and events, including mental health, non-communicable disease and communicable disease.

Project objectives

A pilot routine public health surveillance system was initiated in Jordan in May 2014. The project introduced case-based, integrated disease surveillance of mental health, non-communicable disease and communicable disease, and is programmed using mobile technology and an online framework. The project has two objectives:

- to monitor the epidemiology of priority public health diseases and conditions (including mental health, non-communicable disease and communicable disease) among refugees and host communities in Jordan; and
- to monitor the status and functioning of the national health system in Jordan in response to the Syria and Iraq crises.

The clinician uses the system within the consultation, which introduces clinical-decision support (of case definition, signs and symptoms, risk factors and laboratory advisories) as well as real-time reporting of information. This information is made available within one hour via an online framework with automated generation of SMS and email alerts, support for mapping and reporting functions, and can be accessed at all levels of MOH.

The pilot project was implemented in two phases:

- **Phase 1 pilot: From May – November 2014 (Six months, Epidemiological weeks 22 – 46)**, introduced case-based reporting of communicable disease, using 49 mobile devices, across 49 sites in three directorates of Jordan (Irbid, Mafraq and Zarka).
- **Phase 2 pilot: From November – December 2014 (One month, Epidemiological weeks 48 – 52)**, introduced case-based reporting and clinical decision support of communicable disease, non-communicable disease and mental health conditions, using 87 mobile devices, across 54 sites in three directorates of Jordan (Irbid, Mafraq and Zarka).

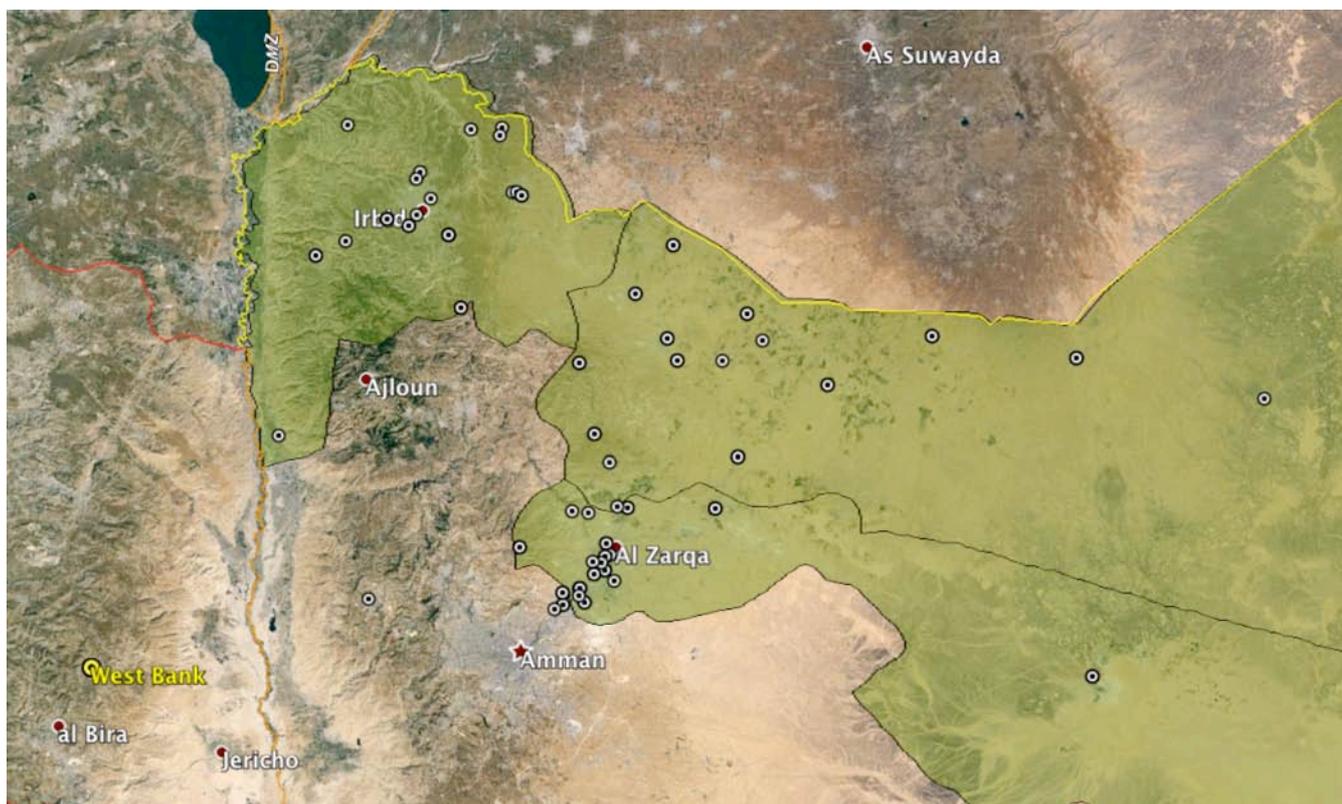


Figure 3. Map of 54 clinics that participated in the public health surveillance project between May – December 2014 (indicated by white dots). Three target directorates (Irbid, Mafrqa and Zarka) are shaded in light green.

Communicable disease		
Acute flaccid paralysis	Anthrax	Ringworm
Polio	Rabies	Leishmaniasis
Measles	Rubella	Plague
Acute watery diarrhoea	Influenza-like illness	Leprosy
Hepatitis A	Foodborne disease	Yellow Fever
Hepatitis B	Typhus	Relapsing Fever
Meningitis	Tuberculosis	SARS
Bloody diarrhoea	Typhoid & Para Typhoid Fever	H1N1
Malaria	Mumps	Coronavirus
HIV	Chicken pox	West Nile virus
Syphilis	Brucellosis	Crimean Congo Fever
Gonorrhoea	Scarlet fever	Acute diarrhoea
Diphtheria	Tetanus	Dengue Fever
Typhus	Pertussis	Rift valley Fever
Animal bite	Bilharzia	Hydatidosis
Scabies		
Non-communicable disease		
Hypertension	Diabetes	
Asthma	Chronic obstructive pulmonary disease	
Neoplasms	Haemophilia	
Mental health		
Alcohol use disorders	Substance use disorders	
Stress related disorders	Psychosis (including Schizophrenia)	
Depression (moderate to severe)	Epilepsy/seizure	
Severe emotional disorder	Self-harm/suicide	
Behavioural disorder	Bipolar disorder	
Developmental disorder	Anxiety disorders	
Dementia	Obsessive compulsive disorder	
Unexplained somatic complaint		

Table 1. Table of diseases, conditions and events reported in the public health surveillance project

Principles of implementation

The project has the following principles of implementation:

1. Routine surveillance

The project supports routine surveillance to ensure the national health system is strengthened and the capacity of the Ministry of Health is developed for long-term ownership and response.

2. Integrated disease surveillance

The project builds on existing WHO and international surveillance standards, guidelines and case definitions for mental health, non-communicable and communicable disease (see Annex 1). A list of diseases, conditions and events that are reported using the system are described in Table 1. Only new cases are reported using the system which are classified as suspected, probable and confirmed according to standard criteria (see Annex 2). Detailed classification, case definition and clinical algorithms of signs/symptoms, laboratory diagnostic criteria and alert thresholds specific to national guidelines are detailed in the national training manual for routine public health surveillance.

3. Case-based surveillance

Data is entered directly by the attending clinician during the consultation (or in some cases following the consultation by a nurse). The system uses mobile information technology to enable case-based reporting in real-time from the health facility.

4. Clinical-decision support

The system includes evidence-based clinical algorithms to provide a standardised case definition, and clinical decision support for each disease, including signs and symptoms, risk factors, diagnostic screening criteria and laboratory advisories. An example of the electronic algorithm followed for suspected measles is described in Annex 3 with screenshots from the mobile interface in Annex 4.

5. Alerts and notifications

Automated real-time notifications and alerts are generated, by SMS and email, within one hour of reporting to inform outbreak investigation and response at the appropriate level of decision-making (see example email alert in Annex 5). A line list of alerts is automatically generated via the online framework which links subsequent alert investigation and outcomes (see example line list in Annex 6).

6. Mobile data collection and management

National reporting forms are replicated in an electronic format and standardised case definitions adhered to. Data is submitted in real-time to a cloud-based server via a mobile data network connection.

7. Online framework

The system shares structured, anonymised data via an online framework for geospatial data visualisation, generation of alerts, and automated generation of reports. Annex 7 displays an example of individual disease information displayed via the online framework. Annex 8 shows an example report that is automatically generated each week. Annex 9 shows an example of how data can be exported (as data tables or raw data) from the online framework.

A demonstration of the online framework used for Jordan public health surveillance (using dummy data) can be accessed via the following link:

<https://emro.info/demo>

username: demo

password: A1qGrJwp

METHODS

Project implementation

The Ministry of Health, in co-ordination with the WHO Jordan country and regional offices, led project implementation. Several tools and cross-cutting themes supported national health system strengthening, including the adoption of a common information management framework, standardised indicators and alert thresholds, technical support and capacity building, and introduction of structured data collection, management and reporting tools.

Budget

USD\$18,235.2 was required for Phase 1 implementation across 49 sites, using 49 mobile devices, in three directorates of Jordan (Irbid, Mafraq and Zarka) over six months between May – November 2014. USD\$ 10,712.9 was required to support Phase 2 implementation across 54 sites, using 87 mobile devices, between November – December 2014.

The estimated cost for the first phase of national scale-up over 12 months is USD\$185,650, covering 293 sites in Jordan (including primary and comprehensive care facilities, hospital, prisons and mental care facilities). Subsequent support and system costs are approximately USD\$60,000 per year.

Item	Phase 1 pilot (6 months) (USD)	Phase 2 pilot (1 month) (USD)	Phase 1 national (12 months) (USD)
Training	2,685.2	690.9	37,315.6
Hardware	12,250.0	9,065.0	88,935.0
Connection	3,300.0	957.0	59,400.0
Total	18,235.2	10,712.9	185,650.6

* JOD:USD 1:1.41 as of 5 January 2015.

Table 2. Budget for Phase 1 and Phase 2 pilots of public health surveillance pilot projects and the first phase of national scale-up over 12 months.

Monitoring

Monitoring of national surveillance and response was routine and continuous, and an evaluation took place in December 2014 (which forms the basis of this report).

Two categories of indicators were monitored during the project – first, the health status of the population, which include morbidity of priority public health diseases, conditions and events, including mental health, non-communicable and communicable disease and second the functioning of the health system and infrastructure.

This report focuses on the first indicator – namely, health status of the population. Functioning and status of the health system is not included in this report.

Risk analysis and mitigation measures

The project assumed the regional and country WHO offices would provide technical, financial and administrative support to the MOH Jordan to introduce a common information management framework and innovative technologies for strengthening public health surveillance. The project timeframe assumed those displaced by conflict would remain at the same or increased numbers for more than one year and would mostly be settled in non-camp settings. The project also assumed WHO would maintain its ability to operate in a safe and secure manner in Jordan.

Data management and security

A two-step process of data management and security was following. In the first step, patient identifiable information was sent from mobile devices at each clinic to a secure, encrypted cloud-based server hosted. Only MOH had access to these data. In the second step, all data were anonymised and sent to a second cloud-based server instance. Patient identifiable data that were removed included name, address and any free-text fields that represent patient identifiable information. The date of birth was rounded to the beginning of the month.

Only anonymised, aggregated data on the second server instance was accessed by a password protected, online framework to generate and display information. This website was updated every hour to inform decision-making and planning and included the following functionality:

- charts, maps and tables of anonymised data, disaggregated by gender, status, nationality, disease and epidemiological week or year.
- data drilled from national to directorate to clinic level.
- individual disease information, including epidemiological curve, classification, source, alert threshold, case definition, risk factors, signs/symptoms and laboratory diagnostics.
- a line list of alerts and notifications automatically updated each hour.
- individual alert information, including clinic, reporting date, investigation date and outcome of investigation.

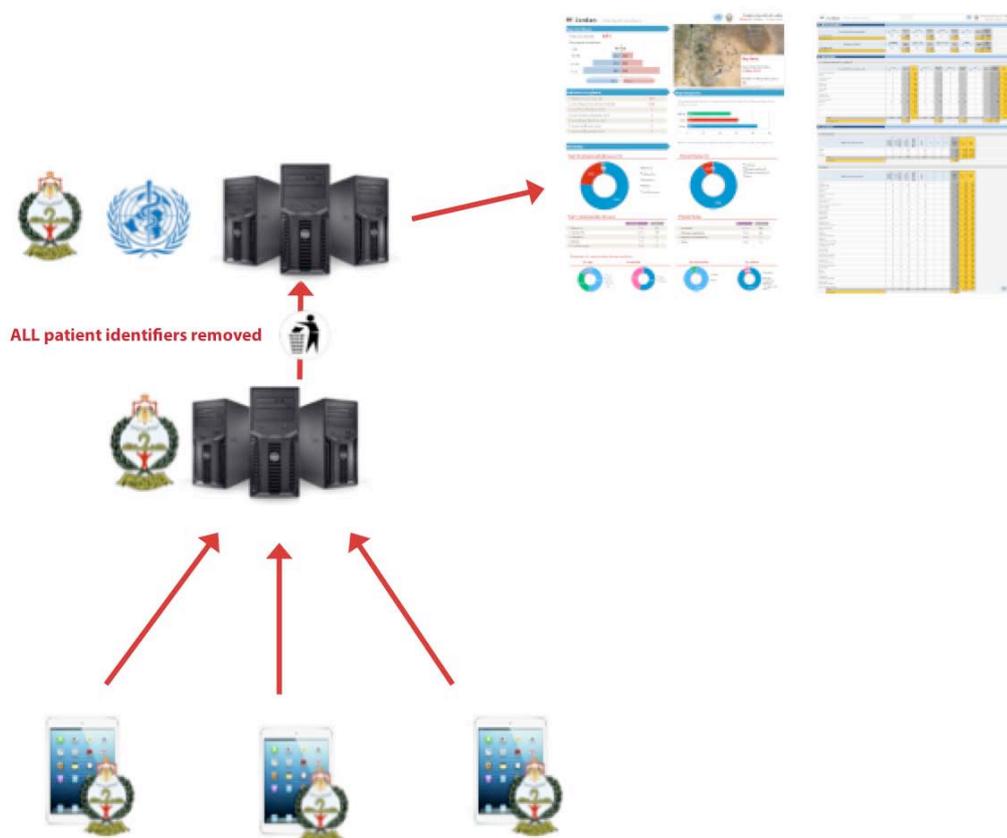


Figure 4. Two step process of data management and security.

Outbreak confirmation

Outbreak confirmation and investigation was not implemented during the two phases of pilot implementation. A workflow is being developed by MOH to investigate all alerts and notifications (specific to each alert type), including:

- each alert will be responded to by the directorate within 48-72 hours and an electronic investigation form completed to assess the status of referral, case management, laboratory diagnosis and contact tracing.
- the investigation form will be completed on a mobile device and uploaded in real-time.
- the form will automatically be linked to the original case report via the online framework.
- the outcome of the alert will be automatically updated according to its status of completion (pending, ongoing, confirmed, not confirmed).
- if an alert is confirmed then formal outbreak investigation will be initiated by MOH.

IT system specifications

1. Data is entered using XML forms and ODK mobile application

Electronic forms were designed in Extensible Markup Language (XML) and presented on mobile devices using a customised version of the ODK Collect application (<http://www.opendatakit.org>). The Lenovo IdeaTab 7" A3000 and A3500 mobile tablets with Android operating system were used in clinics and data transmitted via 3G mobile data connection hosted by Orange.

2) Data is submitted via mobile devices to a WHO hosted FormHub account

Data was collected from mobile devices using **FormHub** (<http://www.formhub.com>), a simplified framework developed at the Sustainable Engineering Lab, University of Columbia, to generate forms and receive data. The project used its own custom installation of FormHub for hosting project data.

An electronic **case-based surveillance form** was completed for each new case during the clinic consultation, which included patient demographics, presenting complaint, signs and symptoms and risk factors. An electronic **daily register** form was completed by each clinic to record total number of consultations recorded each day as well as zero reporting of measles and acute flaccid paralysis cases.

3) A python script anonymises data and imports to a second WHO hosted server every hour

Data were imported, anonymised and aggregated over time and location using a custom designed application. The application was based on a **PostgreSQL** (<http://www.postgresql.org>) database, a **python** (<http://www.python.org>) application programming interface (API) and a password protected HTML/Javascript website. This website was updated with new aggregated and anonymised data every hour.

The custom-designed website displayed demographics and proportional disease morbidity at directorate, district and health centre level. Anonymised, aggregated data were displayed using tables, charts and maps. The website was based on the **Bootstrap framework** (<http://getbootstrap.com/2.3.2>) and used **Nvd3** (<http://nvd3.org>) for charting and **leafletJS** (<http://leafletjs.com>) for mapping functions. The python API is based on the bottle package.

4) Anonymised data is hosted in a PostgreSQL database, developed using a virtual environment (Vagrant) and hosted on Ubuntu 12.04 Virtual Private Server (VPS)

The FormHub installation and online framework were hosted on virtual private servers, provided by **Linode** (<http://www.linode.com>).

5) The PostgreSQL database is relational and facilitates python scripted export of reports and data in other formats

The online framework automatically generated various reports and data tables. Customised PDF reports were generated automatically each week and posted on the website for download. PDF generation was handled by **DocRaptor** (<http://www.docraptor.com>). Excel based raw data and data tables were automatically generated and posted to the website each week for download.

6) The online framework generates automated SMS and Email alerts

Whenever certain notifiable diseases were reported to the system, alerts were sent via SMS and email to appropriate levels of MOH. Text messaging protocols were handled by **Nexmo** (<http://www.nexmo.com>) and batch emails were handled by **Postmark** (<http://www.postmark.com>).

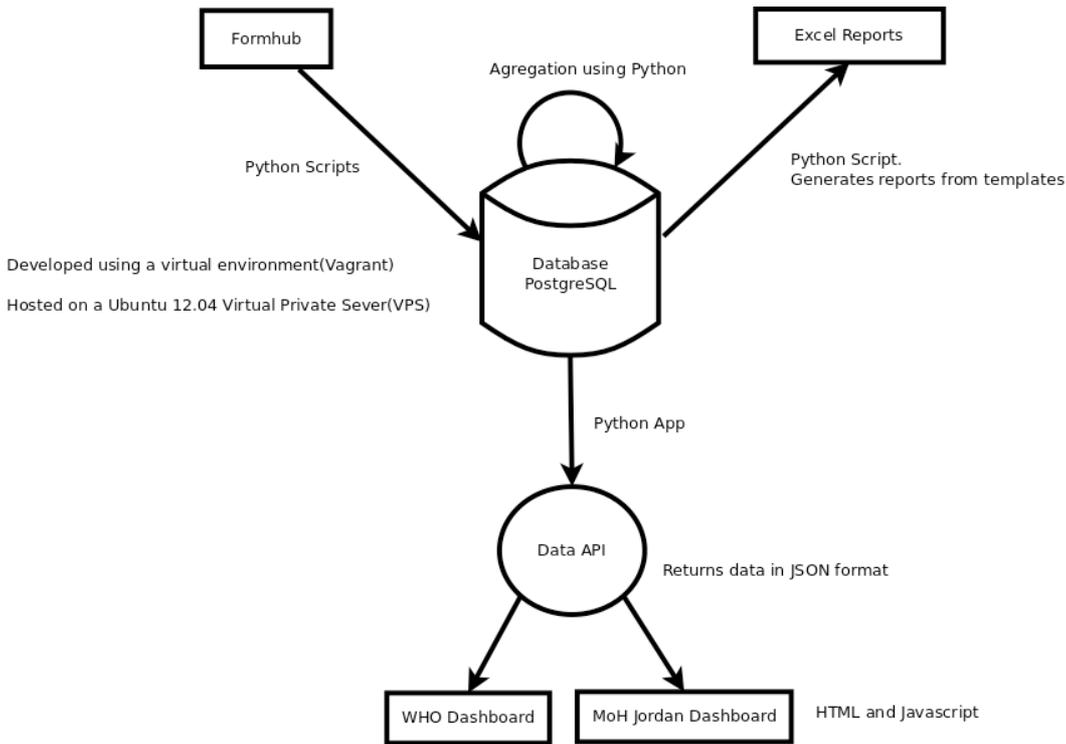


Figure 5. IT systems architecture for the public health surveillance project

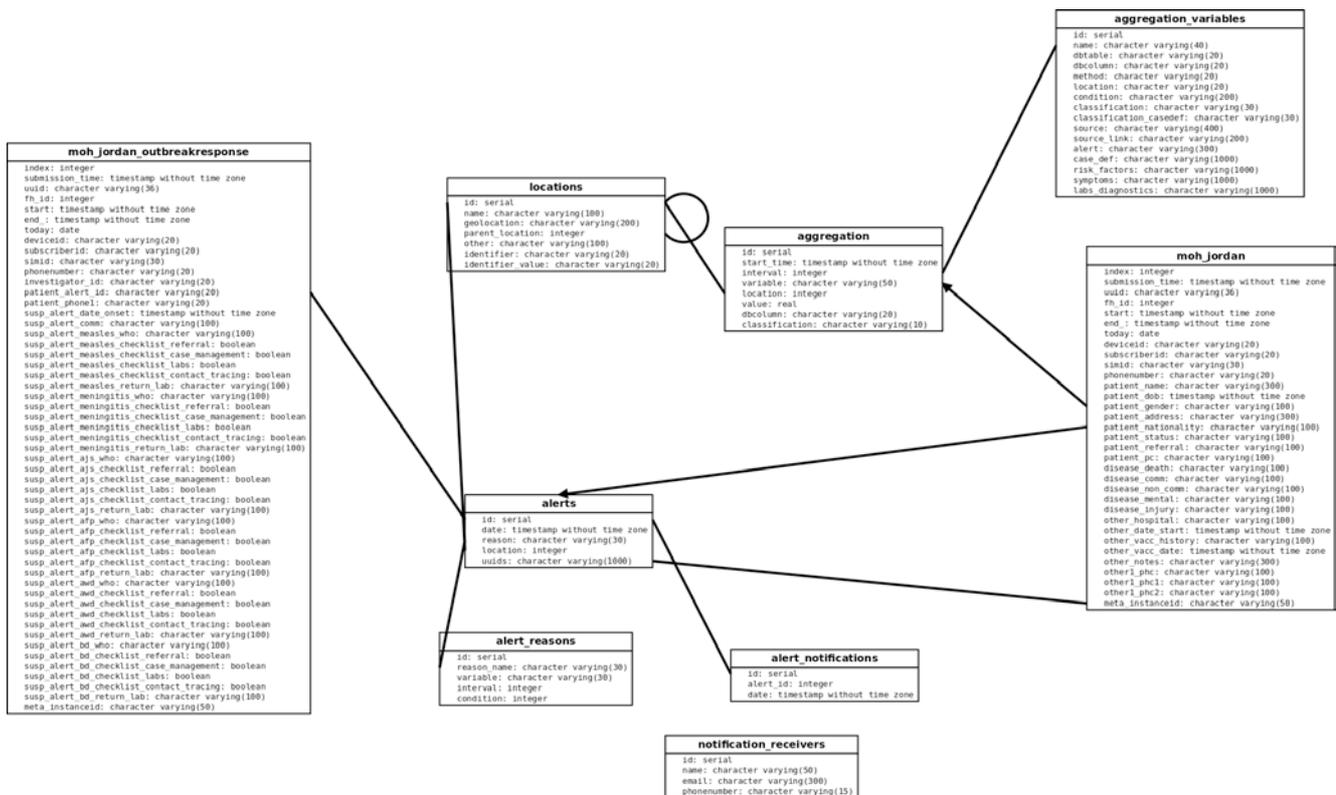


Figure 6. Database schema for the public health surveillance project (incomplete).

RESULTS

Demographics

- A total of 4,373 cases were reported between May – December 2014 from 54 sites in Irbid, Mafrqa and Zarqa directorates.
- 1,978 (45.2%) of cases reported were female and 2,203 (50.4%) of cases reported were under the age of five years.
- 4,122 (94.3%) of cases reported were Jordanian national, 237 (5.4%) of cases reported were refugees (registered or unregistered).
- A demonstration of the online framework used for Jordan public health surveillance (using dummy data) can be accessed via the following link: <https://emro.info/demo>

username: demo

password: A1qGrJwp

Directorate	Female	Male	Total
Irbid	553	628	1,181
Mafrqa	365	462	827
Zarqa	1,060	1,079	2,365
Total	1,978	2,395	4,373

Age Group	N	%
0 - 5	2,203	50.4%
5 - 17	1,368	31.3%
18 - 59	746	17.1%
> 60	56	1.3%

Status	N	%
Jordanian national	4,122	94.3%
Refugee	237	5.4%
Other	14	0.3%

Table 3. Directorate, Gender, Age Group and Status of cases of communicable disease reported through the public health surveillance system between May – December 2014.

Figure 7. Stacked bar graph of number of cases reported through the public health surveillance system, by Gender and Directorate, between May – December 2014.

DEMOGRAPHICS

4,373

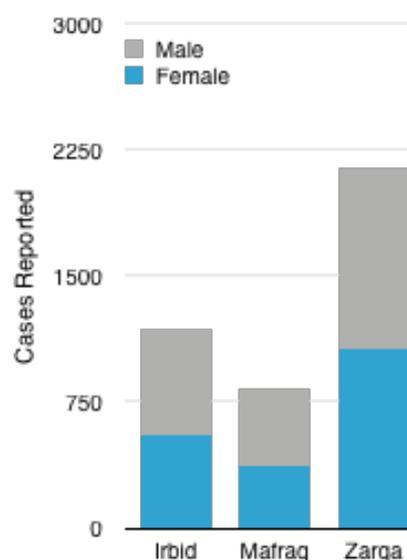
cases were reported between May – December 2014

50.4%

of cases reported were aged under five years

5.4%

of cases reported were refugees (registered or unregistered)



Alerts and notifications

- 158 alerts were generated between May – December 2014 and sent by SMS and Email to directorate and central-level MOH staff.
- The most common alerts generated were for suspected Hepatitis A (38.6%), Meningitis (30.4%) and Mumps (10.1%).
- 9 cases of suspected measles and 6 cases of suspected acute flaccid paralysis were reported through the public health surveillance system.

Alerts	N	%
Hepatitis A	61	38.6%
Meningitis	48	30.4%
Mumps	16	10.1%
Measles	9	5.7%
Brucellosis	7	4.4%
Acute Flaccid Paralysis	6	3.8%
Hepatitis B	3	1.9%
Scarlet Fever	3	1.9%
Typhoid & Para Typhoid Fever	2	1.3%
Rubella	1	0.6%
Cutaneous Leishmaniasis	1	0.6%
Bloody Diarrhoea	1	0.6%
Total	158	100.0%

Table 4. Table of alerts generated between May – December 2014.

ALERTS AND NOTIFICATIONS

158

alerts were generated between May – December 2014

38.6%

of alerts generated between May – December 2014 were for suspected Hepatitis A

30.4%

of alerts generated between May – December 2014 were for suspected meningitis

Alert ID	Alert	Clinic	Date Reported	Date Investigated	Central Review	Outcome
41	Measles	Abu-Al-Zeighan/ Zarqa	2014-11-25	-	-	Pending
42	Meningitis	Princess Rahmah hospital	2014-11-26	-	-	Pending
43	Acute jaundice syndrome	Al-Tatweer Al-Hadari	2014-11-27	-	-	Pending
44	Acute jaundice syndrome	Princess Rahmah hospital	2014-11-27	-	-	Pending
45	Meningitis	Princess Rahmah hospital	2014-11-27	-	-	Pending
46	Acute jaundice syndrome	Al-Tatweer Al-Hadari	2014-11-29	-	-	Pending
47	Acute jaundice syndrome	Princess Rahmah hospital	2014-11-29	-	-	Pending
48	Meningitis	Princess Rahmah hospital	2014-11-29	-	-	Pending
49	Measles	Bal'ama	2014-11-30	-	-	Pending
50	Meningitis	Princess Rahmah hospital	2014-11-30	-	-	Pending
51	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-01	-	-	Pending
52	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-02	-	-	Pending
53	Meningitis	Princess Rahmah hospital	2014-12-02	-	-	Pending
54	Meningitis	Princess Rahmah hospital	2014-12-03	-	-	Pending
55	Meningitis	Princess Rahmah hospital	2014-12-04	-	-	Pending
56	Bloody diarrhoea	Princess Rahmah hospital	2014-12-04	-	-	Pending
57	Acute flaccid paralysis	Princess Rahmah hospital	2014-12-06	-	-	Pending
58	Measles	Bal'ama	2014-12-06	-	-	Pending
59	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-06	-	-	Pending
60	Meningitis	Princess Rahmah hospital	2014-12-06	-	-	Pending
61	Brucellosis	Al-Azraq Al-Shamel	2014-12-06	-	-	Pending
62	Scarlet fever	Bereen	2014-12-06	-	-	Pending
63	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-10	-	-	Pending
64	Meningitis	Princess Rahmah hospital	2014-12-10	-	-	Pending
65	Meningitis	Princess Rahmah hospital	2014-12-11	-	-	Pending
66	Meningitis	Princess Rahmah hospital	2014-12-13	-	-	Pending
67	Meningitis	Princess Rahmah hospital	2014-12-14	-	-	Pending
68	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-15	-	-	Pending
69	Meningitis	Princess Rahmah hospital	2014-12-15	-	-	Pending
70	Meningitis	Princess Rahmah hospital	2014-12-16	-	-	Pending
71	Meningitis	Princess Rahmah hospital	2014-12-17	-	-	Pending
72	Meningitis	Princess Rahmah hospital	2014-12-20	-	-	Pending
73	Acute flaccid paralysis	Princess Rahmah hospital	2014-12-21	-	-	Pending
74	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-21	-	-	Pending

Figure 8. Alert line list from the online framework for Jordan Public Health Surveillance system (dated 7 January 2015).

Communicable disease

- Table 5 lists the cases of suspected communicable disease reported through the public health surveillance system between May – December 2014 across 54 sites in Irbid, Mafrq and Zarqa governorates.
- Acute diarrhoea had the highest reported proportional morbidity (71.7%), followed by Chicken Pox (23.3%) and Hepatitis A (1.4%).

Communicable Disease	N	%
Acute Diarrhoea	3,066	71.7%
Chicken Pox	995	23.3%
Hepatitis A	61	1.4%
Meningococcal Meningitis	34	0.8%
Scabies	34	0.8%
Mumps	16	0.4%
Measles	12	0.3%
Food Poisoning	8	0.2%
Viral Meningitis	8	0.2%
Brucellosis	7	0.2%
Acute Flaccid Paralysis	6	0.1%
Animal Bite	6	0.1%
Non-Meningococcal Meningitis	3	0.1%
Hepatitis B	3	0.1%
O Bacterial Meningitis	3	0.1%
Scarlet Fever	3	0.1%
Typhoid & Para Typhoid Fever	2	0.05%
Hydatidosis	2	0.05%
Typhus	1	0.02%
AIDS	1	0.02%
Rubella	1	0.02%
Cutaneous Leishmaniasis	1	0.02%
Bloody diarrhoea	1	0.02%
Total	4,274	100.0%

COMMUNICABLE DISEASE

4,274

cases of communicable diseases were reported between May – December 2014

71.7%

of cases reported between May – December 2014 were acute diarrhoea

23.3%

of cases reported between May – December 2014 were chicken pox

Table 5. Table of communicable diseases reported through the public health surveillance system between May – December 2014.

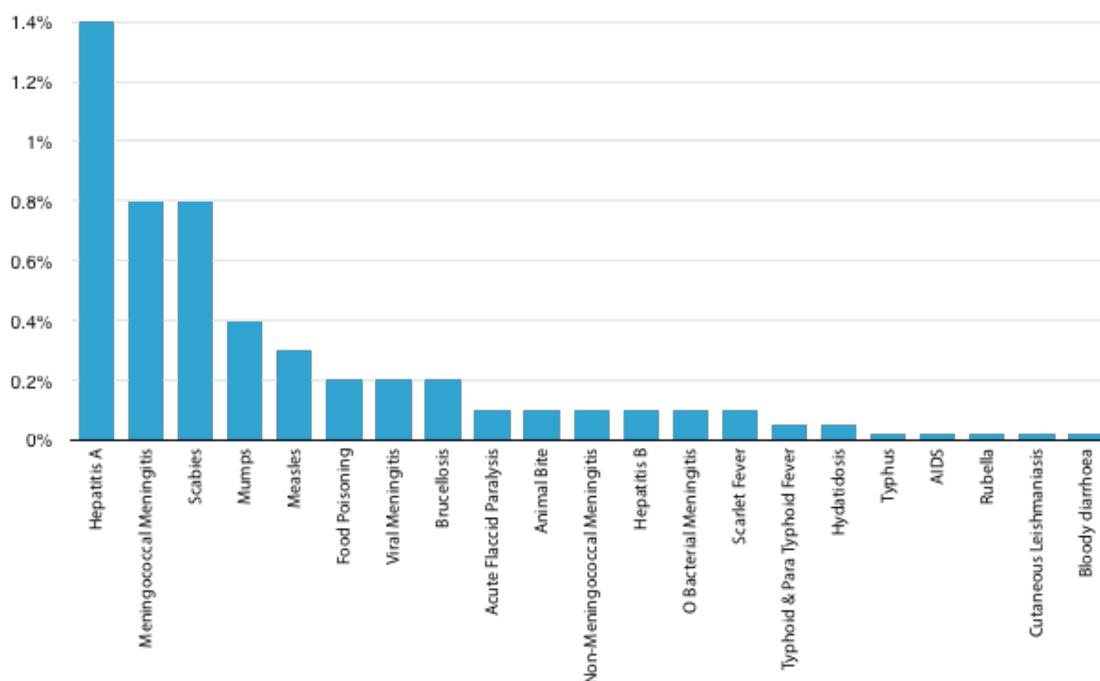


Figure 9. Proportional morbidity of reported communicable disease cases, excluding acute diarrhoea and chicken pox, through the public health surveillance system between May – December 2014

Non-communicable disease

- Limited reporting of non-communicable disease and mental health was included in Phase 2 of the pilot between November – December 2014.

Hypertension

- 41 new cases of hypertension were reported in November – December 2014.
- Mean blood pressure was 160 / 90 among 21 recordings made during the pilot period.
- Mean BMI was 31.6 among 62 laboratory results recorded during the pilot period.

Diabetes

- 33 new cases of diabetes (9 cases of type 1 and 24 cases of type 2 diabetes) were reported in November – December 2014.
- Mean HbA1C was 9.6% among 20 laboratory results recorded during the pilot period.

NON-COMMUNICABLE DISEASE

41

new cases of hypertension were reported between November – December 2014

33

new cases of diabetes were reported between November – December 2014

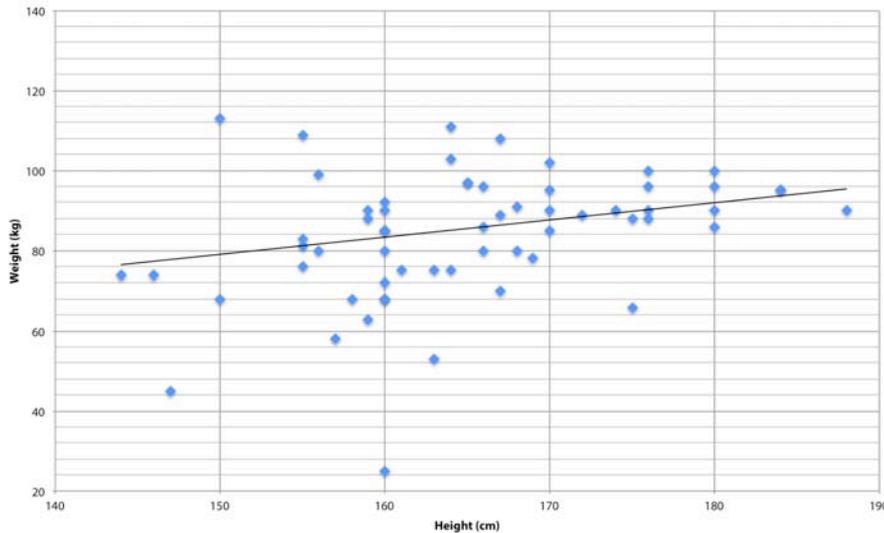


Figure 10. Scatterplot of weight (kg) against height (cm) results reported through the public health surveillance system between November – December 2014.

Mental health

- 1 case of anxiety and 1 case of unexplained somatic complaint was reported in November – December 2014.

Burden of disease among refugee populations

Hypertension

- Refugee populations have 1.4 times higher odds (unadjusted OR 1.36, 95% CI 0.3 – 6.1) of reported hypertension compared to Jordanian nationals through the public health surveillance system.
- This result is non-significant ($p=0.69$) due to a low sample size ($n=47$)

Acute diarrhoea

- Refugee populations have 1.5 times higher odds (unadjusted OR 1.45, 95% CI 1.03 – 2.03) of reported acute diarrhoea compared to Jordanian nationals through the public health surveillance system.

BURDEN OF DISEASE

1.4x

more hypertension cases reported among refugee populations than Jordanian nationals.

1.5x

more acute diarrhoea cases reported among refugee populations than Jordanian nationals.

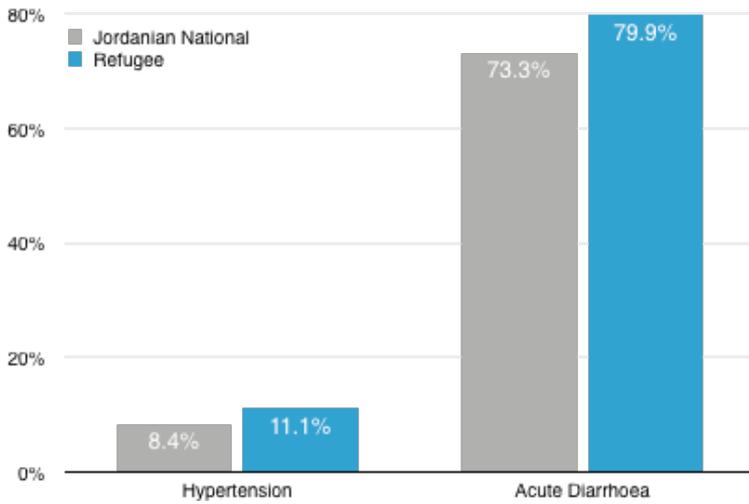


Figure 11. Clustered bar graph of proportional morbidity (%) of hypertension and acute diarrhoea.

CONCLUSIONS

1. Two phases of pilot implementation of integrated, case-based public health surveillance were completed in Jordan between May – December 2014.
 - Phase 1: May – November 2014 (Epidemiological weeks 22 – 46)
 - Phase 2: November – December 2014 (Epidemiological weeks 48 – 52)
2. The pilot implementation demonstrated the feasibility of collecting, analysing and reporting disease surveillance information using mobile tools in real time. This is the first time mobile tools have been applied to national public health surveillance.
3. 4,373 cases of mental health, non-communicable and communicable disease were reported from 87 mobile devices across 54 sites between May – December 2014, including:
 - 24 new cases of type 2 diabetes and 9 new cases of type 1 diabetes (in November – December 2014).
 - 41 new cases of hypertension (in November – December 2014).
 - 61 cases of Hepatitis A
 - 48 cases of Meningitis
 - 16 cases of Mumps
 - 9 cases of Measles
 - 6 cases of Acute Flaccid Paralysis
4. 158 automated real-time notifications and alerts were generated, by SMS and email, within one hour of reporting to inform outbreak investigation and response at the appropriate level of Ministry of Health decision-making.
5. Refugee populations have 1.4 and 1.5 times higher odds of reported hypertension and acute diarrhoea respectively, compared to Jordanian nationals through the public health surveillance system.
6. Additional information was presented to the clinician, including standardised case definition and laboratory advisories.
7. Further information was also collected and reported during or after the consultation including signs and symptoms, risk factors and laboratory results to inform decision-making, notably:
 - Mean blood pressure was 160 / 90 among reported hypertension cases (in November – December 2014).
 - Mean BMI was 31.6 among 62 laboratory results recorded (in November – December 2014).
 - Mean HbA1C was 9.6% among reported diabetes patients (in November – December 2014).
8. A password protected, online framework was updated every hour to inform decision-making and planning and included the following functionality
 - charts, maps and tables of anonymised data, disaggregated by gender, status, nationality, disease and epidemiological week or year.
 - data drilled from national to directorate to clinic level.
 - individual disease information, including epidemiological curve, classification, source, alert threshold, case definition, risk factors, signs/symptoms and laboratory diagnostics.
 - a line list of alerts and notifications automatically updated each hour.
 - individual alert information, including clinic, reporting date, investigation date and outcome of investigation.
9. A demonstration of the online framework used for Jordan public health surveillance (using dummy data) can be accessed via the following link:

<https://emro.info/demo>

username: demo

password: A1qGrJwp

RECOMMENDATIONS

1. Future national scale-up and implementation of integrated, case-based public health surveillance is feasible and cost-effective.
2. Further data collection and analysis will facilitate a more detailed understanding of the burden of disease among host communities and displaced populations in Jordan, including relative disease burden among refugees, for public health and clinical decision-making.
3. The estimated cost for the first phase of national scale-up over 12 months is USD\$185,650, covering 293 sites in Jordan (including primary and comprehensive care facilities, hospital, prisons and mental care facilities). Subsequent support and system costs are approximately USD\$60,000 per year.

ANNEXES

Annex 1. List of guidelines referenced for the public health surveillance project

1. Communicable disease

- Ministry of Health Jordan Purple Book of Communicable Diseases, 2014
- Outbreak surveillance and response in humanitarian emergencies: WHO Guidelines for EWARN Implementation, WHO, Geneva Switzerland, 2012
- Malaria Case Management: Operations manual, WHO Global Malaria Programme, 2009
- Malaria control in humanitarian emergencies: an Inter-Agency Field Handbook, WHO, 2013
- Guidelines for the management of sexually transmitted infections, WHO, Geneva, Switzerland, 2003
- Interim WHO Clinical Staging of HIV/AIDS and HIV/AIDS Case Definitions for Surveillance, WHO, 2005
- WHO Global Epidemiological Surveillance Standards for Influenza, WHO, 2012
- Manual for the Surveillance of Vaccine-preventable Diseases, CDC
- WHO Expert Consultation on Rabies, Technical Report Series #931, WHO, Geneva Switzerland, 2004
- WHO Technical Note: Current recommendations for treatment of tetanus during humanitarian emergencies, WHO, Geneva Switzerland 2010
- Achieving and Sustaining Maternal and Neonatal Tetanus Elimination: Strategic Plan 2012-2015, UNICEF/UNFPA/WHO, 2012
- Guidelines for the Surveillance and Control of Anthrax in Humans and Animals, 3rd edition, WHO
- WHO Foodborne Disease Outbreaks: Guidelines for Investigation and Control, WHO, France, 2008
- WHO Expert Committee on Leprosy, WHO, 2012
- WHO Guide to Eliminate Leprosy as a Public Health Problem, WHO, 2000

2. Non-communicable disease

- Prevention and control of non-communicable diseases: Guidelines for primary health care in low-resource settings, WHO, Malta, 2012
- WHO/International Society of Hypertension (ISH) statement on management of hypertension, WHO and ISH Writing Group, 2003
- Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy, WHO, 2013
- Definition, diagnosis and classification of Diabetes Mellitus and its complications, WHO, 1999
- Global surveillance, prevention and control of chronic respiratory diseases: A comprehensive approach, WHO, Geneva, Switzerland, 2007

3. Mental health

- mhGAP Intervention Guide for mental, neurological and substance use disorders in non-specialized health settings, World Health Organization Mental Health Gap Action Programme, Italy, 2010

Annex 2. Classification of visit and case

Only new cases of disease are entered into the system. A new visit / revisit are defined as:

- **New visit** A patient with no previous history of the diagnosis; or
A patient with a history of the diagnosis and in whom a minimum period of time has elapsed since the most recent diagnosis was made (see Table 5)
- **Revisit** A patient with a history of the diagnosis and in whom the minimum period of time has not yet elapsed since the most recent diagnosis was made (see Table 5)

Classification of new visit

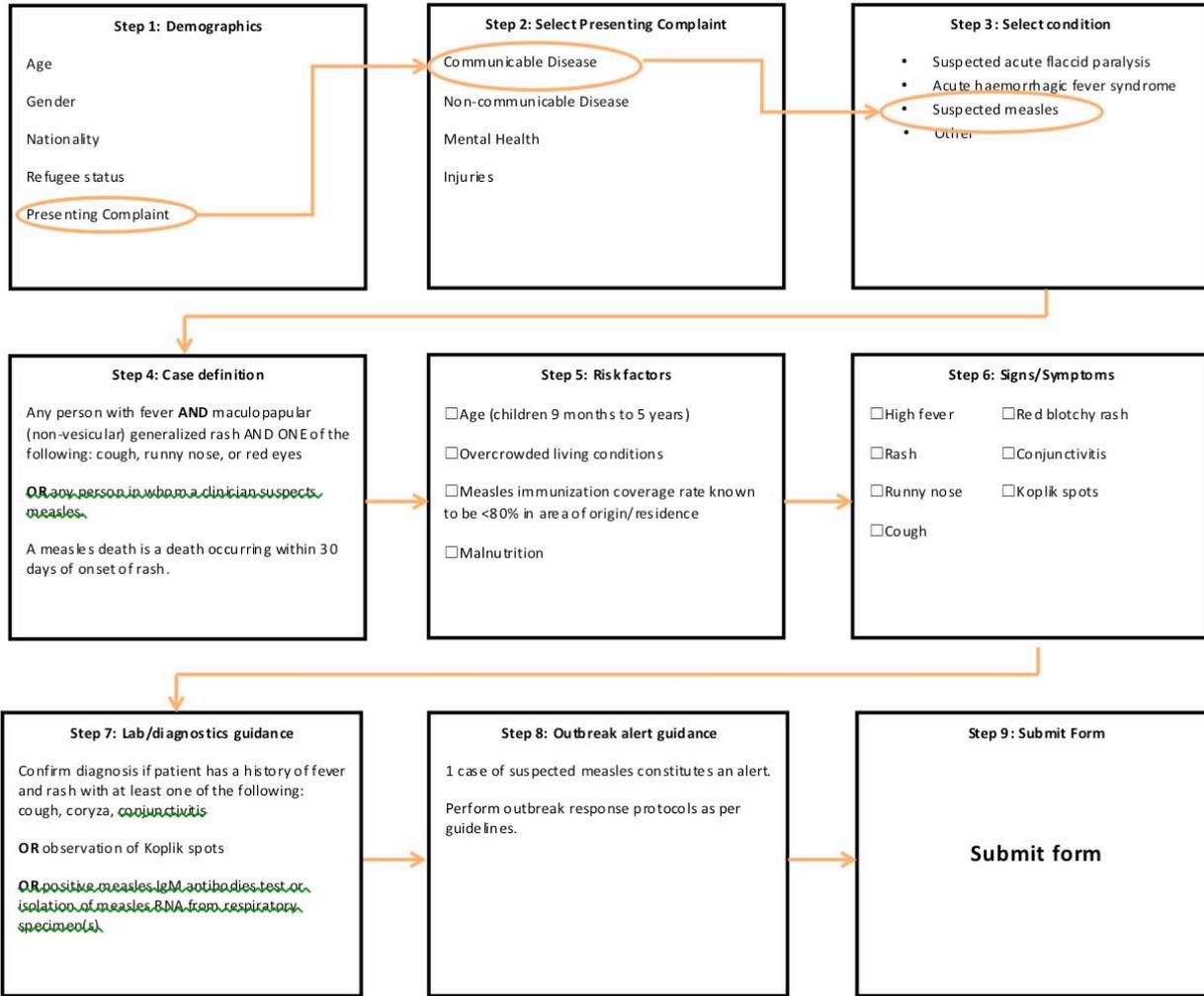
At least 1 week	At least 1 month	At least 1 year	Lifelong*
URTI, LRTI, ILI, SARI Watery diarrhoea Bloody diarrhea Fever of unknown origin Eye infection Intestinal worms	Skin infections Ear infections Dental conditions Sexually Transmitted Infections (except HIV)	Tuberculosis Meningitis	Measles Polio HIV Hypertension Diabetes (Type 1/2) Asthma Chronic obstructive pulmonary disease (COPD)

* A patient can never again be termed a "New Visit" for problems in this category, if a diagnosis has previously been made

Classification of cases

Status of case	Description
Suspected case	Clinical signs and symptoms compatible with the disease/condition of interest without laboratory evidence
Probable case	Compatible signs and symptoms AND additional epidemiological evidence for the disease/condition of interest, such as epidemiological link with a confirmed case or location of case in a high prevalence or endemic area
Confirmed case	Definite laboratory evidence of current or recent condition regardless of the presence of clinical signs or symptoms

Annex 3. Electronic algorithm followed for reporting of suspected measles



Annex 4. Steps followed for reporting of suspected measles

Step 1: Demographics



YF Collect - Jordan Disease Surveillance

Patient

Date of birth

Jun 19 2014

Gender
Select One Answer

Nationality
Select One Answer

Status
Select One Answer

Presenting complaint
Select One Answer

Step 2: Select Presenting Complaint Step 3: Select condition



YF Collect - Jordan Disease Surveillance

Patient

Date of birth

Jun 19 2014

Gender

Presenting complaint

- Death
- Communicable disease
- Non-communicable disease
- Mental health
- Injury
- Remove response



YF Collect - Jordan Disease Surveillance

Presenting Complaint

Select condition

Measles (Suspected)

Step 4: Case Definition



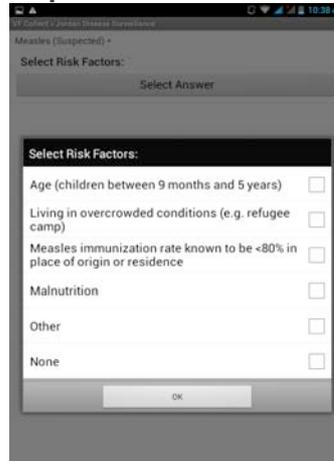
YF Collect - Jordan Disease Surveillance

Measles (Suspected)

Case Definition: Any person with fever AND maculopapular (non-vesicular) rash AND ONE of the following: cough, runny nose or red eyes; OR any person in whom a clinician suspects measles. A measles death is a death occurring within 30 days of onset of the rash.

OK. Please continue.

Step 5: Risk Factors



YF Collect - Jordan Disease Surveillance

Measles (Suspected)

Select Risk Factors:

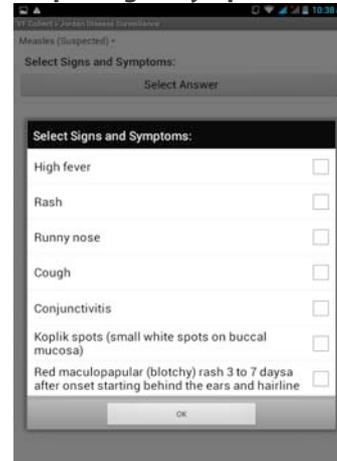
Select Answer

Select Risk Factors:

- Age (children between 9 months and 5 years)
- Living in overcrowded conditions (e.g. refugee camp)
- Measles immunization rate known to be <80% in place of origin or residence
- Malnutrition
- Other
- None

OK

Step 6: Signs/Symptoms



YF Collect - Jordan Disease Surveillance

Measles (Suspected)

Select Signs and Symptoms:

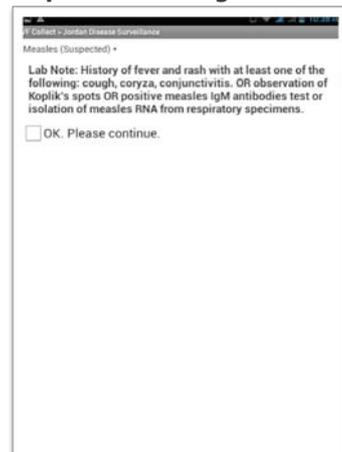
Select Answer

Select Signs and Symptoms:

- High fever
- Rash
- Runny nose
- Cough
- Conjunctivitis
- Koplik spots (small white spots on buccal mucosa)
- Red maculopapular (blotchy) rash 3 to 7 days after onset starting behind the ears and hairline

OK

Step 5: 6: Lab/Diagnostics



YF Collect - Jordan Disease Surveillance

Measles (Suspected)

Lab Note: History of fever and rash with at least one of the following: cough, coryza, conjunctivitis. OR observation of Koplik's spots OR positive measles IgM antibodies test or isolation of measles RNA from respiratory specimens.

OK. Please continue.

Step 7: Outbreak alert



YF Collect - Jordan Disease Surveillance

Measles (Suspected)

Outbreak alert: 1 case

OK. Please continue.

Annex 5. Example email alert notification

Public Health Surveillance

To: John Haskew

Reply-To: surveillance@emro.info

Alert Notification

Alert: Measles

Date: 02 Sep 2014

Clinic: Al-Amir Talal

Governorate: Zarqa

Patient ID: uuid:0e2c9f92-3c2d-4b1c-bb9d-b89eadd611bc

Alert ID: 18

Annex 6. Online framework: Alert line list



Alert ID	Alert	Clinic	Date Reported	Date Investigated	Central Review	Outcome
41	Measles	Abu-Al-Zeighan/ Zarqa	2014-11-25	-	-	Pending
42	Meningitis	Princess Rahmah hospital	2014-11-26	-	-	Pending
43	Acute jaundice syndrome	Al-Tatweer Al-Hadari	2014-11-27	-	-	Pending
44	Acute jaundice syndrome	Princess Rahmah hospital	2014-11-27	-	-	Pending
45	Meningitis	Princess Rahmah hospital	2014-11-27	-	-	Pending
46	Acute jaundice syndrome	Al-Tatweer Al-Hadari	2014-11-29	-	-	Pending
47	Acute jaundice syndrome	Princess Rahmah hospital	2014-11-29	-	-	Pending
48	Meningitis	Princess Rahmah hospital	2014-11-29	-	-	Pending
49	Measles	Bal'ama	2014-11-30	-	-	Pending
50	Meningitis	Princess Rahmah hospital	2014-11-30	-	-	Pending
51	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-01	-	-	Pending
52	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-02	-	-	Pending
53	Meningitis	Princess Rahmah hospital	2014-12-02	-	-	Pending
54	Meningitis	Princess Rahmah hospital	2014-12-03	-	-	Pending
55	Meningitis	Princess Rahmah hospital	2014-12-04	-	-	Pending
56	Bloody diarrhoea	Princess Rahmah hospital	2014-12-04	-	-	Pending
57	Acute flaccid paralysis	Princess Rahmah hospital	2014-12-06	-	-	Pending
58	Measles	Bal'ama	2014-12-06	-	-	Pending
59	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-06	-	-	Pending
60	Meningitis	Princess Rahmah hospital	2014-12-06	-	-	Pending
61	Bruceellosis	Al-Azraq Al-Shamel	2014-12-06	-	-	Pending
62	Scarlet fever	Bereen	2014-12-06	-	-	Pending
63	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-10	-	-	Pending
64	Meningitis	Princess Rahmah hospital	2014-12-10	-	-	Pending
65	Meningitis	Princess Rahmah hospital	2014-12-11	-	-	Pending
66	Meningitis	Princess Rahmah hospital	2014-12-13	-	-	Pending
67	Meningitis	Princess Rahmah hospital	2014-12-14	-	-	Pending
68	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-15	-	-	Pending
69	Meningitis	Princess Rahmah hospital	2014-12-15	-	-	Pending
70	Meningitis	Princess Rahmah hospital	2014-12-16	-	-	Pending
71	Meningitis	Princess Rahmah hospital	2014-12-17	-	-	Pending
72	Meningitis	Princess Rahmah hospital	2014-12-20	-	-	Pending
73	Acute flaccid paralysis	Princess Rahmah hospital	2014-12-21	-	-	Pending
74	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-21	-	-	Pending
75	Acute jaundice syndrome	Princess Rahmah hospital	2014-12-22	-	-	Pending
76	Meningitis	Princess Rahmah hospital	2014-12-22	-	-	Pending
77	Bruceellosis	Al-Azraq Al-Shamel	2014-12-29	-	-	Pending
78	Acute flaccid paralysis	Al-Zarka Al-Jadidah	2014-12-17	-	-	Pending
79	Mumps	Al-Zarka Al-Jadidah	2014-12-20	-	-	Pending

Annex 7. Online framework: Communicable disease proportional morbidity



Location: Jordan

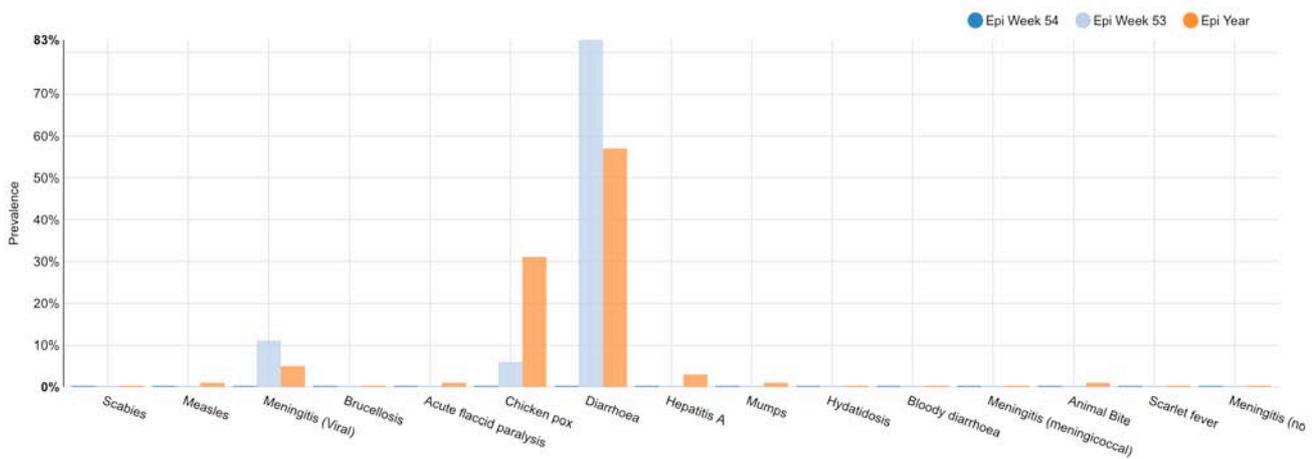
Sublocations (cases):

Irbid (14)

Mafraq (3)

Zarqa (30)

Communicable Disease	Epi Week 54	Previous Epi Week	Current Epi Year
Scabies	0 (0%)	0 (0%)	1 (0%)
Measles	0 (0%)	0 (0%)	4 (1%)
Meningitis (Viral)	0 (0%)	2 (11%)	26 (5%)
Brucellosis	0 (0%)	0 (0%)	2 (0%)
Acute flaccid paralysis	0 (0%)	0 (0%)	3 (1%)
Chicken pox	0 (0%)	1 (6%)	147 (31%)
Diarrhoea	0 (0%)	15 (83%)	275 (57%)
Hepatitis A	0 (0%)	0 (0%)	13 (3%)
Mumps	0 (0%)	0 (0%)	3 (1%)
Hydatidosis	0 (0%)	0 (0%)	1 (0%)
Bloody diarrhoea	0 (0%)	0 (0%)	1 (0%)
Meningitis (meningococcal)	0 (0%)	0 (0%)	1 (0%)
Animal Bite	0 (0%)	0 (0%)	3 (1%)
Scarlet fever	0 (0%)	0 (0%)	1 (0%)
Meningitis (non-meningococcal)	0 (0%)	0 (0%)	0 (0%)
Total	0	18	481



Annex 8. Online framework: Public Health Profile Week 38



Reported Cases

Total cases reported: **3,423**

Demographic breakdown:

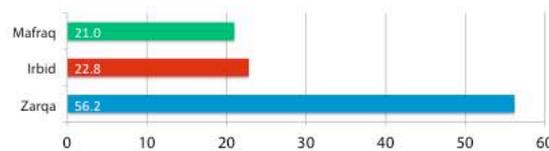


Indicators at a glance

1 Number of cases reported	3,423
2 Syria refugee proportional morbidity	6.2%
3 Acute Flaccid Paralysis alerts	1
4 Acute Jaundice Syndrome alerts	0
5 Acute Watery Diarrhoea alerts	0
6 Suspected Measles alerts	3
7 Suspected Meningitis alerts	11

Reporting Sites

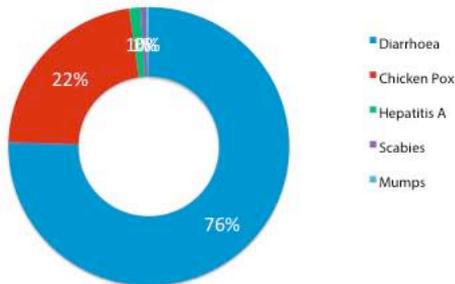
This public health profile is compiled from 50 Ministry of Health reporting sites in northern Jordan.



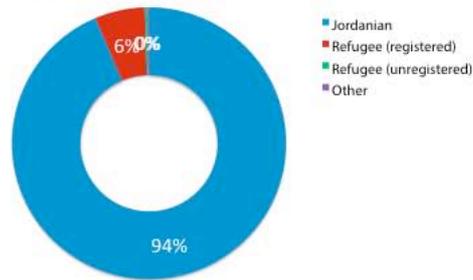
Data is collected using standardised mobile data collection and reporting tools.

Morbidity

Top 5 Communicable Diseases (%)



Patient Status (%)



Top 5 communicable diseases

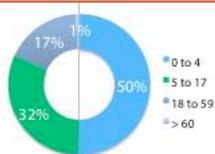
Disease	% morbidity	# of cases
1 Diarrhoea	74.1%	2,537
2 Chicken Pox	21.9%	748
3 Hepatitis A	1.3%	45
4 Scabies	0.6%	22
5 Mumps	0.3%	11

Patient Status

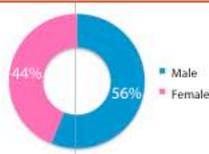
Status	%	# of cases
1 Jordanian	93.6%	3,204
2 Refugee (registered)	5.9%	202
3 Refugee (unregistered)	0.3%	9
4 Other	0.2%	8

Breakdown of communicable disease conditions

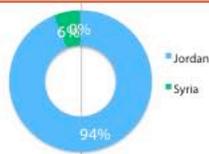
by age



by gender



by nationality



by status



Annex 9. Online framework: Raw data export

	A	B	C	D	E	F	G	H	I	J	K
1	date	directorate	district	clinic	clinic type	ptdob	gender	nationality	status	presenting complaint	pccd
2	17/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	17/12/09	male	jordanian	national	cd	chicken_pox_moh
3	17/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	17/01/14	male	jordanian	national	cd	diarrhoea_moh
4	17/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	17/07/14	female	jordanian	national	cd	diarrhoea_moh
5	17/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	17/07/14	female	jordanian	national	cd	diarrhoea_moh
6	11/12/14	Mafraq	N. Badia	Deir Al-kahf	Comprehensive	26/03/11	female	jordanian	national	cd	diarrhoea_moh
7	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	01/07/14	female	jordanian	national	cd	diarrhoea_moh
8	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	01/07/14	female	jordanian	national	cd	diarrhoea_moh
9	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	26/04/14	male	jordanian	national	cd	diarrhoea_moh
10	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	06/03/13	male	jordanian	national	cd	diarrhoea_moh
11	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	21/08/13	male	jordanian	national	cd	diarrhoea_moh
12	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	19/07/14	male	jordanian	national	cd	diarrhoea_moh
13	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	23/02/14	male	jordanian	national	cd	diarrhoea_moh
14	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	14/09/13	female	jordanian	national	cd	diarrhoea_moh
15	18/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	22/03/10	female	jordanian	national	cd	diarrhoea_moh
16	20/12/14	Zarqa	Zarqa	Al-Azraq Al-Shamel	Comprehensive	04/10/09	male	jordanian	national	cd	diarrhoea_moh
17	20/12/14	Zarqa	Zarqa	Al-Azraq Al-Shamel	Comprehensive	27/03/14	male	jordanian	national	cd	diarrhoea_moh
18	20/12/14	Zarqa	Zarqa	Al-Azraq Al-Shamel	Comprehensive	07/02/14	female	jordanian	national	cd	diarrhoea_moh
19	20/12/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	20/12/05	female	jordanian	national	cd	diarrhoea_moh
20	26/11/14	Zarqa	Zarqa	Jabal Al-Amir Faisal	Primary	26/11/05	male	jordanian	national	cd	chicken_pox_moh
21	26/11/14	Mafraq	Mafraq	Al-Mafraq AL-shamel	Comprehensive	23/02/14	female	jordanian	national	cd	chicken_pox_moh
22	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	07/06/14	male	jordanian	national	cd	diarrhoea_moh
23	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	01/03/14	female	jordanian	national	cd	diarrhoea_moh
24	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	06/09/14	male	jordanian	national	cd	meningitis_moh
25	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	13/06/14	male	jordanian	national	cd	diarrhoea_moh
26	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	01/06/14	male	jordanian	national	cd	diarrhoea_moh
27	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	05/05/13	male	jordanian	national	cd	diarrhoea_moh
28	26/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	12/08/13	female	jordanian	national	cd	diarrhoea_moh
29	26/11/14	Irbid	Koura	Samou'e	Primary	15/03/66	male	jordanian	national	ncd	n/a
30	26/11/14	Irbid	Irbid	Kufur Youba	Comprehensive	11/09/05	male	syrian	national	cd	chicken_pox_moh
31	26/11/14	Irbid	Irbid	Kufur Youba	Comprehensive	05/04/00	male	jordanian	national	cd	chicken_pox_moh
32	26/11/14	Irbid	Irbid	Kufur Youba	Comprehensive	19/09/14	male	jordanian	national	cd	diarrhoea_moh
33	26/11/14	Irbid	Koura	Deir Abi Se'eid	Comprehensive	04/11/74	female	jordanian	national	ncd	n/a
34	26/11/14	Irbid	Irbid	Kufur Youba	Comprehensive	19/04/09	female	jordanian	national	cd	chicken_pox_moh
35	27/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	27/09/14	male	jordanian	national	cd	meningitis_moh
36	27/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	27/11/13	male	jordanian	national	cd	diarrhoea_moh
37	27/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	22/12/13	male	jordanian	national	cd	diarrhoea_moh
38	27/11/14	Irbid	Irbid	Princess Rahmah hospital	Hospital	27/10/13	male	jordanian	national	cd	diarrhoea_moh
39	25/11/14	Mafraq	Mafraq	Al-Khalidiah/ Mafraq	Comprehensive	28/01/14	female	jordanian	national	cd	diarrhoea_moh
40	27/11/14	Zarqa	Zarqa	Abu-Al-Zeighan/ Zarqa	Primary	15/07/71	male	jordanian	national	ncd	n/a
41	27/11/14	Mafraq	N. Badia	Um Al-Qutein	Comprehensive	01/01/45	female	jordanian	national	ncd	n/a
42	27/11/14	Mafraq	N. Badia	Um Al-Qutein	Comprehensive	25/08/67	female	jordanian	national	ncd	n/a

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