

WHO COURSE ON HEALTH ASPECTS AND RELIEF MANAGEMENT

NATURAL DISASTERS

BRUSSELS 1980

POST-DISASTER SURVEILLANCE

Wednesday, 15th OCTOBER, 1980

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POST-DISASTER SURVEILLANCE

A. INTRODUCTION

The necessity for post-disaster surveillance lies in the potential increased risk for infectious diseases following natural disasters.

A rational approach of this risk includes an efficiently organized surveillance system. Distinctive features are its orientation towards symptoms (syndromes), focus on affected area and its intensity i.e. daily collection, collation, analysis and interpretation.

B. RISK FOR INFECTIOUS DISEASES AND NATURAL DISASTERS

Natural disasters can influence the epidemiology of infectious diseases in several ways. Most prominent are its influences on the modes of transmission.

For example:

- in evacuation centers the personal contacts can be increased by crowding. This would have an influence on person-to-person transmission of diseases such as measles.
- tropical depressions and hurricanes can create floods, thereby increasing the water-contact for the affected population. If environmental conditions are suitable for leptospira survival in water, a leptospirosis epidemic might follow.
- Flooding can damage water treatment and pumping stations, distribution mains, so public water systems are disrupted.
- using contaminated water supplies or alternatively untreated unprotected sources such as rivers when the public water systems fails, increases the risk of gastroenteritis and other water borne diseases.

- standing water, following floods, provides suitable breeding places for several vector-mosquitoes. A multiplier effect resulting in e.g. a dengue epidemic six weeks later could occur.

Not only the modes of transmission can be influenced (sometimes unfavourably), but the susceptibility of the population can change as well.

For example:

- drought and famine cause malnutrition in children and thus impair disease resistance.

In contrast, unless imported through international travel, there is no reason why a disaster would introduce new pathogens in an area.

For example:

- the Caribbean has no cholera. The effect of a disaster cannot suddenly introduce cholera in the Caribbean.

Practical experiences in the Caribbean and elsewhere show that the influence on modes of transmission is the most important way in which disasters can change the epidemiology of infectious diseases.

PREVENTION AND CONTROL OF INFECTIOUS DISEASES AFTER NATURAL DISASTERS

From theoretical analysis and practical experience in disaster relief, several guidelines have been established for preventing and controlling communicable diseases in time of disasters.

(1) Routine public health programs should be maintained and strengthened.

(2) Environmental control measures are a first necessity e.g. priority should be given to restoration of a normal water supply.

(3) In order to monitor the situation, an emergency surveillance system should be promptly established.

(4) It should be emphasised that special control measures should only be taken when findings of the post-disaster surveillance system indicate an epidemiological need for them.

For example:

- a mass immunization campaign against typhoid should not be started as an automatic disaster relief measure. Mass immunization campaigns against any disease should only be started on sound epidemiological reasoning, based on the findings of post-disaster surveillance.

D. METHODOLOGY - POST DISASTER SURVEILLANCE

1.0 GENERAL CONSIDERATIONS

The emphasis is on -

1.1 *Sensitivity of the system* - minor changes in occurrence need to be detected so that analysis and appropriate action can be taken immediately. Symptom (syndrome) - monitoring is indicated.

1.2 *Intensity of the system* - since the situation is changing daily, daily reporting is necessary, accompanied by analysis, interpretation and feedback. When increases (real or suspected) are detected, immediate action, in the form of investigation is necessary.

2.0 BACKGROUND KNOWLEDGE

Previous knowledge of the affected area is essential to link the post-disaster surveillance system with reality. Of special importance are:

2.1 Prior knowledge of high disease risk areas

Example:

- when floods affect communities where leptospirosis is prevalent, special attention can be given in the reporting system to leptospirosis, or special leptospirosis surveillance can be organized.

2.2 Immunisation Coverage Status

Knowledge of the estimated coverage against the six diseases of the Expanded Programme of Immunisation Programme e.g. Diphtheria, Whooping Cough, Tetanus, Poliomyelitis, Measles and Tuberculosis, together with the expected incidence of such diseases as measles, would enable the epidemiologist to make a sound estimate of the risk of the transmission of diseases when families are crowded together in evacuation centres.

In addition, there may have been prior immunisation programmes for other diseases e.g. Rubella, Yellow Fever.

2.3 Environmental Health Status

Knowledge of the pre-disaster source and quality of public water supplies and sewerage and solid waste disposal facilities would prove invaluable in assessing post-disaster changes and their likely influence on the health of the communities served.

When post-disaster surveillance information is interpreted by persons who are not familiar with the affected area and its characteristics, over-reaction as well as under-reaction or inappropriate reaction are probable e.g. insisting on providing, as an immediate measure, a treated water supply for a village which did not enjoy this facility before the disaster.

The importance of local knowledge cannot be over emphasised. It is therefore essential that the national designated epidemiologist co-ordinates the intensified post-disaster surveillance. External technical co-operation may be necessary and is best provided by epidemiologists who are themselves familiar with local conditions.

3.0 ESTABLISHING THE POST-DISASTER SURVEILLANCE CENTRE

3.1 The location of the Centre will depend on the following:

3.1.1 Extent of the disaster, local or nationwide.

3.1.2 Pre-disaster organisation of the health services e.g. administered centrally or through regional, parish or county health administrations.

3.1.3 Communication facilities with special emphasis on telephone or radio links with national co-ordinating disaster organisation and field reporting units.

3.2 Use of Maps

Whether, as in the smaller Caribbean countries there is only a central organisation or, as in the larger countries, region (county or parish) units, the medical officer in charge should have as part of the pre-disaster planning, detailed wall maps of the area under jurisdiction. These maps should show the location of all health facilities and current disease problem areas e.g. Typhoid, Leptospirosis.

It is essential, therefore, that the map or maps can be displayed and used as a visual aid to the management of the surveillance system, including the briefing of personnel. The map should, in addition to the location of health facilities^{*} and high risk areas, be used to display the following information:-

3.2.1 Extent of the disaster e.g. areas flooded.

3.2.2 Current status of damaged area e.g. no longer flooded or extent of present flooding.

3.2.3 Current status of public water supplies - inoperative, supply restored but not treated, fully operational.

* Location of staff may be also usefully displayed, especially if they have to work from their homes rather than from health facilities.

3.2.4 Status of main sewerage systems.

3.2.5 Location of evacuation centres in current use.

3.2.6 Impassable roads.

As part of the pre-disaster planning, staff should be trained in marking of the maps. Stocks of mapping pins and markers in a variety of colours should be held in readiness.

4.0 THE QUICK ASSESSMENT OF THE POST-DISASTER SITUATION

The national epidemiologist and/or the local medical officer of health should try to make a rapid assessment of the extent of the damage with special emphasis on:

Communications

Roads

Bridges

Telephone links

Health facilities

Areas flooded

Water supply systems

If roads are passable, then this may be the method of choice. Where roads are impassable and there is access to a helicopter, a short flight may be all that is required to get the essential quick over-view. It is accepted that the full extent of damage may be misleading as viewed from the air, but whatever the method used, it is essential that the officer directing the post-disaster surveillance has this early over-view so that field resources can be used to optimum advantage. Briefing contacts can be held with field personnel during this quick assessment and the opportunity taken to distribute forms, sampling equipment, etc.

5.0 INFORMATION REQUIRED

5.1 For infectious diseases, emphasis is placed on symptom (syndrome) monitoring. Daily information is required on the number of persons attending a health facility or residing in an evacuation centre, who present with the following:-

Fever

Fever with cough

Fever with Diarrhoea

Fever with Rash

Vomiting and /or Diarrhoea

All involved in the surveillance system must understand that negative reporting i.e. reporting that none of the above "conditions" is present is just as important as reporting their occurrence.

Specific forms (sample attached) should be distributed to all reporting units with the request that the forms be completed daily and arrangements made to collect the data daily for transmission to the surveillance centre.

Specific diagnosis will be made by epidemic investigation if this is indicated by unusual reports of any of these "conditions".

5.2 Depending on the epidemiological situation, this general monitoring can also be extended to include data collection for specific diseases e.g. Typhoid and Leptospirosis.

5.3 If the normal surveillance system did not break down during the emergency, it should be continued as usual. The daily symptom (syndrome) monitoring should be added as a reinforcement in the affected areas.

When a normal surveillance system breaks down and a special emergency system operates, the normal system should be fully operational before considering stopping the emergency surveillance.

5.4 Information on public health measures taken e.g. the status of public water supplies restoration, should be collected by or sent to the emergency surveillance centre. Where treatment systems have been restored, testing for free and chlorine residual levels and if laboratory facilities (portable or fixed) are available, bacteriological testing are useful adjuncts.

5.5 Certain information can be collected regarding non-infectious problems. This can include trauma surveillance, dog bite surveillance, or others to be defined by the national epidemiologist, according to circumstances.

5.6 Surveys can be organized to investigate special questions e.g. nutritional status of persons accommodated in evacuation centres.

6.0 SOURCES OF INFORMATION

Daily reports need to be collected from enough sources to give an adequate picture of the situation.

It is not necessary to have complete data, but to have a reliable overall view. Efforts to obtain total reporting might be counterproductive because of the effort and time involved before the system can start, and because the breakdown of one or more reporting units makes interpretation difficult or impossible.

Therefore, sentinel stations are better for symptom (syndrome) reporting purposes. Each sentinel station can be monitored separately. They can also be grouped for a region (parish/county). Since the number of reporting units is well defined, interpretation is easier when one sentinel station fails to report.

Choice of sentinel stations has to depend on geography, health services available to the population, distribution of the population and means of communication. The latter might prove the most difficult to allow for in emergency situations.

Total of all cases reporting, including name and addresses, is desirable for the reporting of selected diseases such as typhoid and leptospirosis. Disease selection will be based on prior knowledge of high risk areas (see 2.1)

In the case of evacuation centres, each centre should be reporting and monitored separately. This is because each evacuation centre is an autonomous unit for epidemiological purposes.

NOTE: Besides organized information channels, there will always be reports on infectious diseases and infectious disease outbreaks in the media (newspaper, radio, television) or as unconfirmed rumours. These are not to be neglected, but incorporated in the organized information, and immediate action is to be taken to verify the source and reliability of the information. Immediate feedback to the general public on these media reports and "rumours" is necessary.

7.0 COLLECTION, COLLATION, ANALYSIS AND PRESENTATION

Collection needs to be organised daily. If reporting forms cannot be collected daily, other means of communicating the information are necessary: Telephone, ham-radio, etc.

Collation and Analysis should be undertaken daily to detect changes.

The first and most important question is

'Is there an epidemic?'

If no, no further action should be taken. In emergencies, no time should be lost looking for more details or analysing a situation thoroughly, however interesting it may be.

Every suspect report or rumour should be investigated immediately.

The normal techniques of epidemic investigation will be followed.

It is important that at the Surveillance Centre, the information is presented so that the present status can be easily assimilated.

As also already reviewed, detailed wall maps suitably marked provide an excellent dynamic presentation of the current status, not only for health personnel, but for the staff of other agencies meeting at the Centre.

Graphs for displaying daily incidence are also useful.

8.0 FEEDBACK

The act of investigations and their results should be published in an official weekly report. It should also contain tables and charts from the daily reports.

Conclusions on detection or absence of epidemics and control measures taken should be included and clearly understandable for all readers.

The circulation should be wide - reporting sources, Ministry of Health officials, Government officials in charge of Relief, Health Care providers and the media.

Besides an official bulletin, a daily consultation should be held between the national epidemiologist and the official in charge of health services. The information exchanged should be reported daily as a brief summary to the overall disaster relief coordinator.

E. CONCLUSION

A post-disaster surveillance system is an essential element of infectious disease control following natural disasters.

Its purpose is to collect daily information on a number of indicators, and to draw conclusions as regards the pattern of infectious diseases in the community or affected parts of the community.

A special sense of urgency permeates the system because of the peculiarity of a disaster situation.

All information collected has to result in decisions to investigate or not. Based on collected information and results of investigations, appropriate measures can be taken by the authorities in charge of disaster relief. Coordination between various government agencies is essential and will be enhanced by pre-disaster planning, including simulation exercises.

EVACUATION CENTRE - BASELINE SANITATION ASSESSMENT

TO BE COMPLETED ON FIRST REPORT ONLY

No. of persons accommodated 0 - 4 yrs
5 - 14 yrs
15 and over

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GENERAL CONDITION AND ADEQUACY
OF BUILDING

WATER SUPPLY

SEWAGE DISPOSAL

SOLID WASTE DISPOSAL

HAND WASHING

BATHING

CLOTHES WASHING

FOOD STORAGE/PREPARATION/SERVING
DISH/PAN WASHING FACILITIES

FOOD SUPPLY

POST DISASTER SURVEILLANCE

Daily Report by For
Name of Reporter *Date*

From <input type="checkbox"/> Evacuation Centre <input type="checkbox"/> Hospital OPD <input type="checkbox"/> Health Centre <input type="checkbox"/> Clinic <input type="checkbox"/> Other Specify	Locating Address	Phone No.
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NUMBER OF NEW CASES WITH		TOTAL
(1) Fever (100°F + 38°C +)		
(2) Fever and Cough		
(3) Fever and Diarrhoea		
(4) Vomiting and/or Diarrhoea		
(5) Fever and Rash		
(6) Other new Medical problems Specify		

COMMENTS

COMPLETE. FOR EVACUATION CENTRES ONLY

No of persons accommodated today

Report significant changes in Sanitation/Food Supply Situation

NOTE: COMPLETE BACK PORTION OF THE FORM FOR FIRST REPORT ONLY.

C A R I B B E E C

Surveillance Report

VOL 5 NO 8

AUGUST 1979

ST VINCENT VOLCANIC ERUPTIONS INTENSIVE SURVEILLANCE SYSTEM FOR EVACUATION CENTRES

In the early morning hours of 13 April, 1979, the Soufriere Volcano in St Vincent started erupting, prompting a rapid evacuation of all people living within a 10-mile radius of the crater. Subsequently, several major eruptions took place until 25 April, 1979, when a slowly raising lava dome was seen in the crater. Thereafter, activity in the volcano decreased slowly. For safety reasons, the evacuation was maintained until the last week of May, when a 5-mile safety range was adopted. This allowed the majority of the evacuees to return home.

During this 6-week period, St Vincent, with a population of approximately 110,000, was forced to house and feed an estimated 20% of its population. Sixty-five evacuation centres were established in schools, churches, community centres, and private homes. The size of the centres ranged from 20 to almost 1,000 persons, although most had to accommodate between one and three hundred people. In a sample of the evacuation centres, undertaken on 19 April, 1979, out of the sample population of 1,290 evacuees, 53.3% were under 16 years of age and 10.4% were under 3. Because of the possibility of communicable disease outbreaks, one of the tasks was to establish a surveillance system in these evacuation centres.

A survey of these evacuation centres undertaken during the first seven days revealed the following problems:-

- (i) Irregular water supply with unsatisfactory coliform counts, though quality was similar before the eruptions, but with superimposed potential chemical contamination from volcanic dust fall-out into the largely surface water supply systems.
- (ii) Unsatisfactory or absent facilities for boiling water or for sterilising feeding bottles.
- (iii) Half of the already insufficient toilet facilities out of order and slow progress with the latrine building scheme.

Published by **CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)**

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Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

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- (iv) Improvised garbage disposal.
- (v) Where it existed, mass preparation of food was undertaken under difficult conditions by inexperienced volunteers. There was a general lack of adequate cooking utensils, equipment and refrigeration.

The risk of outbreaks of communicable diseases was very real and had to be considered.

A double strategy was adopted:-

1. Environmental Control Measures: Highest priority in emergency relief operations was given to improvement of sanitary conditions in the evacuation centres.
2. An intensive surveillance system was established in the evacuation centres. With the information thus collected, collated, and analysed, rational action could be undertaken to control communicable diseases.

It was considered essential that each evacuation centre was monitored daily.

In order to have a sensitive system it was decided to monitor symptoms and syndromes. A daily report was required on new cases of:-

1. Fever
2. Diarrhoea (with or without fever)
3. Cough (with or without fever)
4. Skin lesions

A special form was developed for this report with space for recording other problems at the centre.

The forms were distributed in a general meeting where the system was discussed. Health services had been organised on a geographical basis with six health teams, headed by a medical officer. The teams had an assignment to visit all centres daily and, therefore, the head of the team was made responsible for submitting the daily reports. The collection of information was organised by the medical officer.

Useful and good collaboration was obtained from student nurses who had been assigned to most of the centres and were present on a daily basis. The reports were collated daily and analysed at the centre. A high level of suspicion was maintained and, whenever necessary, an investigation was undertaken.

During these six weeks, two outbreaks of food-borne illness occurred in separate centres and one outbreak of mumps among children in another centre.

The advantages of this intensive surveillance system during the emergency were threefold:-

1. Daily information was available and investigation or corrective action could be concentrated where it was necessary.

FOOD INSPECTION AND SALVAGE FOLLOWING
NATURAL DISASTERS

INTRODUCTION

Natural disasters such as flooding, earthquakes and hurricanes can seriously interfere with food supplies availability and safety through:-

- (1) Direct damage to food stores, shops, catering facilities and processing plants.
- (2) Damage to roads, bridges, sea and airports and thus directly hindering the importation and internal transportation of bulk food.
- (3) Damage to agricultural crops, livestock, land, buildings and equipment.
- (4) Dependence on donated food from internal and external sources which may include items of dubious quality.
- (5) Necessity for mass feeding at evacuation centres which may have inadequate facilities.
- (6) Damage to power lines, electricity generation capacity and thereby non-functional cold storage facilities.
- (7) Use of temporary food storage depots in buildings not designed for this purpose and staffed by personnel not familiar with safe food storage practices.

FOUR (4) CARIBBEAN CASE HISTORIES

1. Following a hurricane, supermarkets and other food retail shops in the capital city were observed to be having flood damage sales. There were, at the time, good transport facilities, both internally and externally.
2. A public health inspector was in the process of condemning the whole contents of a supermarket which had been flooded. The supermarket was in a town cut off, through blocked and flooded roads, from the rest of the country. The

only transport link was by helicopter.

3. Food was being transported by helicopter. An examination of the food items awaiting this expensive mode of transport revealed some donated items unfit for human consumption. An official commented "Beggars cannot be choosers".
4. In a church, used as an evacuation centre, frozen chicken was left to thaw overnight in a closed room at ambient temperature and served to 150 people for lunch after frying for a short time.

LESSONS FROM THE CASE HISTORIES

In spite of the multifaceted problems resulting from natural disasters, it is important to recognise

- (1) Accepting and transporting unsatisfactory food from either external or internal donors is wasteful of resources and can lead to foodborne illnesses.
- (2) Food items should not be universally condemned because a premise has been flooded or otherwise damaged. A salvage operation, under the supervision of a qualified public health inspector (Environmental Health Officer), should be undertaken to sort out the foods.
- (3) No food retailer should be permitted to conduct sales of damaged goods unless there has been sorting into fit and unfit under the supervision of a qualified public health inspector (Environmental Health Officer).
- (4) Facilities for mass feeding should be considered in the selection and the equipping of evacuation centres in the pre-disaster plan. Guidelines should be prepared in advance to ensure food safety e.g. in the absence of cold storage facilities, this pre-disaster preparation should be reinforced

following the disaster, by regular visits to the evacuation centres in use, to review and advise on sanitation including food safety.

BRIEF GUIDELINES FOR THE INSPECTION OF

1. Food Donations

The quality of the food donated by external agencies will probably not be known in advance. However, the recipient Government should have determined in advance the priority food items required. This information can be used to look out for 'high risk foods'.

Trained food inspectors should make daily a rapid survey of all donated foods at the point of entry and have any items of dubious quality separated from detailed assessment. Disasters are not the time to be ultra-fussy about quality, but neither the time to permit food "importations" without any scrutiny.

Internal donated items may show up in various food depots and distribution centres. If new items are arriving daily, then a daily "walk through" scrutiny should be organised. The opportunity can be taken to review food storage and handling practices, providing guidance as necessary.

2. Damage to Food Stores, Retail Outlets

Using flood damage to a supermarket as an illustration, sorting can be carried out in the premises as follows

Items Stored/Displayed above
the level of the Flood

DECISION

- | | |
|--|---------|
| (i) Non-perishable items | Use |
| (ii) Perishable items e.g. in cold display cabinets: if temperature of food at time of inspection is 45 ^o F (7 ^o C) or below, and can be distributed for use the same day. | Use |
| (iii) Perishable items e.g. in cold display cabinets: if temperature of food at time of inspection is above 45 ^o F (7 ^o C). | Destroy |

Items Stored/Displayed below
level of the Flood

- | | |
|--|---|
| (i) Perishable items | Destroy |
| (ii) Items in bags/cartons pervious to water | Destroy |
| (iii) Canned Foods - Labels intact | Use |
| (iv) Canned Foods - Labels missing or damaged but contents identifiable | Use-label with felt pen or other permanent marker |
| (v) Canned food - labels missing or damaged. Contents not identifiable, even following opening of a sample | Destroy |