

# Challenges for Communicable Disease Surveillance and Control in Southern Iraq, April-June 2003

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**T**HE RECENT WAR IN IRAQ HAS RESULTED in the disruption of health services and damage of infrastructures, has been marked by the looting of the health infrastructure, and has led to increasing concerns about safety and security. Consequences of conflict on the health of war-affected populations are often overlooked in military planning.<sup>1</sup> As a result, priorities for humanitarian and health interventions in the acute phase of a complex emergency include mortality assessment; war-related and other traumatic injury evaluation and treatment; provision of food, shelter, access to safe water and sanitation, and medical care; rapid health assessments; and control of communicable diseases and epidemics, public health surveillance, and coordination among agencies.<sup>1-3</sup> In this article, we describe a communicable disease surveillance and control intervention implemented by the World Health Organization (WHO) in the Basrah governorate of southern Iraq during the first 2 months of humanitarian response following the war from April to May 2003. Data are reported through June 2003.

The recent war in Iraq presents significant challenges for the surveillance and control of communicable diseases. In early April 2003, the World Health Organization (WHO) sent a team of public health experts to Kuwait and a base was established in the southern Iraqi governorate of Basrah on May 3. We present the lessons learned from the communicable disease surveillance and control program implemented in the Basrah governorate in Iraq (population of 1.9 million) in April and May 2003, and we report communicable disease surveillance data through June 2003. Following the war, communicable disease control programs were disrupted, access to safe water was reduced, and public health facilities were looted. Rapid health assessments were carried out in health centers and hospitals to identify priorities for action. A Health Sector Coordination Group was organized with local and international health partners, and an early warning surveillance system for communicable disease was set up. In the first week of May 2003, physicians in hospitals in Basrah suspected cholera cases and WHO formed a cholera control committee. As of June 29, 2003, Iraqi hospital laboratories have confirmed 94 cases of cholera from 7 of the 8 districts of the Basrah governorate. To prevent the transmission of major communicable diseases, restoring basic public health and water/sanitation services is currently a top priority in Iraq. Lack of security continues to be a barrier for effective public health surveillance and response in Iraq.

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The objectives of this intervention were to ensure early warning of infectious disease outbreaks, to provide control programs with impact indicators, and to compile data on health care activities for planning purposes and health status information. Valid data on war-related and continued conflict-related mortality and injuries were not available at the time this report was prepared. In the immediate postwar period, the focus of communicable disease

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surveillance was primarily on early detection of outbreaks that could be responsible for an increase in morbidity and mortality. However, the postwar situation and ongoing security concerns in Iraq have posed numerous challenges for effective surveillance and control of communicable diseases.

### **Prewar Status of Communicable Diseases and Nutrition, 1991-2003**

Before the war, Iraq, with a population of 26 million people, had the following health access indicators: 5.5 physicians (1998), 12 hospital beds (1999), and 0.5 primary health centers (1998) per 10 000 population.<sup>4</sup> A central public health laboratory in Baghdad was the reference laboratory for peripheral laboratories at the governorate level. The Basrah governorate included a population of 1.9 million, 10 hospitals and clinics, 77 primary health centers, and 1 public health laboratory with resources to confirm diseases.

Morbidity and mortality due to communicable diseases increased in Iraq during the 1990s primarily because of economic sanctions implemented in 1991, food insecurity, and lack of access to quality health services.<sup>5-7</sup> Infant mortality rates, estimated at 47 deaths per 1000 live births for the period 1984-1989, were reported by UNICEF to increase to 108 deaths per 1000 live births for the period 1994-1999.<sup>8</sup> Reports of incidence of vaccine-preventable disease also increased. In 1999, 16 cases of poliomyelitis were reported in 9 of the 15 south-central governorates of Iraq.<sup>9</sup> Measles was the third highest reported cause of death in children younger than 5 years of age in the 3 autonomous governorates of northern Iraq.<sup>8</sup> In south-central Iraq, more than two thirds of measles cases were reported in older children as a result of low rates of immunization in the mid 1990s when vaccines were in short supply.<sup>10</sup> The number of reported cases of diphtheria at a national level increased from 142 cases in 1991 to 511 cases in 1999,<sup>10</sup> and in the Basrah governorate, 133 cases of pertussis were investigated in 1996.<sup>11</sup>

Since 1991, the water and environmental sanitation situation had deteriorated with less than 50% of the rural population of central and southern Iraq having access to safe water.<sup>5</sup> Waterborne diseases were common with more than 62 000 cases of shigellosis reported in 1993<sup>10</sup> and 20 000 cases of typhoid fever and 500 000 cases of amoebic dysentery and giardiasis reported in 2001.<sup>10</sup> An epidemic of cholera was reported to affect more than 1000 residents of the Basrah governorate in 1989. Following the 1991 crisis, cholera became endemic in all the governorates. In 2002, 39 clinical cases of cholera and 242 *Vibrio cholerae* carriers were laboratory-confirmed in the Basrah governorate (unpublished data, Department of Public Health, Basrah).

Vector-borne diseases also re-emerged. For example, large outbreaks of malaria caused by *Plasmodium vivax* occurred, leading to 94 236 reported cases of malaria in 1994 and 98 705 cases in 1995.<sup>5</sup> In 2001, 2 893 cases of visceral leishmaniasis were reported.<sup>10</sup>

### **Public Health Services Before 2003**

The Iraqi public health system was centralized before the war. Patients with any of 33 notifiable diseases who presented to children's hospitals, fever hospitals, and primary health care centers were reported to district medical officers who transmitted data to the surveillance unit of the primary health care department of the governorate health services.

Communicable disease control activities included vector control, screening of food handlers, water supply testing, screening of contact cases, community mobilization, and outbreak source identification. Immunization coverage had been sustained above 90% from 1996 to 2001, except for measles, which was reported to be less than 80% in 1998 and 2001.<sup>6</sup> However, national immunization campaigns increased vaccine coverage of children younger than 5 years of age to 96% in 2002.<sup>6</sup>

Economic sanctions prevented Iraq from importing certain laboratory equipment and reagents necessary for

bacteria growth and identification and antibiotic resistance testing because of their potential use in biological warfare. In addition, medical and laboratory staff lacked access to advanced training, resulting in a degradation of the quality of epidemiological and laboratory services.<sup>12,13</sup>

In 2002, the Department of Preventive Medicine and the Public Health Laboratory of Basrah had a staff of 88 officers, including physicians, microbiologists, assistants, and entomologists.

### **Communicable Disease Preparedness**

In the fall of 2002, the WHO program on Communicable Diseases in Complex Emergencies coordinated the compilation of the communicable disease profile for Iraq.<sup>10</sup> This profile highlighted the most prevalent risks for public health and included a communicable disease toolkit, including rapid health assessment forms, morbidity and mortality surveillance forms, case definition for priority diseases, and guidelines for case-management and outbreak control.

A trainers course for epidemiologists from the governorates on communicable disease surveillance and control during complex emergencies was carried out in Baghdad in November 2002. The training was replicated in each of Iraq's 18 governorates with the participation of the public health district directors.

To support the health component of the humanitarian response, WHO set up a coordination office in Larnaca, Cyprus, in February 2003 and prepositioned in neighboring countries intervention teams and 73 emergency health kits. Each of the health kits contains drugs and medical supplies to meet the primary health care needs of a population of 10 000 with disrupted medical facilities in the immediate aftermath of an emergency such as war.<sup>14</sup> Drugs had been selected for inclusion in the kits and quantities were estimated based on the average morbidity patterns among previously displaced

and war-affected populations over a 3-month period and for the use of standard treatment guidelines. Drugs included antibiotics, oral rehydration salts (ORS), and analgesics.

### **Public Health Response in the Aftermath of the War**

Following military action, local public health service staff ceased their activities because of concern for their personal safety and the need to prioritize health care resources and services during the war. Even though most health care facilities remained opened, despite apprehension about personal safety, communicable disease surveillance and control activities were disrupted. In early April 2003, WHO sent a team of public health experts to Kuwait, and on May 3 (2 days following the cessation of major combat operations), a base was established in Basrah. The Basrah mission had the following defined areas of work: needs assessments, health information systems, rehabilitation plans, disease surveillance and outbreak control, drugs supply management, and health sector coordination.

**Rapid Health Assessments.** Rapid health assessments for communicable diseases were carried out in health centers and hospitals of southern Iraq by joint United Nations (UN) teams, non-governmental organizations (NGOs), and the coalition forces. Most health care facility records were destroyed during the war and subsequent looting, and hospital attendance was not recorded because of the heavy workload and unavailability of registries. International NGOs and Iraqi physicians reported an increase in outpatient care and hospital admissions for diarrhea in Basrah beginning on April 26. An increase in the cases of visceral leishmaniasis compared with the previous months also was reported, but this may have reflected a delay in seeking medical care during war.

**Drug Supply.** The supply of drugs to treat the most common epidemic prone diseases was determined to be generally adequate. Two of the 3 drug warehouses in Basrah had been protected

from looting by the Iraqi warehouse staff. However, shortages of oxygen and drugs for treatment of chronic diseases (such as hypertension and diabetes), cancer, and visceral leishmaniasis, were noted during the rapid health assessment. Moreover, as in other complex emergencies and disasters, unsolicited donations of medical supplies, medicines, and field hospitals brought into the country by other governments and NGOs constituted a challenge for the management of supply systems.<sup>15</sup> In response to needs identified during the rapid assessment, WHO shipped diarrhea kits, cholera kits, and basic laboratory kits from Kuwait to Basrah. Drugs for chronic diseases were not sent in the first shipment to Basrah. However, once the warehouse in Bagdad was functioning by the end of May, the distribution of all drugs to the governorates, including Basrah, was organized.

On April 27, 2003, 1000 vials of sodium stibogluconate for treatment of visceral leishmaniasis were supplied by UNICEF, and another 2000 vials were ordered. Based on the number of visceral leishmaniasis cases reported in previous years, a total of 3000 vials of sodium stibogluconate should be sufficient for the remainder of year 2003.

**Water.** In Basrah city during the war, the municipal water supply was severely damaged and there were power outages.<sup>16</sup> Four of 8 water treatment plants and the raw water pumping station were damaged. As a result, individuals accessed water by breaking water pipes thereby damaging the distribution network. In addition, water pumping stations and pipes were looted extensively. The sewage drains were blocked (because garbage was not collected and sewage pumping stations were not working properly), which resulted in the municipal sewage system flooding into the city of Basrah. In addition, power outages affected the water pressure in the distribution system, which allowed for further contamination of the water supply.

Potable water was provided to Basrah by UNICEF in collaboration with the Iraqi Red Crescent by 20 water tanker

trucks that brought daily deliveries from Kuwait. However, additional local water tanker trucks distributed water pumped from the contaminated Shatt Al Arab river. With the critical situation of the highly contaminated water in Basrah and the security restrictions that did not permit community interventions, it was not possible to rely on the chemical treatment or boiling of water.

**Coordination.** Since the first days of the response, a Health Sector Coordination Group directed by the WHO was set up comprising representatives from international agencies and NGOs operating in southern Iraq, the US-led Office for Reconstruction and Humanitarian Aid, and coalition forces. Working groups were organized to handle specific issues requiring technical guidance (eg, health infrastructure, communicable diseases). Once the Health Sector Coordination Group was established in Basrah, the local director of health services in Basrah directed this group, which was assisted by the Iraqi directors of the Department of Preventive Medicine and the public health surveillance unit.

The Basrah Department of Preventive Medicine, used to receiving instructions from the central level, encountered difficulties in prioritizing and planning activities. While most of the staff remained at work, the priority for the humanitarian intervention was to provide guidance, support, and coordination rather than to bring in human resources

**Public Health Surveillance.** The national public health surveillance systems and the hospital-based syndromic surveillance system designed in anticipation of the crisis were disrupted in Basrah during the war. Telephone lines in Basrah were not working. However, as most of the international organizations had access to the Internet through satellite connections, WHO set up a distribution list for summarizing information available about possible outbreaks and ensuring prompt investigation and reporting.

In the first week of May 2003, an early warning surveillance system protocol

was developed. A 2-week pilot phase was carried out in the 2 districts of Basrah city. Subsequently, a surveillance workshop was held for directors of the 8 public health districts of the Basrah governorate with participation of UN agencies, NGOs, and coalition forces. The aim of the workshop was to finalize standard case definitions, establish data collection and reporting procedures, and develop an implementation plan. Using a syndromic approach, all health care facilities in the Basrah governorate were advised to report to the public health district 20 priority health events (BOX). During the months of April and May, collection of mortality data from hospitals was not feasible, because of the security situation and the increased workload in hospitals.

**Control of Communicable Diseases.** All control programs (eg, vector control, food inspections) and health education activities were disrupted during the war and could not restart because of security issues. For example, even though the Kuwait government provided products, materials, and vehicles for fumigation of mosquitoes and sand flies for control of malaria and leishmaniasis, which usually runs from May through November, concern about looting impeded the start of the program.

### Cholera Outbreak

On May 4, 2003, results from a Basrah hospital laboratory revealed 7 suspected cases of cholera on cultures from stool samples on specific growth media (thiosulfate-citrate-bile salt-sugar and Kligler agar). On May 7, WHO formed a Cholera Task Force with the Basrah Department of Preventive Medicine, NGOs, coalition forces, and UN agencies to implement outbreak control activities, while still waiting for the confirmation from the public health laboratory in Kuwait, which occurred on May 14.

Health facilities were visited to assess the availability of diarrhea treatment (ORS, fluids, drugs). Even though ORS were available from a Basrah warehouse, some of the public health centers did not want to store them onsite because of concerns about security. No

deaths were reported among the initial confirmed cases. In response to the recommendation of the task force, the coalition forces strengthened the security around health facilities and water processing installations.

In terms of health education about cholera, security issues impeded community interventions. However, public health messages were broadcast by loudspeakers and through the mosques. Guidelines on diarrhea disease outbreak response in Arabic were distributed to all public health centers.

Active daily surveillance of diarrhea cases was implemented in Basrah city hospitals on May 17. Numbers of patients presenting with diarrhea in these hospitals through June 17 are shown in the TABLE. As of June 29, lower southern Iraqi laboratories have confirmed 94 cases of cholera from 7 of the 8 districts of the Basrah governorate (n=89) and from governorates of Missan (n=4) and Samawah (n=1). Among the Basrah cases, 51 cases (59%) were in children younger than 5 years of age (unknown age for 2 cases). Cases were not clustered in a specific area. These cases do not represent the extent of the epidemic, since the majority of the hospital laboratories were not able to confirm diagnoses.

### Comment

The magnitude of the communicable disease crisis in Iraq and the size of the population potentially affected present a challenge for effective humanitarian response. The public health situation already was severe before the war, and in a few weeks, 26 million people were confronted by a deterioration of environmental conditions in conjunction with the interruption of communicable disease surveillance and control activities. Even though humanitarian agencies had anticipated the crisis and worked on preparedness, the lack of security hindered the public health response.

Working with the national health staff has been essential in this crisis. Following the war, because of subsequent looting of public health department facilities and the destruction of

### Box. Health Events Included in the Early Warning Surveillance System, Basrah, April-May 2003

- Acute watery diarrhea
- Acute bloody diarrhea
- Upper respiratory tract infections
- Pneumonia
- Severe malnutrition
- Typhoid fever
- Acute jaundice
- Meningitis (suspected)
- Measles (suspected)
- Diphtheria (suspected)
- Whooping cough (suspected)
- Tetanus (adult)
- Tetanus (neonatal)
- Mumps
- Malaria
- Pulmonary tuberculosis
- Fever of unknown origin
- War-related injuries
- Unexploded ordnance injuries, including those from landmines
- Road traffic injuries

**Table.** Total Number of Diarrhea Consultations by Age Group, May 17–June 18, 2003, Basrah, Iraq\*

	Age <5 y	Age ≥5 y	Total
Acute watery diarrhea	1863	860	2723
Bloody diarrhea	108	44	152
Other diarrheas	11	12	23

\*Teaching Hospital, Tahreer Hospital, General Hospital, Maternal and Child Hospital

registries, local data were not available to guide the humanitarian response. As a result, rapid health assessments and immediate implementation of a surveillance system were needed to identify priorities and plan the humanitarian response.

Surveillance tools had to be adapted to account for the deterioration of the specific health care situation, the disruption of communicable disease control programs, and the absence of laboratory confirmation while taking into account the preexisting public health systems to ensure a smooth future integration. In the initial stage, a sentinel surveillance system was needed for areas where security concerns did not allow

the deployment of public health and humanitarian aid support teams, and exhaustive data collection were justified in areas where such deployment was feasible. However, the lack of readily available laboratories and specific laboratory equipment for disease confirmation hindered effective public health surveillance and resulted in reliance on syndromic-based notification.

The absence of laboratory facilities and lack of supplies specifically impeded the response to the outbreak of cholera in Basrah. A rapid diagnostic dipstick test for *Vibrio cholerae* O1 and O139 was recently developed by the Institute Pasteur, with specificity ranging from 84% to 100% and sensitivity ranging from 94% to 100%.<sup>17</sup> Other commercially available rapid cholera test kits have been developed; however, the use of these kits requires a fairly high level of sophistication, requires refrigeration, and they are relatively expensive. In addition, these test kits yield false positives and false negatives. They could be used in emergencies but with important caveats: they should not be used to confirm or rule out outbreaks of cholera unless laboratory support is available to confirm positive cases, and they should not be used to test individual sporadic suspected cases of cholera. Furthermore, antibiotic sensitivity testing remains necessary. In Basrah, effective guidance could not be provided to health care workers on case management in the ab-

sence of antibiotic sensitivity tests for waterborne pathogens. Thus, even with rapid tests available, restoring public health laboratory function should be a priority.

Prevention of the transmission of major communicable diseases is another priority. With the current water situation, diarrheal diseases were first to be noticed because of their short incubation period. An increase in other waterborne diseases with longer incubation periods, such as hepatitis A and E, may be observed in the coming weeks. In fact, local health centers are beginning to report cases of jaundice and suspected cases of typhoid fever; however, a lack of appropriate laboratory equipment has prevented disease confirmation of these cases to date. Furthermore, the deterioration of the environmental situation and the high temperatures in summer provide for the multiplication and spread of vectors that may account for an increase in cases of malaria and leishmaniasis in the coming months. Therefore, the surveillance system needs to be strengthened to facilitate early detection of these potential outbreaks and to provide the means to evaluate the long-term public health consequences of the conflict.

### Conclusions

Several lessons on communicable disease surveillance and control have been learned, and in some cases, unfortu-

nately relearned, from the emergency response in the Basrah governorate of Iraq. First, humanitarian and public health specific needs should be properly identified before sending supplies and materials. Second, restoration of basic public health and water/sanitation services is critical in Iraq. Any further delay will increase the risk of large-scale outbreaks, particularly of diarrheal diseases. The outbreaks alert system and emergency disease surveillance system were successful in detecting a cholera outbreak in Iraq. However, reinstating communicable disease surveillance in collaboration with national staff is crucial to identify, monitor, prevent, and respond to outbreaks and to contribute to the evaluation of the public health consequences of such a crisis. It also is important to strengthen laboratory capacity to confirm outbreaks; without this, syndromic disease surveillance is the only interim solution. Finally, ensuring proper security for everyone in Iraq is essential for effective public health surveillance and response during this crisis.

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