Mississippi's Infectious Disease Hotline: A Surveillance and Education Model for Future Disasters

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Abbreviations:
ARC = American Red Cross
MDH = Mississippi Department of Health
MEMA = Mississippi Emergency Management Agency

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Abstract

Introduction: The potential for outbreaks of epidemic disease among displaced residents was a significant public health concern in the aftermath of Hurricane Katrina. In response, the Mississippi Department of Health (MDH) and the American Red Cross (ARC) implemented a novel infectious disease surveillance system, in the form of a telephone "hotline", to detect and rapidly respond to health threats in shelters.

Methods: All ARC-managed shelters in Mississippi were included in the surveillance system. A symptom-based, case reporting method was developed and distributed to shelter staff, who were linked with MDH and ARC professionals by a toll-free telephone service. Hotline staff investigated potential infectious disease outbreaks, provided assistance to shelter staff regarding optimal patient care, and helped facilitate the evaluation of ill evacuees by local medical personnel.

Results: Forty-three shelters sheltering 3,520 evacuees participated in the program. Seventeen shelters made 29 calls notifying the hotline of the following cases: (1) fever (6 cases); (2) respiratory infections (37 cases); (3) bloody diarrhea (2 cases); (4) watery diarrhea (15 cases); and (5) other, including rashes (33 cases). Thirty-four of these patients were referred to a local physician or hospital for further diagnosis and disease management. Three cases of chickenpox were identified. No significant infectious disease outbreaks occurred and no deaths were reported.

Conclusions: The surveillance system used direct verbal communication between shelter staff and hotline managers to enable more rapid reporting, mapping, investigation, and intervention, far beyond the capabilities of a more passive or paper-based system. It also allowed for immediate feedback and education for staff unfamiliar with the diseases and reporting process. Replication of this program should be considered during future disasters when health surveillance of a large, disseminated shelter population is necessary.

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Introduction

Background

Hurricane Katrina made landfall near the Mississippi-Louisiana border on 29 August 2005, as a high-level Category 3 hurricane with sustained winds of 145 miles per hour and a 25-foot storm surge.[1] Katrina was the fourth most intense Atlantic Basin hurricane on record, and resulted in the largest displacement of a US population in history.[2]

Among the chief adverse effects of the hurricane on the lives of Mississippi residents, was the mortality suffered during the hurricane's impact phase, and the considerable disruption of livelihoods. An estimated 175 fatalities in Mississippi were directly attributed to the forces of Hurricane Katrina, and 23 further deaths were thought to be an indirect consequence of the hurricane.[3]

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The American Red Cross (ARC) reported that >65,000 households had sustained extensive structural damage, and almost 69,000 were destroyed.[4] According to the Mississippi Emergency Management Agency (MEMA) estimates, 14,000 persons were displaced from their residences to 150 temporary shelters during the first several days following the event.[5] The large group of evacuees was concentrated on the coast, but also extended to Mississippi's northernmost counties. Evacuees were mostly individuals and families who had fled from communities along the Mississippi coastline; a smaller percentage came from other Mississippi districts or neighboring Louisiana.

By 04 September, the fifth day following the storm, an estimated 10,000 evacuees were being housed in 88 official ARC shelters. An additional undetermined number of displaced persons were staying in locally organized and managed community shelters that were not networked with the ARC system. With such a large shelter population, concerns arose regarding the potential for infectious illness outbreaks among shelter residents. These fears, including concerns over potential cholera transmission, were widely discussed by media outlets.[6] The reports contributed to considerable apprehension among those living in the shelters, shelter staff, and the general public.[7] Moreover, it was clear through interviews with key informants that a high level of uncertainty existed among shelter staff and evacuees regarding action strategies in the event of an infectious disease outbreak.

Disease surveillance in shelters demands different methodologies than those required within traditional hospitals, emergency departments, and clinic settings. Volunteers, not healthcare workers, staff the shelters. Even when healthcare professionals do visit shelters, they frequently are nurses, not physicians. These volunteers rarely have public health, infectious disease, or disease reporting training, and often, are retired from their registered profession. The lack of training and experience in data collection make the use of traditional disease or diagnosis-based reporting systems impossible. In response to these hurdles, the Mississippi Department of Health (MDH) and the ARC developed and implemented a novel, symptom-based, telephone reporting system that allowed for immediate, direct feedback and additional data gathering for early and effective case-identification.

Methods

Intervention Design, Setting, and Selection of Participants

The surveillance and education program was implemented during the second week after the hurricane's impact. Some services had been restored, but no other shelter surveillance system existed. A unique, toll-free, public health surveillance hotline was established to facilitate the identification of and response to emerging health threats in shelters in Mississippi.

All ARC-managed shelters that were open at the start of the program were included in the surveillance system. From 08–12 September, shelters were visited by one of four teams comprised of public health professionals and physicians with experience in disaster management. These teams assessed baseline disease prevalence, developed the reporting tool, and trained shelter staff and nurses in the use of the surveillance system. Relief agencies and disaster-assistance centers working with the evacuee population, including MEMA and the US Centers for Disease Control and Prevention, also were made aware of the program.

The training was directed at both shelter staff and evacuees using tools adapted to their level of disease understanding. Laminated posters that described symptoms that would be reported to the surveillance hotline were distributed to each shelter. These included fever in an ill-appearing person, severe respiratory symptoms, cough with blood, three or more episodes daily of watery diarrhea with or without vomiting, any diarrhea with blood, and severe skin infection or rash (Figure 1). These disease syndromes were selected specifically to encompass simple case definitions for illnesses with outbreak potential such as influenza, dysentery, infectious diarrhea, hepatitis A, tuberculosis, meningitis, and West Nile virus. The list of monitored diseases also included non-endemic typhoid and cholera, in order to elucidate the evidence behind specific media reports. Additional notices were posted in the common areas of shelters to educate evacuees of symptoms for which they should seek immediate consultation with shelter staff, notably fever, cough, and diarrhea (Figure 2). If an evacuee presented with any of these symptoms, the staff were asked to call a toll-free number during that same day.

The toll-free telephone number was arranged through a commercial, private branch exchange service (**http://www.virtualpbx.com**) that connected the hotline with the public telephone network. The service provided a professionally recorded greeting that offered callers the option of speaking immediately with a hotline staff member or leaving a message. If callers chose the first option, they automatically were routed to a dedicated cellular telephone answered 24 hours daily by MDH and ARC public health staff that had a broad and comprehensive understanding of the state of Katrina evacuees, current infectious disease concerns, and the organization of responding agencies. To ensure that no calls would be missed, the telephone service incorporated a distribution list that routed hotline calls to other telephones in a pre-determined sequence if the primary hotline telephone was not answered. The system was implemented on 14 September 2005, and remained operational for two weeks, until the shelter population rapidly dropped and the existing surveillance systems were restarted.

Data Collection, Processing, and Analysis

When contacted, the health professionals managing the hotline actively questioned the shelter staff to understand as much as possible about each reported case, as well as the presence of any other potential case in the shelter. Then, they followed protocols established by the MDH regarding management of patients with illnesses of epidemic potential and assisted in coordinating an appropriate response with nearby clinics and hospitals. While the surveillance system was not designed to function as an alternative to emergency medical services, hotline managers were able to provide immediate medical advice to shelter staff regarding isolation, optimal patient care, and helped facilitate the evaluation of ill evacuees by local medical personnel. Each hotline call was logged into a database to monitor and map trends of infectious illnesses affecting the displaced popula-

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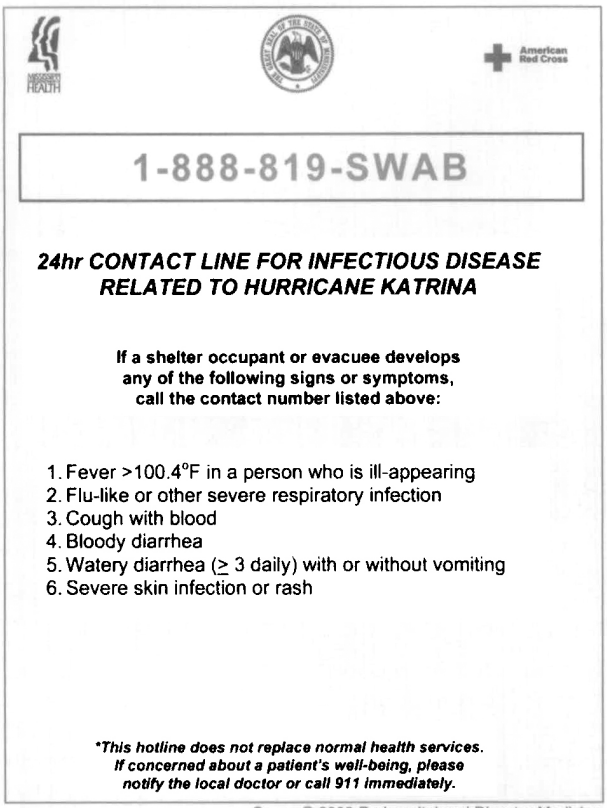

Figure 1—Poster listing symptoms reportable to the surveillance hotline

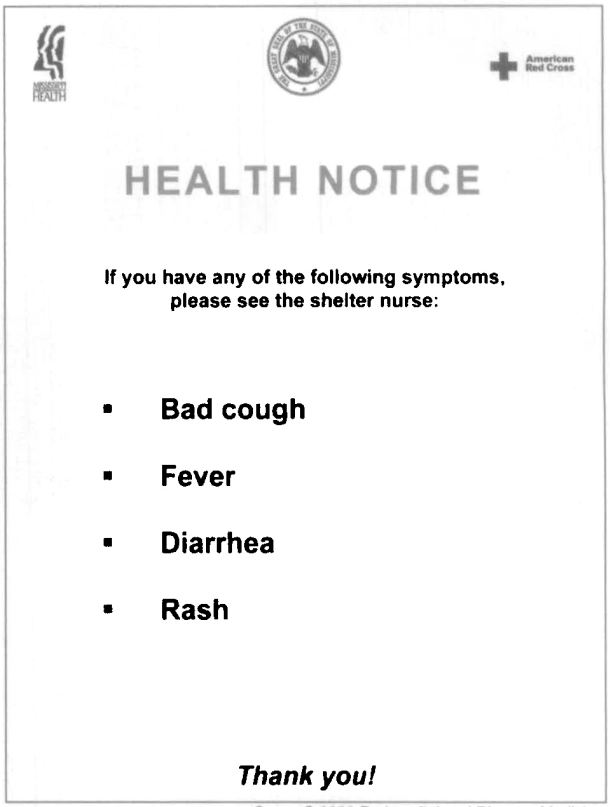

Figure 2—Public poster of symptoms notifiable to shelter staff

Condition	Number	% of Total
Fever, NOS	6	6.5
URI	37	39.8
Diarrhea, NOS	15	16.1
Diarrhea, bloody	2	2.1
Other (including rashes)	33	35.5
TOTAL	93	100

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Table 1—Total reported cases by condition, Mississippi, 14–29 September 2005 (NOS = no other symptoms; URI = Upper Respiratory Infection)

tion (Appendix). The data were analyzed daily to identify events requiring further study. Potential infectious disease cases were investigated by the MDH epidemiologist in conjunction with an ARC public health professional.

This project was approved by both the MDH and the ARC, and exempted by the review board of Johns Hopkins University.

Results

A total of 43 shelters participated in the program, representing 3,520 evacuees. The average shelter census was 82, and the range was 5 to 285 evacuees. From 14–30 September 2005, 17 shelters under surveillance made 29 calls notifying the hotline of 93 potential cases (Table 1). Thirty-four (37%) of these patients were referred to a local physician or hospital for further diagnosis and disease management. A local physician evaluated the two persons with bloody diarrhea on the day of reporting and diagnosed them as "uncomplicated diarrhea". Local medical personnel diagnosed the majority of the rashes as folliculitis or impetigo. Scabies were reported in one shelter. None of the referred evacuees were hospitalized, and there were no significant infectious disease outbreaks and no deaths.

Hotline calls significantly decreased in number after the first 10 days of surveillance as evacuees returned to their homes, shelters were closed, and local health service delivery improved (Figure 3). No calls were logged after 29 September and the program was discontinued at the end of the month.

Discussion

In the United States, volunteers usually staff evacuation shelters, sometimes with the assistance of volunteer nurses. The limited medical knowledge of the shelter staff has made traditional, physician-based, disease reporting impossible and requires a unique approach. Other organizations working in the affected area focused on surveillance in the functioning hospitals, or have used a paper-based reporting system for the sheltered population.[8–10] Neither of these methods addressed the diagnostic difficulties facing untrained and non-healthcare staff, nor could they identify cases of acute infection without considerable time delays, or provide immediate education and feedback to shelter staff. In response to concerns regarding the health safety of Katrina evacuees, the MDH and the ARC implemented a

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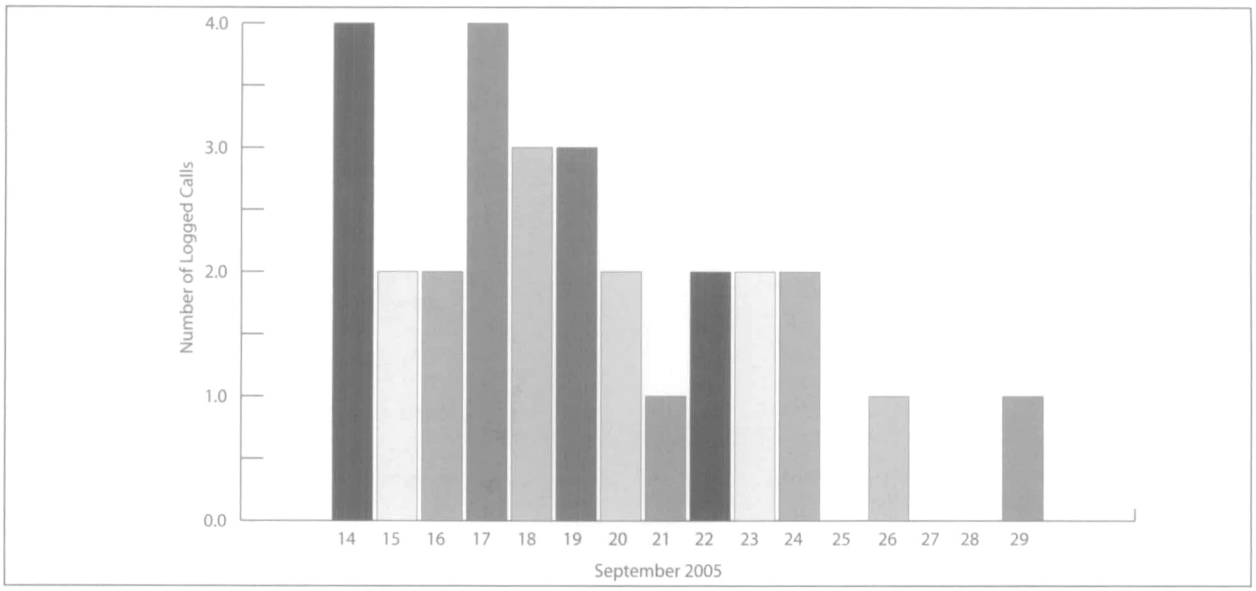

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Figure 3—Hotline calls logged according to day of surveillance

novel infectious disease surveillance system involving symptom-based reports for non-healthcare worker reporters and using a toll-free telephone hotline. The purpose of the program was much broader than a traditional passive surveillance system. Its goals were to prevent and control adverse health events in the aftermath of Katrina by: (1) educating individuals and organizations involved in the disaster about infectious disease risks; (2) providing rapid feedback and guidance to shelter staff members caring for those living in the shelters; (3) investigating and controlling health-related rumors; and (4) detecting and responding promptly to outbreaks of diseases with epidemic potential.

An example of the ability of the program to detect a potential infectious illness of concern, coordinate an investigation, and intervene was demonstrated when a nurse at a Gulfport, Mississippi shelter notified hotline staff of a child suffering from fever and rash. After logging the report and obtaining data regarding shelter demographics, the hotline manager advised shelter staff to isolate the patient and seek specialized pediatric consultation. Two hours later, the shelter confirmed that the child was diagnosed with chickenpox by a local pediatrician. Within three hours following the child's initial presentation, a senior public health officer at the Mississippi Department of Health in Jackson, Mississippi, was informed of the case. The patient remained in isolation and two pregnant women who had been staying in the shelter were transferred to another location. Two additional chickenpox cases were identified at the involved shelter on the following day. These patients also were isolated and no further cases developed.

The public health impact of disasters due to natural hazards such as hurricanes is compounded by secondary effects of the disaster, which may include population displacement and disruption of existing health and public health services. In this setting, health surveillance of the shelter populations is a critical component of the public health emergency response.[11] Factors contributing to the importance of infectious disease surveillance in Mississippi shelters following Hurricane Katrina included: (1) the magnitude of the disaster, which considerably disrupted public service systems responsible for providing potable water, sanitation, food, housing, communication, and security; (2) the potentially variable shelter quality resulting from the severe resources constraints noted above; (3) the sensationalism in the media and by inexperienced responders regarding the possibility of infectious illness outbreaks; (4) the dynamic quality of evacuee movements that made it difficult to predict shelter censuses and demographics from one day to the next; (5) the lack of a clear reporting mechanism for shelter personnel in the event of emergence of a potential contagion; (6) the poor flow of information from shelters to government agencies and relief organizations impeded with the investigations of unconfirmed reports of disease and the management of information and rumors; and (7) the strained local medical services (as a consequence of the closure of most medical offices, local hospitals filled to capacity, and emergency departments inundated by residents and evacuees seeking routine medication prescriptions and assistance for minor and serious health needs.

Concerns among relief agencies, shelter residents and staff, and the general public regarding post-hurricane infectious disease morbidity was centered largely on the potential for outbreaks such as diarrhea, dysentery, influenza, meningitis, and even non-endemic diseases such as cholera and typhoid. Rapid investigation of communicable disease reports and identification of outbreaks was essential. Data collected through the surveillance system were used to reassure government officials and the public that outbreaks had not occurred and were useful in avoiding unnecessary interventions.[12]

An additional, unanticipated benefit was that the discussions regarding potential cases were an excellent educational tool and provided positive feedback for shelter staff with limited infectious disease expertise. Because shelters are not staffed with physicians and not always with nurses, the use of diagnosis-based reporting systems would have had little utility. A symptom-based reporting system was

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used to assist untrained shelter managers and even evacuees with identifying potential infectious cases. Symptom-based surveillance has become more common, particularly with bioterrorism-related surveillance.[13,14]

The following system attributes have been described as necessary for the adequate function of a public health surveillance system, and were inherent in Mississippi's health surveillance hotline:[15,16]

1. *Simplicity*—This hotline surveillance program utilized a system of direct verbal communication between the reporter and a public health professional. System function was widely accessible to a large number of users at multiple entry points and fully implemented in a matter of days. The use of simple, symptom-based case definitions allowed even non-health professionals to report potential cases;
2. *Flexibility*—Information needs and operating conditions were expected to change over time as shelters were closed or consolidated and staff changed. The system required little training other than the posting of literature describing the sentinel symptoms and the toll-free telephone number. The surveillance system's central coordination and minimal logistics infrastructure ensured the program's ability to adapt in response to new demands. The use of cellular telephones enabled hotline managers to continue to provide other, routine, relief services while fielding calls;
3. *Data quality*—The direct communication between shelter staff and hotline managers allowed for comprehensive data collection and immediate, in-depth exploration of potential cases. This direct communication facilitated thorough, health-related event assessment rather than mere case counts;
4. *Acceptability*—The program was implemented in response to requests by the system users (i.e., shelter staff) who expressed a need for both a reporting mechanism and infectious disease education. Qualitative measures of acceptability were realized through active telephone contact with users and subjective assessment of their satisfaction with the program. These discussions provided immediate positive feedback to the reporting staff;
5. *Sensitivity and specificity*—The use of symptom-based case identification was designed to increase the sensitivity of detecting infectious diseases with epidemic potential. Improved specificity was achieved by physician-led detailed history-taking during hotline calls and through in-shelter case investigations when required. Referrals to the healthcare system were intended to further increase the specificity of diagnoses;
6. *Timeliness*—The immediate verbal reports allowed for daily information analyses and investigation. With proper program utilization, hotline managers identified cases upon their first symptomatic presentation to shelter staff;
7. *Stability*—Once established, the system required only telephone access, hotline managers, and investigative capabilities. Surveillance could be implemented for a fixed time period or continued indefinitely with minimal investment of additional resources; and
8. *Low cost*—Financial considerations consisted of toll-free telephone number maintenance, hotline call logging materials, and human capital. The hotline was manned by public health professionals who were able to continuously conduct other routine response functions during the majority of their time.

Limitations

Limitations of the program include information bias, the potential confusion of the health surveillance hotline with emergency medical services, and inadequacy of the reporting tool to detect significant chronic or mental illness. One potential limitation was the lack of reliable telephone communication, but by the eighth day following the event, there was excellent landline and cellular coverage throughout the area. There were significant difficulties with telephone communications in southern Louisiana for the first 7–14 days after Katrina, but there actually are few disasters that have the potential to disrupt the telephone system in the US for any significant length of time. While reliable data reporting was dependent entirely on shelter nurses and managers, improved information quality was facilitated within the program by focused shelter staff training and evacuee education, random site visits to ensure knowledge and utilization of the hotline, and active telephone call surveillance at shelters identified as having higher risks of outbreaks. It was critical that system users understand that the surveillance hotline did not replace normal medical practice. Utilization of local emergency systems (i.e., consultation with local physicians or activation of 9-1-1 telephone services) always was indicated for any patient with an acute medical condition. This information clearly was communicated to shelter staff and evident on hotline information posters. Hotline managers also regularly informed those calling about the need to act locally to deliver appropriate health care to ill evacuees. By design, the hotline surveillance system only detected infectious diseases with serious public health implications. Design modification would be required for the surveillance system to monitor other illnesses of higher incidence such as ischemic heart disease, diabetes, and mental health conditions.

Conclusions

A symptom-based surveillance system shares many of the benefits of traditional diagnosis-based systems in locations without healthcare professionals. The use of telephone reporting improves reporting compliance and accuracy as well as reporting staff satisfaction and knowledge. This infectious disease surveillance hotline program implemented in Mississippi in the aftermath of Hurricane Katrina utilized a system of direct verbal communication between shelter staff and hotline managers to enable rapid reporting, investigations, and interventions far beyond the capabilities of a more passive or paper-based system. During the month following the hurricane, the system successfully monitored the health of the evacuee population and provided educational assistance to shelter staff members faced with patients potentially affected by communicable disease. With minimal planning and preparation, similar programs can be implemented rapidly in most disaster situations.

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These low-cost systems can be made widely accessible to a large number of users, and disease case definitions or clinical syndromes of interest can be readily adapted. Replication of the program described in this report should be considered in future disasters when health surveillance of a large, disseminated shelter population is necessary.

References

1. Weather Service Hurricane Center: Hurricane Katrina. Available at http://www.nhc.noaa.gov/archive/2005/pub/al122005.public.020.shtml. Accessed 12 March 2008.
2. Lang S: Katrina Intensifies into a Powerful Hurricane, Strikes Northern Gulf Coast. In: National Aeronautics and Space Administration. Available at http://www.nasa.gov/vision/earth/lookingatearth/katrina_trmm_0828_0829.html. Accessed 12 March 2008.
3. Mississippi State Department for Health: The annual statistical publication for Mississippi. Available at http://www.msdh.state.ms.us/phs/stat2005.htm. Accessed 06 April 2008.
4. Mississippi Emergency Management Agency: Red Cross Damage Assessments. Available at http://www.msema.org/redcrossassessments.htm. Accessed 15 November 2005.
5. Mississippi Emergency Management Agency. Available at http://www.msema.org/newsreleases/documents/pr100.doc. Accessed 15 November 2005.
6. Thousands feared lost in storm. *The Guardian Newspaper*. Available at http://www.guardian.co.uk/world/2005/sep/01/naturaldisasters.hurricanekatrina. Accessed 23 January 2009.
7. Engelthaler D, Lewis K, Anderson S: Vibrio illnesses after Hurricane Katrina. *MMWR* 2005;54(37):928–931.
8. US Centers for Disease Control and Prevention (CDC): Injury and illness surveillance in hospitals and acute-care facilities after Hurricanes Katrina and Rita—New Orleans area, Louisiana. September 25–October 15, 2005. *MMWR* 2006;55:35–37.
9. CDC: Surveillance in Hurricane Evacuation Center—Louisiana, September–October 2005. MMWR 2006;55:32–35.
10. CDC: Surveillance for illness and injury after Hurricanes Katrina—Three counties, Mississippi September 5–October 11, 2005. *MMWR* 2006;55(9):231–234.
11. World Health Organization: Rapid health response, assessment and surveillance after a tsunami, Thailand, 2004–2005. *Weekly Epidemiological Record* 2005;6:55–60.
12. Lee LE, Fonseca V, Brett KM, *et al*: Active morbidity surveillance after Hurricane Andrew—Florida, 1992. *JAMA* 1993;270:591–594.
13. Mandl KD, Overhage JM, Wagner MM, *et al*: Implementing syndromic surveillance: A practical guide informed by the early experience. *J Am Med Inform Assoc* 2004;11:141–150.
14. Fleischauer AT, Silk BJ, Schumacher M, *et al*: The validity of chief complaint and discharge diagnosis in emergency department-based syndromic surveillance. *Acad Emerg Med* 2004;11:1262–1267.
15. CDC: Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm. Accessed 17 April 2006.
16. Buehler JW, Hopkins RS, Overhage JM, et al: Framework for evaluating public health surveillance systems for early detection of outbreaks: Recommendations from the CDC working group. *MMWR* 2004;7:1–11.

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Appendix—Hotline case log form

MISSISSIPPI STATE DEPARTMENT OF HEALTH

THE GREAT SEAL OF THE STATE OF MISSISSIPPI

American Red Cross

Public Health Surveillance in Mississippi post-Katrina

HOTLINE LOG

GENERAL

1. **Name of responder**
2. **Date**

CALLER

3. **Name of Caller**
4. **Caller Contact no.**
5. **Origin of Call** Shelter [1] Health Ctr. [2] ARC office [3] EOC [4] Other [5]
6. **Location name & address**
7. **Position** Manager [1] Nurse [2] Evacuee [3] Other [4] _____

EVENT

Incident code (please choose the predominant symptom) **No. cases**

8. Fever _____
9. Cough or respiratory infection _____
10. Bloody diarrhea _____
11. Watery diarrhea _____
12. Skin infestation / contagious rash _____
13. Other _____ _____

COMMENTS

14. **Date and time of first presentation**
15. **Has patient(s) been medically treated at the clinic?** YES [1] NO [0]
16. **Have patient(s) been referred (or will they be) to a hospital?** YES [1] NO [0]
17. **If yes, which one?**
18. **Do patient(s) require isolation?** YES [1] NO [0]
19. **Response** No follow-up required [0] Follow-up [1]

If follow-up required:

20. **Call back** Today [1] Tomorrow [2] Other [3] _____
21. **Shelter visit and investigation** YES [1] NO [0]
22. **If yes, by whom?** ARC alone [1] MDH / ARC team [0]

COMMENTS

EXTRA INFO

23. **First incident (serious or non-serious) at this location?** YES [1] NO [0]
24. **If no, how many previous incidents** _____
25. **Similar incidents within 10 mile radius?** YES [1] NO [0]

FOLLOW-UP

26. **Confirmed case of disease with outbreak potential?** YES [1] NO [0]

If yes, which one(s)?

27. Meningitis	Y [1]	N [0]	32. Typhoid	Y [1]	N [0]
28. Tuberculosis	Y [1]	N [0]	33. West Nile	Y [1]	N [0]
29. Dysentery	Y [1]	N [0]	34. Cholera	Y [1]	N [0]
30. Viral gastroenteritis	Y [1]	N [0]	35. Measles	Y [1]	N [0]
31. Contagious rash	Y [1]	N [0]			

HOTLINE LOG CODE:
(Format: countycode/case no. e.g. Jackson county, case 5 = 30 / 05

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