

Acknowledgments

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References

1. Woldehiwet Z. Q fever (coxiellosis): epidemiology and pathogenesis. *Res Vet Sci*. 2004;77:93–100.
2. Hartzell JD, Peng SW, Wood-Morris RN, Sarmiento DM, Collen JF, Robben PM, et al. Atypical Q fever in US soldiers. *Emerg Infect Dis*. 2007;13:1247–9.
3. Nayduch D, Noblet GP, Stutzenberger FJ. Vector potential of houseflies for the bacterium *Aeromonas caviae*. *Med Vet Entomol*. 2002;16:193–8.
4. Hucko M. The role of the house fly (*Musca domestica* L.) in the transmission of *Coxiella burnetii*. *Folia Parasitol (Praha)*. 1984;31:177–81.
5. Dhanda V, Padbidri VS, Mourya DT. Multiplication of *Coxiella burnetii* in certain mosquitoes. In: Proceedings of the Symposium on Vectors and Vector-borne Diseases, Puri, Orissa, India. 1982. National Academy of Vector Borne Diseases. p. 69–73.
6. Mourya DT, Padbidri VS, Dhanda V. Mosquito inoculation technique for the diagnosis of Q fever employing an animal model. *Indian J Med Res*. 1983;78:201–4.
7. Kato CY, Mayer RT. An improved, high-throughput method for detection of bluetongue virus RNA in *Culicoides* midges utilizing infrared-dye-labeled primers for reverse transcriptase PCR. *J Virol Methods*. 2007;140:140–7.
8. Loftis AD, Reeves WK, Szumlas DE, Abbassy MM, Helmy IM, Moriarity JR, et al. Surveillance of Egyptian fleas for agents of public health significance: *Anaplasma*, *Bartonella*, *Coxiella*, *Ehrlichia*, *Rickettsia*, and *Yersinia pestis*. *Am J Trop Med Hyg*. 2006;75:41–8.

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9. Reeves WK. Molecular genetic evidence for a novel bacterial endosymbiont of *Icosia americana* (Diptera: Hippoboscidae). *Entomology News*. 2005;116:263–5.
10. Hatchette TF, Hudson RC, Schlech WF, Campbell NA, Hatchette JE, Ratnam S, et al. Goat-associated Q fever: a new disease in Newfoundland. *Emerg Infect Dis*. 2001;7:413–9.

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Conflict and Emerging Infectious Diseases

To the Editor: In the November 2007 issue of *Emerging Infectious Diseases*, Gayer et al. (1) describe how conflict leaves populations in dire poverty, internally displaced or seeking asylum, having poor access to essential services, and consequentially vulnerable to infectious diseases.

Cholera, caused by the bacterium *Vibrio cholerae*, is a disease that seems particularly sensitive to conflict and deserves more consideration. Major risk factors for cholera—poverty, overcrowding, poor hygiene, contaminated food, and lack of safe drinking water (2,3)—largely resemble the consequences of war and civil fighting. Yet little is known about the relationship between cholera and conflict. This lack of information may be because cholera tends to be epidemic, affecting hundreds to thousands of people across vast, war-torn regions, making it impossible for local governments, nongovernment organizations,

and aid workers to control, let alone collect and analyze data.

Examination of data sources listed by Gayer et al. (1) and recent reviews (2,3) indicate that cholera occurs 1) in countries during war and civil unrest, as exemplified by the latest outbreaks among displaced populations across northern Iraq; 2) in neighboring countries, where temporary camps accommodate masses of political refugees under poor conditions, such as those in eastern Chad near Darfur, Sudan; and 3) during the postwar period when large numbers of repatriated persons return home and consequently place undue pressure on an eroded and fragile national infrastructure, as evident in Angola in recent years.

Moreover, all the countries affected by conflict shown in the Figure by Gayer et al. (1) (available from www.cdc.gov/EID/content/13/11/1625-G.htm) have reported cholera outbreaks (2–4). They are also among the poorest countries in the world; the latest statistics on human development (5) indicate that compared with all developing countries, on average they have higher rates of undernourishment, refugees, child deaths, and less adequate water and sanitation facilities. Thus, more information is needed about conflict and cholera, especially in Africa.

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References

1. Gayer M, Legros D, Formenty P, Connolly MA. Conflict and emerging infectious diseases. *Emerg Infect Dis*. 2007 Nov [cited 2007 Dec 10]. Available from <http://www.cdc.gov/EID/content/13/11/1625.htm>
2. Gaffga NH, Tauxe RV, Mintz ED. Cholera: a new homeland in Africa? *Am J Trop Med Hyg*. 2007;77:705–13.
3. Griffith DC, Kelly-Hope LA, Miller MA. Review of reported cholera outbreaks worldwide, 1995–2005. *Am J Trop Med Hyg*. 2006;75:973–7.
4. World Health Organization. Cholera surveillance and number of cases. 2007 [cited 2007 Dec 10]. Available from http://www.who.int/csr/don/20071210_cholera_surveillance.html

who.int/topics/cholera/surveillance/en/index.html

- United Nations Development Programme. Human development report 2007/2008. Fighting climate change: human solidarity in a divided world. 2007 [cited 2007 Dec 12]. Available from <http://hdr.undp.org/en/reports/global/hdr2007-2008>

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In Response: We agree with Kelly-Hope on the propensity for cholera outbreaks to occur in conflict-affected countries and the need to monitor and respond more effectively to such events. In 2006, cholera was reported from 33 countries in Africa, and 88% of all reported cases were from conflict-affected countries (1).

As highlighted in our November 2007 article on conflict and emerging infectious diseases (2), conflict situations present a multitude of risk factors that enhance disease emergence

and transmission, over and above those in other resource-poor countries. Many such conflicts facilitate the occurrence of cholera outbreaks.

More precise research on cholera and conflict is indeed necessary. However, despite cholera being a disease that has been around for a long time and that causes frequent outbreaks to this day, much information about this disease, beyond its relationship with conflict, remains unknown. For example, although *Vibrio cholerae* persists in the environment, little is known about the exact conditions that trigger a cholera outbreak at a particular time. Further elucidation is needed about the factors that influence the duration of an outbreak, disease severity, and duration of individual protective immunity after an episode of cholera.

Cholera, which is closely linked to a country's social and economic development (1,3), ceased to be of concern in Europe, for example, when access to potable water and sanitation improved although its cause was still unknown and antimicrobial drugs were not yet available. Today, renewed interest from the international public health community is urgently warranted, and strong initiatives are needed to

help developing countries (conflict-affected or not) fight against cholera and control this easily preventable disease on a global level.

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References

- World Health Organization. Cholera 2006. *Wkly Epidemiol Rec.* 2007;82:273-84.
- Gayer M, Legros D, Formenty P, Conolly MA. Conflict and emerging infectious diseases. *Emerg Infect Dis.* 2007;13:1625-31.
- Anbarci M, Escaleras M, Register C. From cholera outbreaks to pandemics: the role of poverty and inequality. Working Papers series no. 05003. Boca Raton (FL): Florida Atlantic University; 2006 [cited 2008 Feb 29]. Available from <http://home.fau.edu/mescalcr/web/working%20papers/Cholera.pdf>

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