that the actual prevalence of plague seems to be underestimated. The low population density in Mongolia explains the low amount of illness in humans. Further investigations should include the screening of rodent populations near the plague-positive loci. In addition, fleas and other parasites (and also predators of small mammals) should be studied. Mongolia is a key area of plague genesis and therefore is an ideal location for more detailed study of the role of rodents as epizootic and enzootic reservoirs of *Y. pestis*.

Acknowledgments

We thank Gabriele Echle, Philipp Vette, and Astrid Thomas for excellent technical assistance and Gilles Vergnaud for providing access to the CRISPR database (http://crispr.u-psud.fr/crispr).

Julia M. Riehm, Damdindorj Tserennorov, Daniel Kiefer, Ingo W. Stuermer, Herbert Tomaso, Lothar Zöller, Dashdavaa Otgonbaatar, and Holger C. Scholz

Author affiliations: Bundeswehr Institute of Microbiology, Munich, Germany (J.M. Riehm, D. Kiefer, L. Zöller, H.C. Scholz); National Center for Infectious Diseases with Natural Foci, Ulanbaatar, Mongolia (D. Tserennorov, D. Otgonbaatar); Institute for Zoology and Anthropology, Goettingen, Germany (I.W. Stuermer); and Friedrich-Loeffler-Institut, Jena, Germany (H. Tomaso)

DOI: 10.3201/eid1707.100740

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Address for correspondence: Julia M. Riehm, Bundeswehr Institute of Microbiology, Neuherbergstr. 11, 80939 Munich, Germany; email: juliariehm@bundeswehr.org

Typhoon-related Leptospirosis and Melioidosis, Taiwan, 2009

To the Editor: Global climatic changes have resulted in more natural disasters worldwide. These natural disasters can then cause outbreaks of emerging infectious diseases, including leptospirosis and melioidosis (*1*–*7*). In 2009, the moderate-strength Typhoon Morakot, with a maximum cumulative rainfall amount up to 3,059.5 mm, damaged Taiwan. After this natural disaster, unusual epidemics of leptospirosis and melioidosis occurred. The main objective of this study was to clarify whether these epidemics have resulted from this natural disaster.

Information about past typhoons that affected Taiwan was collected from the website of the Taiwan Meteorological Bureau (http://photino.cwb.gov.tw/tyweb/mainpage.htm; www.cwb.gov.tw) during January–August, 2009. The influential period of Morakot was in the 32nd week (August 5–August 10) in 2009. To evaluate the effects of this specific natural disaster, we divided the period into 2 intervals for analysis. The early period (before the typhoon) was from the 28th through the 32nd weeks, and the latter period (after the typhoon) was from the 33th through the 37th weeks in 2009. Information regarding 16 typhoons from 2000 through 2009 was further collected to evaluate effects of typhoon level, rainfall level, and maximum cumulative rainfall amounts on case numbers of leptospirosis and melioidosis after a typhoon.

The historical records of numbers of leptospirosis and melioidosis cases for analysis were obtained from the database collected weekly by the Centers for Disease Control, Taiwan. The information was referred to the website of the Taiwan Center for

Disease Control (http://nidss.cdc.gov.tw/). To assess geographic variations, the age-adjusted incidence rates per 100,000 persons of leptospirosis and melioidosis were calculated in each city and county in Taiwan from February through September 2000–2009. SPSS version 15.0.0 software (SPSS Inc., Chicago, IL, USA), ArcGIS (ArcMap, version 9.3; ESRI Inc., Redlands, CA, USA), and SaTScan version 8.0 (www.satscan.org) were used for statistical analysis.

As shown by Mann-Whitney U test, frequencies of leptospirosis and melioidosis cases before the typhoon were significantly lower than those after the typhoon (all $p<0.05$). Furthermore, more leptospirosis and melioidosis cases were observed during the posttyphoon period in 2009 than during 2006–2008 (all $p<0.05$) (Figure).

Using Pearson correlation test to evaluate the effect of cumulative rainfall from Morakot, we found a positive correlation for leptospirosis ($r = 0.54$, $p<0.05$) and for melioidosis ($r = 0.52$, $p<0.05$). Effects of typhoons on numbers of leptospirosis and melioidosis cases in the late stage of a typhoon were further analyzed by using records of typhoon level and maximum 24-hour cumulative rainfall during 2000–2009. After weighting typhoon levels with scores (strong typhoon: 5 points; moderate typhoon: 3 points; mild typhoon: 1 point), we found that typhoon level with higher weight was significantly correlated with more cases of leptospirosis and melioidosis ($r = 0.81$ and 0.87, respectively; all $p<0.05$). The results further suggested that, when the 24-hour cumulative rainfall was >500 mm, significantly more meliodosis cases were observed ($p<0.05$). Although not statistically significant, the number of leptospirosis cases was positively correlated with 24-hour cumulative rainfall ($r = 0.71$; $p = 0.14$).

Using the Anselin local Moran statistic to evaluate geographic variations of leptospirosis and melioidosis after Morakot, we identified significantly higher incidence rates of melioidosis in Tainan, Kaohsiung, and Pingtung Counties in southern Taiwan ($p<0.01$). Nevertheless, no melioidosis cases were observed in Taitung, the county in the same latitude (20°N) but in eastern Taiwan. No significant geographic variation was found in the occurrence of leptospirosis. However, a high incidence of leptospirosis was observed in Pingtung, where flooding caused by Morakot was most serious (maximum cumulative rainfall >2,500 mm).

This study found that epidemics of leptospirosis and melioidosis possibly resulted from the moderate Typhoon Morakot. The findings implied that the effect of typhoon strength on the case numbers of leptospirosis and melioidosis could be less than that of rainfall level and maximum cumulative rainfall amount. Of major importance, the number of melioidosis cases was positively correlated with rainfall level >500 mm. The study further indicated that typhoon strength level and total amount of rainfall must be studied separately to determine their effects on epidemics of infectious diseases. The current typhoon classification system is only related to its intensity, which might not be always associated with total rainfall. The results of this study also implied that epidemic of melioidosis was more likely to be restricted to some geographic regions; this finding was not observed for epidemics of leptospirosis.

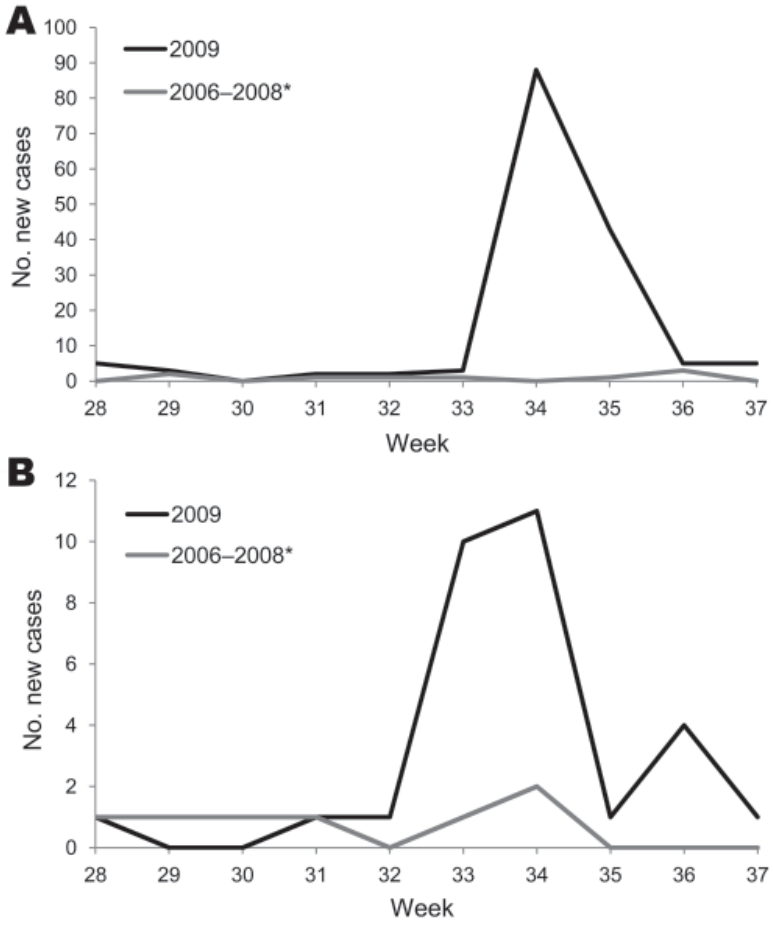

Figure. Comparison of epidemic curves during 2009 and 2006–2008. A) Epidemic curves of leptospirosis. B) Epidemic curves of melioidosis. 2006–2008* indicates that the curve was made by plotting the average weekly numbers.

In conclusion, this study suggests that natural disasters, such as typhoons, that engender large amounts of rainfall could result in epidemics of leptospirosis and melioidosis. More in-depth studies need to be conducted. Efforts need to be taken in advance to prevent possible transmission of these infectious diseases after typhoons.

Acknowledgment

We appreciate the administrative support that we received from the Centers for Disease Control, Taiwan.

Hsun-Pi Su, Ta-Chien Chan, and Chao-Chin Chang

Author affiliations: Centers for Disease Control–Department of Health, Taipei, Taiwan (H.-P. Su); China Medical University, Taichung, Taiwan (H.-P. Su); Kaohsiung Medical University, Kaohsiung, Taiwan (H.-P. Su); National Taiwan University, Taipei (T.C.-Chan); and National Chung Hsing University, Taichung (C.-C. Chang)

DOI: 10.3201/eid1707.101050

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Address for correspondence: Chao-Chin Chang, School of Veterinary Medicine, Graduate Institute of Microbiology and Public Health, National Chung Hsing University, Taichung 402, Taiwan; email: changcc@dragon.nchu.edu.tw

Exposure to Lymphocytic Choriomeningitis Virus, New York, USA

To the Editor: Lymphocytic choriomeningitis virus (LCMV) is an arenavirus carried by the house mouse, *Mus musculus*. Human infections can range from mild febrile illness to severe encephalitis and disseminated disease (*1*). Infection during pregnancy is associated with teratogenic effects, including congenital hydrocephalus and chorioretinitis (*2*).

The overall occurrence of human exposure to LCMV is not known. Two large US serosurveys suggest that 3%–5% of persons tested had previous LCMV exposure as measured by immunoglobulin (Ig) G (*3*,*4*). In 2002, LCMV-associated congenital subependymal calcifications, hydrocephalus, and chorioretinitis were confirmed for 2 children in central Syracuse, Onondaga County, New York, USA. In 2009, the Centers for Disease Control and Prevention confirmed another case of LCMV-associated congenital hydrocephalus and chorioretinitis in a child from the same neighborhood. For each of the 3 cases, the mother's history included exposure to mice during pregnancy. One mother also had a pet guinea pig, which had negative results for LCMV by serologic testing and reverse transcription PCR of kidney tissue (*5*).

Congenital LCMV is rarely reported to public health departments or in the literature. Therefore, to better understand the magnitude of LCMV exposure in the general population of Onondaga County, we conducted a serosurvey. The American Red Cross provided the Wadsworth Center of the New York State Department of Health with blood or serum samples collected from persons ≥16 years of age at blood drives during August 2009. Information about date of birth, sex, and county and ZIP code of residence was provided. A subset of samples from blood donors residing in Onondaga County were tested at the Centers for Disease and Prevention by ELISA for LCMV IgM and IgG as described (*4*). State and federal institutional review board approval was obtained for this study.

Samples from 562 blood donors were tested. Mean age of donors was 48 years (median 50 ± 15 SD, range 17–79 years). LCMV IgG was detected in 2 (0.4%) samples (titer ≥400) and was undetectable in all other samples. LCMV IgM was not detected in any samples. Of the 25 donors who reported residing in 1 of the 2 ZIP codes as the case-patients with congenital LCMV, none had positive test results.

Given our findings, little evidence supports a high level of human exposure to LCMV in Onondaga County. Compared with previously reported seroprevalences of 3%–5%, the proportion of persons exposed to LCMV was lower than expected (*3*,*4*). The same serologic assay was used in this study and the 2 previous US serosurveys, suggesting that the different results are not an artifact of different assays. Additionally, persons tested in the current survey were older than those tested in previous serosurveys (median 50 vs. 23 [*3*] and