immunocompromised patients, the endogenous autoinfection cycle may result in the overproduction and dissemination of larvae into intestinal and extraintestinal tissues, including the central nervous system, leading to the hyperinfection syndrome which can be lethal (*5*). Most cases (96%) occur in immigrants, but some have been described in patients with a history of travel, sometimes many years previously. *S. stercoralis* infections have been reported up to 65 years after initial exposure in veterans who served in Asia during World War II (*4,6*).

Although our patient exhibited poor general condition, he likely did not experience hyperinfection syndrome because he was not immunosuppressed, and he completely recovered after receiving standard ivermectin treatment. That the patient was originally infected in the Canary Islands seems improbable, although a low level of transmission exists in rural and disadvantaged areas in continental Spain, Portugal, and Italy (*7*). We did not find evidence of *Strongyloides* spp. transmission in the Canary Islands. In particular, the patient stayed in a high-status tourist hotel for a short period, and he never walked in bare feet. He was probably infected when he lived in Vietnam.

This case highlights the importance of systematically considering chronic strongyloidiasis when seeking a diagnosis for persistent hypereosinophilia, even in patients with no underlying disease, and the value of systematically obtaining any history of travel in disease-endemic areas even if it occurred many years previously. The endogenous autoinfection cycle can possibly persist for a lifetime. In addition, systematic examination of stool samples should be carried out, and ivermectin should be given when an immunosuppressive drug is required in a patient who has a history of travel to, or residence in, an area to which strongyloidiasis is endemic.

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References

1. Genta RM. Global prevalence of strongyloidiasis: critical review with epidemiologic insights into the prevention of disseminated disease. Rev Infect Dis. 1989;11:755–67. doi:10.1093/clinids/11.5.755
2. Berk SL, Verghese A, Alvarez S, Hall K, Smith B. Clinical and epidemiologic features of strongyloidiasis. A prospective study in rural Tennessee. Arch Intern Med. 1987;147:1257–61. doi:10.1001/archinte.147.7.1257
3. Grove DI. Human strongyloidiasis. Adv Parasitol. 1996;38:251–309. doi:10.1016/S0065-308X(08)60036-6
4. Gill GV, Beeching NJ, Khoo S, Bailey JW, Partridge S, Blundell JW, et al. A British Second World War veteran with disseminated strongyloidiasis. Trans R Soc Trop Med Hyg. 2004;98:382–6. doi:10.1016/j.trstmh.2003.11.002
5. Marcos LA, Terashima A, Dupont HL, Gotuzzo E. *Strongyloides* hyperinfection syndrome: an emerging global infectious disease. Trans R Soc Trop Med Hyg. 2008;102:314–8. doi:10.1016/j.trstmh.2008.01.020
6. Robson D, Beeching NJ, Gill GV. *Strongyloides* hyperinfection syndrome in British veterans. Ann Trop Med Parasitol. 2009;103:145–8. doi:10.1179/136485909X385009
7. Román-Sánchez P, Pastor-Guzman A, Moreno-Guillen S, Igual-Adell R, Suner-Generoso S, Tornero-Estebanez C. High prevalence of *Strongyloides stercoralis* among farm workers on the Mediterranean coast of Spain: analysis of the predictive factors of infection in developed countries. Am J Trop Med Hyg. 2003;69:336–40.

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Anaplasma phagocytophilum Infection in Ticks, China–Russia Border

To the Editor: *Anaplasma phagocytophilum*, an emerging human pathogen of public health importance, is transmitted to humans most commonly by tick bites (*1*). The agent has been detected in various species of *Ixodes* ticks around the world (*2*) and in *Dermacentor silvarum* ticks in northeastern People's Republic of China (*3*), where 3 *A. phagocytophilum* strains were isolated from wild and domestic animals (*4*). In the Asiatic region of Russia adjacent to China, *A. phagocytophilum* was identified in *Ixodes persulcatus* ticks, and *A. bovis* in *Haemaphysalis concinna* ticks (*5*). Human granulocytic anaplasmosis was reported in the southern area of the Russian Far East that borders China (*6*). The objectives of this study were to investigate the prevalence of *A. phagocytophilum* in ticks collected from the China–Russia border and to characterize the agent by molecular biology techniques.

During May–June 2009, host-seeking ticks were collected by flagging vegetation of grassland or woodland along the China–Russia border. Attached ticks were collected from sheep and goats in Hunchun, and from dogs in Suifenhe (Table). All ticks were identified by morphologic features to the species level and the developmental stage by 2 entomologists (Y. Sun and R.-M. Xu). DNA was extracted from tick samples by using Tissue DNA Extract kit (Tiangen Biotechnique Inc., Beijing, China), following the instructions of the manufacturer. Nested PCR was performed to amplify partial citrate synthase gene (*glt*A) of *A. phagocytophilum* as previously described (*7*). To avoid possible contamination, DNA extraction, the reagent setup, amplification, and agarose gel electrophoresis were performed in separate rooms, and negative control samples (distilled water) were included in each amplification.

A. phagocytophilum was detected in 83 of 2,429 adult ticks, with an overall prevalence of 3.42% (Table). The infection rates in the 14 survey sites ranged from 0 to 5.96%, and were significantly different (χ^2 = 24.43, df = 13; p = 0.027). Except for *H. japonica*, ticks from 4 species, including *H. concinna*, *H. longicornis*, *I. persulcatus*, and *D. silvarum*, were found to be naturally infected. The difference in infection rates among tick species was statistically significant (χ^2 = 13.03, df = 4; p = 0.011). Of 367 attached *H. longicornis* ticks obtained from domestic animals in Hunchun and Suifenhe, 12 (3.27%) were infected with *A. phagocytophilum* (Table). Nymphal ticks were only collected from vegetation in Hunchun, and 30 pools (10 in each pool) of 1,190 *H. concinna* nymphs were positive with an estimated minimum prevalence of 2.52%.

PCR products were purified by TIANgel Mini Purification Kit (Tiangen Biotechnique Inc.) and sequenced. The sequences obtained were compared with previously published sequences deposited in GenBank by using BLAST (http://blast.ncbi.nim.nih.gov/ Blast.cgi). The sequences of partial *glt*A from positive samples had 97.1%–100.0% identity in nucleotide sequences and 95.9%–100.0% identity in deduced amino acid sequences, 97.0%–99.4% and 96.5%–99.1% identity to Khabarovsk-01 strain from far eastern Russia (GenBank accession no. AY339602), and 96.1%–97.4% and 93.8%–98.3% identity to other corresponding sequences deposited in GenBank. Eighteen representative variant sequences obtained in this study were included in phylogenetic analysis based on 348-bp nucleotides of *glt*A by using neighbor-joining methods in MEGA 3.0 software (*8*), which found that the *A. phagocytophilum* identified in this study can be placed in a separate clade, together with Russian Khabarovsk-01 strain, which is distinct from previously reported strains from the United States and Europe (online Appendix Figure, www.cdc.gov/EID/content/17/5/932-appF.htm).

Table. *Anaplasma phgacytophilum* infection in adult ticks from the China–Russia border, 2009*

			Tick species, no. positive/no. tested (%)					
Survey site	Location	Origin	*Haemaphysalis concinna*	*H. longicornis*	*H. japonica*	*Ixodes persulcatus*	*Dermacentor silvarum*	Total
Mohe	52°28.34′N, 123°28.56′E	Woodland	–	–	–	2/49	0/6	2/55 (3.64)
Heihe	52°28.34′N, 123°28.56′E	Grassland	–	–	–	–	0/76	0/76
Jiayin	50°14.19′N, 127°26.39′E	Woodland	2/36	–	–	0/13	0/2	2/51 (3.92)
Xunke	49°34.26′N, 128°28.29′E	Woodland	0/98	–	–	0/3	0/70	0/171
Luobei	48°52.41′N, 130°03.56′E	Woodland	0/50	–	0/19	0/3	2/103	2/175 (1.14)
Tongjiang	47°34.54′N, 130°15.2′E	Woodland	0/4	–	0/20	0/3	0/12	0/39
Huyuan	47°42.42′N, 131°28.37′E	Woodland	1/23	–	–	0/5	–	1/28 (3.57)
Raohe	48°18.05′N, 134°.20.26′E	Woodland	0/30	–	–	4/90	0/4	4/124 (3.22)
HuLin	46°49.48′N, 133°59.11′E	Woodland	0/36	–	–	0/18	4/89	4/143 (2.80)
Mishan	45°50.8′N, 133°09.04′E	Woodland	3/55	–	–	1/29	0/6	4/90 (4.44)
Mudanjiang	45°16.25′N, 131°58′E	Grassland	4/40	–	–	8/120	0/40	12/200 (6.0)
Dongling	44°31.23′N, 130°34.25′E	Woodland	7/261	–	–	1/48	0/44	8/353 (2.27)
Suifenhe	43°53.23′N, 130°46.46′E	Woodland Dogs	3/28 0/52	– 2/11	– –	2/53 2/9	0/4 –	5/85 (5.89) 4/72 (5.56)
Hunchun	44°21.39′N, 130°44.3.18′E	Woodland Goats, sheep	23/243 0/4	1/148 10/356	– –	0/9 1/2	0/3 0/2	24/403 (5.96) 11/364 (3.02)
Total			43/960 (4.48)	13/515 (2.52)	0/39	21/454 (4.63)	6/461 (1.30)	83/2,429 (3.42)

*–, none identified.

A. phagocytophilum infection has been reported in *I. persulcatus* and engorged *D. silvarum* ticks in northeastern China (*3*). In this study, we also found *Haemaphysalis* spp. ticks, including *H. longicornis* and *H. concinna* ticks, to be infected by the agent. This finding indicates that various tick species may be involved in the maintenance and transmission of *A. phagocytophilum*. Both *H. longicornis* and *H. concinna* ticks usually have 3 hosts in their life cycle and can infest a variety of wild and domestic animals such as rodents, deer, scaly anteaters, sheep, goats, and dogs. *Haemaphysalis* ticks are distributed in a broad range of China and sometimes feed on humans. Their competency as a vector for *A. phagocytophilum* and the importance of this agent in public health as well as in veterinary medicine has yet to be investigated, particularly in the areas where they are predominant (*9*). The *gltA* sequence analyses indicated that the agents detected in this study were similar to the strains isolated from rodents and sheep in northeastern China (*4*) and to *A. phagocytophilum* strains from the Russian Far East adjacent to our survey sites. However, the strains from China are genetically distant from *A. phagocytophilum* strains in the United States and Europe. The genetic diversity of *A. phagocytophilum* in various geographic locations deserves further study.

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References

1. Dumler JS, Barbet AF, Bekker CP, Dasch GA, Palmer GH, Ray SC, et al. Reorganization of genera in the families *Rickettsiaceae* and *Anaplasmataceae* in the order Rickettsiales: unification of some species of *Ehrlichia* with *Anaplasma, Cowdria* with *Ehrlichia* and *Ehrlichia* with *Neorickettsia,* descriptions of six new species combinations and designation of *Ehrlichia equi* and "HGE agent" as subjective synonyms of *Ehrlichia phagocytophila.* Int J Syst Evol Microbiol. 2001;51:2145–65.
2. Woldehiwet Z. The natural history of *Anaplasma phagocytophilum.* Vet Parasitol. 2010;167:108–22. doi:10.1016/j.vetpar.2009.09.013
3. Cao WC, Zhan L, He J, Foley JE, De Vlas SJ, Wu XM, et al. Natural *Anaplasma phagocytophilum* infection of ticks and rodents from a forest area of Jilin Province, China. Am J Trop Med Hyg. 2006;75:664–8.
4. Zhan L, Cao WC, Jiang JF, Zhang XA, Liu YX, Wu XM, et al. *Anaplasma phagocytophilum* from rodents and sheep, China. Emerg Infect Dis. 2010;16:764–78.
5. Shpynov S, Fournier PE, Rudakov N, Tarasevich I, Raoult D. Detection of members of the genera *Rickettsia, Anaplasma*, and *Ehrlichia* in ticks collected in the Asiatic part of Russia. Ann N Y Acad Sci. 2006;1078:378–83. doi:10.1196/annals.1374.075
6. Sidelnikov YN, Mediannikov OY, Ivanov LI, Zdanovskaya NI. Clinical and laboratory features of human granulocytic ehrlichiosis in the south of Russian Far East [in Russian]. Epidemiologia i Infectsionnye Bolezni. 2002;3:28–31.
7. Inokuma H, Brouqui P, Drancourt M, Raoult D. Citrate synthase gene sequence: a new tool for phylogenetic analysis and identification of *Ehrlichia.* J Clin Microbiol. 2001;39:3031–9. doi:10.1128/JCM.39.9.3031-3039.2001
8. Kumar S, Tamura K, Nei M. MEGA3: Integrated software for molecular evolutionary genetics analysis and sequence alignment. Brief Bioinform. 2004;5:150–63. doi:10.1093/bib/5.2.150
9. Teng KF, Jiang ZJ. Economic insect fauna of China. Fasc 39 Acarina: Ixodidae. Beijing [in Chinese]. Beijing: Science Press, Academia Sinica; 1991. p. 359.

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Japanese Encephalitis, Tibet, China

To the Editor: Tibet is located in the Qinghai-Tibet Plateau of western People's Republic of China and has been internationally recognized as a Japanese encephalitis (JE)–nonendemic area because the average altitude is thought to be too high to facilitate the cycle of Japanese encephalitis virus (JEV) between mosquitoes and vertebrates (*1*,*2*). In addition, JE is a reportable infectious disease in China, and no clinically confirmed case has been reported in Tibet since establishment of a national case reporting system in 1951 (*3*,*4*). Neither the mosquito vector of JEV nor JEV isolates have been described in Tibet. In this study, JEV was isolated from *Culex tritaeniorhynchus* mosquitoes, the main vectors of JEV, collected in Tibet. Serologic assays detected anti-JEV antibodies in a large number of human and porcine serum samples collected in this region. These data demonstrate that JEV is currently circulating in Tibet.

During August 5–15, 2009, mosquitoes were collected in Mainling