analyses to understand the variation in prescribing rates according to geographic area in the United States do not suggest that population density is playing a role. Another difference is that the selection of antibiotics by providers in Sweden favors narrower-spectrum, beta-lactam agents, whereas azithromycin is the most frequently prescribed antibiotic in the United States. The Swedish rate may provide a useful reference for establishing a benchmark. Promoting appropriate antibiotic use is critical for preserving antibiotic effectiveness, and we applaud public health officials, providers, and policymakers in Sweden who have led these efforts. Reductions in U.S. antibiotic prescribing have been observed since the launch of the Centers for Disease Control and Prevention’s Get Smart: Know When Antibiotics Work Campaign, but overprescribing is still a problem. An important next step is to determine how much prescribing is too much.

Rickettsia sibirica Subspecies sibirica BJ-90 as a Cause of Human Disease

TO THE EDITOR: In May 2012, a 64-year-old farmer was admitted to Mudanjiang Forestry Central Hospital in Mudanjiang, China, after 4 days of fever, chills, asthenia, insomnia, headache, anorexia, nausea, and vomiting. He recalled a tick bite on the back of his right hand 4 days before the onset of the illness. His medical history was notable for a surgical operation for intestinal obstruction 20 years previously. On admission, his temperature was 40°C, with a pulse of 119 beats per minute and blood pressure of 110/80 mm Hg. Physical examination showed confluent pale-pink maculae widely distributed on his trunk and four limbs (see Fig. 1 in the Supplementary Appendix, available with the full text of this letter at NEJM.org). Electrocardiography showed sinus tachycardia with a premature ventricular beat. Initial laboratory tests indicated lymphopenia (0.8×10^9 cells per liter), thrombocytopenia (101.0×10^9 cells per liter), elevated serum levels of alanine aminotransferase (108.2 U per liter) and aspartate aminotransferase (136.7 U per liter), proteinuria, an increased level of cerebrospinal fluid protein (0.7 g per liter), and a decreased level of cerebrospinal fluid glucose (2.2 mmol per liter). He received doxycycline at a dose of 100 mg twice daily, since this syndrome with rash suggested an infection with rickettsiae of the spotted fever group. He recovered and was discharged from the hospital 15 days after the initiation of therapy.

To identify a potential cause of his illness, we...
investigated rickettsiae of the spotted fever group species as possible etiologic agents. We used polymerase-chain-reaction amplification of the conserved citrate synthase gene (gltA) and spotted fever group–restricted outer-membrane protein A gene (ompA), followed by sequencing from the blood sample obtained from the patient before the initiation of therapy. Both gltA and ompA sequences amplified from the patient were identical to the corresponding fragments of *Rickettsia sibirica* subspecies *sibirica* BJ-90. The phylogenetic analyses based on 1050-bp gltA and ompA sequences are shown in Figure A and B, respectively.

**Figure A: gltA Sequence**

- R. sibirica subspecies sibirica 246 (RSU59734)
- R. sibirica subspecies mongolotimonae (RSU59731)
- R. sibirica subspecies sibirica BJ-90 (AF178035)
- Patient (JX945526)
- R. parkeri (RPU59732)
- R. honei (AF022817)
- R. conorii (RCU59730)
- R. slovaca (RSU59725)
- R. japonica (RJU59724)
- R. helongjiangensis (AY285776)
- R. aesculimannii (RSU59722)
- R. raoultii (DQ365804)
- R. australis (RAU59718)
- R. akari (RAU59717)
- R. prowazekii (RPU59715)
- R. typhi (RTU59714)
- R. canadensis (RCU59713)
- R. bellii (AY362703)

**Figure B: ompA Sequence**

- R. sibirica subspecies sibirica BJ-90 (AF179365)
- R. sibirica subspecies sibirica 246 (RSU43807)
- R. sibirica subspecies mongolotimonae (RUH43796)
- R. africæ (U43790)
- R. parkeri (U43802)
- R. slovaca (U43808)
- R. honei (U43809)
- R. conorii (U43806)
- R. rickettsii (U43804)
- R. helongjiangensis (AB473998)
- R. japonica (U43795)
- R. raoultii (AF120021)
- R. massiliae (U43799)
- R. aesculimannii (U43800)
- R. canadensis (NC_009879)
325-bp ompA sequences revealed that the agent clustered with other R. sibirica subspecies and was most closely related to R. sibirica subspecies sibirica 246, which had been isolated from Derma-centor nuttalli in Russia (Fig. 1). In serum samples obtained from the patient, the titers of IgM and IgG antibodies against R. sibirica on indirect immunofluorescence assay increased from 1:32 and 1:64, respectively, in the acute phase to 1:4096 for IgM and for IgG in the convalescent phase.

The study of this case was approved by the institutional review board of the Chinese Academy of Military Medical Sciences. The patient provided written informed consent.

R. sibirica subspecies sibirica BJ-90 was initially isolated from D. sinitus in China in 1990, and it was detected in D. silvarum in Russia. Our case shows that this organism can cause human disease. Unlike patients infected with R. sibirica and R. heilongjiangensis in the same geographic region, this patient was severely ill with multisystem dysfunction. Further investigation of the epidemiologic and clinical features of R. sibirica subspecies sibirica BJ-90 is required to distinguish it from other known tickborne infections.

Na Jia, M.D.
State Key Laboratory of Pathogen and Biosecurity
Beijing, China

Jia-Fu Jiang, M.D.
Beijing Institute of Microbiology and Epidemiology
Beijing, China

Qiu-Bo Huo, M.S.
Mudanjiang Forestry Central Hospital
Mudanjiang, China

Bao-Gui Jiang, M.D.
Beijing Institute of Microbiology and Epidemiology
Beijing, China

Wu-Chun Cao, M.D., Ph.D.
State Key Laboratory of Pathogen and Biosecurity
Beijing, China
caowc@bmi.ac.cn

Drs. Jia and Jiang contributed equally to this letter.
Supported by grants (81290344 and 81130086) from the National Natural Science Foundation of China.
Disclosure forms provided by the authors are available with the full text of this letter at NEJM.org.


DOI: 10.1056/NEJMci1303625

Human Infection with Candidatus Rickettsia tarasevichiae

TO THE EDITOR: From May through August 2012, a total of 251 patients who had recent tick bites sought treatment at Mudanjiang Forestry Central Hospital in northeastern China and were tested for tickborne infections. Polymerase-chain-reaction testing followed by sequencing of eschar and blood samples showed that 5 patients were infected with Candidatus Rickettsia tarasevichiae, a new species of rickettsiae of the spotted fever group. Phylogenetic analysis based on either the citrate synthase gene or the outer-membrane protein A gene showed that the agent was genetically close to R. canadensis (see Fig. 1 in the Supplementary Appendix, available with the full text of this letter at NEJM.org), one of several “ancestral” rickettsiae that are suspected to be endosymbionts and nonpathogens. In an indirect immunofluorescence assay, IgM or IgG antibodies reacted to two endemic species of rickettsiae of the spotted fever group, R. heilongjiangensis and R. sibirica.

The study of these cases was approved by the institutional review board of the Chinese Academy of Military Medical Sciences. All patients provided written informed consent.

Characteristics of the five patients are shown in Table 1. All five patients had a recent tick bite and no documented immunocompromised conditions. Their ages ranged from 12 to 56 years (median, 30 years), and three were women. They were hospitalized with fever (in two patients), asthenia (in three patients), anorexia (in three

Human Infection with Candidatus Rickettsia tarasevichiae