considerable genetic distance from them. Isolates in the outbreak in China had only a minor nucleotide sequence variation from the Thailand isolates, indicating that the virus has a high genetic relatedness to the Southeast Asia strain. However, previous studies showed that isolates from Europe, South Korea, and China were serologically identical to the prototype CV777 strain (1, 4).

To our knowledge, fecal–oral transmission is probably the main or only route of PEDV transmission (5–7). In our study, if a fecal sample from a sick piglet was found to be positive for PEDV, we also collected and studied milk from its mother. These results showed that PEDV was present in sow milk (online Technical Appendix Table 3), but the detection rate was lower for these samples (40.8%) than for the fecal samples (82.0%).

On the basis of these results, we hypothesize that sow milk could represent a possible (and potentially major) route for the vertical transmission of PEDV from sow to suckling piglet. This hypothesis could be indirectly verified by our field observation that piglet death rates decreased as a result of fostering (data not shown). Our findings show that PEDV was identified not only in fecal samples from sick piglets, as expected, but also in the milk of the sow, which suggests vertical transmission of the virus.

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References

1. Puranaveja S, Poolperm P, Lertwatcharasarakul P, Kesadaengsakonwut S, Boonsoongnern A, Urairong K, et al. Chinese-like strain of porcine epidemic diarrhea virus, Thailand. Emerg Infect Dis. 2009;15:1112–5. doi:10.3201/eid1507.081256
2. Kim SY, Song DS, Park BK. Differential detection of transmissible gastroenteritis virus and porcine epidemic diarrhea virus by duplex RT-PCR. J Vet Diagn Invest. 2001;13:516–20. doi:10.1177/104063870101300611
3. Jiménez G, Correa I, Melgosa MP, Bulildo MJ, Enjuanes L. Critical epitopes in transmissible gastroenteritis virus neutralization. J Virol. 1986;60:131–9.
4. Pospischil A, Hess RG, Bachmann PA. Light microscopy and ultrahistology of intestinal changes in pigs infected with epizootic diarrhea virus (EVD): comparison with transmissible gastroenteritis (TGE) virus and porcine rotavirus infections. Zentralbl Vet Med A. 1981;28:564–77. doi:10.1111/j.1439-0450.1981.tb01774.x
5. Riley S. Large-scale spatial-transmission models of infectious disease. Science. 2007;316:1298–301. doi:10.1126/science.1134695
6. Utiger A, Tobler K, Bridgen A, Ackermann M. Identification of the membrane protein of porcine epidemic diarrhea virus. Virus Genes. 1995;10:137–48. doi:10.1007/BF01702594
7. Turgeon DC, Morin M, Jolette J, Higgins R, Marsolais G, DiFranco E. Coronavirus-like particles associated with diarrhea in baby pigs in Quebec. Can Vet J. 1980;21:100–xxii.

Bartonella quintana Transmission from Mite to Family with High Socioeconomic Status

To the Editor: Urban trench fever caused by Bartonella quintana has been reported in persons who abuse alcohol and in homeless persons in large cities worldwide. Symptoms vary from asymptomatic intermittent bacteremia to serious complications (1). Pediculus humanus lice, the known vector of the infection, are not always identified, which raises the possibility that other vectors might also be involved (2). We report on an outbreak of B. quintana infection among a young family of high socioeconomic status and their visiting relatives.

The family resides in a regional city (population 104,000) in northern Czech Republic in an old, renovated apartment located on the top floor, just under the roof. In the summer of 2007, hundreds of ectoparasitic mites migrated from a hole in the roof and settled on the inner side of a permanently open window before infesting family members. Two weeks later (day 1 of symptom onset), a papular rash and pruritic vesicular lesions were noted by the parents on the body and legs of their 2 children, a 1-year-old girl and a 3-year-old boy. On day 3, the girl’s body temperature rose to 38.0°C, and the boy’s temperature rose to 39.5°C. The rash resolved in ≈10 days in both children. Vesicular lesions on the girl’s buccal mucosal membrane resolved in 5 days. Excoriated areas resulting from spontaneous rupture of lesions or scratching were still visible on day 14.

On day 4, a fever (temperature, 38.5°C) and intense tibialgia, which persisted for 5 days, developed in the 33-year-old father of the infected children. On day 5, a vesicular rash, which resolved in 10 days, developed in the 33-year-old mother. The children’s
grandfather and both grandmothers also showed symptoms of infection within ≈14 days after having spent >1 days or nights in the infected family’s household (Table). In addition, the regional epidemiologist who was involved in the investigation showed development of a severe infection 16 days after exposure to implicated mites (Table). Recurrent fevers of decreasing intensity, followed by remissions at 1-week intervals, were observed in all patients for up to 3 months.

Seven mites, which were collected by the father on day 6 after symptom onset, were identified as engorged and nonengorged members of the genus *Dermanyssus*. After treatment with ethanol, the mites were investigated by culture and DNA analysis. DNA fragments specific for *Bartonella* spp. (i.e., a 185-bp [3] and a 397-bp [4,5] fragment of the 16S rRNA gene) were amplified; the sequence of the 397-bp fragment was 100% similar to the *htrA* sequence of the *B. quintana* strain Toulouse (Table). Results were negative for PCRs with primers for 16S *rDNA* of *Anaplasma phagocytophilum* (6) and primers for *ospA* of *Borrelia burgdorferi* (7). Only *Staphylococcus cohnii* subsp. *urealyticus*, as part of human or animal commensal flora, was detected on blood agar plates that were cultured for 30 days in a microaerophilic atmosphere.

Patient samples were analyzed by using the specific 16S *rRNA* primers; the *Bartonella*-specific amplicon was found only in a sample that was collected on day 4 from the father. Amplification of the *htrA* gene fragment of identical size and with identical sequences also confirmed the presence of DNA specific for *B. quintana* in the father’s sample.

Hemocultures were not performed.

### Table. Patient and microbiologic data from a study of *Bartonella quintana* transmission from mites to a family with high socioeconomic status, Czech Republic, 2007*

| Day after symptom onset† | Date of specimen collection | Specimen type‡ | Case-patient | Main symptoms | Incubation period, d | Specimen testing | PCR¶ | IgG titer§ |
|--------------------------|-----------------------------|----------------|--------------|---------------|---------------------|------------------|------|-----------|
| 1                        | NA                          | NA             | Daughter, son | Papular rash, pruritic lesions | NA                 | NA   | NA       |
| 3                        | 2007 Jul 5                  | Serum          | Son          | Rash, vesicles, fever (temperature 39°C) | Neg   | Neg/ND | 14 |
|                          |                             | Serum          | Daughter     | Rash, vesicles, fever (temperature 39.5°C) | Neg   | Neg/ND | 14 |
| 4                        | 2007 Jul 6                  | Serum          | Father       | Recurrent fever (temperature 38.5°C), tibialgia, headache | 256   | Pos/pos | 15 |
| 5                        | 2007 Jul 7                  | Serum          | Mother       | Vesicles, tibialgia             | 512   | Neg/ND | 16 |
| 6                        | 2007 Jul 11                 | Mites          | NA           | NA                         | NA         | NA    | Pos/pos |
| 28                       | 2007 Aug 2                  | Serum          | Epidemiologist | Malaise, arthralgia, headache | 256   | Neg/ND | 16 |
| 35                       | 2007 Aug 9                  | Serum          | Grandfather  | Malaise, arthralgia, rash, headache | Neg   | Neg/ND | 14 |
|                          |                             | Serum          | Grandmother 1| Fatigue, malaise             | 256   | Neg/ND | 14 |
|                          |                             | Serum          | Grandmother 2| Fatigue, malaise             | 64    | Neg/ND | 14 |
| 41                       | 2007 Aug 15                 | Serum          | Son          | Recurrent fever | 256   | Neg/ND | 14 |
|                          |                             | Serum          | Daughter     | Recurrent fever              | 64    | Neg/ND | 14 |
|                          |                             | Serum          | Father       | Malaise and intense headache | 256   | Neg/ND | 15 |
|                          |                             | Serum          | Mother       | Malaise and intense headache | 512   | Neg/ND | 16 |
|                          |                             | Serum          | Grandfather  | Recurrent fatigue and malaise | Neg   | Neg/ND | 14 |
|                          |                             | Serum          | Grandfather  | Recurrent fatigue and malaise | 256   | Neg/ND | 14 |
| 68                       | 2007 Sep 11                 | Mites          | NA           | NA                         | NA         | NA    | Pos/pos |
| 74                       | 2007 Aug 17                 | Serum          | Epidemiologist | Recurrent fever; fatigue and intense headache | 512   | Neg/ND | 16 |
| 163                      | 2007 Dec 13                 | Serum, B, H    | Epidemiologist | Poor concentration, headache | 256   | Neg/ND | 16 |
| 197                      | 2008 Jan 17                 | Serum, B, H    | Son          | None                     | Neg   | Neg/ND | 14 |
|                          |                             | Serum, B, H    | Daughter     | None                     | Neg   | Neg/ND | 14 |
|                          |                             | Serum, B, H    | Father       | Poor concentration, headache | 128   | Neg/ND | 15 |
|                          |                             | Serum, B, H    | Mother       | None                     | 128   | Neg/ND | 16 |
|                          |                             | Serum, B, H    | Grandmother 1| None                     | Neg   | Neg/ND | 14 |

*NA, not applicable; neg, negative; ND, not done; pos, positive; B, blood with anticoagulant EDTA; H, hemoculture. During August 9–19, 2007, children and adult case-patients received oral clarithromycin and oral doxycycline, respectively. On August 9 and 19, 2007, the apartment building in which the case-patients lived was treated with insecticide.

†Days after symptom onset do not correlate with incubation period in last column.

‡Specimens were analyzed as follows: serum by serologic testing, EDTA blood by PCR, hemoculture by culture. Patient serum samples were negative for *Anaplasma phagocytophilum* (by immunofluorescence assay [IFA], IgM, and IgG); *Borrelia burgdorferi* (by ELISA and Western blot, IgM, and IgG); *Coxiella burnetii*, *Rickettsia conorii*, and *R. prowazekii* (IFA, total immunoglobulin).

§Determined by IFA.

¶Detected by 16S rRNA and by *htrA* amplification.
at symptom onset, but results for patient serum samples cultured under the same conditions as the homogenized parasites remained negative. Significant titers of IgG against B. quintana and B. henselae or IgG seroconversion in paired serum samples were observed for all patients except the grandfather (Table).

Oral clarithromycin and doxycycline were administered to the children and adults, respectively, for 10 days. The apartment was repeatedly treated with insecticide, and the hole in the roof was repaired, leading to eradication of the mites. The few dead and dry mites that were available for additional parasitologic analysis were mounted in Swan mounting medium (information about the medium is available from the authors), but no characteristics allowing differentiation between species of the genus Dermanyssus were recognized during examination by light microscopy. Failed attempts were made to trap pigeons that had lived on the roof of the apartment or in the same city; however, samples from trapped synanthropic pigeons from the north (n = 20) and central (n = 33) part of the country were negative for Bartonella spp. by the culture and amplification methods described above. Recurrent fever reported by adult patients resolved in 3 months, and all patients made a full clinical recovery. Laboratory findings for the patients were followed for 6 months after symptom onset (Table).

The fact that the suspected vector was a hematophagous mite (Dermanyssus sp.), a parasite of synanthropic pigeons and a suspected vector of other bacterial pathogens (6,9), and that the 16S rRNA Bartonella spp. gene was detected in mites (Steatornyssus sp. from the superfamily Dermanyssoidae) (10) remains a challenge for additional study. Pigeons probably played the role of accidental host in this outbreak, but the source of the infection remains unclear.

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References

1. Drancourt M, Mainardi JL, Brouqui P, Vandenesch F, Carta A, Lehner F, et al. *Bartonella* (Rochalimaea) quintana endocarditis in three homeless men. N Engl J Med. 1995;332:419–23. doi:10.1056/NEJM199503153320702
2. Comer JA, Paddock CD, Childs JE. Urban zoonoses caused by Bartonella, *Coxiella*, *Ehrlichia*, and *Rickettsia* species. Vector Borne Zoonotic Dis. 2001;1:91–118. doi:10.1089/153036601316977714
3. Breitschwerdt EB, Hegarty BC, Hancock SI. Sequential evaluation of dogs naturally infected with *Ehrlichia canis*, *Ehrlichia chaffeensis*, *Ehrlichia equi*, *Ehrlichia ewingii*, or *Bartonella vinsonii*. J Clin Microbiol. 1998;36:2645–51.
4. Anderson B, Sims K, Regnery R, Robinson L, Schmidt MJ, Goral S, et al. Detection of *Rochalimaea henselae* DNA in specimens from cat scratch disease patients by PCR. J Clin Microbiol. 1994;32:942–8.
5. Arvand M, Schád SG. Isolation of *Bartonella henselae* DNA from the peripheral blood of a patient with cat scratch disease up to 4 months after the cat scratch injury. J Clin Microbiol. 2006;44:2288–90. doi:10.1128/JCM.00239-06
6. Massung RF, Slater KG. Comparison of PCR assays for detection of the agent of human granulocytic ehrlichiosis, *Anaplasmaphagocytophilum*. J Clin Microbiol. 2003;41:717–22. doi:10.1128/JCM.41.5.717-722.2003
7. Hulínská D, Votýpka J, Pich J, Vlcek E, Valešová M, Bojar M, et al. Molecular and microscopic evidence of *Ehrlichia* spp. and *Borreliaburgdorferi* sensu lato in patients, animals and ticks in the Czech Republic. New Microbiol. 2002;25:437–48.
8. Valiente Moro C, De Luna CJ, Tod A, Guy JH, Sparagano OAE, Zenner L. The poultry red mite (*Dermanyssus gallinae*): a potential vector of pathogenic agents. Exp Appl Acarol. 2009;48:93–104. doi:10.1007/s10493-009-9248-0
9. Valiente Moro C, Thioulouze J, Chauve C, Normand P, Zenner L. Bacterial taxa associated with the hematophagous mite *Dermanyssus gallinae* detected by 16S RNA PCR amplification and TTGE fingerprinting. Res Microbiol. 2009;160:63–70. doi:10.1016/j.resmic.2008.10.006
10. Reeves WK, Dowling APG, Dasch GA. Rickettsial agents from parasitic *Dermanyssus* (Acari: Mesostigmata). Exp Appl Acarol. 2006;38:181–8. doi:10.1007/s10493-006-0007-1

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Urban Transmission of Human African Trypanosomiasis, Gabon

To the Editor: We describe a confirmed case of human African trypanosomiasis (HAT) in an expatriate returning to France from Gabon after a probable tsetse fly bite in the urban setting of Libreville. This case indicates a possible urban transmission of HAT in Gabon and stresses the need for entomologic studies in Libreville.

HAT is endemic to sub-Saharan Africa. *Trypanosoma brucei rhodesiense* (eastern Africa) and *T. b. gambiense* (western Africa) parasites are transmitted to humans by tsetse flies of the *Glossina morsitans* group (*T. b. rhodesiense*) and of the *G. palpalis* group (*T. b. gambiense*), which are found only in Africa. *T. b. gambiense* represents >90% of all reported cases...