Table. HI and MN antibody titers for influenza A(H7N7) virus and other H7 subtype viruses in serum samples of 5 men, Italy, 2013*

Person ID and phase type†	Age, y	Activity of person	Date of sample collection	Virus strain (subtype) and titer							
				A/It/3/2013 (H7N7)		A/Tk/It/3889/ 1999 (H7N1)		A/Tk/It/214845/ 2002 (H7N3)		A/Ck/It/2837-54/2007 (H7N3)	
				HI	MN	HI	MN	HI	MN	HI	MN
1											
Acute	51	PW, culling	Sep 6	10	<10	<10	<10	<10	<10	<10	<10
Convalescent			Dec 6	**20**	**35**	<10	<10	<10	<10	<10	<10
2											
Acute	46	Culling	Sep 6	10	<10	<10	<10	<10	<10	<10	<10
Convalescent			Dec 11	**20**	**62**	<10	<10	<10	<10	<10	<10
3											
Acute	49	Culling	Sep 7	<10	<10	<10	NT	<10	NT	<10	NT
Convalescent			Dec 23	**10**	**87**	<10	<10	<10	<10	<10	<10
FO10‡	34	Culling	Dec 23	**20**	**72**	<10	<10	<10	<10	<10	<10
RA32‡	55	PW, culling	Dec 11	**20**	**33**	<10	<10	<10	<10	<10	<10

*Bold indicates titers of seropositive persons (HI positive results confirmed 3 times by MN). Values for 1 of 3 MN assays that showed similar results are reported. Seropositive persons were selected from 93 persons who participated in the study among 140 persons involved in culling activities.
HI, hemagglutination inhibition; ID, identification; MN, microneutralization; NT, not tested; PW, poultry worker.
†Persons 1, 2, and 3 had laboratory-confirmed cases of conjunctivitis caused by infection with influenza A(H7N7) virus.
‡Asymptomatic person.

Other H7 subtype viruses previously circulating in Italy were included in the analysis to rule out potential cross-reactivity with influenza A(H7N7) virus (*5*). HI titers ≥10 and MN titers ≥20 were considered positive; only HI-positive serum samples confirmed 3 times by MN assay were considered positive results for influenza A(H7N7) virus.

We detected antibodies against influenza A(H7N7) virus in convalescent-phase serum samples from the 3 H7 subtype-positive patients and 2 asymptomatic persons but found no seropositivity against other H7 subtype viruses (Table). Because of lack of acute-phase serum samples, we could not assess whether seropositivity for the 2 asymptomatic persons, 1 (RA32) of whom worked with poultry before the outbreak, was caused by infection acquired during the outbreak. All workers were trained and most participants, including the 2 asymptomatic influenza A(H7N7) virus–seropositive persons, reported that PPE was commonly used during culling on infected premises. Nevertheless, it is likely that worker compliance with PPE was not always 100% during the 3-week outbreak because of poor knowledge and real perception of biologic risks among workers.

Future efforts should ensure timely collection of paired serum samples from all workers involved in avian influenza outbreaks, especially when infections occur in humans. Strict compliance with recommended preventive control measures and serologic surveillance programs are crucial to avoid and eventually assess risk for infections with avian influenza viruses in persons exposed to infected poultry.

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Increase in Eyeworm Infections in Eastern Europe

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To the Editor: In the past 30 years, war in the Balkans, the fall of Communist regimes, and economic recession in Europe have undermined the economic stability of countries in eastern Europe and eventually favored occurrence of so-called neglected infections of poverty (*1*). Parasitic infections causing eye disease in persons living in areas with low socioeconomic standards might be caused by parasites not well known by healthcare providers.

A good example is *Thelazia callipaeda* (Spirurida, Thelaziidae) nematode infections in children and elderly persons living in rural and poor communities in countries in Europe and Asia (*2*). In Europe, vectors for this nematode are male *Phortica variegata* drosophilids, which feed on ocular secretions of hosts and transmit infective stage larvae to domestic and wild carnivores, lagomorphs, and humans (*3*). Possible outcomes of this infection include conjunctivitis, lacrimation, corneal ulcers, perforation, and blindness (*3*), but differentiating *T. callipaeda* infection from other ocular conditions, such as conjunctivitis-causing pathogens and allergies, can be difficult because signs and symptoms might be similar.

T. callipaeda was previously known as the oriental eyeworm because of its original description in countries in eastern Asia (e.g., China, Japan, and Thailand), where it has caused >1,000 cases of human infections in the past 2 decades (*2*). Since 1989, this nematode has also been detected in many countries in Europe, including Italy, France, Spain, Portugal, Switzerland, Germany, and Greece, as an agent of animal and human ocular infection (*3*). However, data on the occurrence of this parasite in countries in eastern Europe were not available until 2014.

Over the past 2 years, several autochthonous cases of ocular thelaziosis in dogs and cats (Romania, Croatia, Serbia, Bosnia and Herzegovina, Bulgaria) and foxes (Bosnia and Herzegovina) were reported (*4*–*7*) (Table). In 2016, the zoonotic potential of this parasite in those regions was further confirmed by 2 human cases of thelaziosis, one in a 36-year-old man living in Serbia (*7*) and one in an 82-year-old man living in Croatia (*8*) (Table).

We report 10 new cases of ocular infection by *T. callipaeda* in dogs living in Bulgaria (n = 9) and Hungary (n = 1). All animals had no history of travel outside their native countries and were brought to the Department of Parasitology (Stara Zagora, Bulgaria) and to a veterinary practitioner (Pécs, Hungary) with various ocular disorders (i.e., epiphora, conjunctivitis). Nematodes detected in the conjunctival sac were collected by flushing the sac with saline solution. These nematodes were then stored in 70% ethanol and morphologically identified according to the procedure of Otranto et al. (*9*).

Table. Cases of thelaziosis reported in animals and humans in eastern Europe

Country	Host	No. infected hosts	Reference
Bosnia and Herzegovina	Fox	51	(*5*)
Bosnia and Herzegovina	Dog	4	(*5*)
Bosnia and Herzegovina	Cat	1	(*5*)
Croatia	Dog	2	(*5*)
Croatia	Human	1	(*8*)
Romania	Dog	1	(*6*)
Serbia	Dog	6	(*4*,*7*)
Serbia	Cat	2	(*4*)
Serbia	Human	1	(*7*)
Hungary	Dog	1	This study
Bulgaria	Dog	9	This study

Molecular characterization by using PCR amplification and sequencing of a partial region of the cytochrome oxidase subunit 1 gene were performed as described (*10*). Nucleotide sequences were identical to those of *T. callipaeda* nematode haplotype-1 (GenBank accession no. AM042549), which is the only haplotype circulating in animals and humans in Europe.

Our confirmed autochthonous cases of thelaziosis in Hungary and Bulgaria have extended the geographic distribution of *T. callipaeda* nematodes from neighboring countries (e.g., Bosnia and Herzegovina, Croatia, Romania and, Greece), where occurrence of the parasite in humans and animals was already documented. Cases of human thelaziosis are reported in areas where the infection is highly prevalent in animals (*3*). Although no large-scale prevalence study has been conducted in countries in eastern Europe, 51 (27.7%) of 184 foxes in Bosnia and Herzegovina were infected with *T. callipaeda* nematodes (*5*). Isolation of *T. callipaeda* eyeworms from dogs in Bulgaria and Hungary should increases awareness of medical and veterinary communities in countries in eastern Europe for this zoonotic parasitosis. Use of a One Health approach is imperative for preventing additional eyeworm infections in persons living in eastern Europe.

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Febrile or Exanthematous Illness Associated with Zika, Dengue, and Chikungunya Viruses, Panama

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To the Editor: The earliest clinical cases of Zika virus infection were reported from continental South America in 2015 (*1*), after which the virus spread rapidly through the Americas (*2*). Here we describe an investigation of febrile or exanthematous illnesses for possible association with Zika, dengue, or chikungunya virus; these illnesses occurred in the Guna Yala region of eastern Panama, which borders northern Colombia (Figure).

We collected and analyzed a convenience sample of 276 serum samples and 26 paired urine samples from 276 patients who sought care at clinics in Guna Yala during November 27, 2015–January 22, 2016, for reported fever or rash of <5 days' duration in addition to 1 of the following: headache, malaise, arthralgia, myalgia, or conjunctivitis. We also collected data on clinical signs and symptoms, date of illness onset, age, sex, residence, and self-reported status of pregnancy.

At first, we performed real-time reverse transcription PCR (rRT-PCR) tests specific for dengue (*3*) and chikungunya (*4*) viruses. However, because all the samples received during the week of November 27 were negative for those viruses and Zika virus was being reported in Colombia as of October 2015, we also tested the samples with a flavivirus-specific rRT-PCR (*5*), followed by amplicon sequencing; or with an rRT-PCR specific for Zika virus (*6*).

Of the 276 patients whose samples were tested, 164 (60%) were female. A total of 22 (8%) samples were positive for dengue; 2 were positive for chikungunya. Of the remaining 252 patients, 50 (20%) had ≥1 sample that tested positive for Zika virus (50/252 serum samples, 4/26 paired urine samples). Of these 50 patients, 30 (60%) were female. Most of these patients reported illness onset during December 9–27, 2015 (online Technical Appendix Figure 1, http://wwwnc.cdc.gov/EID/article/22/8/16-0292-Techapp1.pdf). Zika virus infection affected all age groups (median age 35 y, range 0.1–80 y).

The most commonly reported signs and symptoms were fever (86%), exanthema (72%), and headache (62%). The clinical characteristics of these infections showed no statistically significant difference with those associated with dengue and chikungunya virus infections and with cases found to be negative for all 3 viruses, suggesting that the negative cases could represent Zika virus infections (online Technical Appendix Table). One of the patients with confirmed Zika virus infection reported being in her second trimester of pregnancy; she underwent a fetal ultrasound at 36 weeks' gestation, which was interpreted as normal, and the infant was found to have no neurologic defects at birth.

By using Vero E6 cells (American Type Culture Collection), we isolated Zika virus from 9 samples (8 serum, 1 urine). Phylogenetic analysis of 5 Zika virus sequences (a 428-nucleotide fragment encompassing a conserved region of the nonstructural protein 5 gene) placed these isolated (GenBank accession nos. KU724096–100)

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