Table. Knowledge of human risks associated with avian influenza, European region, 2006*

For each of the following statements tell me whether, in your opinion, it is true or false:			
	Response, no. (%)		
Transmission risks	True	False	Don't know
The avian influenza virus can be transmitted between humans	9,864 (33.8)	**16,574 (56.8)**	2,732 (9.4)
Humans can catch avian influenza by touching contaminated birds	**22,722 (77.9)**	4,473 (15.3)	1,975 (6.8)
Food-related risks			
Even when it is contaminated, poultry is not a health risk if it is cooked	**17,906 (61.4)**	8,536 (29.3)	2,728 (9.4)
The avian influenza virus contained in an egg or present on its shell can be eliminated by prolonged cooking	**17,369 (59.5)**	6,593 (22.6)	5,208 (17.9)
It is not dangerous to eat the meat of a chicken vaccinated against avian influenza	**12,833 (44.0)**	9,272 (31.8)	7,065 (24.2)
Other			
The vaccination against seasonal influenza is also effective against avian influenza	4,265 (14.6)	**20,847 (71.5)**	4,058 (13.9)
If a chicken is contaminated by avian influenza on a farm, all the poultry on that farm must be destroyed immediately	**24,492 (84.0)**	2,725 (9.3)	1,953 (6.7)

*Source: Eurobarometer 65.2 (http://ec.europa.eu/public_opinion/archives/eb/eb65/eb65_ee_exec.pdf). Information in **boldface** refers to the correct answer.

and human-to-human virus transmission leaves areas for further work.

These results support previous findings that knowledge about avian influenza, especially about prevention and human-to-human transmission, has scope for improvement (*4*,*5*). Persons in Europe reported that they have little ability to prevent themselves from getting avian influenza (*6*). Previous research in the Lao People's Democratic Republic examined how consumers' knowledge of avian influenza risk reduced the likelihood that consumers will substitute poultry for other foods during an avian influenza crisis. This research indicates the importance of informing persons about consumption and transmission-related risks to reduce the likelihood of unnecessary behavioral changes that can cause larger macrolevel market effects (*7*).

The state of knowledge about avian influenza in Europe during the outbreak in the spring of 2006 leaves room for further public health information campaign efforts, especially those that increase consumers' understanding of consumption-related avian influenza risks. Persons in Europe appear to be aware of culling procedures and the risks of touching infected birds but have a more limited understanding of how avian influenza in their region should influence their consumption patterns.

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Human *Salmonella* Infection Yielding CTX-M β-Lactamase, United States

To the Editor: In the United States most third-generation cephalosporin resistance among salmonellae is due to AmpC plasmid–mediated β-lactamases. Extended-spectrum β-lactamases (ESBLs) have rarely been reported (*1*). The CTX-M β-lactamases constitute a group of ESBL enzymes that are increasing in prevalence worldwide. Currently, the CTX-M enzymes are classified into 5 different subgroups on the basis of DNA sequence similarities (*2*). We report on a domestically acquired CTX-M–producing *Salmonella* isolate in the United States.

In 2003, public health laboratories in all US state health departments submitted every 20th non-Typhi *Salmonella* (NTS) isolate from humans

to the Centers for Disease Control and Prevention (CDC) for susceptibility testing by the National Antimicrobial Resistance Monitoring System (NARMS). MICs were determined by broth microdilution and interpreted according to Clinical and Laboratory Standards Institute standards (www.clsi.org), when available. Resistance to cefquinome was defined as ≥32 mg/L.

Among the 1,864 human NTS isolates submitted to NARMS in 2003, 105 (5.6%) displayed elevated MICs (≥2 mg/L) to ceftriaxone or ceftiofur, third-generation cephalosporins used in human and veterinary medicine, respectively. Genomic DNA was prepared from the 105 isolates, and a PCR with degenerate primers capable of detecting all CTX-M enzymes identified a single positive *S. enterica* ser. Typhimurium (*3*). The isolate came from a stool sample collected in September 2003 from a white, non-Hispanic, US-born, 3-month-old boy who lived in the state of Georgia. The patient had diarrhea and fever for ≈1 week. Because neither the patient nor his family had traveled internationally in the 3 months before specimen collection, the infection appears to have been domestically acquired. The patient did not receive any antimicrobial agents before illness but was treated for 14 days with cefpodoxime. The infant recovered from the illness without complications.

The isolate displayed resistance to β-lactams, aminoglycosides, phenicols, tetracyclines, and folate pathway inhibitors (Table). Two β-lactamases (isoelectric pH [pI] 7.5 and 8.8) were resolved by isoelectric focusing.

Group-specific PCR primers were used to characterize the presumed $bla_{\text{CTX-M}}$ gene (*4*). Primers TOHO1–2F and TOHO1–1R yielded a 351-bp product, confirming a group II $bla_{\text{CTX-M}}$ gene. To perform sequencing of the entire gene, a ClustalW alignment with representatives from group II was performed to identify primers (DNASTAR, Madison, WI, USA). The sequence of the gene was identical to the sequence of the $bla_{\text{CTX-M-5}}$ gene detected in other isolates of *S. enterica* ser. Typhimurium (GenBank accession nos. U95364 and AF286192) as well as to the *kluA-2* gene of *Kluyvera ascorbata* (GenBank accession no. AJ251722).

Table. MIC values of antimicrobial drugs for the *Salmonella* ser. Typhimurium isolate and its *Escherichia coli* DH10B transformant

Antimicrobial agent	MIC, mg/L		
	S. ser. Typhimurium	*E. coli* DH10B transformant	*E. coli* DH10B
Amikacin	1	1	1
Amoxicillin–clavulanic acid	32	16	4
Ampicillin	>32	>32	4
Aztreonam	32	32	0.12
Cefepime	32	32	≤0.06
Cefotaxime	>64	>64	≤0.06
Cefotaxime–clavulanic acid	0.25	0.12	≤0.06
Cefoxitin	2	8	8
Cefquinome	>32	>32	≤0.06
Ceftazidime	8	8	0.5
Ceftazidime–clavulanic acid	0.5	0.25	0.12
Ceftiofur	>8	>8	0.5
Ceftriaxone	>64	>64	≤0.25
Chloramphenicol	>32	≤2	≤2
Ciprofloxacin	≤0.016	≤0.016	≤0.016
Gentamicin	4	≤0.25	≤0.25
Imipenem	0.5	0.25	0.25
Kanamycin	>64	≤8	≤8
Nalidixic acid	4	1	1
Piperacillin-tazobactam	>64	2	2
Streptomycin	≤32	>64	>64
Sulfisoxazole	>256	≤16	≤16
Tetracycline	>32	≤4	≤4
Trimethoprim-sulfamethoxazole	>4	≤0.12	≤0.12

Presence of other β-lactamase–encoding genes (bla_{TEM}, bla_{SHV}, and bla_{OXA}) was investigated by PCR (*6*–*8*). Amplification with primers OXA-1F and OXA-1R yielded a 595-bp product with a sequence consistent with that of $bla_{\text{OXA-1}}$ (*8*).

To determine whether the CTX-M enzyme was plasmid-borne, plasmids were extracted and transformed into electrocompetent *Escherichia coli* DH10B. The transformant exhibited resistance to cefotaxime but not to ceftazidime (Table). In addition, the transformant exhibited resistance to cefquinome and cefepime. The presence of a $bla_{\text{CTX-M}}$ gene was confirmed by PCR (*3*,*4*). The bla_{OXA} gene could not be amplified from the *E. coli* transformant (*8*).

A CTX-M–producing *Salmonella* isolate has been reported only once previously in the United States (*9*). This was in 1994, when an isolate of *Salmonella* ser. Typhimurium var. Copenhagen with a CTX-M-5 was recovered from a 4-month-old girl adopted from Russia; that infection was not domestically acquired (*9*). We compared the 1994 isolate and the isolate in this study by pulsed-field gel electrophoresis; the isolates showed distinct patterns.

The IS*Ecp1* insertion sequence has been described as a flanking region of several $bla_{CTX\text{-}M}$ genes and has been implicated in the expression and mobilization of the genes (*5*). A recent study by Lartigue et al. showed that a CTX-M-2 progenitor in *K. ascorbata* could be mobilized and transferred to a conjugative *E. coli* plasmid by the IS*Ecp1B* element; enhanced mobilization was observed in the presence of ceftazidime, cefotaxime, and piperacillin (*10*).

This *Salmonella* isolate's resistance to cefepime and cefquinome, fourth-generation cephalosporins, is troubling. Cefquinome is not approved for use in the United States but has been used in Europe for treating food animals since 1994. ESBLs, including CTX-M enzymes, are more common in Europe than in the United States (*1*). Further studies are warranted to clarify the extent to which the use of cefquinome has contributed to high CTX-M prevalence in Europe.

In conclusion, we report a domestically acquired CTX-M–producing *Salmonella* isolate in the United States. Because third-generation cephalosporins are important for treating invasive *Salmonella* infections, continued monitoring of ESBL-producing bacteria is important.

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Yersinia pseudotuberculosis O:1 Traced to Raw Carrots, Finland

To the Editor: Illness caused by *Yersinia pseudotuberculosis* is mainly characterized by fever and acute abdominal pain due to mesenteric lymphadenitis that mimics appendicitis. Secondary manifestations include erythema nodosum and reactive arthritis (*1*). Outbreaks have been reported in the Northern Hemisphere, including Canada (*2*,*3*), Japan (*4*), and Russia (*5*). Several community outbreaks have also been reported in Finland since 1982 (*1*,*6*–*9*). Only in a few of the outbreaks has the vector or source of the infection been identified. Recently, fresh produce, such as iceberg lettuce (*7*) and carrots (*9*), has been implicated by epidemiologic investigations as a source of infection, but mechanisms of contamination of fresh produce have remained unknown.

On April 8, 2004, the National Public Health Institute of Finland was informed of several cases of gastroen-