

## Supplementary Online Content

Francois Watkins LK, Laughlin ME, Joseph LA, et al. Ongoing outbreak of extensively drug-resistant *Campylobacter jejuni* infections associated with US pet store puppies, 2016-2020. *JAMA Netw Open*. 2021;4(9):e2125203. doi:10.1001/jamanetworkopen.2021.25203

**eTable.** Study Isolate Accession Numbers—National Center for Biotechnology and Information

**eFigure 1.** Surveillance and Investigation Timeline—United States, 1996-2020

**eFigure 2.** Traceback Schematic Showing Breeder and Distributor Information for 13 Puppies With an Epidemiologic or Laboratory Link to a Patient With Extensively Drug-Resistant *Campylobacter jejuni* Infection During Investigation 1 (January 2016-February 2018)

This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable. Study isolate accession numbers – National Center for Biotechnology and Information**

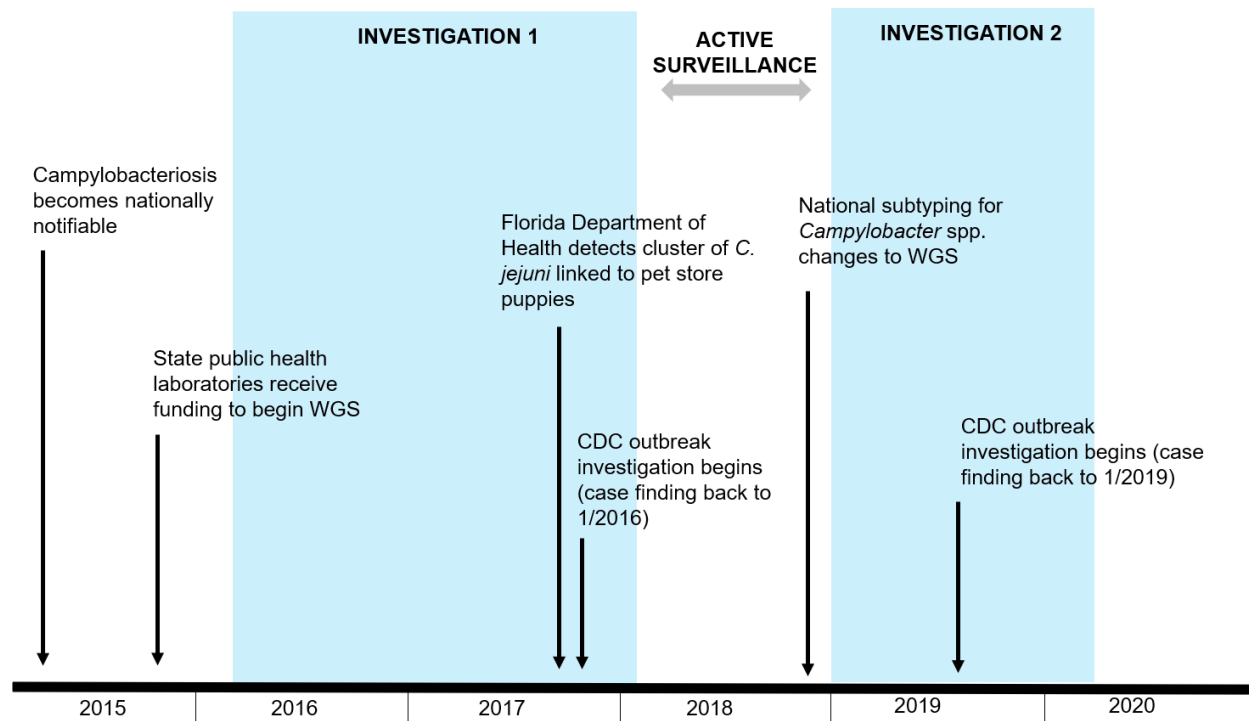
Strain	Source	Year	BioSample	Run
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2014AY-0122	Human	2014	SAMN08098208	SRR6354033
2015AY-0446	Human	2015	SAMN08098200	SRR6354030
2015AY-0648	Human	2015	SAMN08098206	SRR6354035
2015AY-1130	Human	2015	SAMN08098202	SRR6354020
2015AY-1290	Human	2015	SAMN08098205	SRR6354025
2016AY-0371	Human	2016	SAMN08098203	SRR6354019
2016AY-1256	Human	2016	SAMN08098204	SRR6354026
2017D-0132	Human	2017	SAMN07615386	SRR6014503
2017d-0136	Animal	2017	SAMN07504897	SRR6171584
2017d-0138	Animal	2017	SAMN07504895	SRR6171584
2017d-0139	Animal	2017	SAMN07504896	SRR6171587
2017d-0140	Animal	2017	SAMN07504898	SRR6171583
2017d-0163	Animal	2017	SAMN07674670	SRR6171585
2017d-0180	Human	2017	SAMN07605519	SRR6202903
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Cfsan070929	Animal	2017	SAMN07823471	SRS2631803
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Cfsan076607	Animal	2018	SAMN08624510	SRS3025470
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PNUSAC002518	Human	2017	SAMN07510042	SRR5937910

Strain	Source	Year	BioSample	Run
PNUSAC002574	Animal	2017	SAMN07504894	SRR5935033
PNUSAC002580	Animal	2017	SAMN07504900	SRR5935048
PNUSAC002743	Human	2017	SAMN07646583	SRR6048555
PNUSAC002744	Human	2017	SAMN07646584	SRR6048556
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PNUSAC003101	Human	2011	SAMN07967650	SRR6252249
PNUSAC003152	Human	2017	SAMN08014318	SRR6289219
PNUSAC003153	Human	2017	SAMN08014319	SRR6289213
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PNUSAC003172	Animal	2017	SAMN08016801	SRR6289215
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PNUSAC003814	Human	2018	SAMN08729633	SRR6856517
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Strain	Source	Year	BioSample	Run
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PNUSAC004272	Human	2018	SAMN09008083	SRR7089365
PNUSAC004317	Human	2018	SAMN09070521	SRR7118963
PNUSAC004406	Human	2018	SAMN09210563	SRR7166319
PNUSAC004536	Human	2018	SAMN09223455	SRR7182410
PNUSAC004639	Human	2018	SAMN09254485	SRR7214227
PNUSAC004666	Human	2018	SAMN09380202	SRR7276867
PNUSAC004860	Human	2018	SAMN09429079	SRR7346454
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PNUSAC005127	Human	2018	SAMN09671544	SRR7532444
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PNUSAC006544	Human	2018	SAMN10266281	SRR8083469
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PNUSAC007628	Human	2018	SAMN10714797	SRR8418787
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PNUSAC008091	Human	2019	SAMN11022492	SRR8632918
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PNUSAC009087	Human	2019	SAMN11490887	SRR8950402
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PNUSAC009606	Human	2019	SAMN14390643	SRR11321380
PNUSAC009659	Human	2019	SAMN14608373	SRR11557474
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Strain	Source	Year	BioSample	Run
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PNUSAC011331	Human	2019	SAMN12642726	SRR10024862
PNUSAC011593	Human	2019	SAMN12736016	SRR10103059
PNUSAC011649	Human	2019	SAMN12745436	SRR10116195
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**eFigure 1. Surveillance and investigation timeline—United States, 1996–2020**



NARMS = National Antimicrobial Resistance Monitoring System; WGS = whole genome sequencing. Highlighted regions show the time periods of two multistate investigations for *Campylobacter jejuni* infections linked to pet store puppies.

Information about surveillance practices can provide a framework for understanding the public health response to extensively drug-resistant *Campylobacter jejuni* infections linked to pet store puppies.

Before 2015, national surveillance for campylobacteriosis was conducted through three primary systems established in 1996: PulseNet, FoodNet, and NARMS. PulseNet (<http://www.cdc.gov/pulsenet>) is the national laboratory network responsible for detecting outbreaks by linking cases of enteric bacteria disease based on subtyping information submitted from state public health laboratories. Initially, pulsed-field gel electrophoresis (PFGE) was the primary subtyping method used by PulseNet. Few states performed PFGE on *Campylobacter* isolates before the early 2000s when *Campylobacter*-specific protocols were developed; practices varied by state, with many performing PFGE on only a subset of isolates and some not at all. FoodNet (Foodborne Diseases Active Surveillance Network (<http://www.cdc.gov/foodnet>)), is a laboratory-based surveillance system comprising sites in 10 states that cover approximately 15% of the U.S. population. FoodNet collects demographics, epidemiologic information, and outcome data about patients with *Campylobacter* infection. Public health laboratories affiliated with FoodNet sites submit of *Campylobacter* isolates to CDC's NARMS laboratory (<http://www.cdc.gov/narms>) for antibiotic susceptibility testing using a frequency-based sampling scheme.

In 2015, campylobacteriosis became nationally notifiable, a change that prompted some health departments to improve their surveillance programs. The same year, state public health laboratories received funding to begin implementing WGS of enteric pathogens, and by October 2018, core genome multilocus sequence typing (cgMLST) based on WGS replaced PFGE as PulseNet's primary subtyping modality for *Campylobacter* spp. Some state laboratories also sequenced older isolates, making it possible to identify related strains from earlier times.

However, challenges to *Campylobacter* surveillance have persisted. The organism can be difficult to culture and requires trained laboratory personnel. The increased availability of culture-independent PCR-based tests during the 2010s has had a dramatic impact on diagnostic testing. Many clinical and public health laboratories are not equipped to perform reflex culture of positive PCR tests, so many *Campylobacter* diagnoses do not result in an isolate (required for assessing relatedness to an outbreak strain or susceptibility testing). Not all states require isolates be submitted to state public health laboratories, and reporting delays often result in isolates being discarded by clinical laboratories before public health officials are aware of the case. Furthermore, although WGS holds great promise for improving outbreak detection, the process is costly; many public health laboratories cannot sequence all isolates due to resource constraints.



**eFigure 2. Traceback schematic showing breeder and distributor information for 13 puppies with an epidemiologic or laboratory link to a patient with extensively drug-resistant *Campylobacter jejuni* infection during Investigation 1 (January 2016–February 2018)**

