

## SUPPLEMENTAL MATERIAL

**Title:** Risks Shift Along Seafood Supply Chains

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Table S1. Public datasets analyzed in this study.

Agency	Name of Dataset	Years available online	Searchable database	Visualize data on website	One-click download able data	Data documentation	FOIA for this study	Ease of Use
CDC	National Outbreak Reporting System	1998 to 2018	yes	yes	yes	yes	no	A+
FDA	Import Alerts and Refusals	2002-present	no	no	no	limited	yes, 2010-2018 refusal value	C
USDA FSIS	Import Refusals	2015 to present	yes	no	no	yes	no	B
FDA CFSAN	Domestic Recall Information	2012 to present	yes	no	no	limited	yes	B+
USDA FSIS	Domestic Recall Information	2005 to present	yes	yes	yes	yes	no	A
CBP	USA Trade Online	1992 to present	yes	yes	yes	yes	no	A+
NOAA NMFS	Fisheries of the US	1999 to 2018	no	no	no	yes	no	B-

FOIA = Freedom of Information Act Request.  
 Agency acronyms defined in Figure 1.

Table S2. U.S. imports and refusals by country of origin and value for the top-30 exporters, total values for 2010 – 2018. Data sources: (US Census Bureau, 2020) and FDA FOIA.

Country	Total import Value (billion USD) <sup>a</sup>	% of total	Import refusal value (million USD) <sup>a</sup>	% of total
Canada	44.1	18%	5.4	1%
China	35.1	14%	108.7	21%
Chile	24.0	10%	9.2	2%
India	21.1	9%	34.1	7%
Indonesia	19.3	8%	69.9	13%
Vietnam	16.2	7%	63.1	12%
Ecuador	13.1	5%	15.6	3%
Thailand	11.3	5%	22.7	4%
Norway	8.64	4%	0.8	0%
Mexico	8.60	4%	4.4	1%
Japan	4.10	2%	2.9	1%
Peru	3.44	1%	25.5	5%
Russia	3.14	1%	0.4	0%
Argentina	2.88	1%	0.9	0%
Iceland	2.75	1%	0.1	0%
Philippines	2.22	1%	10.2	2%
Malaysia	1.91	1%	27.8	5%
Korea, South	1.81	1%	6.1	1%
Brazil	1.75	1%	25.4	5%
Honduras	1.48	1%	2.8	1%
Spain	1.24	1%	0.8	0%
Taiwan	1.22	1%	26.5	5%
United Kingdom	1.17	0%	0.5	0%
New Zealand	1.08	0%	0.5	0%
Faroe Islands	0.96	0%	0.0	0%
Bangladesh	0.89	0%	11.2	2%
Panama	0.80	0%	1.0	0%
Nicaragua	0.73	0%	5.5	1%
Costa Rica	0.68	0%	2.0	0%
Germany	0.60	0%	0.5	0%
Total (171 countries)	243.9	100%	524	100%

<sup>a</sup> Value = the price paid for merchandise excluding import duties, freight, and insurance. The top-30 countries represent 97% of import value and 93% import refusal value

Table S3. Share of supply and hazards by species. Data sources: (FDA, 2020a, 2020b; USDA, 2020; CDC, 2020a, 2020b; US Census Bureau, 2020).

Species	Imports		Supply <sup>a</sup>		Consumed	
	% of imports <sup>a</sup>	% import refusals <sup>b</sup>	% supply <sup>c</sup>	% recalls <sup>d</sup>	% supply <sup>c</sup>	% outbreaks <sup>e</sup>
anchovy	0.19	1.38	0.03	1.32	-	-
catfish	3.36	1.60	4.90	1.09	4.90	0.19
clam	0.38	0.10	1.09	1.66	1.09	1.69
cod	2.15	0.63	3.87	1.09	3.87	0.38
crab	8.37	5.64	3.47	3.74	3.47	1.69
crawfish	-	-	0.74	0.28	0.74	0.56
croaker	-	-	0.68	0.14	-	-
eel	0.02	3.62	0.09	0.14	-	-
fish	-	-	11.64	5.63	11.64	15.35
flounder	-	-	2.30	0.05	-	-
haddock	-	-	1.26	0.19	-	-
halibut	-	-	0.34	0.24	-	-
herring	0.30	0.27	0.19	5.44	-	-
lobster	6.60	5.55	1.17	2.37	1.17	0.47
mackerel	0.34	0.52	0.21	1.14	-	-
mahi mahi	0.13	12.81	-	-	-	-
mussels	-	-	1.22	0.43	1.22	1.32
n/a	-	3.47	0.72	1.94	0.72	0.75
ocean perch	-	-	0.41	0.05	-	-
octopus	0.64	2.02	0.05	0.28	-	-
oysters	0.17	0.65	0.64	5.11	0.64	24.9
perch	-	-	1.08	0.71	1.08	0.09
pollock	0.74	0.26	-	-	-	-
salmon	14.9	2.44	14.5	20.1	14.51	1.88
sardines	0.65	0.35	0.65	0.52	-	-
scallops	1.61	2.92	0.71	0.43	0.71	0.47
sea bass	-	-	0.92	0.09	0.92	0.38
seafood	-	-	2.34	2.51	-	-
shellfish	-	-	0.47	0.05	-	-
shrimp	29.5	23.9	14.3	7.95	14.3	2.07
snapper	0.56	3.25	-	-	-	-
squid	1.68	1.67	0.75	0.43	0.75	0.38
swordfish	0.42	1.21	-	-	-	-

swordfish	-	-	0.22	0.05	-	-
tilapia	4.74	3.62	9.69	1.56	9.69	0.28
trout	-	-	1.29	0.95	1.29	2.45
tuna	8.18	15.2	14.3	12.0	14.3	15.6
Total	85.6	93.0	96.3	79.6	87.0	70.9

<sup>a</sup> U.S. Customs and Border Protection, imports by value, based on totals for 2010 - 2018. Value = the price paid for merchandise excluding import duties, freight, and insurance.

<sup>b</sup> FDA import refusals by value, based on totals for 2010 - 2018

<sup>c</sup> NHANES per capita consumption, based on bi-annual surveys conducted from 2007 - 2016.

NHANES consumption was used in place of NFI's top-10 supply ranking to include a larger number of species. The relative frequencies of species in NFI and NHANES are similar.

<sup>d</sup> FDA and USDA seafood recalls by count, based on totals for 2003- 2018

<sup>e</sup> CDC seafood-related outbreaks by count, based on totals for 2002-2018

<sup>g</sup> Other = other aquatic animals, multiple species, and unnamed species

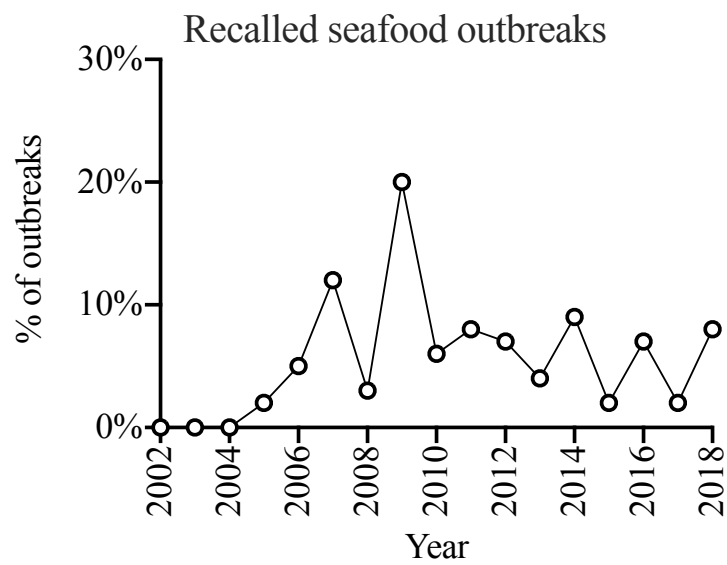
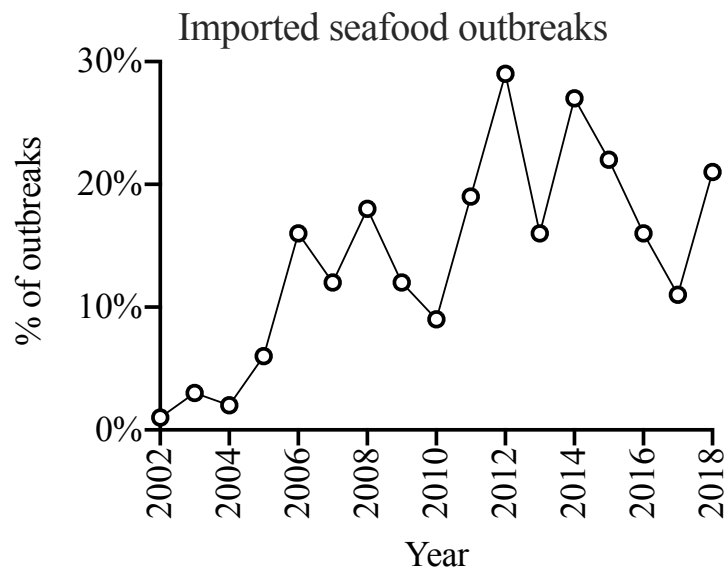


Figure S1. Seafood-related outbreaks from a) imported and b) recalled seafood. Data sources: (CDC, 2020b) and (Gould, 2017) for imported seafood outbreaks from 2002 to 2008.

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