

# SEAFOOD / AQUACULTURE PRODUCTS IN THE DIET: BENEFITS AND RISK

**Doris Hicks, Seafood Technology Specialist, and  
John Ewart, Aquaculture and Fisheries Specialist**

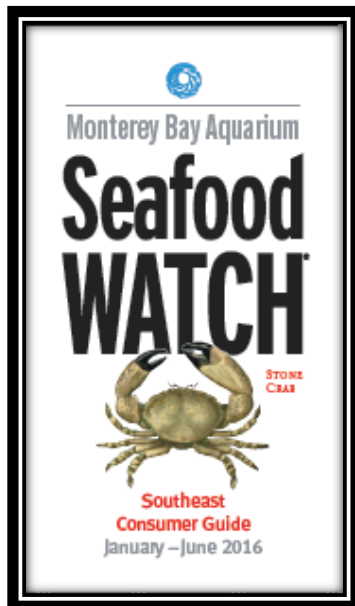
**University of Delaware Sea Grant Marine Advisory Service**

**2016 North Central Aquaculture Conference  
March 12-13, 2016 Milwaukee, Wisconsin**

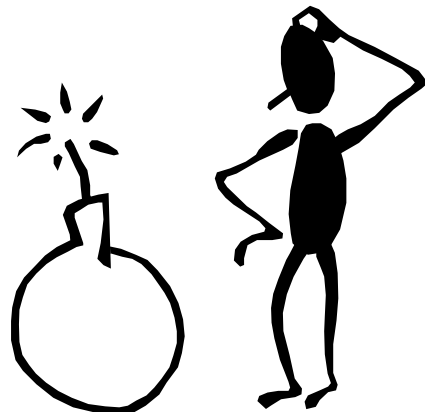


# Conflicting Messages – Who to Believe?

**FDA** U.S. Food and Drug Administration



**Mercury Contamination in Fish**  
A Guide to Staying Healthy and Fighting Back



## What Do The Colors Mean?



### Green - Best Choice

These species are from sources that are well-managed and caught or farmed in environmentally responsible ways.



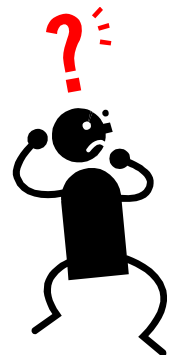
### Yellow - Good Alternative

These species are from fisheries or farms with good qualities but there are still some associated environmental concerns.



### Red - Unsustainable

These species are caught or farmed in ways that can cause harm to the environment.



# Risk-Benefit Assessment

## We Do it Everyday

**“...it is necessary always to bear in mind that any such attempt at analysis of risks only attacks one aspect of any problem – the risks of any event or action have only to be weighed against the costs and benefits.”**

**R Wilson and EAC Crouch 2001  
Risk-Benefit Analysis, Harvard  
University Press**

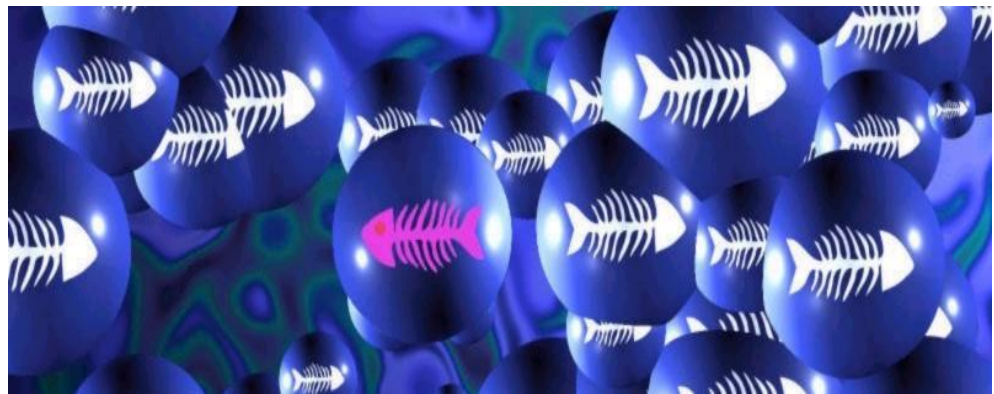
“Probably no food category has lent itself more to a risk-benefit comparison than seafood.”



# Health Hazards in Seafood

- \* Pathogens
- \* Marine toxins
- \* Allergens
- \* Persistent organic pollutants
- \* Heavy metals

While the most important human health risks in seafood are from pathogens, the risks that generates the most publicity is from mercury (Hg).



# Risk – Benefit Communication

- \* Necessary for any risk-benefit analysis of foods
- \* Needs to be science-based
- \* Needs to understand perceptions of target audience
- \* There is conflicting information and confusion among consumers
- \* How does the end user decide

However - You can't always control what is printed

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### CELEBRITY

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## DAILY GOSSIP ON TODAY'S CELEBRITIES



**ROB LOWE RETURNS TO WEST  
WING**



**FRIENDS ALUM RETURNS TO TV**



**OSU PROFESSOR GIVES OK  
TO EATING CONTAMINATED  
FISH**

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# Top 2016 Trend is “free from”

Finally settling down to my vegan, gluten free, soy free, antibiotics free, raw, non GMO, organic, fat free, low carb meal!



Joanne P. Ikeda, MA, RD  
Nutritionist Emeritus  
Department of Nutritional Sciences  
University of California, Berkeley

# US consumer survey

- \* The top food safety concern among Americans is no longer "foodborne illness," having been overtaken by "chemicals in food," according to the International Food Information Council (IFIC) Foundation's 2015 Food and Health Survey.
- \* However, when it comes to risks to consumers, foodborne illnesses are far and away the greater health concern.
- \* This year, 36 percent of Americans cited "chemicals in food," such as pesticide residues, as the most important food safety issue for them and their family, edging out "foodborne illness from bacteria" (34 percent). The increase in the number of people citing "chemicals in food" as their top concern is striking. Last year, only 23 percent of Americans chose that option.





**Which foods give you the most safety concerns? (N=850)**

- **Seafood 47%**
- **Meat 41.8%**
- **Prepared take-out 35.8%**
- **Fresh produce 24.7%**
- **Dairy 24.6%**
- **Canned foods 13.6%**



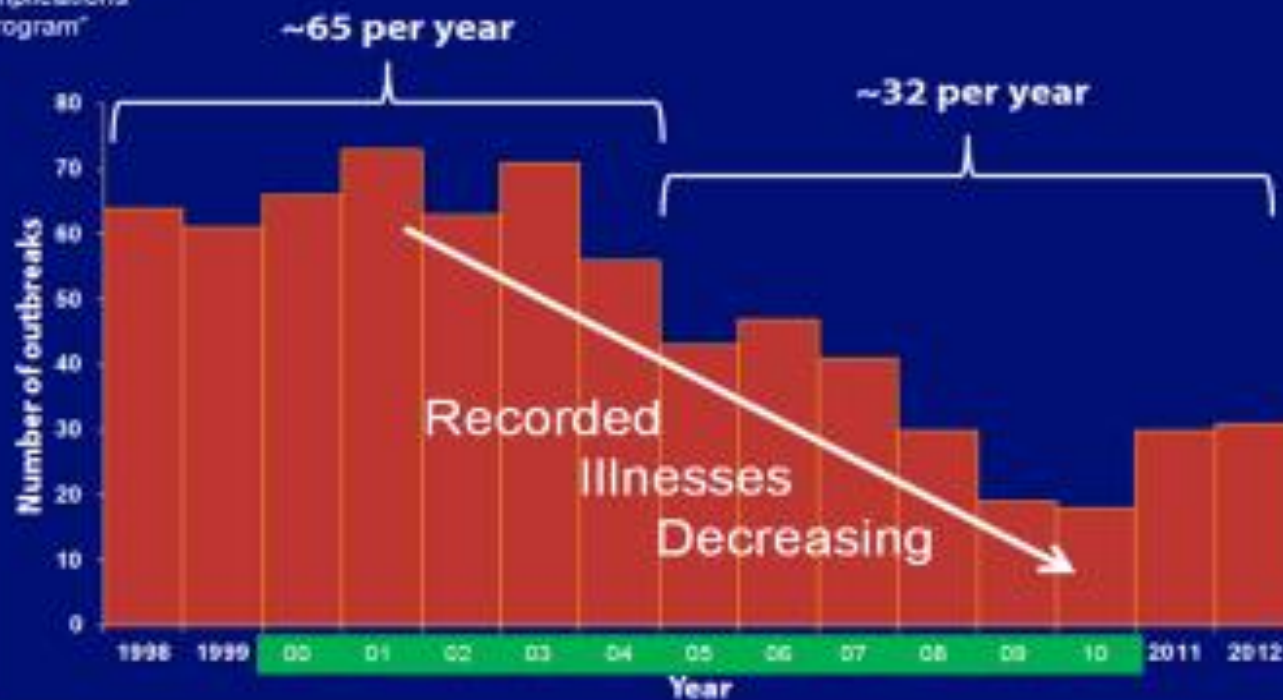
- **GAA-Fishin' Company Survey finds consumer unfamiliar with farm-raised product.**
- **47% of 500 survey respondents had a negative perception of farmed seafood – due to quality, food-safety concerns and environmental issues.**
- **However this did not mean they would not purchase – only 5% said they would only buy wild seafood.**

**Source:** BroodTALK blog by Steven Hedlund (GAA's Communication Manager) 9/11/15.

# AQUACULTURE Disease Management / Food Safety

## Fish-Attributed Outbreaks by Year, United States, 1998–2012

CDC Presentation  
Aug 13, 2014  
Baltimore, MD  
"Implications  
Program"



# Growing Fish and Shellfish

- \* The aquaculture industry will be a chief food producer alongside industrial agriculture. Cargill's decisions mesh with reports by the *World Bank* that estimate how 62 percent of all fish eaten in 2030 will be farm raised. (SeafoodNews.com September 14, 2015 Monday)



# Seafood Survey

## FARMED v. WILD

500 CONSUMERS WERE ASKED WHAT MATTERED MOST WHEN PURCHASING SEAFOOD. HERE'S WHAT THEY SAID.



### Wild things

"I consider wild fish to be healthy, and I have some safety concerns over farmed fish."  
— Male New Yorker, 30 years old



POSITIVE VIEW OF WILD SEAFOOD

88%

29% preferred wild fish

### Confusion at the counter

What is your preferred choice, farmed or wild seafood?

Either no preference or no idea

57%



POSITIVE VIEW OF FARMED SEAFOOD

53%

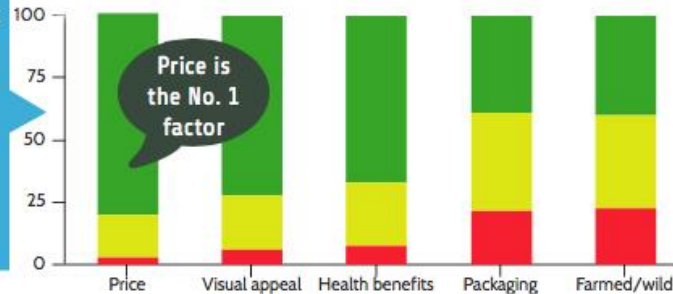
15% preferred farmed fish

### What matters most when buying seafood?

Most important

Somewhat important

Slightly/not important



Source: The Fishin' Co. and the Global Aquaculture Alliance



# 2015-2020 Dietary Guidelines for Americans at a Glance

## Key Recommendations

The Dietary Guidelines' Key Recommendations for healthy eating patterns should be applied in their entirety, given the interconnected relationship that each dietary component can have with others.

Consume a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level.

### A healthy eating pattern includes:

- \* A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other
- \* Fruits, especially whole fruits
- \* Grains, at least half of which are whole grains
- \* Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages
- \* A variety of protein foods, including **seafood**, lean meats and poultry, eggs, legumes (beans and peas), and nuts, seeds, and soy products
- \* Oils





# Fish: What Pregnant Women and Parents Should Know

## Draft Updated Advice by FDA and EPA

### June 2014

#### Key Message

- \* **Eat 8 to 12 ounces of a variety of fish\*** each week from choices that are lower in mercury. The nutritional value of fish is important during growth and development before birth, in early infancy for breastfed infants, and in childhood.

#### Who should know

- \* Women who are pregnant (or might become pregnant) or breastfeeding. Anyone who feeds young children.

<http://www.fda.gov/Food/FoodbornIllnessContaminants/Metals/ucm393070.htm#top>

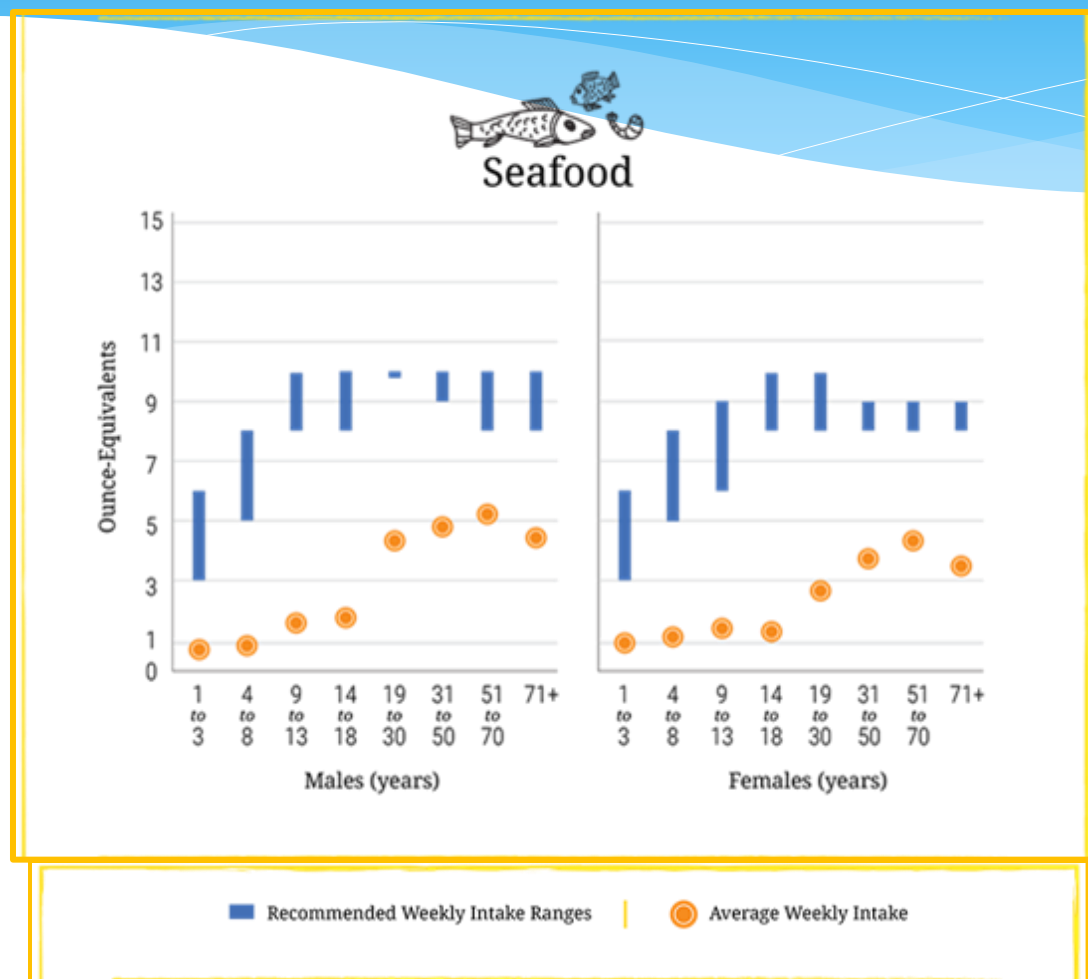
**Note** \*This advice refers to fish and shellfish collectively as “fish.”

#### What to do

- 1. Eat 8-12 ounces of a variety of fish a week.**
  - \* That's 2 or 3 servings of fish a week.
  - \* For young children, give them 2 or 3 servings of fish a week with the portion right for the child's age and calorie needs.
- 2. Choose fish lower in mercury.**
- 3. Avoid 4 types of fish: tilefish from the Gulf of Mexico, shark, swordfish, and king mackerel.**
  - \* These 4 types of fish are highest in mercury.
  - \* Limit white (albacore) tuna to 6 ounces a week.
- 4. When eating fish you or others have caught from streams, rivers, and lakes, pay attention to fish advisories on those waterbodies.**
- 5. When adding more fish to your diet, be sure to stay within your calorie needs.**

**Why this advice is important** - Fish contains important nutrients for developing fetuses, infants who are breastfed, and young children. Fish provides health benefits for the general public. Many people do not currently eat the recommended amount of fish.

# Average Seafood Intakes in Ounce-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intake



<http://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/#callout-nutrient-dense>

# http://seafoodhealthfacts.org/ Launched September, 2011



**Seafood Health Facts: Making Smart Choices**  
Balancing the Benefits and Risks of Seafood Consumption  
*Resources for Healthcare Providers and Patients*

A joint project of Oregon State University, Cornell University, and the Universities of Delaware, Rhode Island, Florida and California.

[Home](#) [Site Overview](#) [Seafood Choices](#) [Seafood & Nutrition](#) [Seafood Safety](#) [Compare Benefits & Risks](#) [Seafood Q & A](#)



**FACT:** The mercury levels in salmon are often so low as to be undetectable.

**Welcome to SeafoodHealthFacts.org**

**Overview: Eat Seafood Twice a Week**  
Current advice from the government and health organizations recommends eating two seafood meals each week. Scientists from government and universities, and healthcare professionals from all over the world have concluded that the most people the overall benefits of this level of seafood consumption outweigh potential food safety risks.

**Nutritional Benefits**  
Seafood is a nutrient rich food that is a good source of protein, vitamins and minerals. Scientific studies continue to explore the relationship between the unique type of fat found in seafood, the omega-3 fatty acids DHA and EPA, in the prevention or mitigation of common chronic diseases. Click on the "Seafood and Nutrition" tab to learn more.

**Food Safety**  
Like other perishable foods, food borne illness caused by microorganisms or naturally occurring toxins is the primary food safety risk associated with seafood. Illness is usually associated with improper harvesting, handling, storage or preparation. Those seafood products that are consumed raw or partially cooked represent the highest risk. Other risks associated with environmental contaminants could be a concern for some individuals especially those who catch and eat their own fish or shellfish from lakes, rivers, streams or bays or harvesters that are contaminated by environmental pollutants. Click on the "Seafood Safety" tab to learn more.

**Compare Risks and Benefits**  
Risks associated with seafood are as diverse as the commodity itself. Fish and shellfish can come from the wild, from fish farms, and from individuals who catch fish for recreation or to supplement their household food supply. Click on the "Seafood Risks and Benefits" tab to learn more.

**Site Map and Overview**  
This website is designed to provide science based information to help individuals and healthcare professionals understand both the benefits and the risks that could be associated with seafood. This information is organized to provide useful resources for:

- consumers who are interested in overview information,
- healthcare professionals who are seeking more detailed information, and
- researchers interested in original scientific publications or government reports.

**NEWS & FEATURED ARTICLES**  

July 8, 2011  
[Fastlane: The New England Seafood Reporters for Continued on September 20-21, 2011, University of Delaware](#)

February 9, 2011  
[Eat for a Healthy Heart: New FDA Guidance Issued](#)

January 31, 2011  
[FDA Announces New Dietary Guidelines for Americans 2010](#)

November 15, 2010  
[Hawaii Seafood, Sustainable: Mitigate some of Seafood Health Benefits and Risks](#)

**PUBLICATIONS FOR CONSUMERS OR PATIENTS**  

[Seafood for Health \(Two Page Trifold Brochure\)](#)

[Seafood for Health \(Two Page 8.5 x 11 FactSheet\)](#)


[Seafood for Health \(Two Page 8.5 x 16 Four Color Brochure\)](#)

**PUBLICATIONS FOR HEALTH CARE PROFESSIONALS**  

[Seafood for Health Reference Guide \(Six Page 8.5 x 11 FactSheet\)](#)


[Seafood for Health Summary Guide \(Two Page 8.5 x 11 FactSheet\)](#)


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**Seafood Health Facts: Making Smart Choices**  
Balancing the Benefits and Risks of Seafood Consumption  
*Resources for Healthcare Providers and Patients • seafoodhealthfacts.org*

A joint project of Oregon State University, Cornell University, and the Universities of Delaware, Rhode Island, Florida and California.

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**Patients and Consumers**

**Healthcare Professionals**

**Scientific Publications and References**

**Seafood Safety**

**General Information for Healthcare Professionals**

These resources are for professionals who wish to have a more detailed explanation of the major concepts summarized in publications for the general public, but who do not have the time or desire to read journal articles or lengthy scientific publications. This content is generally in the format of short fact sheets, position papers or articles intended for a professional audience.


**Seafood Safety Overview**  
A summary of current knowledge and advice on food safety issues associated with seafood products.

**Guide to Selecting Seafood**  
This section provides practical advice for consumers to evaluate the quality and safety of seafood products when purchasing them in retail stores or restaurants.

**Seafood Handling and Storage**  
This publication provides practical advice for transportation, storage and preparation of seafood products to ensure safety and maximize quality.

**Seafood Safety Issues for Specific Products**  
This section contains information on potential food safety concerns for certain types of seafood products including: raw molluscan shellfish; ready-to-eat products; and recreationally caught fish and shellfish.

**Seafood Safety Topics**  
Information is provided on specific food safety hazards that can be associated with seafood and other perishable foods; including: microbial pathogens; parasites; natural toxins; man-made pollutants; and mercury.

**Healthcare Professionals**

# Framing the Message About Seafood

A Conference  
About Communicating  
Seafood Safety



This workshop was partially funded by a grant from USDA NIFA Grant No. 2010-51110-21077.

# Final Launch – February, 2012

Designed for Consumers & Health Care Professionals

The screenshot shows the homepage of the Seafood Health Facts website. At the top, there is a blue header with the website's logo (a stylized fish) and the title "Seafood Health Facts: Making Smart Choices Balancing the Benefits and Risks of Seafood Consumption". Below the title, it says "Resources for Healthcare Providers and Patients". A line of text below the header identifies it as a joint project of Oregon State University, Cornell University, the Universities of Delaware, Rhode Island, Florida & California and the Community Seafood Initiative. The main navigation bar is orange and includes links for Home, Site Overview, Seafood Choices, Seafood & Nutrition, Seafood Safety, Compare Benefits & Risks, and Seafood Q & A. Below the navigation bar, there is a large image of mussels. To the right of the mussels, there is a vertical stack of orange buttons: "Patients and Consumers", "Healthcare Professionals", "Scientific Publications and References", and a larger button that says "HERE to customize your seafood consumption information". Below the mussels image, there is a text box that reads: "FACT: Mussels are rich in iron, manganese, phosphorous, selenium, zinc and vitamins C and B12." Below this, there is a section titled "Welcome to SeafoodHealthFacts.org" with a sub-header "Overview: Eat Seafood Twice a Week". The text in this section states: "Current advice from the government and health organizations recommends eating two seafood meals each week. Scientists from government and universities, and healthcare professionals have all concluded that for most people the overall benefits of this level of seafood consumption outweigh potential food safety risks." To the right of this section, there is a blue box titled "NEWS & FEATURED ARTICLES" with a sub-header "September 2011". The text in this section reads: "Fish Mercury and Nutrition: The Net Effects, Seafood benefits and risks are put into perspective on a new Website from NOAA and the University of North Dakota Energy and Environmental".

**Seafood Health Facts: Making Smart Choices**  
Balancing the Benefits and Risks of Seafood Consumption  
*Resources for Healthcare Providers and Patients*

A joint project of Oregon State University, Cornell University, the Universities of Delaware, Rhode Island, Florida & California and the Community Seafood Initiative.

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Patients and Consumers  
Healthcare Professionals  
Scientific Publications and References  
**HERE to customize your seafood consumption information**

**FACT:** Mussels are rich in iron, manganese, phosphorous, selenium, zinc and vitamins C and B12.

**Welcome to SeafoodHealthFacts.org**

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**NEWS & FEATURED ARTICLES**

**September 2011**

Fish Mercury and Nutrition: The Net Effects, Seafood benefits and risks are put into perspective on a new Website from NOAA and the University of North Dakota Energy and Environmental

User-friendly, comprehensive website with three levels of content:

1. Consumers/General Public (summary information for “waders”).
2. Health Care Professionals (more background info for “swimmers”).
3. Scientific References (for doctors or others who want references “divers”)







**CLICK HERE to Customize Your Seafood Consumption  
Information**



# Seafood Issues

## Customize Your Seafood Consumption Information

### Seafood and Health

#### **Seafood and Health**

Current dietary guidelines suggest that all Americans should eat 2 to 3 seafood meals per week (8 to 12 ounces) of a variety of different seafood products.

**Click on the box to the left to learn how to maximize benefits and minimize risk based on the amount and type of seafood you eat.**

### Seafood Sustainability

#### **Seafood Sustainability**

Issues related to fisheries management and the sustainability of ocean resources are important for many people.

**Click on the box to the left to learn about the NOAA Fish Watch site and sustainability issues.**

### Seafood Choices and Market Issues

#### **Seafood Choices and Market Issues**

Issues related to seafood choices, where seafood comes from, and how the marketplace works and is regulated are important for many people.

**Click on the box to the left to learn more.**



# Seafoodhealthfacts.org



CLICK HERE  
to customize your  
seafood consumption  
information

## Seafood and Health



### Download PDF

To maximize the health benefits and minimize potential risks based on the amount and type of seafood you eat, begin by clicking on the box below that best describes how much seafood you eat.

For reference, a meal is generally considered to be a 3 to 4 ounce cooked portion of fish or shellfish.

A 3 ounce portion of boneless fish or shellfish meat is about the size of a deck of cards.

A small can of drained tuna is approximately 3 to 4 ounces.

A salmon steak about 4 to 6 ounces.

The number of shrimp for a 3 to 4 ounce portion will vary depending on their size or the number per pound. If there are about 20 shrimp per pound, then a 3 to 4 ounce portion would be about 4 cooked shrimp, 6 cooked shrimp at 30 per pound, or 8 cooked shrimp at 40 per pound.

Less Than

Same As

More Than

### EAT LESS THAN...

You indicated that you eat less than the currently recommended amount of seafood 2 to 3 meals (8 to 12 ounces) per week. You now need to select one or more options that describe the type of seafood you eat or your status in a special group.



If you eat seafood that you purchase in retail stores or restaurants click on this box.

Learn More



If you frequently or sometimes eat recreational fish click on this box.

Learn More



If you are pregnant, breast feeding, plan to become pregnant, or have children under 12 years of age click on this box.

Learn More

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# How to eat more seafood



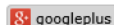
## Seafood Health Facts: Making Smart Choices Balancing the Benefits and Risks of Seafood Consumption *Resources for Healthcare Providers and Consumers*

A joint project of Oregon State University, Cornell University, the Universities of Delaware, Rhode Island, Florida & California and the Community Seafood Initiative.

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[HOME](#) / [CONSUME LESS THAN THE RECOMMENDED AMOUNT FROM RETAIL OUTLETS](#)

## Consume Less Than The Recommended Amount from Retail Outlets

[Share](#)[Tweet](#)[Pinterest](#)[googleplus](#)[Email](#)[Download PDF](#)

### Your Customized Advice

**Your Goal** is to try to eat more seafood. Eat 2 to 3 seafood meals each week. Choose a variety of different kinds of fish and shellfish from retail stores and restaurants that is prepared in healthy ways.

Seafood contains special healthy fats called omega-3s that are good for your heart and brain. This is why dietary guidelines recommend that you eat 2 to 3 seafood meals (8 to 12 ounces) each week. Age appropriate portions should be served to children.

All fish and shellfish contain omega-3s, but some types have more. To maximize health benefits, continue to eat the types of fish and shellfish you enjoy but try to eat fish like salmon, herring, mackerel, mussels, trout and sardines more often because they contain more omega-3s.

Potential food safety risks are minimal if you eat a variety of different seafood products purchased from retail stores and restaurants and cook them thoroughly. Select recipes or menu items with healthy ingredients and use cooking methods that do not add fat, calories or sodium.

If you eat recreationally caught fish or are pregnant, planning to become pregnant or have an infant or young children, click on the appropriate boxes in the diagram above for additional advice.

### Customized Resources for More Information

Use the links below to obtain more information on seafood nutrition, omega-3s, healthy preparation methods, seafood choices, handling seafood and eating raw seafood products.



[Click here to learn more about seafood nutrition and the health benefits of omega-3s.](#)

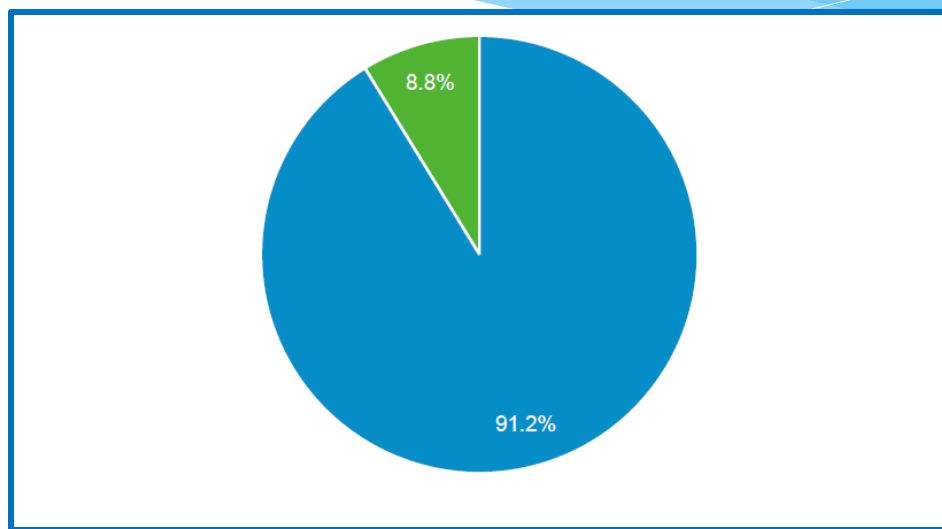


#### MENU

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# New versus Returning

## 1/20/16 – 2/19/16



	49,579 % of Total: 100.00% (49,579)	49,579 % of Total: 100.00% (49,579)
1. ■ New Visitor	45,226	91.22%
2. ■ Returning Visitor	4,353	8.78%

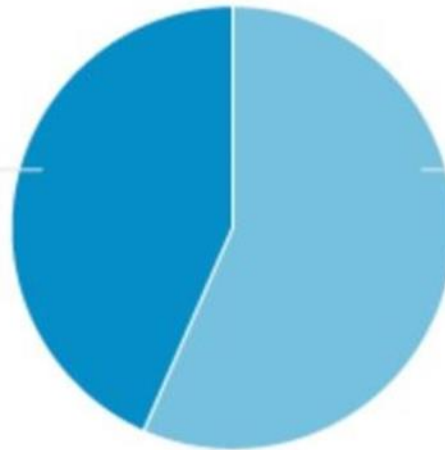
# Gender

1/20/16 – 2/19/16

## Gender

100% of total sessions

45.85%  
Female

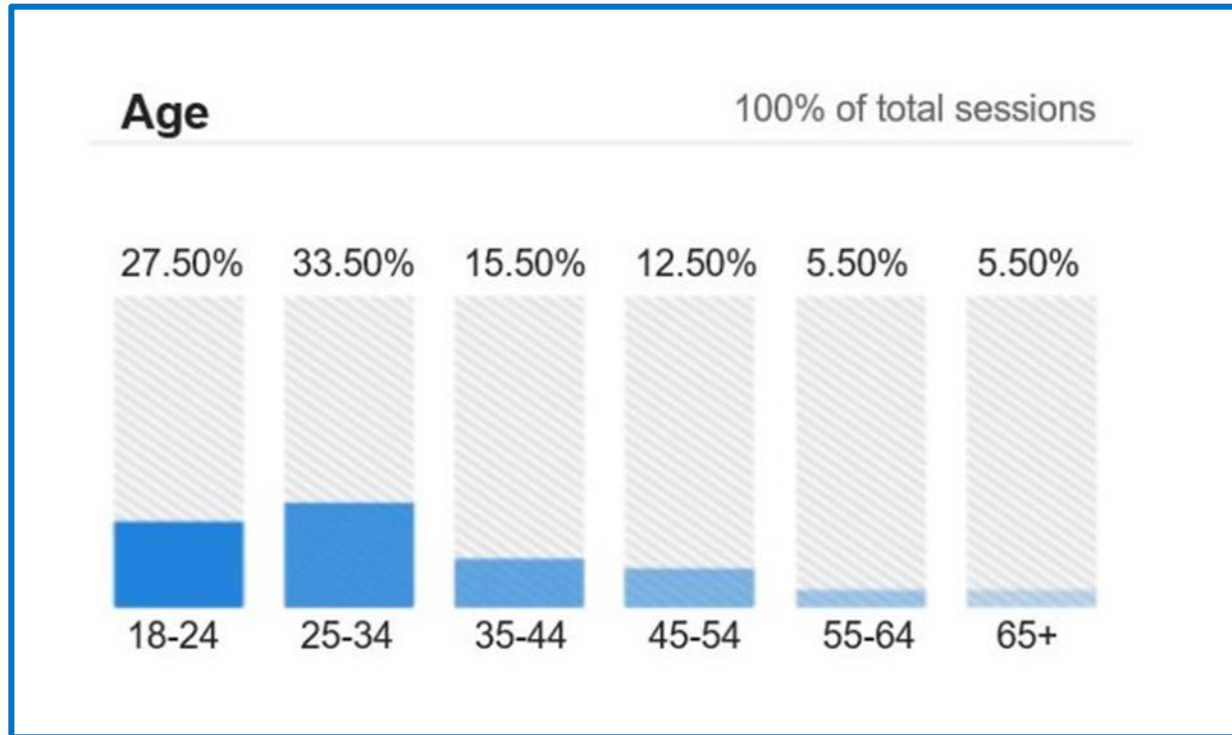


54.15%  
Male



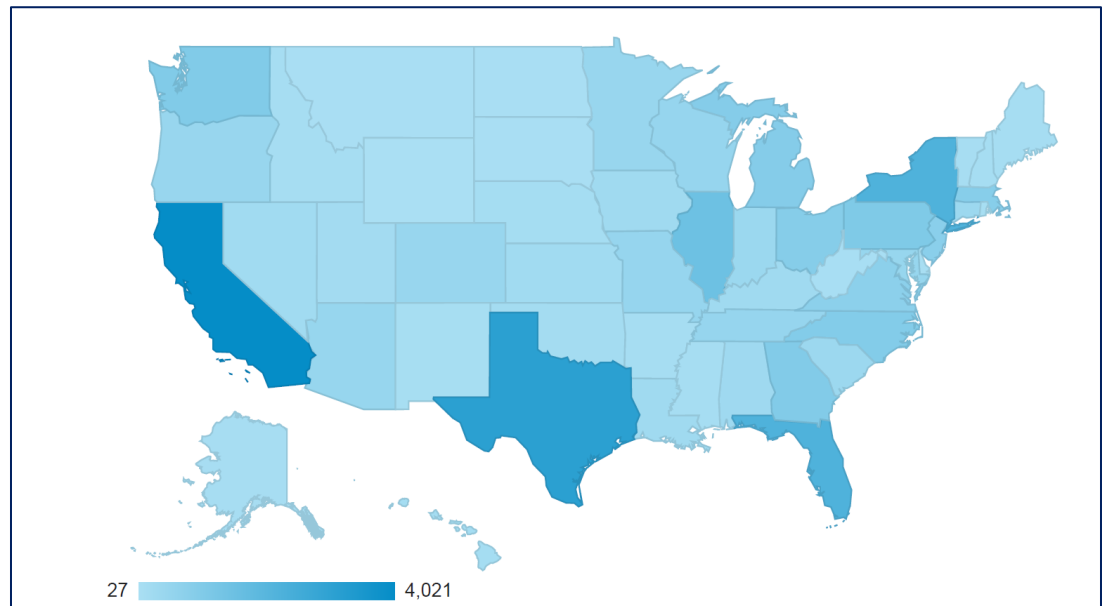
# Age of Visitors

1/20/16 – 2/19/16



# States in the U.S.

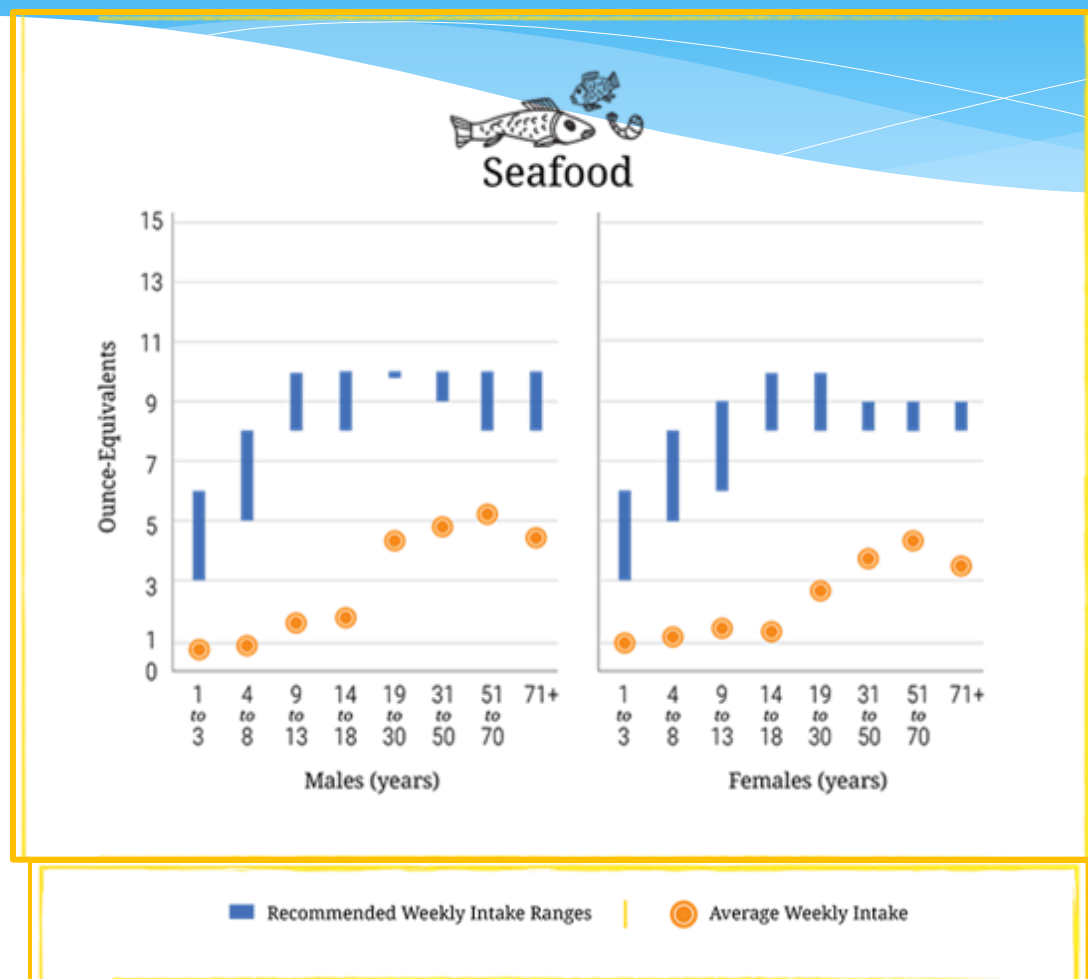
1. California	4,021 (13.11%)
2. Texas	3,106 (10.13%)
3. Florida	2,224 (7.25%)
4. New York	2,219 (7.23%)
5. Illinois	1,504 (4.90%)
6. Pennsylvania	1,074 (3.50%)
7. Washington	1,021 (3.33%)
8. Georgia	992 (3.23%)
9. North Carolina	970 (3.16%)
10. Michigan	929 (3.03%)
11. Ohio	902 (2.94%)
12. Massachusetts	866 (2.82%)
13. New Jersey	793 (2.59%)
14. Virginia	746 (2.43%)



# Top Countries

1.	United States	<b>30,675</b> (61.87%)
2.	United Kingdom	<b>4,474</b> (9.02%)
3.	Canada	<b>3,269</b> (6.59%)
4.	Australia	<b>1,168</b> (2.36%)
5.	India	<b>1,132</b> (2.28%)
6.	Philippines	<b>877</b> (1.77%)
7.	Singapore	<b>573</b> (1.16%)
8.	Pakistan	<b>478</b> (0.96%)
9.	South Africa	<b>343</b> (0.69%)
10.	Malaysia	<b>332</b> (0.67%)
11.	Ireland	<b>331</b> (0.67%)
12.	Netherlands	<b>325</b> (0.66%)

# Average Seafood Intakes in Ounce-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intake



<http://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/#callout-nutrient-dense>

# Eat Seafood

## 3 REASONS IS ALL YOU NEED

**M**ost people feel good about seafood – they'll agree that it's good for their health, it's a perfect choice when they want something special, or they love how it tastes. Despite this, few people are eating seafood at home on a regular basis – only one in 10 consumers meet the goal of having seafood two times per week.<sup>1</sup> To help consumers make the leap, give them these three reasons:



***Eat seafood...  
live longer***

- Eating fish literally saves lives. It is estimated that an additional 50,000 deaths from heart disease and stroke are avoided per year by eating fish.<sup>2</sup>
- Eating seafood two to three times per week reduces the risk of death from any health-related cause by 17 percent.<sup>3</sup>
- Seafood has essential omega-3s. Low seafood intake contributes to 84,000 deaths each year, making seafood deficiency a leading dietary contributor to preventable death in the U.S.<sup>4</sup>



***Seafood is a  
“protein with benefits”***

- Seafood sits among the highest-quality proteins (like eggs, meats, poultry, dairy) and offers additional health benefits. It can reduce your risk of heart disease by 36 percent, improve how you feel during pregnancy and help your child develop a healthy brain and eyes, and improve memory and sharpness in older adults.<sup>3,5,6</sup>
- As a “protein with benefits,” the USDA recommends that Americans eat seafood twice a week.<sup>1</sup>



***Seafood is delicious,  
versatile, budget-friendly,  
and fast***

- From delicate, mild flounder to rich, flavorful salmon, or sweet and savory shrimp, seafood can please any palate.
- Seafood fits with all of your favorite flavors – it can be incorporated into a spicy Latin dish, flavorful Creole recipe, light and refreshing salad, or a rich Italian pasta bowl.
- Fresh, local, seasonal catches are easy on the wallet, as are frozen options and canned seafood, like tuna or salmon.
- From start to finish, fresh, frozen, or canned seafood can make a meal in 15 minutes or less.

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The Seafood Nutrition Partnership's mission is to inspire a healthier America by raising awareness about the health benefits of seafood.  
[SeafoodNutrition.org](http://SeafoodNutrition.org)

# Questions?



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# SEAFOOD / AQUACULTURE PRODUCTS IN THE DIET: BENEFITS AND RISK

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