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Communicating Dietary Seafood Advice to Pregnant Women

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EXECUTIVE SUMMARY

The goal of this study was to improve our understanding of how to effectively communicate seafood consumption guidelines to encourage pregnant women to eat recommended amounts of seafood. We began by reviewing recent literature on how to communicate seafood consumption guidelines for women of childbearing age, especially pregnant women. We then conducted three focus groups with pregnant women and recently pregnant women across the U.S. to better understand how women: a) perceive barriers to consuming seafood and how those barriers might be overcome; b) interpret messages with gain versus loss framing of health benefits; c) interpret an "Eat Seafood" message vs. an "Eat Lower-mercury Seafood" message; and d) interpret seafood consumption guidelines organized in consumption categories.

We found that focus group participants identified most of the barriers to eating seafood previously reported in the literature (e.g., cost, smell, lack of knowledge to prepare seafood). Some women also reported barriers specifically when they were pregnant, including reducing or eliminating consumption of seafood due to concerns about mercury in seafood.

When asked about gain-framed statements emphasizing the benefits of seafood consumption versus loss-framed statements emphasizing the consequences of not eating enough seafood, we found women preferred the gain-framed statements. No participants indicated they preferred the loss-framed statements. Further, many women indicated the gain-framed statements would encourage them to eat seafood and increase their consumption. A few women indicated the loss-framed statements might scare them into eating more seafood. These findings suggest effective communications might emphasize gain-framed messages about health benefits because they appear to be preferred by women and may change behavior in a desired direction. Use of loss-framed messages may be warranted in contexts where "scaring" women into following consumption recommendations may be appropriate.

To encourage consumption of the recommended amount of seafood while limiting the consumption of mercury, we examined how women in the focus groups responded to a message simply encouraging seafood consumption vs. a message encouraging eating lower-mercury seafood. We found that some women preferred the "eat seafood" statement with no mention of mercury in part because they believe when mercury is mentioned it scares some women away from eating seafood. Other women indicated the "eat seafood" statement would make them more likely to eat seafood, but would then make them wonder if their choice of seafood would be best for their baby. The "eat lower-mercury seafood" message was preferred by some women because it recognizes that mercury occurs in some seafood and guides women to select types of seafood lower in mercury. We found no clear preference for one message over the other among focus group participants.

Consumption recommendations may vary in the number of recommended consumption categories and the number of species listed in each category. We found some focus group participants preferred shorter lists because of their clarity and ease of use. Many women preferred longer lists because they provided more options and could presumably be used by women across the United States. These findings suggest using a layered approach to communication might be helpful by providing short, dichotomous lists of best seafood to eat and seafood to be avoided followed by a link to a longer, more complete list of recommended seafood to be eaten and seafood that should be avoided.

Although our research was not focused on understanding the importance of trusted sources of information to women, the topic came up repeatedly in the discussions. It is clear women value information coming from a trusted source, usually mentioning health care professionals in this context.

Several other issues appeared during the focus groups, which may warrant further study. First, some women wondered how to weigh the benefits of omega-3s versus the risks of mercury when making decisions about seafood consumption. Research might be conducted to test messages framed around "net-effects," which characterize the overall health effects of fish consumption based on analysis of both the risks and benefits. Second, some women wondered why their prenatal supplements containing omega-3s could not be substituted for seafood consumption. Messages could be tested that explain the benefits of consuming whole foods versus supplements. Third, there was confusion among some women regarding tuna consumption given that there are different types of tuna with different recommendations. Message testing focused on specific recommendations for tuna may be warranted.

Finally, at the end of the report we make recommendations for best practices for communicating about seafood consumption with women of childbearing age, especially pregnant women, based on the literature and our focus group findings.

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INTRODUCTION

Recent research has found that many women of childbearing age, and pregnant and nursing women in particular, do not consume enough fish to derive optimal health benefits for themselves and their babies (Lando et al. 2012, Connelly et al. 2014, 2016). Hibbeln et al. (2019) demonstrated that improved neurocognitive development in women's offspring was among the primary benefits of seafood consumption by pregnant women. The goal of this study was to improve our understanding of how to effectively communicate seafood consumption guidelines to encourage pregnant women to eat recommended amounts of seafood.

The objectives of the study were to:

- Review current literature on how to communicate seafood consumption guidelines for women of childbearing age, especially pregnant women.
- Conduct three focus groups with pregnant women and recently pregnant women to better understand how women: a) perceive barriers to consuming seafood and how those barriers might be overcome; b) interpret gain versus loss framing of health benefits; c) interpret an "Eat Seafood" message vs. an "Eat Lower-mercury Seafood" message; and d) interpret seafood consumption guidelines organized in consumption categories.
- Make recommendations based on the literature and focus group results for best practices for communicating seafood consumption advice to encourage pregnant women to eat seafood at recommended amounts.

This report has three main sections following the objectives above. First, we synthesize results from the most recent research on communication about seafood consumption with women of childbearing age, particularly pregnant women. Second, we provide information on focus group topics, methods, and results. Finally, we make recommendations for best practices for communicating with women of childbearing age, especially pregnant women, based on the literature and our focus group findings.

RECENT LITERATURE

In this section, we review current literature on how to effectively communicate seafood consumption guidelines with women of childbearing age, especially pregnant women. We focus first on two review publications that summarize the literature up to 2013-14 (Lauber et al. 2013, Lando and Lo 2014). Then, we review the literature from 2013-14 to present. The current literature is grouped by topic area (message content and format, distribution methods, and barriers) and then chronologically within topic area.

Review publications

Lauber et al. (2013) conducted a literature review and survey of members of the Great Lakes Consortium for Fish Consumption Advisories to synthesize existing knowledge from the literature and practitioners about effective fish consumption advisory communication. They found a number of recommendations that were common to both practitioners and the literature including suggesting advisory messages be communicated in multiple ways and from trusted and credible sources. They also found several recommendations regarding advisory message content that were common to both practitioners and the literature:

- Be simple and straightforward.
- Provide information on both the benefits and risks of fish consumption, emphasizing positive messages.
- Enable target audiences to make informed choices about eating fish.

Lando and Lo (2014) provide a good review of recent research and recommendations for how best to communicate with pregnant women about both the benefits and risks associated with fish consumption during pregnancy. They suggest that it is "important to provide women with concrete advice about how the risks of methylmercury exposure can be managed, such as by providing a list of the safest kinds of fish that pregnant women can find in their grocery stores, so that fears about mercury do not seem unmanageable or otherwise overshadow the benefits of fish consumption (p. 90)." Further, they identify health care providers as a trusted source of information for pregnant women, who therefore play an important role in communicating with women about the risks and benefits of fish consumption.

Studies focused on message content and format

Personal narratives. To examine the effect of providing fish consumption recommendations via a short narrative simulating the personal experiences of a pregnant woman/new mother, women of childbearing age (WCBA) who lived in the Great Lakes region and possessed a fishing license were recruited to participate in a two-wave longitudinal experiment (Niederdeppe et al. 2019). They reported their fish consumption in summer 2014 and summer 2015 via an online diary and were randomly selected to receive a brochure containing the short personal narrative prior to the second summer. Exposure to the brochure that included the narrative helped move fish consumption of women whose baseline levels of fish consumption were furthest from federal recommendations closer to those guidelines. Niederdeppe et al. concluded that narratives hold promise as a means to communicate effectively about the benefits and risks of fish consumption for WCBA.

Guideline complexity. Taylor et al. (2018) compared and contrasted the content and presentation of national guidelines on fish consumption for pregnant women. They concluded the complexity of the guidelines might lead some pregnant women to reduce their fish intake. They recommended that future guidelines should be clear and memorable, and might include visual rather than narrative content. They suggested the use of apps to enable women to record their fish consumption in real time and measure compliance with guidelines.

Nutritional values. McLean Pirkle et al. (2015) surveyed pregnant women in Bermuda to assess whether changes in their fish eating patterns during pregnancy were consistent with public health messages. They found that public health messages advocating reduced consumption of larger, higher mercury-containing fish species appeared to be effective, but also resulted in a reduced consumption of small fish species, with low mercury concentrations. They concluded that public health messages may need to be modified so that women understand the nutritional value of consuming smaller, low mercury fish.

Health benefits. Connelly et al. (2014) conducted a two-part study to better understand what might be done to encourage women of childbearing age to eat healthy fish—a mail survey of women who recently gave birth in Minnesota, Wisconsin, and Pennsylvania, and six focus groups with women of childbearing age living in the Great Lakes region. From the survey of women who recently gave birth, they found that women who believed that eating fish was good for the baby were more likely to be trying to follow the recommendations for healthy fish consumption. From focus group participants, they found that messages about the specific health benefits of fish consumption for their children were particularly influential.

Knowledge of benefits and risks. Engelberth et al. (2013) surveyed women in Maine who had given birth in the previous three months by mail/web to evaluate the effectiveness of Maine's fish consumption advisory in improving knowledge among this audience. They found that those who read the advisory had an increased knowledge of both the benefits and risks of consuming fish while pregnant compared with those who had not read the advisory. The advisory also increased women's knowledge of both low and high-mercury fish. They concluded that a well-written advisory can be effective in providing information on both the health benefits and risks of fish consumption.

Studies focused on distribution methods

Mobile-responsive website. We conducted focus groups with women in Minnesota to explore how to best package and deliver messages that describe and promote safe fish consumption (Renner et al. 2018). Based on the findings, a brochure and mobile-responsive website were designed using pictures and recipes. The format used is similar to Pinterest. The authors hope

that exposure to the brochure or website will encourage women to seek out more complex fish information and consume safe fish during pregnancy.

Smartphone applications. Hearn et al. (2013) conducted focus groups or interviews with 116 perinatal women and 76 perinatal health care providers (PHCPs) to determine what online information, and in what form, would promote healthy lifestyles among women in the perinatal period. They found that women wanted smartphone applications (apps) linked to trustworthy websites. PHCPs wanted evidence-based, practical information that was presented in a simple, interactive form.

Multiple methods. Oken et al. (2013) implemented an educational intervention with 61 pregnant women who consumed less than three servings of fish per month. The intervention consisted of a brochure, shopping list pad, wallet-sized cards, and weekly email reminders with detailed information about the health benefits of eating fish, the types of fish that are lower in mercury, and suggested ways to prepare fish. They acknowledge the small sample size, but found that the intervention was able to persuade some pregnant women to consume more fish, and that this increased consumption did not increase their mercury intake significantly.

Studies addressing barriers to seafood consumption

Mercury fears, taste, and cost. Bishop and Leblanc (2017) studied a small sample (n=54) of pregnant women in Canada to compare their dietary intake of DHA and EPA via fish consumption at 30 weeks of gestation with current recommendations. They identified barriers to fish consumption including lack of cooking inspiration, general dislike/taste preferences, gastrointestinal and sensory sensitivities due to pregnancy, cost, and fears associated with mercury contamination.

Taste, cost, and risk aversion. Lucas et al. (2016) surveyed a small sample (n=15) of pregnant women in Australia to explore their perceptions of consuming fish and seafood during pregnancy. They found that barriers to consumption included taste, cost, and a general desire to avoid risks such as mercury in fish and seafood. They also found that women with knowledge about the health benefits of seafood would be more likely to consume it during pregnancy.

Cost and convenience. McGuire et al. (2016) calculated that for certain fish species the number of servings necessary to reach an adverse mercury exposure was at least twice the estimated amount needed to achieve peak developmental benefits for a child when the fish was consumed during pregnancy or while breastfeeding. Canned light tuna was the least expensive option at $1.83 per week to achieve maximum IQ benefit. They suggest that future educational efforts could highlight the health benefits while also considering cost and convenience.

FOCUS GROUP METHODOLOGY

We used focus groups to gather data for this study because they are an effective method of discovering a broad range of perspectives on a topic of interest. Focus groups rely on open-ended questions and encourage participants to interact with and respond to each other. We conducted three focus groups in September, 2021, via Zoom, with women between the ages of 18 and 35 who were currently pregnant or recently pregnant (within the past three years). To attract women from across the United States, we scheduled each focus group for the convenience of women in a different time zone: Eastern, Central/Mountain, and Western. We recruited ten women for each focus group. We offered participants $125 Amazon gift cards as an incentive to participate. Before implementing the focus groups, our research protocols were reviewed by the Cornell University Institutional Review Board for Human Subjects and considered Exempt from IRB Review.

We used the services of a professional recruiter (Southpaw Insights) to recruit women to participate in the focus groups. Using contact information from a large online database, recruiters sent introductory emails to potential participants (women aged 18-35) with a link to screening questions. The screening questions assessed pregnancy status, age, time zone, whether or not the woman ate any seafood, education level, race, and ability to participate via Zoom. Because some women do not eat seafood during pregnancy the screening questions assessed whether they had consumed seafood in the past and were likely to consume it in the future thereby eliminating anyone with an allergy or other reason for not eating seafood. Recruiters called by phone a sub-group, selected from qualified respondents based on pregnancy status, seafood consumption, time zone location, and diversity in terms of education and race, to make sure potential participants could express themselves clearly and verify key items from the screening questionnaire. Those who qualified after the call were sent confirmation emails with the focus group time and Zoom link, and follow-up reminder emails prior to the focus group.

We divided the focus group discussion into four main topics. We sought to better understand how women: a) perceive barriers to consuming seafood and how those barriers might be overcome; b) interpret gain versus loss framing of health benefits; c) interpret an “Eat Seafood” message vs. an “Eat Lower-mercury Seafood” message; and d) interpret guidelines for how much fish to consume organized in consumption categories. Appendix A contains the complete focus group protocol. We describe each topic and the materials tested within that topic in the subsections that follow.

Each focus group lasted approximately 2 hours. We audio-recorded and transcribed each group. We conducted a content analysis of the transcripts using ATLAS.ti (Version 9.1.5), a qualitative

data analysis program. We reviewed each transcript, broke all relevant sections of the transcript into segments of one sentence to one paragraph in length, and marked them with one-word codes we developed to characterize their content. For example, as women identified barriers to consuming seafood we labeled the segment describing the barrier using words like "cost," or "mercury" to refer to women's concerns about the high cost or seafood or their perceptions of the negative impacts associated with consuming seafood with high levels of mercury. The lead author then coded all the transcripts and another researcher provided a check of the coding by independently coding segments from each focus group. The lead author compared the original coding to the independent second coding and found two discrepancies out of 51 coded segments. Given the low percentage of discrepancies, no further error checking was done. Transcript segments with the same code were grouped together. We analyzed the segments within each code and illustrate our findings with relevant quotes. We labeled each excerpt according to the focus group from which it was drawn (e.g., FG-1).

PARTICIPANT CHARACTERISTICS

Of the 30 women recruited, 27 women participated in the focus groups. Of those who participated, 67% (18 women) were currently pregnant and 33% (9 women) had been pregnant in the past 3 years (Table 1). Participants were equally divided among the three time zones, resulting in broad distribution across the US. Women who participated ranged in age from 18 to 35, with a mean age of 31. Over three-quarters of women had a college degree, but 15% had only completed high school. Almost two-thirds of women (63%) were white and over one-third (37%) were black, with fewer being Asian (11%) or American Indian/Alaskan Native (7%). (Racial categories are not mutually exclusive and several women identified themselves as being from several different categories.)

To begin our discussion, we asked women to introduce themselves and indicate how often they usually ate seafood, and the types of seafood eaten. The summary of that discussion presented below is intended to give readers a sense of the range of seafood eaten and the typical consumption frequency. It is not intended to be a comprehensive or quantitative listing of participants' seafood consumption.

Table 1. Socio-demographic characteristics of participants.

Characteristics	Percent
Time zone of residence	
Eastern	33
Central and Mountain	33
Western	33
Pregnancy status	
Currently pregnant	67
Pregnant in the past 3 years	33
Education	
High school graduate or GED	15
Technical/vocational school, some college	7
College degree	52
Graduate/post-graduate degree	26
Race*	
White or Caucasian	63
Black or African American	37
Asian	11
American Indian or Alaskan Native	7
	Mean
Age	31

*Categories are not mutually exclusive.

Amount of seafood eaten during pregnancy

Current guidelines suggest "women who are pregnant or lactating should consume at least 8 and up to 12 ounces of a variety of seafood per week" (USDA, 2020, p. 117), which equates to 2-3 servings per week. Some women in our focus groups indicated that when they were pregnant they ate seafood three times a week, while others said they did not eat any. The most common response was one or two times per week.

> *I tried to make sure to limit it to about like three times a week, just because you can't have that much fish when you're pregnant. (FG-1)*

> *During my first pregnancy, I totally avoided seafood. (FG-1)*

> *I ate pieces of fish a couple times. But it wasn't something I actively avoided or actively sought out. (FG-2)*

I am currently 39 weeks pregnant, so I have been trying to abide by my doctor's rules and eat only one or two servings of seafood a week. (FG-2)

I probably eat it …[1] *once a week. (FG-3)*

I eat seafood probably one to two times a week. (FG-3)

Types of seafood eaten

Women in each focus group ate a variety of seafood, from the more common salmon, tuna and shrimp to the less frequently mentioned crawfish, tilapia, and mussels. There did appear to be some regional differences, with sushi mentioned in the Eastern and Western time zones and shrimp more common in the Central and Mountain time zones. Salmon in packets was mentioned in the Eastern time zone; smoked salmon in the Western time zone.

BARRIERS TO SEAFOOD CONSUMPTION

Govzman et al. (2021) conducted a systematic review of the literature on determinants of seafood consumption, including barriers to consumption. They focused on literature from the United States, Canada, Europe, and Australia. Their review found the most commonly reported barriers to seafood consumption among adults were cost, sensory barriers (e.g., taste, smell), health and nutritional beliefs, familial habits, availability, and preparation/cooking skills.

Several authors have identified barriers to consumption among pregnant women similar to those reported by Govzman et al. For example, taste and cost were barriers for pregnant women in small studies conducted in Australia and Canada (Lucas et al. 2016, Bishop and Leblanc 2017). Also specific to pregnant women were concerns about mercury in seafood mentioned in these studies, as well as by Lando et al. (2012). We sought to further explore the barriers faced by pregnant women, the level of impact on their consumption, and how these barriers might be overcome.

Methods

To identify potential barriers to seafood consumption among pregnant women, we asked participants why they did not eat seafood more often. We followed up with probes for barriers

[1] Ellipses indicate that material has been deleted to eliminate extraneous material and improve readability.

identified in the literature (e.g., cost, knowledge about how to prepare/cook). We then asked if participants had any suggestions for what might be done to overcome the barrier.

Findings

Participants identified a number of barriers to seafood consumption, some of which could apply to all adults and are discussed first below. Barriers that appear to be more specific to pregnant women, or recently pregnant women, are discussed next. We conclude this section with a discussion of how barriers might be influenced by information coming from trusted sources.

Smell

Some women indicated they did not like the smell of seafood being cooked in their house, and the smell kept them from eating more seafood.

> *I don't typically cook [seafood] in my house. I don't love the smell of it being cooked in my house. So when you're saying things that hold me back, I mean it would be [smell][2]. (FG-1)*

Women offered suggestions for minimizing the smell in the house including using certain cooking methods, such as steaming or grilling outside.

> *I do steam it. I find it's easier to get rid of that smell than frying it. (FG-1)*

> *I'll make [salmon] at home because I put it on my grill, which is outside. (FG-1)*

Others suggested methods for dissipating the odor in the house.

> *We usually like [fish] fried, so we just prepare the house for the smell. We have all the windows open, we'll have our vent on, and we'll have all the doors closed. (FG-1)*

> *I have tried this a few times- you boil pot of water with lemon rind or orange rind with whole cloves and cinnamon sticks. I like that a lot, because I mean opening all the windows is very restrictive in New Jersey when it comes to the winter. (FG-1)*

Others chose to eat seafood only at a restaurant because of the smell.

> *[Smell] is primarily why I eat it when I am out [at a restaurant] versus in my home. (FG-1)*

[2] Text in [ ] was added by the authors to clarify meaning.

Cost

The cost of certain seafood was mentioned as a barrier.

> *I totally would never buy crab legs or a lobster. They're expensive. (FG-2)*

> *I wish my family ate more salmon because I think salmon is pretty good for you, but it is expensive. (FG-2)*

A few alternatives that are less expensive were suggested.

> *A salmon pack is … a healthy eating choice that is not expensive. (FG-1)*

> *Salmon is kind of expensive. Shrimp seems like it's the most affordable. (FG-2)*

Lacking the knowledge or ability to prepare or cook the seafood

Some women indicated they did not know how to prepare seafood or lacked recipes.

> *Scallops, I'll eat those at a restaurant but I have never bought them to cook. I don't really know how to prepare them. (FG-2)*

> *We're avid sushi and sashimi eaters, but we are not very good at making it at home. (FG-1)*

> *I don't usually branch out in the seafood department very much. I don't know a lot of recipes for seafood options. (FG-2)*

Women offered a few ideas for how to increase their knowledge, such as getting easy and quick recipes that also provided nutritional information.

> *If I had … recipes that are easy, family friendly, and really quick that would help me. I would be more likely to cook. (FG-2)*

> *I want to see some recommended ways of preparing the seafood that will have the whole nutrition value. (FG-1)*

Family food preferences might limit consumption

Some participants indicated their children would only eat seafood if it was prepared a certain way.

I have a whole cookbook of pastas that have all kinds of seafood in them. But if I make that for my children they're going to be like, "Ah, what's that?" … so you just stray away from it, or you end up preparing it very simply. (FG-2)

While other women indicated their children enjoyed eating seafood.

I guess for the kids it's not necessarily that hard for us because we have introduced [seafood] early on. … like a lemon shrimp, yeah, because they love lemon and they love shrimp. (FG-2)

Concerns about risks during pregnancy

Some women appeared to be aware of recommendations for seafood consumption during pregnancy (i.e., number of servings, raw seafood) and restricted their consumption based on their understanding of the recommendations.

Before being pregnant, I had seafood a lot, like four times a week. Now I'm limiting it to about two times a week. (FG-3)

Before I was pregnant, sushi is one of my favorite foods, but now I can't eat it like I want to. (FG-3)

Other women changed the species they consumed to lower their mercury intake.

I changed over recently from the tuna packets to salmon packets. During this pregnancy, my OB suggested it as a healthier way to lower my [mercury] intake. (FG-1)

While others increased their consumption because of the omega-3s in seafood.

I don't crave much seafood but I'm eating [it] because it has a good source of omega-3 fatty acid. My doctor recommended that I need it while pregnant, so I … eat a lot more seafood than normal. (FG-2)

Some women indicated a difference in their adherence to the recommendations depending on whether it was their first or subsequent pregnancy.

My first pregnancy … I was probably more cautious. I think if I were to be pregnant again, I don't think I will be as careful, so I probably wouldn't Google and probably would just eat going forward. (FG-2)

I ate seafood more towards the end [of my pregnancy] because I think I got a little more lax with all of the rules. (FG-2)

Concerns about mercury in seafood

For some women the change in their consumption was due to information they were aware of related to mercury in seafood.

> *They said to try to avoid canned tuna because tuna is higher in mercury and mercury is bad for a baby. (FG-2)*

> *I have heard … one reason it is suggested to avoid seafood during pregnancy is elevated levels of mercury, which are higher in tuna, specifically canned versus packaged. (FG-2)*

> *When you go into a restaurant, they have a sign on the wall that says some seafood … contains mercury and may cause birth defects. Maybe I'm making that birth defect up but … the warning about seafood … that's pretty frightening. (FG-3)*

> *Swordfish I've heard is a big no-no [to eat while pregnant], and whatever tilefish is. (FG-3)*

Some women addressed their concern about mercury by changing the species they ate.

> *I didn't eat a lot of tuna … because my OB suggested that I change over to salmon instead of tuna, for lower mercury. (FG-1)*

Others eliminated or cut back on the amount they consumed of species they thought they should avoid.

> *Swordfish, tuna, those are my favorites and I just I didn't have those, because I was instructed too much mercury. (FG-1)*

> *I will say when I was pregnant I didn't order tuna out and I didn't make it. It was very heartbreaking. (FG-1)*

> *So a couple years before I got pregnant … I worked out all the time. … I would eat the package tuna and rice every single day for lunch. … My trainer at the gym actually told me [when I was thinking about getting pregnant] … I should probably cut back on the tuna I'm eating because of the mercury. (FG-2)*

While others stopped eating seafood altogether.

> *A lot of pregnant women, including some of my close friends, they just don't eat seafood altogether, while they're pregnant. (FG-1)*

They [my friends] would rather not take the risk [mercury] because they don't care about seafood or sushi that much. They would rather just avoid it … because it's just not important enough for them. (FG-3)

Concerns about eating raw fish

Several women mentioned that their understanding was that pregnant women should not eat raw fish.

I was under the impression that pregnant women can't eat raw fish at all. (FG-3)

Some women decided to eat raw fish under certain conditions, such as from reputable sources or in moderation.

We make sure that it's good quality … and it's sourced from a particular place because of the fact that it's raw. (FG-1)

If you've got a sushi place you normally go to … you trust the quality of the fish … I was told by my midwife and from several sources that that's okay. (FG-3)

When I went to the OB he said sushi, the raw fish, is okay in moderation. … I haven't had it yet, but … I'm definitely going to have it. I can't go nine months without it. (FG-3)

I talked to my OB about it and she made the point that women in Japan continue to eat raw fish. It's part of their normal diet and they don't have any more risky pregnancies, … so that gave me comfort. (FG-3)

Belief that pregnant women should avoid bottom-feeding seafood

Several women mentioned that they don't eat what they considered to be bottom-feeding fish or shellfish.

I don't do any bottom feeders. I don't eat catfish. I feel like they're more exposed to all the things that settle to the bottom of the water. Catfish, lobster, or any other shellfish, especially during my pregnancy, I just don't do it. (FG-1)

I like shrimp, but I think of that as a bottom feeder. I don't know how good the shrimp is you're getting? (FG-2)

Availability of seafood was not an issue for participants

Although lack of availability of seafood has been seen as a barrier in previous research, none of the participants in our focus groups mentioned it, nor felt it was a barrier when we asked if it limited their seafood consumption.

> *I don't have any limitations to the type of fish that I can get. (FG-1)*

Importance of trusted sources

Throughout the discussion of barriers and why women were limiting or changing their seafood consumption during pregnancy reference was made to trusted sources of information. Health care professionals were often referenced as a trusted source of information, which in most cases seemed to result in women following their recommendations.

> *My OB/GYN told me … I should stay away from seafood because of the mercury level, or limit the amount of servings. (FG-1)*

> *My doctor did say as long as you're not eating a ton of it … then you're fine. But if I wanted it a couple days a week, tuna specifically, then it'd be fine. (FG-2)*

> *My doctor did give me this list that listed the types of fish and how many servings I should have per week. The high mercury fishes I should try to limit. That was super helpful. (FG-3)*

There were a few instances when women said they did not always follow the recommendations of their doctor.

> *I'm 30 weeks pregnant. I don't listen to a lot of what the doctor says, kind of just do what I want. (FG-2)*

> *I do listen sometimes to my doctor. (FG-2)*

Participants reported using other sources of information besides health care professionals, including a book – Expecting Better -- and Google searches.

> *There's so much conflicting information. … Then this book, "Expecting Better," kind of put all the stats in place and so with that information, now I'm open to maybe trying sushi. (FG-3)*

> *My research is all Google, which is dangerous I'm sure. I see a lot of conflicting information. (FG-3)*

I'm constantly on my phone going, "Is blank safe for pregnancy? Is blank kind of fish high in mercury?" (FG-3)

Summary

Participants in our focus group identified most of the barriers to eating seafood previously reported in the literature (e.g., cost, smell, lack of knowledge to prepare seafood). They also had a wide range of knowledge (some accurate, some not) about the recommendations for seafood consumption by pregnant women. Some of them adjusted their consumption in ways that were recommended (e.g., switching species, not consuming certain species), while others stopped consuming altogether.

Our research was not focused on understanding the importance of trusted sources of information to women, but the topic came up in this section as well as other sections of the report. It is clear women value information coming from a trusted source. They usually mention health care professionals as that trusted source.

GAIN VERSUS LOSS FRAMING OF HEALTH BENEFITS

Information about a health-related behavior can emphasize the benefits of taking action (i.e., a gain-framed statement) or the costs of failing to take action (i.e., a loss-framed statement) (Robbins and Niederdeppe 2019). For example, statements encouraging seafood consumption could include a series of statements describing the health benefits of consumption (e.g., babies develop better with sufficient maternal seafood consumption) or a series of statements describing the health costs if you fail to consume (e.g., babies develop more slowly with insufficient maternal seafood consumption).

Research on gain or loss framing is grounded in prospect theory, which postulates people's behaviors related to risks are sensitive to how information is framed (Kahneman and Tversky 1979). People are more likely to take a risk when information is framed in terms of losses, but more likely to be risk averse when outcomes are known and information is framed in a manner to emphasize potential gains. Rothman et al. (2006), in their review of the literature, found that gain-framed statements were more effective in promoting prevention behaviors, such as sunscreen, bug spray, or cancer screenings.

We could not find literature describing comparisons of gain-framed statements versus loss-framed statements in relation to the health benefits of seafood consumption. Based on past research in other contexts we hypothesized that gain-framed statements about the benefits of

seafood consumption for women's babies or children would be more effective in encouraging consumption.

Methods

We developed two pairs of gain/loss frame statements based in part on statements used by Niederdeppe et al. (2019). Each pair described a different health impact of fish consumption giving us the opportunity to test reactions to gain/loss framing in two ways. The statements describe health impacts associated with different patterns of seafood consumption by pregnant women (Table 2). One pair describes the gains or losses to babies based on their mothers' consumption of seafood with omega-3s. The other pair, the gain or loss is to the child from the mothers' consumption of low-mercury seafood. The gain-framed statements emphasize the benefits of seafood consumption, whereas the loss-framed statements emphasize the consequences of not eating enough seafood. In the focus groups, we provided each statement in written form on the screen. We asked women to read the statement and then the facilitator asked questions about the clarity of the statement, their understanding of the statement, and whether the statement would encourage seafood consumption and why. After participants discussed a pair of statements, both statements in the pair were shown together on the screen. The facilitator asked which statement participants preferred and which statement, if either, would encourage them to eat more seafood than they currently consume. The facilitator also asked for reasons for their responses. We varied the order of the statements in different focus groups as shown in Table 2 to reduce the opportunity for bias by always presenting one frame first or one statement topic first.

Findings

At the beginning of this section we discuss findings related to participants' understanding of the statements including questions about omega-3s, mercury, and use of the word "may." We also revisit questions about the source of the information and the importance of receiving information from trusted sources. Then, we examine participants' reactions to the gain versus loss framing, including their preference for one versus the other, the reasons for their preference, and whether one would be more likely than the other to cause them to increase their seafood consumption.

Table 2. Gain/loss framed statements and order of presentation, by focus group.

	Order of Presentation		
Statements	Group 1	Group 2	Group 3
Eating seafood with omega-3s while pregnant may help brain and eye development in a woman's baby. (Gain frame)	1st	2nd	4th
Eating too little seafood with omega-3s while pregnant may slow brain and eye development in a woman's baby. (Loss frame)	2nd	1st	3rd
Women who eat low-mercury seafood when they are pregnant may have children who do better developmentally. (Gain frame)	4th	3rd	1st
Women who don't eat enough low-mercury seafood when they are pregnant may have children who develop more slowly. (Loss frame)	3rd	4th	2nd

Novelty of information about omega-3s

For some women the information about the benefits of omega-3s was new.

> *I don't know that I ever heard this when I was pregnant. [in reference to omega-3s] (FG-1)*

> *I didn't realize this, when I was pregnant. Now I feel like I've screwed up my kids. (FG-1)*

For others, the information about omega-3s reinforced information they had heard previously.

> *This is a reinforcement of everything I've ever been told. Omega-3s … good for your baby's brain development. (FG-1)*

Questions about omega-3s and mercury

The statements about omega-3s raised a number of questions for participants.

Is omega-3 the only thing I'm benefiting from through seafood? … Is it the seafood or the omega-3 that's more important? (FG-3)

If you don't like seafood or you can't eat seafood, is what we're getting in our prenatals enough? (FG-2)

They wondered if they should also be eating seafood if they were already getting omega-3s in their prenatal vitamins.

Some people even take a separate omega-3 supplement, and then you're eating seafood on top of that. Is there a point where it becomes too much, when you can overdo it? (FG-3)

Women also had questions about the mercury statements. They were particularly interested in knowing which seafood was low in mercury.

What are low-mercury versus high-mercury seafood? … Because I still don't know other than tuna, and I've had two pregnancies. (FG-2)

They wanted more context around how mercury would influence children's development.

I want to know when they say, "develop more slowly." Do they mean in the womb, do they mean after the fact … are they gonna talk later, walk later? Are they going to perform not as well in school? (FG-2)

And maybe just a prelude sentence that talks about the harms of mercury. I think it would just give it a little bit more context and make the information more robust. (FG-1)

Some women wanted to understand which was more important – getting enough omega-3s or keeping mercury consumption low?

Is the goal to get low mercury? Is the goal to get high omega-3s? What's more important for the health of the baby? (FG-2)

Interpretation of "may"

We purposely used the word "may" in the statements to determine how women reacted to the uncertainty. The few women who commented on the use of the word seemed to understand that it implied uncertainty.

I like this statement because it says, "when they're pregnant [they] <u>may</u> have children who do better," who do better developmentally. That "may" is saying that it's not a

given. … It's almost like, I wouldn't say it places any sort of doubt, but it does say, you could try it and see. You know, perhaps it does help with brain development. (FG-1)

It says <u>may</u> have children who do better. So it's not like it's proven, it's just like a hard suggestion. (FG-3)

Greater detail about quantities

Women wanted to know more details than the statements provided about how much they should be eating, and how much omega-3 they should be getting. (Some of this information was provided later in the focus group.)

I feel like there's not enough information in the statement in general. For any of [the statements] really, … I think that it could be a lot more helpful to have something in there that says as far as how much you should be consuming, exactly what the parameters are. (FG-3)

Is like eating low mercury seafood five days a week, or three days a week, or one day- is one day a week enough? I don't know … give actual amounts. (FG-1)

It would be more impactful if it would say, "women who don't get 800 milligrams of omega-3 a day..." If there was an amount that you were aiming to get. (FG-3)

Information underlying consumption advice

Women wanted more background information than was contained in the statements.

I'd want to understand how that data was obtained. (FG-1)

I want to know what the details are. What are the differences that people are noticing? (FG-3)

I would just immediately want to jump online and find out exactly why low mercury seafood may help children do better developmentally. (FG-3)

Trust of information source

Some women were cautious about believing the statements we presented because we did not attribute them to a source they trusted.

This statement … doesn't have weight because there isn't a study link to it, there isn't a doctor that's an OB-GYN or pediatrician that is saying this. (FG-1)

Women indicated they would follow their doctor's advice.

> *Normally I don't eat much seafood. But when I'm pregnant I do eat more … because the doctor says, this omega-3 … helps to build up the baby. (FG-2)*

> *The doc that I've chosen, I trust. … I would believe her. I'd follow what she says. … Because it would be from a trustworthy source. (FG-3)*

Perceived positivity of gain-framed statements

Participants recognized the positive wording of the statements (i.e., may help with brain and eye development in a woman's baby; may have children who do better developmentally), which in turn elicited a positive response.

> *You know it's going to have a positive effect on your baby. You would just want to do anything to help. (FG-1)*

> *I think you're always going to have a more positive response with a positive statement. Everyone usually responds better when you start off with something positive to say. (FG-3)*

> *The one [statement] that's more positive, that's more optimistic. (FG-1)*

> *I definitely would respond better to a more factual, positive statement. (FG-2)*

Preference for gain-framed statements

When women were asked which statement they preferred, many indicated they preferred the gain-framed statements. They appreciated the positive wording because it made them feel good about what they were doing to help their baby or child.

> *"Oh great seafood's good for my baby." I'm doing good, yeah! It comes across a lot more positive. I'm a firm believer of, you catch more bees with honey. (FG-3)*

They preferred the gain-frame because it felt less threatening.

> *I don't want to be challenged or threatened. I'm not a very confrontational person. … So something that's more suggestive and positive tends to go over a lot better. It does with me and my group of friends. (FG-1)*

It also made them feel less worried.

> *I read this and I feel less concerned or worried. … It's definitely less stressful and concerning about what's happening to the baby. (FG-2)*

Gain-framed statements would increase seafood consumption for many

When asked which statement would increase their seafood consumption, a number of women indicated the gain-framed statements would do so.

> *This would influence me to have more fish, specifically salmon or seafood that I know is high in omega-3s. (FG-3)*

When asked why the gain-framed statements would increase their consumption, women offered the following reasons:

> *It is almost like a motivator. It's encouraging me to eat seafood. (FG-1)*

> *It's going to help to our baby to develop. … I'm going to eat more seafood. (FG-2)*

> *It's positive. … I would be drawn to actually do this. (FG-3)*

> *Something about it is almost like a challenge. I want to see if I can have a child who develops better. … It kind of like amps me up to want to eat the seafood. (FG-1)*

> *I know, last time I said the negative one would scare me into eating [seafood] more. But this one [referring to eating low mercury seafood], I feel like "Oh, I want my child to develop better or faster than others." So I'll probably eat more with this one. (FG-2)*

> *This would definitely encourage me and make me feel more comfortable about eating seafood more frequently. … Instead of being worried about it doing harm to your child, it could actually do have some benefits. (FG-3)*

Recognition of negative wording of loss-framed statements

Participants recognized the negative wording of the statements (i.e., may slow brain and eye development in a woman's baby; may have children who develop more slowly) compared with the gain-framed statements.

> *The way that the sentence is worded it is more of a negative. It's saying, if you eat too little omega-3s, it can actually harm your baby. (FG-1)*

This statement is basically saying the same thing as last statement just in a more negative light. (FG-3)

Perceived negativity of loss-framed statements

A number of women had strong, negative reactions to the loss-framed statements. The statements raised concerns about their previous seafood consumption being insufficient and leading to negative outcomes for their children.

I read this and I was like, "oh my God. My children seem pretty intelligent, but maybe I really screwed them up here." (FG-1)

I ate fish. I didn't eat tremendous amounts of fish, though, so maybe I really missed something. (FG-1)

They felt the statements caused stress and made them feel bad about themselves.

When you're telling women this information in this way … you're causing stress in women, you're adding to the stress that we already have … I think it just doesn't really help at all. (FG-3)

It just it really makes me feel like a bad human being. (FG-1)

They felt the statements were blaming or shaming women.

My first reaction, because of the way it's stated would be: "Oh great, another thing that I can't do right." …It's just too negative and blaming. (FG-3)

So you're shaming them for not eating enough of something … and you tell them "if you don't eat seafood then your child's going to have developmental problems." And then, if God forbid, if your children do later on, then you're the only one to blame. (FG-1)

For some women, it seemed the statements were being used as a scare tactic or fear mongering.

It leans toward more of a scare tactic than actually providing someone with any helpful or relevant information. (FG-3)

This is that negative connotation of scaring you into eating low mercury seafood. I don't like this tactic. (FG-2)

I feel like it's part of that… fear mongering. "You're not doing the right thing while you're pregnant that's good for your baby, if you don't do this." (FG-3)

Loss-framed statements would increase seafood consumption for some

No one indicated they preferred the loss-framed statements, but several women indicated the statements might scare them into eating more seafood.

> *So that would scare me … maybe I should put a little bit more effort into eating seafood rather than avoiding it. (FG-1)*

> *It might scare me into eating seafood more, because … it's going to make them dumb and blind. (FG-2)*

> *This statement … is pretty powerful. It draws some fear and although I might not agree with how they worded it, I think this would actually spur me to do more research. … kind of go into that panic mode of "Oh crap, I need to eat more fish." (FG-3)*

Other women indicated the loss-framed statements would not particularly scare them into eating more seafood, but they were more of a motivator to increase their consumption.

> *I don't particularly like this statement, but it definitely makes eating seafood more urgent. (FG-3)*

> *I think I would probably eat fish one day a week more … for an extra boost. (FG-1)*

Lack of impact of statements on seafood consumption for some

A few women indicated that none of the statements would impact their seafood consumption.

> *I just listen to my own body. (FG-2)*

> *I feel like they say this for everything. … It kind of goes in one ear and out the other. (FG-2)*

> *I think I would continue to eat the seafood that I already eat. I wouldn't necessarily eat more because I feel like I'm already eating the amount that I would like to be having. … I wouldn't change my eating habits. (FG-3)*

Summary

We presented the gain-framed and loss-framed statements in a different order in each focus group. While we cannot statistically test for bias due to statement order, it did not appear that questions about omega-3s or mercury varied based on whether the gain-frame or loss-frame was presented first. Further, when participants were asked to compare gain- versus loss-framed

statements and offer their preference, we did not detect a difference in preference based on statement order.

When presented with the gain-framed and loss-framed statements, women often desired more details about the source of the information, comparative risks and benefits (i.e., which is more important increasing omega-3s or lowering mercury), and what steps they should take to increase their seafood consumption (which was covered in a later section of the focus group reported below). Some also wanted to know more about why eating seafood was important if they were already getting omega-3s in supplements.

Women preferred the gain-framed statements vs. the loss-framed statements, consistent with our hypothesis. No one indicated they preferred the loss-framed statements. Further, many women indicated the gain-framed statements would encourage them to eat seafood and increase their consumption. A few women indicated the loss-framed statements might scare them into eating more seafood. The next section addresses recommending seafood consumption generally versus lower-mercury seafood consumption, providing additional insights about the possible effects of mentioning mercury (risk) specifically.

COMPARISON OF "EAT SEAFOOD" MESSAGE WITH "EAT LOWER-MERCURY SEAFOOD" MESSAGE

The newly released USDA Dietary Guidelines for Americans suggests "Women who are pregnant or lactating should consume at least 8 and up to 12 ounces of a variety of seafood per week, from choices lower in methylmercury" (USDA, 2020, p. 117). However, several studies show many women of childbearing age are eating less than the recommended amount of seafood (Lando et al. 2012, Connelly et al. 2014, 2016). For example, most pregnant women in the U.S. eat less than ½ of a serving of seafood a week (Lando et al. 2012). To encourage consumption of the recommended amount of seafood without consuming too much mercury, we examined how women in the focus groups responded to a message simply encouraging seafood consumption vs. a message encouraging eating lower-mercury seafood. In conjunction with these messages, we also examined whether knowing how much seafood was currently being consumed by pregnant women would influence their consumption.

Methods

We first showed participants a statement containing the definition of a serving size (Table 3). Next, we showed participants a statement indicating how much seafood women who are pregnant or breastfeeding should eat per week. We asked participants to read the statement and then we asked questions about the clarity of the statement, their understanding of the

statement, and whether the statement would encourage them to eat seafood and why. Next, we presented a different statement containing the same information about servings but with an additional phrase about limiting consumption to choices lower in mercury. We then asked the same set of questions about clarity, understanding, and whether the statement would encourage them to eat seafood. Following that discussion, we showed both statements on the screen together. We asked which statement participants preferred and which statement, if either, would encourage them to eat more seafood than they currently consume. We also asked for reasons for their responses. Finally, we added a statement about current seafood consumption among pregnant women in the U.S. to the screen. We asked participants how the new information influenced their thinking about the prior statements, and if this statement would be more or less likely to encourage them to eat seafood.

Table 3. Order of "eat seafood" statement presentation.

Statements
A serving of seafood is 4 ounces, which is about the size of a deck of cards.
Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week.
Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week, from choices lower in mercury.
Most pregnant woman in the U.S. eat less than ½ of a serving of seafood a week.

Findings

We discuss our findings in this section in the order that the statements were presented during the focus group.

Reaction to the "eat seafood" message

Women appear to understand the "eat seafood" message and recognize that it addresses one of the information gaps they identified earlier about the recommended amount of seafood to consume.

> *Pregnant and breastfeeding women should eat seafood. (FG-3)*
>
> *It's clear and concise. You don't have to figure out how many times a week. (FG-1)*

Some women think relevant background information about why it is important to eat seafood is missing from the statement.

> *What's missing is why [I should eat seafood]. If it doesn't tell me why, then why should I care? (FG-3)*

> *Is this [recommendation based on] mercury excluding or omega-3 driven? (FG-1)*

Concern about eating more than the recommended servings

Some women wonder about what will happen if they eat more than the two to three recommended servings.

> *I definitely eat more than two to three servings of seafood a week. So now I'm questioning, am I eating too much mercury in my diet? (FG-3)*

> *I want to know, like outside of the two to three servings, what's the danger zone? … If I want more, if I just happen to eat more, am I causing a problem? (FG-2)*

Once again, trusted sources are important

In one focus group, women wanted to know the source of the information and that the source is one they trust. They do not trust all sources of information.

> *I think if it said, "according to" whichever source … important, credible sources. [including] medical journals that are peer reviewed. (FG-1)*

> *The FDA and CDC don't do a whole lot for me. I want … medical experts in this field. (FG-1)*

> *If the credibility is there, then I would adhere to whatever is best for my baby's development. (FG-1)*

Number of servings recommended perceived as too large

Some, but not all, women who participated in the focus groups did not eat much seafood and were concerned that they or other women would not be able to eat two to three servings in a week.

> *Will a prenatal suffice in taking up some of the slack of not being able to eat three servings? (FG-2)*

> *Honestly, is any of this [two to three servings] even attainable in America? (FG-2)*

Other women were concerned that the amount recommended might be too much because of concerns about mercury.

> *Two to three servings, that's a decent amount. Is tuna okay? I was warned against not a ton of tuna. (FG-2)*

> *Just seems like such a high amount of servings when I feel like we get told you can't consume too much seafood because of mercury. … What I've heard is you really only should eat seafood like once a week because of mercury. So [two to three servings] just seems different than everything I've ever been told. (FG-2)*

Reaction to the "eat lower-mercury seafood" message

Women appear to understand the message about consuming seafood that is lower in mercury.

> *Mercury is bad, seafood is good. (FG-3)*

> *It's directive and informative. You need to be eating a variety of these seafoods every week, but you need to be choosing from the variety that is lower in mercury. (FG-1)*

Some expressed their preference for the word "lower" rather than "low," which was used in statements in the previous section of the focus group.

> *"Lower" is better. … People will be assuming that all fish have mercury, it's just that the concentration is acceptable. (FG-1)*

> *I feel … "lower in mercury" seems more comfortable than "low in mercury." (FG-1)*

Some women think relevant information about the relationship between fish and mercury, and the risks associated with mercury are missing from the statement.

> *The statement assumes that the audience knows … that fish are carriers of mercury. (FG-1)*

> *What is the risk if I eat too much mercury? (FG-3)*

Some women want to know why it is important to eat seafood, especially if it contains mercury. They question whether they could get the benefits of eating seafood from supplements or prenatal vitamins instead.

I wonder why fish oil isn't pushed? Because fish oil doesn't have mercury in it, but it has all the things that we need from seafood. So really we don't have to eat seafood we can just consume a little bit of fish oil and get the same things. (FG-3)

Women want to know what species they should eat

A number of women thought the statement should include examples of species they should be consuming. A statement that just says seafood lower in mercury was not sufficient for them.

I would say spit it out, what do you want me to eat? … I don't have time to research what types of fish or seafood are lower in mercury. (FG-2)

It needs to be a bit more specific in what those choices are, and what low in mercury actually means. (FG-3)

Preference for the "eat seafood" vs. "eat lower-mercury seafood" message was inconsistent

Some women prefer the "eat seafood" statement because it is simpler and doesn't mention mercury, which they believe scares some women away from eating seafood.

As soon as you add that negative, you throw that word mercury in there, … you're bringing up the thing that most women are limiting their seafood intake because of. … As soon as you're reminding people, "oh seafood has mercury," they're like, "two to three meals may be too much. I think I'm just going to stick with my one or two times a week be on the safe side." Just leave the mercury out of it, and I think you might have a better response. (FG-3)

When mercury gets brought up it discourages seafood altogether. (FG-3)

Other women think the statement would make them more likely to eat seafood, but wonder then if their choice of seafood would be best for their baby.

I think [this statement] would [make me] more likely [to eat seafood], but it may not be helping me any because I might just go pick up my package of tuna that I used to eat, and that might not be good for the baby. So I might be more apt to eat seafood, but it doesn't mean that's a good choice. (FG-2)

We're always looking up is this safe? Is this okay? You're just exhausted by it. So I might be more apt to eat more seafood with the [eat seafood statement]. That doesn't mean it might be what's best for me and the baby. (FG-2)

Some women prefer the "eat lower-mercury seafood" message because it mentions selecting seafood lower in mercury and that alerts women to look for those types of seafood.

> *I like the low in mercury, because at least it gives you a clue on what to be looking for. (FG-2)*

> *The statement at least says "from choices lower in mercury." From there I can Google seafood that's low in mercury. Whereas, the [statement without the mercury phrase] is just too broad. (FG-3)*

One person mentioned that they thought it was more responsible to include the "lower in mercury" phrase.

> *I think the [statement including "from choices lower in mercury"] is more responsible. … I think whether you're pregnant or not, you don't want to be getting a ton of mercury in your body. (FG-3)*

Knowing the seafood consumption rate of other women leads to mixed reactions

Women initially compared their consumption with the estimated seafood consumption among pregnant women in the U.S. and concluded they were consuming about the same amount as most women, so there was no need to increase their consumption. (The focus group approach did not determine whether women's perceptions of their own seafood consumption were accurate.)

> *I think it … would like reassure me. If I'm getting at least like a half of serving a week then I'm doing about, as well as most everyone else. So I'll probably be okay, the baby should be okay. I think that statement would make me feel… just more content with, "at least if I'm getting close to what everyone else is doing, it should be fine." (FG-2)*

> *It makes me feel like I didn't do that bad because if most pregnant women are eating half a serving or less and most babies are healthy, then I feel like I'm gonna be okay. (FG-2)*

Other women said knowing the U.S. consumption rate would cause them to increase their consumption.

> *I must be eating more than the average pregnant woman, for one, because I know I'm having more than just half a serving. But I'm not having three servings in a week. … I'd probably want to increase mine, maybe half a serving or one full serving more a week, as a result of knowing where the US stands in consumption. (FG-3)*

Some women said they would increase their consumption because they wanted to do better than other women.

> *I would feel like I don't want to be the average, I want to kind of defy the average. So maybe I would push myself to find other low mercury fish outside of salmon. Because … like I said the fish that I eat tend to be higher in mercury. So maybe I would make sure to seek out other fish. (FG-1)*

Several women said the statement would have no impact on their consumption.

> *I think it's an interesting fact, but it doesn't change [my consumption]. (FG-2)*

Summary

To encourage consumption of the recommended amount of seafood without consuming too much mercury, we examined how women in the focus groups responded to a message simply encouraging seafood consumption vs. a message encouraging eating lower-mercury seafood. We found that some women preferred the "eat seafood" statement in part because they believe when mercury is mentioned it scares some women away from eating seafood. Other women indicated the statement would make them more likely to eat seafood, but then wonder if their choice of seafood would be best for their baby. The "eat lower-mercury seafood" message was preferred by some women because it mentions selecting seafood lower in mercury and that alerts them to look for those types of seafood. We found no clear preference for one message over the other among focus group participants.

Mentioning how much seafood was currently being consumed by pregnant women would influence the consumption of some women, but not necessarily with the result of increasing consumption to the recommended amount. Some women thought if they were consuming about the same amount as most women, there was no need to increase their consumption.

INTERPRETING INFORMATION IN CONSUMPTION CATEGORIES

It is possible to vary the level of detail regarding the number of categories of consumption recommendations, and the number of species listed in each category. One option would be to focus solely on a few species that are recommended for consumption. Another approach would be to provide several categories with different recommendations. For example, the 2020-2025 Dietary Guidelines for Americans lists some recommended species and some species that should be avoided (USDA 2020). The current EPA/FDA advice provides three categories – best, good, and avoid, with an extensive list of species in each category (FDA no date). We examined

how women interpreted information presented in different types of consumption categories. We also examined how women would respond to shorter versus longer lists. We compared perceptions of preferred level of detail and perceived clarity of recommendations across different category systems. We also assessed how participants think their seafood consumption would change if they received advice through different category systems, and how they might use the lists in everyday life.

Methods

We showed participants four screens in succession, each with species-specific consumption information (Table 4). The first three screens limited the maximum number of species shown in a category to six (i.e., shorter lists). The first screen listed the most commonly consumed seafood that were high in omega-3s and low in mercury. The second screen contained information found in the 2020-2025 Dietary Guidelines for Americans about commonly consumed lower-mercury seafood and species that should be avoided during pregnancy. The third screen was an abbreviated list from the current EPA/FDA consumption advice highlighting best and good species choices, and those species that should be avoided. The final screen was the full list from the current EPA/FDA consumption advice. After we showed each screen, we asked participants about the clarity of the information, if they found the information helpful, and what they would do if they wanted to consume seafood that was not on the list. After all four screens had been viewed we asked participants which list they preferred and why. We also asked them how they would use the lists, and under what circumstances they might use them.

Table 4. Species-specific consumption information shown in order presented.

Most commonly consumed varieties that are high in omega-3s and low in mercury
(Eat 2 to 3 servings a week)
Clams
Crab
Pollock
Salmon
Shrimp
Tuna, canned light

Seafood varieties commonly consumed in the United States that are lower in mercury
(Eat 2 to 3 servings a week)
Catfish
Crab
Salmon
Shrimp
Tilapia
Trout

Certain species of seafood should be avoided during pregnancy
(Eat none)
King mackerel
Shark
Swordfish

Best Choices OR (Eat 2 to 3 servings a week)	**Good Choices** (Eat 1 serving a week)	**Choices to Avoid** (Eat none)
Clams	Chilean sea bass / Patagonian toothfish	King mackerel
Crab	Grouper	Marlin
Pollack	Halibut	Orange roughy
Salmon	Mahi mahi / dolphinfish	Shark
Shrimp	Snapper	Swordfish
Tuna, canned light	Tuna, albacore / white tuna, canned and fresh/frozen	Tuna, bigeye

Best Choices (Eat 2 to 3 servings a week)		**OR**	**Good Choices** (Eat 1 serving a week)	**Choices to Avoid** (Eat none)
Anchovy	Pollock		Bluefish	King mackerel
Atlantic croaker	Salmon		Buffalofish	Marlin
Atlantic mackerel	Sardine		Carp	Orange roughy
Black sea bass	Scallop		Chilean sea bass / Patagonian toothfish	Shark
Butterfish	Shad		Grouper	Swordfish
Catfish	Shrimp		Halibut	Tilefish (Gulf of Mexico)
Clam	Skate		Mahi mahi / dolphinfish	Tuna, bigeye
Cod	Smelt		Monkfish	
Crab	Sole		Rockfish	
Crawfish	Squid		Sablefish	
Flounder	Tilapia		Sheepshead	
Haddock	Trout, freshwater		Snapper	
Hake	Tuna, canned light (includes skipjack)		Spanish mackerel	
Herring	Whitefish		Striped bass (ocean)	
Lobster, American and spiny	Whiting		Tilefish (Atlantic Ocean)	
Mullet			Tuna, albacore / white tuna, canned and fresh/frozen	
Oyster			Tuna, yellowfin	
Pacific chub mackerel			Weakfish / seatrout	
Perch, freshwater and ocean			White croaker / Pacific croaker	
Pickerel				
Plaice				

Findings

We discuss our findings in the order that the lists were presented to participants. After the discussion of each list, we offer participants' perspectives on their preferred list, what they would do if the species they wanted to consume was not on the list, and how they might use the lists in everyday life. At the end of the section, we offer some general suggestions made by participants for alternative ways the lists could be combined and communicated, and how that information could then be combined with information discussed previously in the focus group.

The list of commonly consumed species

Participants perceived the first list of the six most commonly consumed seafood that were high in omega-3s and low in mercury as easy to use and straightforward.

> *I feel like this makes it easy to make decisions. If it's high in omega-3s and low in mercury, it's meeting the requirements I need. This list makes it easy to start picking things out. (FG-2)*

If your OB-GYN handed you this at an appointment and said "follow this" … to me this is very helpful. These are the fish that you should stick to. Stick to these, eat them this amount of times per week, and here's what a serving sizes. I mean this is very straightforward. (FG-1)

Some women also had positive reactions to the list because of the types of seafood on the list.

I like that [the list] includes canned tuna because not everybody can always have access to fresh fish. It's letting you know that there's a way that you can go to the store and still get your dose of omega-3. (FG-1)

The fact that it has salmon, shrimp and tuna, which are mainly the things that I would choose to eat. That makes it pretty easy. (FG-2)

Some women wanted more information on the source of the data used to create the list, and wondered how current the data was.

I would want more information. I want details and validity of where the data is coming from, and if it's recent data. … Is it based on data from 10-12 years ago? I would not really consider that credible. I wouldn't dismiss it, but I also wouldn't find it very credible either. (FG-1)

Others had questions about the specific species.

Is pollock what's in fish sticks? (FG-2)

With crab I was wondering if that included imitation crab? (FG-3)

The list with commonly consumed lower-mercury seafood and those species to avoid

The second list with both seafood varieties commonly consumed in the United States that are lower in mercury and those species to avoid was helpful to some.

I think this list is helpful because it is similar to what my doctor was giving me. …It's good to see what you can't eat while you're pregnant and the foods that are okay. (FG-1)

The fish at the top of the list, I already enjoy, they're accessible to me. The list [at the bottom] just gives you more confidence in knowing what you shouldn't be eating. If I were to go off the list, it wouldn't be as concerning for me to think that I'm choosing something I shouldn't be having even though it's not specified. (FG-3)

In one focus group, women questioned why there was an absolute statement of "eat none."

> *I would think that it would be helpful to add the levels of mercury in the fish that we shouldn't eat, or the reasoning behind why we shouldn't eat them, instead of just saying, "eat none of them." Why shouldn't I eat shark? (FG-3)*

> *My midwife says even those fish that are higher in mercury content are okay once in a while. You're not going to get mercury poisoning and die from eating swordfish one time. … "Eat none" is a little too cut and dry for my personal taste. (FG-3)*

> *I kind of wish the bottom part [of the list] would say "not recommended" or "eat sparingly" … It's a little bit difficult to say that you shouldn't eat any. I guess it is very clear, though. (FG-3)*

The abbreviated list of best choices, good choices, and those species to avoid

The third list we presented was an abbreviated list of best choices, good choices, and those species to avoid from the current EPA/FDA consumption advice. Women viewed this list as useful because it provided more categories (best, good, avoid) than the previous lists.

> *I like the three different options. Like kind of a risk scale. (FG-3)*

> *I feel like you have options and choices between "best" and "good," … and you know exactly what to avoid. (FG-3)*

They perceived that it clearly specified what you could and could not eat, and how much.

> *I think this list is very straightforward. … It's very categorically easy to read, especially "eat none," "eat one serving a week," or "two to three servings." There shouldn't really be even a question as to what you can and can't eat based on this list, in my opinion. (FG-1)*

Women also mentioned that this list provided more clarifying information about advice regarding tuna.

> *I'm still shocked by the light tuna. … It's just interesting to me that there's such a stigma around tuna. Don't eat it when you're pregnant, don't eat too much of it when you're pregnant. … but there are several options that you can eat. From the first list where canned light tuna was on the it's okay to eat list, I would have thought don't eat the albacore, don't eat the white tuna. [This list] has "no it's okay to eat it just don't eat as much." And then definitely don't eat the bigeye. (FG-2)*

The complete list of best choices, good choices, and those species to avoid

The fourth list had the same categories as the third list (best, good, avoid), but it listed all species in each category as can be found in the current EPA/FDA consumption advice. Many women appreciated the long list because it provided more choices.

> *I like this one because I feel like it has all your choices. You have so many more options. I feel like when I was pregnant I wanted a lot of options, because not everything was appealing to me. (FG-2)*

> *I like this list. It's comprehensive. (FG-3)*

However, the length of the list was overwhelming to some.

> *I think having a shorter list is nice for a quick reference. This [longer list] is overwhelming at first. … I think it should be available if people want that deeper information. … But I think it might be too overwhelming to provide this as the first round of information, or the first thing that people see. (FG-3)*

> *I think if I was scrolling the Internet or social media, and I saw this, I think I would be overwhelmed. (FG-3)*

In one focus group, some women were unsure of the purpose of the word "OR" and the reasons behind the use of "best" and "good." They appeared to interpret "best" and "good" in reference to omega-3s.

> *Why is there an "or" in between the "best" and "good" choices? … Should [Best and Good] be reversed? If I'm eating the best choice then I only need to eat it once a week. But if I'm eating a good choice I need to eat it maybe two to three times a week, because I need to make up for those omega-3s that I didn't get out of one serving of anchovies. … I don't understand what this means. (FG-3)*

> *I'm interpreting that "or" as either you eat two to three servings of something that's the best choice, or just have one serving of a good choice, and that's all you need. I'm sure that's not probably the intention, but I could easily interpret it that way. (FG-3)*

Preferred list

When asked which of the lists they preferred, women tended to compare the complete best, good, avoid list vs. all of the shorter lists, not making any distinctions between the shorter lists. The complete best, good, avoid list was popular because it provided a long list of species options.

[The longest list] gives you options. … You can assume this list should be good for everybody here in the United States. (FG-1)

[Re: the longest list:] The more information, the better. … It gives you additional options, … additional fish to think about for that matter. (FG-1)

I would love to have a long, extensive list of different kinds of fish that are high in omega-3s and low in mercury. Because I like making a whole bunch of different kinds of fish. (FG-3)

A few women preferred shorter lists.

With a shorter list, I think I could kind of quickly memorize some things. … So if I'm at a restaurant, I'd be able to quickly memorize the shorter list. (FG-3)

I've never even heard of some of these types of seafood [on the longest list], so I liked the smaller list because I could just pull from things that I know what they are. (FG-2)

When I go somewhere, I can just look at [the shorter list] and even if there's something else on the menu that is not on this list, maybe I would choose to eat something on this list. (FG-3)

Consumption of seafood not on the list

For all three abbreviated lists, women were asked what they would do if the seafood they wanted to eat was not listed. "Google it" was a very popular answer, as was eating the unlisted species in moderation.

Google. (FG-2)

If I was really unsure, I would just Google it. (FG-3)

I would just eat it in moderation. (FG-3)

A few women said they would just go ahead and eat the seafood they wanted.

As long as it was cooked I would probably have it. In my first trimester, I would probably research it more, but now that I'm in my second and getting sick of all the things that you can't have, … I would probably go ahead and have it. (FG-3)

I would probably eat it, if it was like a onetime thing. (FG-2)

If it's not on the list to avoid, then I would just eat it. (FG-2)

How women would use lists

Women were asked if and how they would actually use the lists. A few would use the shorter lists, especially focusing on the species to avoid as a quick reference.

> *I think probably what I would actually use more often is the "choices to avoid." … The "choices to avoid" is shorter. The rest I would just eat in moderation. (FG-3)*

> *I think for convenience, I would just go by the ones to avoid and remember those. (FG-3)*

In reference to the complete best, good, avoid list, some women said they would take it to the grocery store or a restaurant, especially if they could access it on their phone.

> *I think I would take this list with me to the supermarket. If I'm going to buy fresh fish, seeing maybe what fish is on sale and comes in which of these categories and link that up. (FG-1)*

> *I would hope that would be able to access it on my phone. … I remember sitting at a restaurant table once Googling whether salmon was okay or not. So I hope that I would be able to access it in the moment if I needed it to answer a question. (FG-2)*

> *I would use it. I would save it to my phone and I would use it as a reference for when I'm having people over during the week. I can plan my meals ahead, so that I'm getting the servings in per week. Or when I'm going out to dinner, I can use it as a reference. Or even in the grocery store to be reminded of what I can get for the week. (FG-3)*

Other women did not think it would be practical to use in a grocery store or restaurant.

> *I wouldn't use a list like this. It just doesn't seem practical. I don't know if I would be expected to carry it in my purse, or take my phone out and Google every time before I want to order something or buy something. It just sounds like a headache to me. (FG-3)*

> *I'm not coming to this list every single time I'm going to the store or making a decision at the restaurant. (FG-3)*

Some women thought they would use it more as a reference and in meal planning.

> *I'd use it as a reference guide. "What can I eat? … Am I supposed to eat this?" And then I would pull out my handy dandy fish chart. (FG-2)*

> *I would use it for meal planning. (FG-2)*

How all the information presented could be combined

Several women offered suggestions for alternative ways of presenting the information in the lists.

> *Three lists … a list that has fish that are high in omega-3s and low in mercury, then other fish that are low in mercury and not as high in omega-3s but there's still fine to eat, and then the ones that should be avoided. I would find that helpful. (FG-3)*

> *It might be easier and more effective to use the shorter list for certain things. Where it's like, "here's the most common ones to get an idea." But [then saying] "please refer to our website for a full list of different types of fish and how safe they are." I would really appreciate that. (FG-3)*

One women offered a suggestion for how to combine all the information presented in the focus group.

> *The first thing about, "less than half the people" then "we recommend two to three serving sizes at four ounces a serving size," coupled with the [longest species-specific list]. If that was all put in a pamphlet and handed to me at my OB appointment, when I go in for my six week appointment. Or my pediatrician gave it to me at my newborn appointment, it would be something very influential in my decision making during my pregnancy and while I was nursing. (FG-1)*

Summary

Variability exists in the level of detail provided by different sources regarding the number of categories of consumption recommendations, and the number of species listed in each category. We examined how women interpreted information presented in different types of consumption categories and found women generally understood the intensions of the categories, particularly the dichotomous lists of eat and avoid. (As a caution, some of their ease in interpretation of the lists may have been because of the discussions that preceded the discussion of the lists.) Some women said they would focus on remembering the seafood to avoid, then eat other seafood in moderation. The use of the word "or" between best and good was confusing to some.

We also examined how women would respond to shorter versus longer lists, and found the shorter lists were preferred by some for their clarity and ease of use. The longer list was preferred by many because it provided more options and could presumably be used by women across the United States. This list was more likely to be used as a reference.

RECOMMENDATIONS FOR BEST PRACTICES FOR COMMUNICATIONS WITH WOMEN OF CHILDBEARING AGE, ESPECIALLY PREGNANT WOMEN

Recommendations presented in this section derive from two sources. The first source was the literature review presented at the beginning of this document that compiles research reported in two review publications conducted prior to 2013-14 and more recent articles. The second source was the set of recommendations based on results of focus groups conducted as part of this study.

The recommendations are organized into five sections:

1. Characteristics of effective messages;

2. Specific content of effective messages;

3. Effective communication formats;

4. Preferred distribution methods (e.g., health care providers, apps, etc.);

5. Additional information on overcoming barriers not covered in the previous sections on communication.

A note of caution is warranted when using these recommendations for best practices. The literature on communication of seafood advice for women of childbearing age is quite fragmented and leads to conclusions with varying levels of robustness. Indeed, many of the recommendations summarized in this report come from a relatively small number of studies. Also some of the recommendations cited by Lauber et al. (2013) come from a synthesis of recommendations of practitioners, which may or may not be supported by research.

Effective messages

- Keep it simple, clear, and straightforward (Lauber et al. 2013, Taylor et al. 2018).
- Include information about risks and benefits, with a focus on benefits as many women appear to be aware of risks (Focus group results, Engelberth et al. 2013, Lauber et al. 2013). Include information about the health benefits of ingesting supplements derived from seafood compared to consuming seafood directly (Focus group results).
- Emphasize gain-framed messages about health benefits. They appear to be preferred by women and may change behavior. Use of loss-framed messages may be warranted in

certain contexts because some women indicated loss-framed messages would “scare” them into following seafood consumption recommendations (Focus group results).

- Foster informed personal choice so women feel confident in making their own decisions (Lauber et al. 2013). One approach to supporting personal choice would be to pair general statements about criteria to consider when choosing seafood with specific information about how different species compare against those criteria (Focus group results).
- Explain uncertainties in predicting specific risks and benefits for different individuals. For example, seafood consumption guidelines might include a statement such as: It is difficult to know who might experience health problems from consuming chemicals in fish. Some people may exhibit no seafood-related health concern after years of eating seafood with these chemicals in them, while other people can exhibit health problems (Lauber et al. 2013, Connelly et al. 2018).

Effective specific message content

- Describe and compare the health benefits and risks of seafood consumption by providing information on the benefits to babies and children, and concrete advice about how the risks of mercury can be managed (Lauber et al. 2013, Oken et al. 2013, Connelly et al. 2014, Lando and Lo 2014).
- Promote and encourage desired behaviors (e.g., number of servings, recommended cleaning and cooking techniques) (Lauber et al. 2013).
- Describe the benefits to babies and children (Connelly et al. 2014).
- Describe how frequently seafood should be eaten, with frequency varying in relation to mercury levels (Focus group results, Lauber et al. 2013).
- Describe which types of seafood provide the most health benefits and the fewest health risks (Focus group results, Lauber et al. 2013).
- Describe the benefits of eating smaller, low mercury fish (McLean Pirkle et al. 2015).
- Describe what cleaning, cooking, and storage techniques can reduce health risks (Lauber et al. 2013).
- Identify which types of seafood should be limited or avoided (Focus group results, Lauber et al. 2013).

Effective formats

- Use a positive, cajoling or encouraging tone. Not a commanding tone. (Lauber et al. 2013).
- Use both visuals and text (Lauber et al. 2013, Taylor et al. 2018).

- Use intuitive graphics and illustrations (Lauber et al. 2013).
- Use a layered approach to provide information. Provide short, dichotomous lists of best seafood to eat and those to be avoided, followed by a link or text providing longer, more complete lists of recommended seafood to be eaten and those that should be avoided (Focus group results).
- Use narratives simulating the personal experiences of a pregnant woman/new mother as one format to communicate effectively about the benefits and risks of seafood consumption (Niederdeppe et al. 2019)

Effective distribution methods

- Focus on distribution through health care professionals, including OB/GYN offices, primary care physicians, pediatricians, nurses, and community healthcare organizations. These people are often viewed as trusted sources. (Focus group results, Lauber et al. 2013, Lando and Lo 2014).
- Use trusted and credible sources (Focus group results, Hearn et al. 2013, Lauber et al. 2013).
- Use multiple methods in addition to health care professionals, including mass media, web sites, brief printed materials, apps (Hearn et al. 2013, Lauber et al. 2013, Oken et al. 2013, Taylor et al. 2018).
- Provide opportunities for multiple exposures to the information (Lauber et al. 2013, Oken et al. 2013).

Addressing barriers

- Provide an app (or other easily accessed material) with simple and quick recipes using pictures that also provides nutritional information (Focus group results, Oken et al. 2013, Renner et al. 2018).
- Provide information on lower cost seafood options (Focus group results, McGuire et al. 2016).
- Suggest methods that dissipate odor in the house, such as boiling lemon water or grilling outside (Focus group results).

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The three focus groups we conducted provided valuable insights on how pregnant women understand information they receive about seafood consumption. We learned that women preferred gain-framed statements about health benefits compared to loss-framed statements.

No women preferred the loss-framed statements. Many women indicated the gain-framed statements would encourage them to eat seafood and increase their consumption. A few women indicated the loss-framed statements might scare them into eating more seafood. We conclude that communications might emphasize gain-framed messages, as they appear to be preferred by women and may change behavior in a desired direction. Use of loss-framed messages may be warranted in certain contexts where "scaring" women into following consumption recommendations may be appropriate.

When comparing a message simply encouraging seafood consumption vs. a message encouraging eating lower-mercury seafood we found no clear preference for one message over the other among focus group participants. When providing species-specific recommendations, we found shorter, dichotomous lists of best seafood to eat versus those to be avoided were preferred by some women, while others preferred longer, more complete lists. These findings suggest using a layered approach to communication might be helpful by providing short, dichotomous lists of best seafood to eat and seafood to be avoided followed by a link to a longer, more complete list of recommended seafood to be eaten and seafood that should be avoided.

Although our research was not focused on understanding the importance of trusted sources of information to women, the topic came up repeatedly in the discussions. It is clear women value information coming from a trusted source, usually mentioning health care professionals in this context.

Several other issues appeared during the focus groups, which may warrant further study. First, some women wondered how to weigh the benefits of omega-3s versus the risks of mercury when making decisions about seafood consumption. Research might be conducted to test messages framed around "net-effects," which characterize the overall health effects of fish consumption based on analysis of both the risks and benefits. Second, some women wondered why their prenatal supplements containing omega-3s could not be substituted for seafood consumption. Messages could be tested that explain the benefits of consuming whole foods versus supplements. Third, there was confusion among some women regarding tuna consumption given that there are different types of tuna with different recommendations. Message testing focused on specific recommendations for tuna may be warranted.

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APPENDIX A: FOCUS GROUP GUIDE

Introduction (7:00-7:05)

- WHO I AM. WHO NANCY IS.
- The purpose of this focus group is to help us learn more about how women who are pregnant or were recently pregnant understand information about eating seafood. When I talk about seafood I'm including a variety of types:
    - fresh, frozen, or canned fish,
    - fish in pouches (like salmon and tuna),
    - fish sticks, and
    - shellfish, like shrimp, crab, and clams.

  Government agencies and other groups often share information about eating seafood with women who are pregnant, but they're not sure how women understand this information.
- We're going to share some different types of information about eating seafood with you. We'd like to find out your thoughts about whether and how it might influence the seafood you eat.
- We'll be asking you a series of questions. For most of these questions, we'd like you to answer in an open discussion. We may follow up with additional questions in response to particular points people raise. All perspectives are important. There are no right or wrong answers. We simply want to hear your own thoughts and reactions about the information we share. We may check in with some of you from time to time to find out if you agree or disagree with points that others have made.
- Participation in this group is voluntary. You do not have to participate if you don't want to. You may also refuse to answer specific questions. There is no penalty to you if you decide you do not want to complete the focus group, although we will send you a $125 Amazon gift card if you complete the group.
- Your identity will remain confidential outside of this discussion. No one but the researchers in this study will be able to associate your responses with your name. We will not report results in a way that would allow other people to tell who made particular comments to us. We may use direct quotations from some people in reports or publications, but we'll delete any information that could be used to identify specific people before we do.
- We will record this meeting, so that we can listen to the discussion and transcribe it later.

Questions? Are there any questions before we get started?

Introductory Questions (7:05-7:15)

- We'd like to start with everyone introducing themselves. I'll go around my screen calling on people in the order I see them. Please tell us your first name, how often you usually eat seafood, and the types of seafood you usually eat.
- From now on, I won't be calling on everyone in the same order for every question. So you should speak up when you have something to say, or use the 'Raise Hand' function on Zoom. Nancy will show you how to use the raise hand for those who might not be familiar.
- In this group, we're particularly interested in how pregnant women would react to the information we're going to share. If you're not pregnant right now, I'd like you to tell us how you think you might have responded recently when you were pregnant.

Common barriers to seafood consumption among pregnant women, potential communication strategies (7:15-7:35)

Now we'd like to talk some more about what you think about when you decide to eat seafood.

Questions:

- In what situations are you most likely to eat seafood?
- What are the reasons you don't eat seafood more often?
    - Taste?
    - Cost?
    - Availability?
    - Knowledge about how to prepare/cook?
    - Ability to prepare/cook?
    - Perceived safety of eating seafood?
    - Different family eating patterns?
    - Differences when pregnant?
- Some of you identified x barrier, what could be done to overcome that barrier?
    - Most frequently identified barriers first
    - Possible suggestions are: recipes, meal planning tools, info on the beneficial nutrients in seafood, etc.

Gain vs. loss framing of health benefits (7:35-8:05)

(7:35-7:50)

I'm going to switch to a different topic now. I'm going to be sharing my screen and show you different information about eating seafood. I'm going to give you a chance to look it over, and then ask you some questions about it. Here is the first statement:

Slide 1

Eating seafood with omega-3s while pregnant may help brain and eye development in a woman's baby.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- What conclusions do you draw from this statement about how eating seafood affects your baby's health?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

Slide 2

Eating too little seafood with omega-3s while pregnant may slow brain and eye development in a woman's baby.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- What conclusions do you draw from this statement about how eating seafood affects your baby's health?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

Now I'm putting both statements together on the same slide.

Slide 3

Eating seafood with omega-3s while pregnant may help brain and eye development in a woman's baby. Eating too little seafood with omega-3s while pregnant may slow brain and eye development in a woman's baby.

- Which statement would make it most likely for you to eat seafood? What is it about the statement that would make it more likely for you to eat seafood?
- *What is it about the other statement that wouldn't make it as likely for you to eat seafood?*

(7:50-8:05)

OK, here is another statement.

Slide 4

> Women who don't eat enough low-mercury seafood when they are pregnant may have children who develop more slowly.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- What conclusions do you draw from this statement about how eating seafood affects your children's health?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

Slide 5

> Women who eat low-mercury seafood when they are pregnant may have children who do better developmentally.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- What conclusions do you draw from this statement about how eating seafood affects your children's health?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

Now I'm putting both statements together on the same slide.

Slide 6

> Women who don't eat enough low-mercury seafood when they are pregnant may have children who develop more slowly.
>
> Women who eat low-mercury seafood when they are pregnant may have children who do better developmentally.

- Which statement would make it most likely for you to eat seafood? What is it about the statement that would make it more likely for you to eat seafood?
- *What is it about the other statement that wouldn't make it as likely for you to eat seafood?*

Testing eat seafood message vs. eat seafood but within limits message (8:05-8:30)

(8:05-8:15)

Now I would like to ask you some questions about statements that focus on how much seafood you should eat.

First for your information:

Slide 7

A serving of seafood is 4 ounces, which is about the size of a deck of cards.

Here is the first statement I'd like us to talk about.

Slide 8

Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

Now I will add something to this statement.

Slide 9

Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week, from choices lower in mercury.

- What questions do you have about this statement?
- What conclusions do you draw from this statement about eating seafood?
- After seeing this statement, how might you change the amounts or types of seafood you eat?

(8:15-8:20)

Now I'm putting both statements together on the same slide.

Slide 10

Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week. Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood each week, from choices lower in mercury.

- How do you understand the difference between these statements?
- Which statement would make it most likely for you to eat seafood? What is it about the statement that would make it more likely for you to eat seafood?
- *What is it about the other statement that wouldn't make it as likely for you to eat seafood?*

(8:20-8:30)

I've added some information about how much seafood pregnant woman in the U.S. eat now.

Slide 11

Most pregnant woman in the U.S. eat less than ½ of a serving of seafood a week. Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood per week. Women who are pregnant or breastfeeding should eat 2 to 3 servings of a variety of seafood per week, from choices lower in methylmercury.

- When this new information is added, would these statements be more or less likely to encourage you to eat seafood?
- What is it about the new information that would change the way you respond to the statements?
- How does the new information affect the way you think about eating seafood?

Interpreting information in consumption categories (8:30-8:55)

The final topic I'd like to discuss today has to do with information about which types of seafood are most healthy for you to eat—and how much you can eat. The next slides show you lists of types of seafood with a recommendation for how much to eat. These recommendations are for women who are pregnant or lactating. They are intended as illustrations and don't cover all types of seafood. When looking at the lists, think about the information you shared earlier about the types of seafood you eat.

(8:30-8:35)

Slide 12 -

Most commonly consumed varieties that are high in omega-3s and low in mercury (Eat 2 to 3 servings a week) Clams Crab Pollack Salmon Shrimp Tuna, canned light

- Think about the types of seafood you eat. If you saw this list how easily do you think you could use it to determine what seafood you want to eat?
    - What do you find helpful about the list?
    - What, if anything, is unclear about the list?
- What would you do if you were considering eating a certain type of seafood, but you did not find it mentioned on this list?

(8:35-8:40)

Slide 13

Seafood varieties commonly consumed in the United States that are lower in mercury (Eat 2 to 3 servings a week) Catfish Crab Salmon Shrimp Tilapia Trout Certain species of seafood should be avoided during pregnancy (Eat none) King mackerel Shark Swordfish

- Think about the types of seafood you eat. If you saw this list how easily do you think you could use it to determine what seafood you want to eat?
    - What do you find helpful about the list?
    - What, if anything, is unclear about the list?
- What would you do if you were considering eating a certain type of seafood, but you did not find it mentioned on this list?

(8:40-8:45)

Slide 14

Best Choices OR Good Choices	Choices to Avoid
(Eat 2 to 3 servings a week)	(Eat none)
Clams	King mackerel
Crab	Marlin
Pollack	Orange roughy
Salmon	Shark
Shrimp	Swordfish
Tuna, canned light	Tuna, bigeye
(Eat 1 serving a week)	
Chilean sea bass / Patagonian toothfish	
Grouper	
Halibut	
Mahi mahi / dolphinfish	
Snapper	
Tuna, albacore / white tuna, canned and fresh/frozen	

- Think about the types of seafood you eat. If you saw this list how easily do you think you could use it to determine what seafood you want to eat?
    - What do you find helpful about the list?
    - What, if anything, is unclear about the list?
- What would you do if you were considering eating a certain type of seafood, but you did not find it mentioned on this list?

(8:45-8:55)

Some versions of the list I just showed you are actually much longer. Here is the complete version:

Slide 15

Best Choices OR Avoid	Good Choices	Choices to
(Eat 2 to 3 servings a week)	(Eat 1 serving a week)	(Eat none)
Anchovy	Bluefish	King mackerel
Atlantic croaker	Buffalofish	Marlin
Atlantic mackerel	Carp	Orange roughy
Black sea bass	Chilean sea bass / Patagonian toothfish	Shark
Butterfish	Grouper	Swordfish
Catfish	Halibut	Tilefish (Gulf of Mexico)
Clam	Mahi mahi / dolphinfish	Tuna, bigeye
Cod	Monkfish	
Crab	Rockfish	
Crawfish	Sablefish	
Flounder	Sheepshead	
Haddock	Snapper	
Hake	Spanish mackerel	
Herring	Striped bass (ocean)	
Lobster, American and spiny	Tilefish (Atlantic Ocean)	
Mullet	Tuna, albacore / white tuna, canned and fresh/frozen	
Oyster	Tuna, yellowfin	
Pacific chub mackerel	Weakfish / seatrout	
Perch, freshwater and ocean	White croaker / Pacific croaker	
Pickerel		
Plaice		
Pollock		
Salmon		
Sardine		

Scallop Shad Shrimp Skate Smelt Sole Squid Tilapia Trout, freshwater Tuna, canned light (includes skipjack) Whitefish Whiting

Questions to ask after seeing all 4 lists:

- Which list do you prefer? What are the reasons you prefer that list?
- If not discussed previously: There are differences between the lists in recommendations for tuna. Which list provides you with the information you need? Why is that the case?
- How would you use these lists? Under what circumstances might you use these lists?

Wrap Up (8:55-9:00)

Those are all of the questions I have. Is there anything we haven't talked about that you think is important for me to know?

THANK YOU!