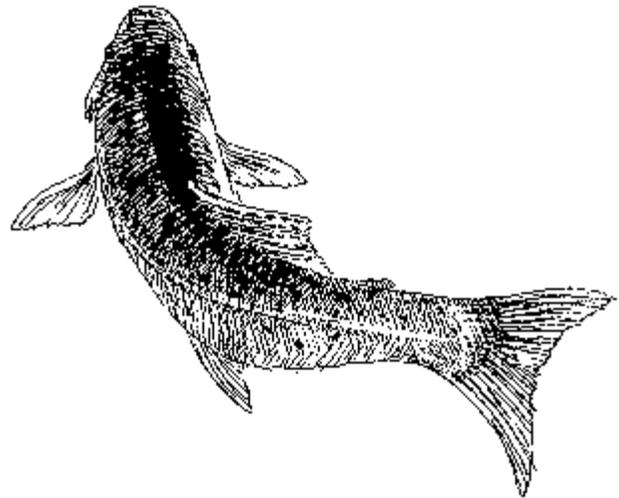

Factors Influencing Fish Consumption by Key Audiences in the Great Lakes Region



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EXECUTIVE SUMMARY

A consortium of the eight Great Lakes states' health, environmental, and natural resource agencies was funded by the U.S. Environmental Protection Agency to work together to enhance state fish consumption advisory programs by determining how to communicate information to the public more effectively, thereby increasing public knowledge about the risks and benefits of fish consumption and reducing exposure of the public to toxic substances from consumption of contaminated fish. As part of this work, Cornell University's Human Dimensions Research Unit conducted a series of focus groups with key audiences of fish consumption health advisories. The purpose of these focus groups was to identify factors that influence consumption of fish in each target audience. In each group, participants were asked a series of open-ended questions about factors that may influence fish consumption (informed by the Theory of Planned Behavior)

- Three focus groups were conducted with women of childbearing age, who were of interest because they are advised to reduce their exposure to contaminants in fish more than other groups in most states given that children they might bear may be affected by contaminants they consume. These groups took place in Grand Marais, MN, Milwaukee, WI, and Indianapolis, IN. A total of 25 women participated in these three groups. The women ranged in age from approximately 20 to 50. Participants were predominantly white, but also included African Americans and Native Americans.
- Three focus groups were conducted with urban anglers. Urban anglers were of interest because they may be restricted to urban fishing sites (which often have fish with higher levels of contaminants) and dependent on the fish they catch for food. These groups took place in Buffalo, NY, Erie, PA, and Flint, MI. A total of 41 individuals participated in these three groups. The majority of participants were white; approximately one-third were African American and one-tenth were of Asian descent. Approximately three-quarters were male and one-quarter were female.
- One focus group was conducted with retirees (specifically retired men). Retired men were of interest because they may have more time to fish and, therefore, more opportunity to eat fish. Mercury consumption in older men, however, may contribute to heart ailments, and research conducted in Wisconsin found that older men have some of the highest levels of mercury. This group was conducted in Duluth, MN, and included participants from both Minnesota and Wisconsin. Seventeen men participated in this group ranging in age from 50 to mid-80s. All were white. Multiple focus groups are needed to generate reliable data from a particular audience. This single group was implemented as a pilot study to explore whether additional groups with this audience should be conducted in the future.

Each focus group lasted approximately two hours. The discussions were audiorecorded and transcribed. Content analysis of the transcripts was done using Atlas.ti (Version 6.2.23).

This report is organized into three sections, one for each of the key audiences considered in this research. For each audience, we discuss fish consumption patterns, factors influencing fish consumption, and how the audience responded to information about the health risks and benefits of fish consumption.

Women of Childbearing Age

Several conclusions emerge from our results about how women understand the health risks and benefits of fish consumption.

- Although many focus group participants recognized that women needed to reduce their exposure to contaminants in fish more than men, considerable uncertainty existed about *which types* of women needed to reduce their exposure: pregnant women, women actively trying to become pregnant, all sexually mature girls and women, or all girls and women who might become pregnant in the future.
- This confusion was related to women's understanding of the terminology used to describe women in fish consumption advisories (women of childbearing age, women planning to become pregnant, etc.).
- Focus group participants recognized and acknowledged the presence of contaminants in fish, yet expressed uncertainty about: (a) the health effects of contaminants on a woman's body in relation to the development of a fetus; and (b) why fish consumption guidelines are different for women than men.
- Although some women consumed fish in excess of advisory recommendations, others restricted their fish consumption unnecessarily, not eating fish at all when they were pregnant and therefore foregoing the potential health benefits of fish consumption during pregnancy.
- Many women held misconceptions about how to judge whether or not fish were safe to eat.

We drew additional conclusions about how women respond to fish consumption advisory information.

- Women varied widely with regard to how much information they wanted about the health risks and benefits of fish consumption. Most expressed a preference for clear, simple messages presented in ways that they would not be able to miss, in the course of their routine media exposure or daily routines.
- Many women became more interested and receptive to information when they were pregnant, seeking out and absorbing information from a variety of sources.
- Some women expressed a strong preference for information that was specific to the particular areas in which they lived and fished, disregarding information that seemed designed to apply across broader regions.
- The term "sport-caught fish" was widely interpreted to apply only to those fish that were valued game or trophy fish (rather than any caught fish).

Based on these results, we formulated several recommendations regarding possible emphases in fish consumption advisory programs as a starting point for discussions within the Consortium.

- Because an apparent majority of women are not inclined to seek out advisory information, being proactive about the distribution of advisory information could be beneficial.

- Because a subset of women is intensely interested in advisory information, however, more detailed sources of information about advisories also should be available.
- Targeting pregnant women with advisory information has been effective, but greater effort may be needed to reach women before they become pregnant.
- Since warnings about fish consumption risks discourage some women, particularly pregnant women, from eating fish at all, positive advisory messages that encourage women to eat particular species may make it more likely that they will get the health benefits of fish consumption.
- Because certain misconceptions are common about which factors influence whether or not fish are safe to consume, developing advisory materials that identify and explicitly refute these misconceptions could be helpful.
- Since some women are more receptive to advisory information that targets their particular locality, packaging this information into materials aimed at a particular locality could increase the receptivity of women to it.
- Working toward consistency in advisory messages targeting women may help to reduce confusion about which types of women should be reducing their exposure to contaminants in fish and why they should be reducing their exposure.
- The least ambiguous way to identify women who are the intended targets of advisory information would be to use an age range rather than terms like “women of childbearing age.”
- The term “sport-caught fish” will likely be misunderstood by many.

Urban Anglers

Several conclusions emerge from our results about factors influencing urban anglers’ fish consumption and their understanding of the risks and benefits of eating fish.

- Some urban anglers appeared to consume fish in excess of advisory recommendations, but others restricted their fish consumption unnecessarily, therefore foregoing the potential health benefits of fish consumption.
- A number of anglers held misconceptions about how to judge whether or not fish were safe to eat.
- Although many recognized that fish preparation methods could reduce the likelihood of consuming contaminants, they did not indicate that they were aware that these methods worked for PCBs, but not for mercury.
- Some urban sites have significant subpopulations of anglers from different ethnic and cultural backgrounds with different fish consumption norms.
- Urban anglers may consume a lot of fish if they can not obtain food easily in other ways.
- Because sites for fishing were often limited, urban anglers could not always fish at sites with the characteristics they preferred.

We drew additional conclusions about how urban anglers respond to fish consumption advisory information.

- Some audiences are difficult to reach with advisory information, including: immigrants, very low-income anglers who depend heavily on fish for food, and people who are given fish by anglers.
- Anglers had a variety of questions related to fish advisories and many of the answers to their questions were already readily available in advisory materials.
- Some anglers expressed a strong interest in having more information about which fish were safe to eat rather than which fish were not safe to eat.
- As with women of childbearing age, the term “sport-caught fish” was widely interpreted to apply only to those fish that were valued game or trophy fish (rather than any caught fish).

Based on these results, we formulated several recommendations regarding possible emphases in fish consumption advisory programs.

- Some at-risk urban audiences, such as immigrant groups and low income anglers, may be easiest to reach through community-based communication programs conducted in partnership with local organizations.
- Because some urban anglers may not have any choice but to eat fish, focusing advisories on communicating risk-reduction strategies may be worthwhile.
- Since warnings about fish consumption risks discourage some anglers from eating fish at all, positive advisory messages that encourage them to eat particular species may make it more likely that they will get the health benefits of fish consumption.
- Because certain misconceptions are common about which factors influence whether or not fish are safe to consume, developing advisory materials that identify and refute these misconceptions could be helpful.
- The term “sport-caught fish” will likely be misunderstood by many.

Retirees

The purpose of this single focus group was to determine whether preliminary data suggested that retirees might be at particular risk from fish consumption making it worthwhile to conduct additional focus groups. Relevant themes that emerged during this focus group included:

- Some retirees fished more now than when they were working. Because many liked to eat the fish they caught, they might very well be eating more fish.
- Some had concerns about health risks of fish consumption, but many did not because they believed at their age they were unlikely to experience negative effects from fish contaminants. None expressed an awareness that mercury could contribute to heart ailments.
- Although some awareness existed that cleaning methods could reduce contaminants consumed, anglers showed no recognition that these methods were not effective for reducing mercury.
- Misconceptions about how to determine which type of fish were safest to eat existed. Some anglers relied on characteristics such as the clarity of the water and the color of the fish.

- Retirees tended to trust the fish they caught more than other sources of food because they had greater knowledge of where the food came from.

Based on these preliminary findings, it is possible that retired anglers may be consuming potentially contaminated fish without full awareness of the risks it poses to them or how to reduce that risk.

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BACKGROUND

A consortium of the eight Great Lakes states' health and environmental departments formed in the 1980s to develop shared science-based protocols for fish consumption advice in the Great Lakes (Anderson et al. 1993, McCann et al. 2007). This Consortium has worked together since then, as time and funding have allowed, on various communication tools, data sharing, and additions to the protocols. Most recently, the group submitted a proposal and was funded by the U.S. Environmental Protection Agency through its Great Lakes Restoration Initiative to work together to enhance state fish consumption advisory programs by determining how to communicate information to the public more effectively, thereby increasing public knowledge about the risks and benefits of fish consumption and reducing exposure of the public to toxic substances from consumption of contaminated fish. The Consortium is working with Cornell University's Human Dimensions Research Unit on several research projects to achieve their objective, including a series of focus groups with key audiences of fish consumption health advisories. For this report, these audiences are:

- Women of childbearing age. For the purposes of these focus groups, the definition of "women of childbearing age" was women who: (a) self-define as being of childbearing age (b) are or may become pregnant; and (c) eat at least some fish (or whose families eat at least some fish) caught by themselves, family members, or friends. This audience was of interest because women of childbearing age are advised to reduce their exposure to contaminants in fish more than other groups in most states given that any children they might bear may be affected by contaminants they consume.
- Urban anglers. For the purposes of these focus groups, the definition of "urban anglers" was English-speaking anglers who live and fish in urban areas. This audience was of interest because fish in urban locations often have higher levels of contaminants. Because urban anglers may have lower incomes on average, however, they may be more restricted to urban fishing sites and depend more on the fish they catch for food (potentially exposing them to more contaminants).
- Retirees. For the purposes of these focus groups, the definition of "retirees" was (a) men; (b) who self-identify as retired; (c) are at least 55 years old; and (d) who eat at least some northern pike or walleye (higher mercury fish) caught by themselves, family members, or friends. This audience was of interest because retired men may have more time to fish and, therefore, more opportunity to eat fish. Mercury consumption may contribute to heart ailments in older men, and research conducted in Wisconsin found that older men have some of the highest levels of mercury.

The purpose of these focus groups was to identify factors that influence consumption of fish in each target audience. The Theory of Planned Behavior (Ajzen 1989) identifies the types of factors that influence behavior and was, therefore, relevant to understanding factors influencing fish consumption. It has been used to explain compliance with regulations and recommendations in a wide variety of contexts, including complying with traffic regulations (Elliott et al. 2003), following health recommendations (O'Boyle et al. 2001), and obeying tax laws (Bolek and Hatfield 2003). Knuth et al. (1993) applied the Theory of Planned Behavior specifically to understand whether anglers complied with the recommendations of fish consumption health advisories.

In this study, we used the Theory of Planned Behavior to identify factors that influence whether individuals comply with fish consumption health advisories. The Theory of Planned Behavior postulates that these behaviors are influenced by three interrelated factors: (1) "attitude toward the behavior" (Does an individual think engaging in the behavior is generally positive or generally negative? For example, do individuals think it is important vs. unimportant, or good vs. bad to cook their fish in the ways recommended in advisories?); (2) "perceived behavioral control" (How easy or difficult do individuals think the behavior is? For example, how easy would it be for individuals to follow the recommended procedures for cooking fish?); and (3) "subjective norm" (What social pressures do people perceive for individuals to engage in the behavior? For example, do people think that their friends and family members think it is important to cook fish in the ways recommended in advisories?). Each of these factors is, in turn, affected by others:

"Attitude toward the behavior" is determined by "behavioral beliefs" and "outcome evaluation." "Behavioral beliefs" are the outcomes people expect if they engage in the behavior. For example, they expect limiting their consumption of fish will reduce their exposure to contaminants, reduce their risk of cancer, or reduce their access to a food source on which they rely. "Outcome evaluation" is a person's judgment about whether those outcomes are positive or negative. For example, a person may believe that the reduction in their cancer risk is so small as to be unimportant.

"Perceived behavioral control" is determined by "control beliefs" and "perceived facilitation." "Control beliefs" are beliefs about the factors that could make engaging in the behavior easier or more difficult. For example, individuals may believe that following the recommended procedures for cooking fish will take time and expertise. "Perceived facilitation" refers to perceptions about whether these factors will make the behavior easier or more difficult. For example, individuals may be willing to spend the time to follow the fish preparation guidelines, but lack the necessary understanding of how to carry them out.

"Subjective norms" are determined by "normative beliefs" and "motivation to comply." "Normative beliefs" are people's beliefs about whether others would approve of them engaging in the behavior. For example, they may consider whether following fish consumption health advisories is important to friends and families or advocated by state health departments or their own health care providers. "Motivation to comply" refers to how important an individual thinks it is to comply with these other people.

We used the Theory of Planned Behavior to inform the questions used in our focus groups.

METHODS

Focus groups were chosen for this study because we were not confident we could identify *a priori* all of the factors that might influence fish consumption in our target audiences. Focus groups rely on open-ended questions and encourage participants to interact with and respond to each other and are an effective method of discovering the full set of variables that may influence a phenomenon of interest (such as fish consumption). Focus groups are not an effective method

of determining how extensive the influence is, however (e.g., the percentage of people in a target population whose fish consumption is influenced by a particular factor).

Focus group participants were recruited by state health departments and fish and wildlife agencies that were members of the consortium and nongovernmental community organizations interested in fishing and fish consumption. Participants were offered \$25 Visa gift cards and a light meal as incentives to participate. The number of participants in the groups ranged from 3 to 20.

In each group, participants were asked a series of open-ended questions about factors that may influence fish consumption (informed by the Theory of Planned Behavior): (1) perceived positive and negative outcomes of consuming fish; (2) perceived attitudes of important social referent groups (friends, family, etc.) towards consuming fish; (3) opportunities for and barriers to consuming fish (e.g., whether fish are available, affordable, etc.); (4) current sources of information about the risks and benefits of fish consumption; and (5) the key messages received from current sources of information. In addition, each group was asked questions about their interpretation of terms frequently used in fish consumption advisories. A complete list of the questions used to guide the focus groups for each audience is provided in Appendix A.

- Three focus groups with women of childbearing age were conducted. These groups took place in Grand Marais, MN, Milwaukee, WI, and Indianapolis, IN. A total of 25 women participated in these three groups. The women ranged in age from approximately 20 to 50. Participants were predominantly white, but also included African Americans and Native Americans.
- Three focus groups with urban anglers were conducted. These groups took place in Buffalo, NY, Erie, PA, and Flint, MI. A total of 41 individuals participated in these three groups. The majority of participants were white, approximately one-third were African American, and one-tenth were of Asian descent. Approximately three-quarters were male and one-quarter were female.
- One focus group with retirees was conducted in Duluth, MN, and included participants from both Minnesota and Wisconsin. Seventeen men participated in this group ranging in age from 50 to mid-80s. Virtually all were white. Multiple focus groups are needed to generate reliable data from a particular audience. This single group was implemented as a pilot study to explore whether additional groups with this audience should be conducted in the future.

Each focus group lasted approximately two hours. The discussions were audiorecorded and transcribed. Content analysis of the transcripts was done using Atlas.ti (Version 6.2.23). This qualitative data analysis program allowed us to mark/code segments of interviews that described factors influencing fish consumption. The codes used for this analysis were based in the Theory of Planned Behavior and modified as necessary to reflect the full range of data in the transcripts. Transcript segments with the same code were grouped together, reviewed, and relevant quotes are used in subsequent sections of this report to illustrate factors influencing fish consumption.

This report is organized into three sections, one for each of the key audiences considered in this research. For each audience, we discuss fish consumption patterns, factors influencing fish

consumption, and how the audience responded to information about the health risks and benefits of fish consumption. Excerpts from focus group transcripts are used to clarify and illustrate particular findings. Each of these excerpts is labeled according to the focus group from which it was drawn (e.g., “FG-1”).

RESULTS: WOMEN OF CHILDBEARING AGE

Fish Consumption

The amount of fish consumed by women who participated in our focus groups varied widely, but for many, fish was a major component of their diet:

I eat a lot of fish, and my kids eat fish, and when I was pregnant I ate fish. (FG-1)

I don't eat pork or beef so I rely heavily on fish and chicken and any other poultry. So fish is a daily thing almost in my diet. And I take fish oil tablets so I'm always consuming some type of fish somewhere. (FG-5)

I eat fish quite frequently... This week I think I've had salmon at least once a day... If you look in our refrigerator we have everything from pickled fish, smoked fish, fish that was on the grill, fried fish. (FG-5)

Many women, however, mentioned avoiding or minimizing fish when they were pregnant or nursing infants:

I'm pregnant right now, and I've eaten it all winter long. I just minimize my consumption I guess. (FG-1)

I like to eat a lot of fish but once I've been pregnant ... and breastfeeding ... you still got to keep it low. And then with little kids because their brains are developing, you still have to keep it low... I've just kind of been on a hiatus – not avoiding it but not buying it ... once a week ... [as opposed to] two to three times a week. (FG-5)

Some went so far as to eliminate fish from their diet completely when they were pregnant forgoing the health benefits for their developing child because of concern about the health risks:

I just don't eat at all when I'm pregnant. (FG-1)

The type of fish consumed differed from person to person and included sport-caught fish and fish purchased at fish markets and grocery stores (fresh, frozen, and canned). Those who fished recreationally (or who had family members who fished) were more likely to consume and prefer sport-caught fish. No clear patterns of preferred species emerged, but some women said they were more likely to eat smaller sport-caught fish:

The smaller, we call them "eaters," and I want to say those are less than eight pounds – five pounds maybe... We call those the "eaters..." And those are nice fillets. (FG-5)

One focus group participant expressed a preference for larger fish, however, because too much work is required to eat smaller fish:

Smaller stripers or bluegills or stuff like that ... the work that goes into it to get a small piece of fish... We throw them back... We only keep the big ones, the ones that have been there for a long time. (FG-6)

Larger fish are potentially more contaminated than smaller fish, although this participant did not indicate that she recognized this fact.

In most participants' families, everyone ate the same type of fish:

We probably all eat the same type of fish – whatever is being served. (FG-1)

Most differences that did exist in families were based in personal preferences and not related to health considerations:

My husband likes walleye, and I prefer bass. So it depends on what we catch. If we catch walleye, we eat walleye. If we catch one of each, I get the bass, he gets the walleye, and the kids get chicken... They ... don't really have a taste for real fish I guess. (FG-1)

In some cases, however, participants described family differences in fish consumption that appeared to be related to concerns about contaminants:

We split it up. Well, like if someone catches a northern ... one of the big burly guys will eat it. And so I stay away from it. We kind of divide it... The kids will get the little panfish. (FG-1)

Factors Influencing Fish Consumption

Opportunities and Constraints

One of the factors affecting fish consumption was the availability of fish. Availability was influenced by whether people fished (or had family members who fished), time of year, location, and affordability.

Those women who fished, or who had family members who fished, typically ate fish when they caught it:

We eat a lot of locally caught fish. We don't really buy anything at like the grocery store. It's all mainly ... seasonally caught. In the summertime. And then ice fishing ... is where we get it too in the winter. (FG-1)

In the summer, we eat it all the time. And then we freeze it and probably gets ... through Christmas, January, February. Then we run out. (FG-1)

My husband brings it home, and we eat it. I eat a lot of perch. That's my favorite. Lake Michigan perch. I can eat that every single day. (FG-5)

Some participants also ate fish they were given by acquaintances:

The neighbor down the road is a walleye snob. So if he catches bass, he brings it to us and we'll eat it, gladly eat it. (FG-1)

Although individuals fished for a variety of reasons, catching fish to eat was one of the motivations for almost everyone:

We like to fish in the lakes that we know what fish we're going to catch. And we like fishing a lot... We go out fishing because it's fun, and we like to do it. And then if we catch fish we have a meal... The goal is to catch fish but it's not like if we don't have fish, we're not going to eat. (FG-1)

Only one focus group participant did not eat what she caught at all:

I like fishing but I don't eat what I catch... It's just like a sport for me so... I'll catch it and usually I give it away to some friends or family. (FG-6)

The type and amount of fish consumed depended heavily on the sport-caught and commercial fish available locally.

It's actually kind of a neat thing because ... you got salmon in this area. And then where else do you get salmon, like Alaska... So it's kind of a cool thing about ... where we live. We've got so many different fish to choose from, so people get excited. They're like: "Oh salmon, I can go out for salmon!" (FG-5)

I'm strictly availability. If somebody brings some fish over, the fish is on sale, we've had enough beef and chicken that week ... that's what we're having. (FG-5)

During the season [the fish market is] open ... my family eats it quite a few times a week, fish. (FG-1)

For some participants, the cost of fish influenced both the type and amount consumed:

He loves mahi-mahi. That's his hands-down favorite fish. It's ... less available around here and more expensive. So sometimes I would love to pick some up, but it's pricy here... Freshwater fish is a lot cheaper. So sometimes that's the reason to pass up the saltwater fishes would be price. (FG-1)

We're on a budget so we eat what's on sale whether that's the tilapia or orange roughy ... or you know just Pick 'n Save kind of fish that's frozen in a bag. (FG-5)

I would buy more if it wasn't so costly. (FG-6)

Social Influences

Fish consumption was influenced by family, friends, and other social groups – both past and present. When focus group participants described their reasons for eating fish, a number mentioned their children’s likes and dislikes:

Fish is one of the few things my daughter eats. (FG-1)

My kids eat a lot of fish. (FG-1)

Others referred to their own or others’ upbringing as influencing the types of fish they chose to eat today:

My dad always told me the old fish, you’ve got to keep them living, and only eat the little fish... And that’s what I did. Plus, I always caught the small fish anyway. (FG-1)

One challenge we have, my husband grew up in Wyoming, which is completely landlocked. So other than some river fish ... he was raised to not necessarily trust fish or where it came from or how fresh it is because it had to travel so far. (FG-1)

Two individuals mentioned religion as affecting fish consumption:

I eat fish about every Friday, and it’s just been kind of a tradition from when I was a kid. We always ate fish on Friday... Everybody that I’m around, family members and all that still do the same thing... I went back to that family tradition or whatever of eating it at least every Friday... I guess the Catholic thing has something to do with it. (FG-6)

One woman noted the fact that her friends and family paid more attention to providing her with alternatives to fish when she was pregnant:

Then it was like: “Oh, we’re having fish... We’re inviting you guys up for lake trout, but ... we figure you can... we’ll have other things too so you don’t have to eat a lot.” (FG-1)

Fish Consumption Outcomes

Focus group participants identified a variety of outcomes of eating fish that affected their fish consumption. The outcomes they sought included enjoyment, knowledge about their food, conservation of fish stocks, health benefits, and avoiding health risks.

Enjoyment. When the women in our groups discussed the reasons they ate fish, taste was often one of the first things they mentioned:

I go for taste... Walleye is our #1. Walleye tastes better. (FG-1)

Really just because of the taste of it... It doesn’t have that fishy taste... Tilapia, same thing. (FG-6)

R1: I always caught the small fish anyway.

R2: They taste better. (FG-1)

Similarly, when people chose not to eat fish, taste was sometimes a reason:

R1: If you don't know what Lutefisk is, it's soaked in lye... Lye is like what they use to...

R2: Perm your hair...

R1: My ... family does that once a year, and I sit and watch. It's gross. (FG-1)

Like really pungent fishy ... smell, can't even do it. I don't even care if it's good for you.

Won't do it because I'll just ... associate the smell with it being bad. (FG-5)

Another factor, less frequently mentioned, that influenced enjoyment (and consumption) of fish was its appearance:

When the fish come in to spawn ... the color of the meat changes. So I love salmon.

However, when the meat starts to turn color, and it's not that you can't eat the meat, it's just that ... you're used to ... seeing ... that nice salmon pink color, it starts to turn white... When I see that, the appearance of the meat is a turn-off. (FG-5)

Knowledge of Food. Many participants in our focus groups liked to eat local fish, particularly fish they or their family members caught. One reason for this preference was that some participants viewed local fish as a more sustainable food source, the use of which benefitted the community.

You can go and fish and get the fish yourself whereas ... eating red meat ... unless you're ... killing your own meat ... red meat is a less sustainable protein source. So I guess for me it's ... a big reason ... why I choose fish, too. I mean it's regionally supported... It supports all these people you know. (FG-1)

More frequently, however, women preferred locally caught and self-caught fish because they wanted knowledge about their food. Food, in general, and fish, in particular, that was not local was viewed as greater risk:

If I go out to eat, and it's ... a fish fry ... it's like the mystery fish. Ugh. Whatever it is or where it came from, I don't eat that. (FG-1)

I noticed it came from China and ... a couple years ago there was some scare in the water in China. I can't even remember what it is now. So we decided not to buy fish from China anymore. So then I switched to buying the flounder from Canada. (FG-6)

Health Benefits. The health benefits of eating fish were widely recognized and were one of the reasons for fish consumption:

If I cut my intake of other foods like beef ... I feel better... I feel healthier, and I lose weight faster... I feel better after I eat when I eat fish, and so there's something in my mind that says this is good for me. Eat it. (FG-5)

Some women mentioned that because fish provided lean protein, eating fish was good for weight control and health:

The health issue ... I was weighing like 270 pounds. Dropped 70 pounds... I started eating a lot of fish and ... a lot of it is for health. (FG-6)

It's less fatty than ... something like beef. (FG-6)

A number of participants referred to the importance of the fatty acids found in fish and said that the presence of those fatty acids influenced their fish consumption:

I think as a health-conscious adult, people eat fish, some people like me eat fish not necessarily for the taste but because it's good for you, and it's got omega-3 fatty acids. And you know you're seeing all the time how you should be eating fish two to three times a week... I was raised in an environment with fish, but if you're not raised in an environment with fish then you would probably eat it because you thought it was healthy. (FG-6)

Salmon ... doesn't it have an awesome amount of fatty acids? That's why we eat it because it has such benefits. I mean I know it is fatty, and I know it does have more mercury but I guess do the benefits outweigh the negatives? I don't know. (FG-1)

Participants in each group attributed particular health benefits to fish, often referring to brain development:

R1: *And then with the salmon, 'cause my son eats a lot of salmon 'cause I always thought salmon was really good. It helps with brain development and everything so...*

R2: *Because of the healthy oils. (FG-1)*

I really do think that it is brain food when you have fish and you have a lot of fish. I prefer the fish oil [supplements] for that reason, and if I don't consume fish having that fatty acid ... [the supplements are] helpful to me. (FG-5)

R1: *Good for your heart, good for your nails, good for your hair, which is all a woman cares about.*

R2: *And your brain.*

R1: *And your brain.*

R2: *Yeah, brain development especially in children, and you know my daughter has some left/right brain issues so things like that help her in school.*

R1: *Lowers your cholesterol doesn't it? (FG-6)*

Some individuals tried to consume more fish when pregnant to obtain those benefits:

My sister-in-law ... before her boys were born she ... said “I need more fish... We’re trying to get pregnant...” So she actually wanted some fish for health reasons. (FG-5)

I would think it would be helpful ... for the brain development. (FG-6)

Health Risks. Each group discussed the potential health risks of fish consumption, too. Most frequently, those participants who were concerned about fish consumption were concerned about mercury in fish:

We eat it about twice a week only. Because I just don’t know, I have little ones. I don’t know how much mercury is in everything. I don’t know ... how much to give them. I don’t want to give them too much. (FG-1)

If you eat fish, my understanding is that the mercury in the fish is something that builds up in your system... Once it’s there, it’s there. (FG-5)

Concerns about other contaminants and pathogens in fish existed, too:

R1: *But it’s not just mercury...*

R2: *The smog...*

R3: *Like the green...*

R4: *Like definitely bacteria and parasites... (FG-1)*

Some women perceived pregnancy as a particularly risky period during which to eat fish:

Before I was pregnant, we ate any kind of fish. And then suddenly when you’re pregnant, you’re reading all these things. You don’t even want to eat the lunch meat... I’m scared to death of everything. But it was then that I think this thought came that, “Oh, maybe I shouldn’t eat the skin every time.” (FG-1)

‘Cause I’ve been pregnant ... a couple times over the last five years, and I know you can’t eat as much fish. So then I get all bummed out. (FG-5)

I think that you should just try to cut down to once a week or once every couple weeks while you’re pregnant and breastfeeding. Then after that you can go back to your heyday. (FG-5)

Others mentioned avoiding cooking fish at home with children because of the health risks:

I have two kids, too, and I know all the fish have mercury so I can’t do too much. (FG-5)

On the other hand, many participants were not concerned about the health risks of fish consumption at all:

Last spring while I was pregnant we caught 45 [fish] between me and his sister and him. And we had a huge grill-out with his family. But that's everyone's favorite. I really don't think about [contaminants]. (FG-5)

Some recognized that health risks existed, but believed they were minimal:

I feel like part of it's just kind of a life choice or lifestyle balance... If I'm generally eating really healthy, I just assume that whatever fish I eat, because I love fishing, it gets offset by just living a generally healthy lifestyle. I'm not going to stop whitefishing because it might be dangerous... Pick and choose your battles. (FG-1)

Even those who were concerned about contaminants in fish had uncertainty about what the effects of those contaminants might be:

From what I understand, it's still sort of ambiguous... Mercury could cause neural damage and things closely associated to Parkinson's and this and that. And ... well, we think it's stored in this part of your brain... I think that ... a lot of pollutants like mercury is so recent that it's rarely been concentrated in our systems... It's more like maybe you shouldn't eat it because we really don't know what it does. (FG-1)

I think mercury is associated with brain damage... But I don't know ... anything beyond that... I think mercury is brain damage. (FG-5)

Factors Affecting Health Risks and Benefits. Focus group participants discussed a variety of factors that they thought made fish riskier to eat. Many recognized that some waters contained more mercury than others and considered fish from those waters less safe:

The only time I ever had a concern was, there's a certain lake that ... we really like to fish out of and I know it has higher mercury. (FG-1)

One participant considered saltwater safer than freshwater:

I thought saltwater was ... safer, less mercury. (FG-1)

Some of the fish with the highest mercury levels, however, are saltwater species.

More frequently, however, participants were concerned about polluted waters and more industrial areas:

We recently caught a fish in the White River that was a big bass, and we talked about keeping it. But you know you hear all the time about the White River is so polluted ... and you see stuff floating down it. So we're like, "No, we're not going to keep it." (FG-6)

I feel like I would eat less fish if there was more industrial activity in the area for sure. (FG-1)

Well, I'm originally from Michigan, Detroit... We didn't eat fish as much unless we went up north where it was cleaner air ... even though we lived right by Lake Huron ... because Detroit's right there. (FG-1)

Some incorrectly associated green water with unsafe water and so avoided eating fish from waters that were green:

I had the same experience living out west from the twin cities. Farming community, your lakes are green. Gross. I'm not going to eat that. So, yeah, I didn't even fish down there. I'd only fish when I came up here. (FG-1)

A number of women believed that eating fish from waters that looked clean and were far from cities was safe, although this is not necessarily the case:

It would be one thing if we were ... in the cities where there's pollution, like major pollution in lakes, to where we would have to worry about you know a three-eyed fish or something. But if it's ... naturally occurring mercury... (FG-1)

I don't really think about what's ... in the fish as long as we get fish from Lake Superior... I can see the lake. The lake looks pretty. It looks fresh. I just assume the fish are, too. (FG-1)

One participant argued that fish from cold waters were safe:

You've got to think ... the average temperature is like 38° for the whole year. So that lake doesn't get above that temperature. So your fish aren't getting the bacteria that your inland fish are getting... If you're getting a trout out of Lake Superior, it's a lot healthier and the mercury level I'm sure is here [hand held low] compared to here [hand held high] if you're even comparing it to an inland fish in that way. So I've never ever even worried about the fish coming out of our lake. I guess if they're coming out of Lake Michigan or something like that then I'd be a little more worrisome, but they're fishing in 70° water. (FG-1)

In fact, one focus group participant's trust in local waters was strong enough that she was willing to disregard the state's health advisory, even when some advice pertained specifically to local lakes:

I'm living up here now ... and [the advisory's] for the whole state... So I'm like: That's somewhere else. That's not up here in the boundary waters, and it's beautiful, and it's fresh... It's not here... There's no way that should account for us, even though you can go and check [the advisory for] some [local] lakes that'll tell you once a week. (FG-1)

One participant questioned arguments like these, however:

Okay, so here's a question: Isn't the mercury that the fish are getting coming from the rain? ... Okay, so is it going to rain fresher rain up here vs. the cities rain? ... I mean it's not. It's not going to rain fresher rain up here vs. the cities... Really, is our mercury intake up here for our fish any different than somewhere else? Because, again, the rainfall isn't going to say, "Well, I'm going to put the mercury here and not." (FG-1)

In addition to the types of waters from which fish were harvested, women in the focus groups believed that health risks and benefits varied with the type of fish. One argued that wild fish were more nutritious than farmed fish:

If it's wild, I guess that would be better than the pellet-fed because there's a corn base in there or something like that. Where fish, if they're in the wild, they're eating ... throughout the ecosystem... So that would be better. Hopefully the wild fish is more nutritious. (FG-5)

Several correctly maintained that smaller fish posed fewer health risks than larger fish:

Common sense says the smaller fish are the younger fish. So then if they are the predators ... they haven't lived as long so they haven't taken in as much. (FG-1)

The smaller ones are typically the ... less contaminated fish. So when we bring in our catch anybody that wants the big ones, we're like, "Go for it." (FG-5)

A preference for eating smaller fish, however, was not always based in concern about health risks. In some cases, anglers kept smaller fish because they wanted to help conserve fish stocks:

My motivation for eating smaller fish is always keep the bigger ones in the lake for spawning... Never thought about mercury or anything. (FG-1)

Some participants judged the health risks associated with the fish based on their appearance:

Visually, if it doesn't look the way that I normally see it, it means it's bad... There's something with your eyes that warns you ... that something might not be good. (FG-5)

A few women recognized that fish preparation methods could reduce health risks:

Don't eat the skin. And you have to get the fat off the back down the center. And she loves it. She loves that flavor. That's where the flavor is. But I'm always thinking, "Oh no, that's where the bad stuff is." (FG-1)

Several participants were willing to accept the risks of consuming potentially contaminated fish because they believed that fish consumption was only one of many health risks they faced:

I don't even think about the mercury, and if it does pop into my mind I think of everything you eat they tell you is bad... We just eat vegetables and fruit. How many herbicides are on that?... They tell you don't eat eggs because of the cholesterol... Don't drink ... diet

pop because ... what is it, saccharine in there. So we might as well all give up eating then. Because everything has got something wrong with it. So because there's a little bit of mercury in this fish, it's not going to stop me from eating it because I enjoy it. (FG-1)

I have a friend who's like, "Well, I could die smoking cigarettes or I could die eating northerns, so I'd rather eat the northerns and die..." You know it's pesticides or it's this or it's that or it's whatever it is. And I really like fish and fishing so whatever, you know. (FG-1)

Information about Fish Consumption

Amount of Information

Many of the women who participated in our focus groups described themselves as uninformed about the health risks of fish consumption.

I'm always looking to learn more about mercury... It seems like it can be such a gray area. (FG-1)

I don't know that much about it except that I know that I'm supposed to pay attention to that. Except you pay attention, but you don't know what you're paying attention for. (FG-1)

It's like this fear, this unknown ... You're supposed to know when you're pregnant what you can and can't do or what you should do. (FG-5)

Those individuals who elaborated on this topic believed that they had some information, but little depth of understanding:

Like "deadly fish," "carcinogens in the fish..." You hear ... it flashed up on some news story. You follow it for a little while. It trails off. You never hear about it again, but those are the things that kind of stick with you. So if you hear something bad about catfish, and you should only eat the freshwater catfish, that sticks with you. You may not necessarily know why you're only to go with the freshwater catfish. (FG-5)

I know there's mercury problems. If you eat too much tuna you can get mercury poisoning, but I don't know how much tuna you'd have to eat. I don't know. I'm sure it's a lot, like you have to be eating tuna every day... So I know that there are some issues, but I'm not really that informed. (FG-6)

Sources of Information

The sources of information about the health risks and benefits of fish consumption on which our focus group participants relied were many and varied. They included:

- Health care providers

- WIC (Women, Infants, and Children) clinics
- Fish and wildlife agency websites
- Fish and wildlife agency posters at fishing sites
- Fishing regulations guides
- Fitness centers
- Internet
- Newspapers, magazines, and television
- Books
- Word of mouth

Many women referred to having access to more sources of information when they were pregnant and paying more attention to that information:

If you're pregnant ... they send you all sorts of those pregnancy magazines. Or when you're in the ob-gyn you start to really notice things. Or if you're ... one of those avid 20-20 watchers like I was when I was pregnant. It was like everything that they said about babies and food and what not to do, it was just like, "Okay, okay." (FG-1)

Being pregnant I got all the stuff from the doctors and the books and all. It's again and again about the fish with all your pregnancy materials... Whether it's an independent provider that's ... doing pregnancy ... wellness checkups with you via the phone, or your regular physician, or "What to Expect When You're Expecting" books, everything talks about the fish. (FG-5)

Although many mentioned health care providers as a source of information, some indicated they had NOT received information about fish consumption from health care providers:

But I've never had a health care provider actually talk to me about it. (FG-6)

Some participants mentioned concerns about biases in the information that was available about fish consumption. One wondered whether fish and wildlife agencies would be completely honest about the risks of fish consumption given that they benefit from the sales of fishing licenses.

I mean this is being put on by the DNR... I'm reading the fish manual and ... they say one fish a month. And they make a lot of money getting fishing licenses. So they probably wouldn't tell me to not eat any fish... I don't think anyone would outright lie about it. But I think if it's borderline... Once a month seems pretty sparse... If it's dangerous to eat it more than once a month, is it really safe? (FG-1)

Others argued that the usefulness of information provided by state agencies was limited because it was too generalized.

R1: *And I feel like the information has to come from [our area] and that's where the tests should be done ... instead of a generalization...*

R2: *Yeah, there should be specifics for our area. (FG-1)*

The internet was viewed as a convenient way to access information, but underutilized by many:

Well, with all the information that's on the web, it's not like we don't have access to it. If we ever really wanted to see what somebody was writing about the fish and pregnant women and doing studies we could easily go to pub.med.gov. (FG-5)

You could probably easily google it. I haven't googled it or anything. (FG-6)

Quite a few women mentioned word of mouth as an important source of information:

I kind of go what people say. If I hear people say don't eat stuff out of the White River or they say ... don't eat stuff out of Erie Lake, you don't eat stuff out of Erie Lake. (FG-6)

One, however, questioned the quality of word of mouth information.

Sometimes word of mouth isn't always true so you do have to back up your facts and make sure. (FG-6)

Key Messages

The specific messages that women in our groups remembered receiving about fish consumption were relatively few. One commonly remembered message was to avoid or minimize fish consumption:

They do say a lot of things about not eating it. (FG-1)

Overconsumption is a no-no. (FG-5)

Some recalled messages about mercury:

You hear all the time about increased mercury levels. (FG-6)

One participant recalled a detailed conversation with her health care provider that addressed both the risks and benefits of fish consumption:

Limit my consumption of fish because of the mercury was one of the things that I got... But I also remember him talking about fish oil ... and making sure that I had ... some fish in my diet. But just to be careful about the consumption. And he told me the fish that I should go with, the ones with the fatty acids like the salmon and ... what's another oily fish? I think he said tuna and a couple of other fish. (FG-5)

A number of women also recalled messages about eating smaller fish:

What basically what stuck in my mind was eat the littler fish. (FG-1)

I remember that the smaller fish are the feeders and the bigger ones like walleye or northern or a big old bass or something eat the other ones. So since they all have it that would be a little worse. (FG-5)

Information Clarity

Some messages about fish consumption were confusing. A number of women found it difficult to reconcile information about the health benefits of fish consumption with messages about health risks:

There's so many different places to get information ... Sometimes the information is conflicting so it's hard to make an educated decision. When ... you hear people say, yes, it's healthy because you get all the benefits and all the nutrition and ... all the healthy fats, but, no, it's not healthy because it also has x, y, z in it. So how do you decide? It's a tough decision. (FG-6)

The WIC clinic ... I thought it was weird when I was breastfeeding ... "Here's your tuna voucher." And I'm like, did you all not read the first pamphlet you gave me? ... I was like, why are you giving me canned tuna ... so I can just pump it through my baby? ... It seemed weird. (FG-1)

Or it's like when you're pregnant they tell you don't eat fish, but eat salmon because of the benefits. And it doesn't make sense ... don't eat it, but eat it. (FG-1)

Participants were also confused as to why women received different consumption advice than men. Was fish consumption only a problem for women who were actually pregnant? Were there possible effects on women that had nothing to do with pregnancy?

R1: *I don't really know what the danger in ... mercury ... really is. I know that it's bad and they say like pregnant women and women of childbearing age... Is that just because you may be pregnant and not know it yet? I don't know...*

R2: *Does the mercury stay in your body and then if you should become pregnant later on I mean your child could have birth defects or I mean I don't know either.*

R1: *Yeah like when is it advantageous to begin being cautious you know. (FG-1)*

R1: *I always assumed it was just for fetal development...*

R2: *I always wondered too about the synergy with body fat because a lot of toxins are stored in body fat and women just generally have fat stores. We've got things that need fat... But mostly I understood it as, well, if you're consuming mercury in your body and then you have this little fetus and you're ... feeding it ... that's a lot for a really tiny little body to take in if there's any question of mercury. (FG-1)*

This confusion had important implications regarding decisions about when to begin paying more attention to reducing exposure to contaminants in fish:

I think one thing that I would want to know ... is what is my safe range... Let's say I'm planning to become pregnant. Okay, well then when do I got to cut off the fish. Because I eat a lot of fish. (FG-5)

One wondered whether consumption by men could also influence children:

RI: *How about do men need to be cautious too? ... Think of their DNA...*

Interviewer: *So not because of the effects it would have on them, but the effects it might have for their kids?*

RI: *Right. (FG-1)*

Several had questions about the specific health risks to children of fish consumption by their mothers:

RI: *What are the actual tangible effects that mercury supposedly ... what is it linked to in children? I don't really know ... if they're going to have 3 legs or ... what...*

R2: *Or autism or ADHD. (FG-1)*

Some women had basic questions about consumption guidelines and about the differences between different types of fish:

How much fish can your kids eat per week? (FG-1)

RI: *Farmed fish ... do they really have more mercury? Is it a mercury issue?*

R2: *Or ... are there fewer nutrients in a farmed fish than a wild fish so that's why you should eat it vs. the mercury content is the same. Or what other kind of issues in general are we thinking about with fish other than mercury? (FG-1)*

Preferred Sources and Types of Information

Focus group participants brainstormed a variety of possible means for distributing fish consumption health advisory information. These included:

- Websites
- Email
- U.S. mail
- Smartphone apps
- Fishing regulations guides
- Women's magazines (placed near recipes for fish)
- News sources on radio, television, or the internet
- Posters at fishing sites
- Presentations at fishing club meetings
- Programs for school children

They believed a variety of forms of educational materials could be valuable, including flyers or brochures, summary cards, and stickers or magnets (which were portable and could be taken fishing).

One participant argued that an interview format would be very effective:

I like to see people go back and forth so someone can ask questions that ... might spark an interest in me. So if ... Barbara Walters ... were to sit down with someone like the surgeon general and talk about ... fish consumption, that would grab my attention. So an interview between two very informed individuals I would like to see. That would be helpful to me. (FG-5)

Some advocated information in a visual format:

I'm all about the videos and visual information. Like you can tell me all you want but ... show me some stuff along with it. Like, "This is a fish that's bad." Or, "This size, not too big ... This is the appropriate size." Or, "This is the poundage." It's kind of like when people talk about their diets. "How much meat should you be eating? Size of a deck of cards." (FG-5)

One expressed a preference for simple information:

Maybe including ... really simple guidelines... Like saying eat small fish... a simple line. Especially when you find out you're pregnant, you're being suddenly bombarded with a million different health tips and food tips and it's just like some sort of more simple rule of thumb... if someone really isn't interested in finding out all the nuanced information about what mercury really does to your system... I can at least look at that if I don't have time or energy or desire to look at anything else. (FG-1)

Participants in our focus groups said that they most trusted information from experts, but they had different opinions about who the experts were:

I mean you've got the DNR and you got the health department. That's all I could ask for. Take care of my nature. Take care of my health. Come together. (FG-5)

I would say the Department of Health and Human Services ... or even the CDC. (FG-5)

WebMD tends to be a popular resource for anybody that's suffering from something or if their family has something from an illness... I'd probably have WebMD as one of my sites to check out to see ... what they would ... say about fish consumption. (FG-5)

In two of the focus groups, participants argued that for fish consumption health advisory information to be communicated effectively, it had to be distributed in a way that people would come across it rather than expecting people to search it out.

R1: *If it's information about why we shouldn't be doing this or that, you're going to have to push it on people. No one's going to go looking for why we shouldn't eat fish...*

R2: *Shove it down your throat...*

R1: *It would have to be a little more forceful than just something I would have to seek out. (FG-5)*

I know for me it's nothing I'm going to search out. It's going to have to come across me, which seems really self-centered and selfish, but it's the truth. I mean it's not on my radar for immediate needs and so I'm going to have to see it on TV. I'm going to have to hear it from one of my family members or somebody that I know talk about it and say, "You know you really should be eating this because of that." Because I'm not going to go ... to a website and say, "Now I wonder what they say about fish?" (FG-6)

Terminology

Women of Childbearing Age. We asked focus group participants about how they interpreted terms that are used (or could be used) to describe one target audience for fish consumption advisory information. When asked how they understood the term "women of childbearing age," focus group participants immediately translated the term into an age range for women:

Eighteen to menopause. (FG-1)

Eighteen to thirty-eight? (FG-5)

In all groups, however, participants subsequently observed that if advisory information was intended for any female who might bear a child, it would have to apply to girls younger than eighteen:

If I wasn't over-analyzing it, I would say eighteen to thirty-five, but knowing that [much] younger people can have children... thirteen to forty. (FG-6)

I do healthcare... And often ... I might be helping a pregnant woman who's not technically a woman yet. You know she might be sixteen or seventeen. (FG-1)

But in certain neighborhoods that's really fourteen. Really the age of menstruation all the way to menopause in certain areas. (FG-5)

Consequently, women found the term ambiguous, and some argued that an age range would be clearer.

R1: *It's ambiguous.*

R2: *Probably not as clear. I think numbers is actually better... If I'm a female between this age and this age ... that would probably be something that I would pay attention to more. You say "childbearing age..." If someone's young they might think, well ... that doesn't apply to me. (FG-5)*

Although an age range might be clearer, participants in one group were uncertain who the advisory information was *intended* for: women of a certain age or women who would have children.

Is that what they're meaning when they say childbearing age, and they just don't want to directly say ... if you want to become pregnant or are pregnant? Or does it really mean just ... adult women? Or ... women ... from twenty to thirty-five? (FG-1)

In that group, one woman wondered if women who had no intention of becoming pregnant could disregard the advisory information:

If you can have kids ... if you're able to or you're trying to or you want to. But if you're somebody who's, "I don't want to have kids. I don't really plan on it," then they ... would disinclude themselves ... from it. (FG-1)

An alternative term, "women who are or who may become pregnant," was generally perceived as applying to an older age range of females:

It just seems like the person is older ... that you're addressing the older person. (FG-5)

Well, I was of childbearing age from ... thirteen on, but I didn't consider myself someone who could be or planning to become pregnant ... probably until I was married. Twenty-one. (FG-1)

Focus group participants also tended to understand this term as applying to women who were more interested in or actively planning on having a baby:

Basically whoever is ... planning to have a baby. (FG-6)

R1: *You're either pregnant, or you're planning on becoming pregnant.*

R2: *That would mean twenties and thirties or ... people who maybe are actively planning...*

R3: *Yeah, they're planning, and they're trying. (FG-1)*

Based on this understanding, women who were not actively trying to have a baby might not think this term applied to them despite the fact that contaminants can remain in their systems for a considerable period of time.

One woman pointed out that this term also might be better at capturing women's attention:

The only other thing with the second one with the advice to women who are planning to become pregnant, it's more like ... if someone is pregnant or is planning to become pregnant that might catch someone's eye more like, "Oh I'm planning on becoming pregnant." The childbearing age you know I would assume that it's more general health knowledge. But if ... you're target audience is pregnant or going to be pregnant women, that that might get more people. (FG-1)

Sport-caught Fish. We also asked focus group participants for their interpretation of terms used to describe the types of fish to which advisory information applied. When asked about the term “sport-caught fish,” some interpreted it as any fish caught by anglers:

R1: *Angling and fly fishing rather than commercial...*

R2: *Yeah, right. Caught it yourself. (FG-1)*

For many women, however, the term suggested only larger, game fish:

R1: *I think of sport as like ... the ocean marlin championship show or whatever...*

R2: *Well that's trophy fishing basically.*

R1: *Sport fishing... It's ... a sport. Whereas I think like when we go fishing, it's more of a ... hobby...*

R3: *You mean ... fishing for the big huge fish ... rather than just fishing for “Ooh, I might get one today.” (FG-1)*

R1: *When I hear sport-caught fish I think of the bigger fish.*

R2: *Me, too!*

R1: *The walleye, the northerns, the muskies, the sporting fish. Bass are smaller but the fish that the guys like to fight with... It's a little bit more exciting than, “Oop, look I got a bluegill. Oop, here it is...” When I hear the word “sport” I automatically associate that with a larger fish that anglers like to get into the boat. The trophy fish. The picture fish...*

R3: *Coho, laker, brown trout... I'm automatically thinking all those big names. (FG-5)*

R1: *Going out bass fishing... To me sporting fish is you're going to catch it, and then you're throwing it back.*

R2: *Right. That's what I was thinking...*

R1: *It's a sport. That's what you do ... to have fun and ... relax. Catch it. Throw it back.*

R2: *Yeah, “sport-caught” reminds of ... when you watch the fishing tournaments...*

They're catching a whole bunch of fish. Then they weigh them all at the end... You don't ever think about them actually eating them, and you just think about them as trophies.

R1: *Yeah, just catching them for fun. (FG-6)*

An alternative term, “locally caught fish,” was interpreted by some women as applying to fish caught in a particular geographic area:

R1: *Cook County, caught here...*

R2: *Cook County, yeah. Cook County, yeah. (FG-1)*

One participant pointed out, however, that “local” was a matter of perspective, and that the size of the region to which it applied depended on the context:

Does it depend on who is saying it? If it was ... the USDA saying “local” I might think it included Minnesota and Wisconsin. But if it’s ... the Minnesota Department of whatever saying “local” I would maybe think they meant their region. (FG-1)

Others interpreted “locally caught fish” as applying to fish they or someone they knew caught:

Well, he was local at the time so I guess it was locally caught, but brought back... My thinking is if I’m actually catching it, it’s local. I’m right there in the environment... So if I hear “locally” that means I know exactly ... it’s from the area that I was physically in. (FG-5)

I think local caught fish is you going out ... you or somebody you know or somebody who sells to a store, going and actually physically catching it, and then doing something with it. Eating it. (FG-6)

A final phrase, “fish you or someone you know catches,” was viewed as the least ambiguous term:

R1: That’s a lot more clear to me...

R2: Well either I caught it or I know who caught it.

R3: You know the origin.

R4: Yeah, you know where it came from... There’s no question about where it came from. (FG-1)

R1: You caught it or somebody else caught.

R2: It’s self-explanatory. (FG-6)

CONCLUSIONS AND RECOMMENDATIONS: WOMEN OF CHILDBEARING AGE

Several conclusions emerge from our results about how women understand the health risks and benefits of fish consumption.

- Although many focus group participants recognized that women needed to reduce their exposure to contaminants in fish more than men, considerable uncertainty existed about *which types* of women needed to reduce their exposure: pregnant women, women actively trying to become pregnant, all sexually mature girls and women, or all girls and women who might become pregnant in the future. Some women believed they only had to be cautious about their exposure to contaminants when they were pregnant and failed to recognize that some contaminants would stay in their bodies for some time after they stopped eating fish.
- This confusion was related to women’s understanding of the terminology used to describe women in fish consumption advisories. Most women found the term “women of child-bearing years” ambiguous. They initially interpreted this term as applying to adult women prior to menopause, but also recognized that even girls in their early teens could potentially bear children. “Women planning to become pregnant” was generally understood to apply only to those women who were actively trying to become pregnant.

- Focus group participants recognized and acknowledged the presence of contaminants in fish, yet expressed uncertainty about: (a) the health effects of contaminants on a woman's body in relation to the development of a fetus; and (b) why fish consumption guidelines are different for women than men.
- Although some women consumed fish in excess of advisory recommendations, others restricted their fish consumption unnecessarily, not eating fish at all when they were pregnant and therefore foregoing the potential health benefits of fish consumption during pregnancy. This response to advisory information seemed to be related to the difficulty in reconciling messages about the health risks and the health benefits of fish consumption, which seemed to conflict.
- Many women held misconceptions about how to judge whether or not fish were safe to eat. A lot of emphasis was placed on the characteristics of the water from which fish were caught (such as clarity and temperature) and the proximity of fishing sites to industrial and agricultural development.

We drew additional conclusions about how women respond to fish consumption advisory information.

- Women varied widely with regard to how much information they wanted about the health risks and benefits of fish consumption. A few actively sought out detailed information about consumption advisories and how they were formulated, but most did not. While they might recognize that a wide variety of information was likely available on the internet and through other sources, few pursued it. These individuals often expressed a preference for clear, simple messages presented in ways that they would not be able to miss, in the course of their routine media exposure or daily routines.
- Many women became more interested and receptive to information when they were pregnant, seeking out and absorbing information from a variety of sources.
- Some women expressed a strong preference for information that was specific to the particular areas in which they lived and fished, disregarding information that seemed designed to apply across broader regions.
- The term "sport-caught fish" was widely interpreted to apply only to those fish that were valued game or trophy fish (rather than any caught fish).

Based on these results, we formulated several recommendations regarding possible emphases in fish consumption advisory programs.

- Because an apparent majority of women are not inclined to seek out advisory information, being proactive about the distribution of advisory information could be beneficial. Most of the emphasis should be on clear and simple messages, distributed in ways that women will encounter rather than having to seek them out.
- Because a subset of women is intensely interested in advisory information, however, more detailed sources of information about advisories also should be available. Web sites are likely effective tools for making more detailed information available.
- Certain subgroups of women may be particularly worthwhile target audiences. Because pregnant women are often more interested in advisory information and seem to be receiving and responding to advisory messages, continuing to target pregnant women

through advisory programs seems to be worthwhile. Fewer women reported receiving and responding to fish consumption advisory messages *before* they became pregnant, however, and so other efforts may be needed to reach this group.

- Since warnings about fish consumption risks discourage some women, particularly pregnant women, from eating fish at all, positive advisory messages that encourage women to eat particular species may make it more likely that they will get the health benefits of fish consumption. Relatively few women seemed to have a clear understanding of the specific health benefits and problems to which fish consumption could contribute, and it is possible that more information comparing health risks and benefits would make women more willing to consume some fish when pregnant.
- Because certain misconceptions are common about which factors influence whether or not fish are safe to consume, developing advisory materials that identify and explicitly refute these misconceptions could be helpful.
- Since some women are more receptive to advisory information that targets their particular locality, packaging this information into materials aimed at a particular locality could increase the receptivity of women to it. Even if much (or all) of the advisory information is the same from locality to locality, this approach may convince women that this information is indeed specific to their region.
- Working toward consistency in advisory messages targeting women may help to reduce confusion about which types of women should be reducing their exposure to contaminants in fish and why they should be reducing their exposure.
- The least ambiguous way to identify women who are the intended targets of advisory information would be to use an age range rather than terms like “women of childbearing age.” This approach, however, would include some women who did not need to be targeted by advisories (e.g., those who are unable to have children).
- The term “sport-caught fish” will likely be misunderstood by many. Identification of an alternative term may be beneficial. “Fish that you or someone you know catches” is more cumbersome but seemed to promote the clearest understanding.

These recommendations are intended only as starting points for discussion within the Consortium. Final decisions about preferred approaches to communicating fish consumption advice should follow such discussion.

RESULTS: URBAN ANGLERS

Fish Consumption

The amount of fish consumed by urban anglers varied, but most of their diets included fish and often they caught this fish themselves:

I like it for breakfast. I'll eat fish four or five days a week if I can keep the fish smell out of my apartment... For breakfast it is really good. I never get tired of fish. I love fish. (FG-7)

Twice a week ... I usually eat perch twice a week. (FG-4)

You can't find too many people that throwing fish back except for the sheephead and the gobies. And then if the right person is down there when you catch a sheephead that ain't going back. (FG-3)

Some, however, chose to limit their intake:

I haven't eaten any lately... Mostly I fish for recreation. So but I've eaten perch before. I've eaten the salmon I caught. I've eaten a bass once. (FG-3)

We eat the one fish meal a week or something like that. No more than that. (FG-7)

One participant ate no fish whatsoever:

Interviewer: *Do you eat no fish at all that you catch under any circumstances?*

R: *None. I eat no fish period. (FG-3)*

The types of fish eaten varied from person. Many people had particular fish that they ate and did not eat. Often, anglers preferred fish they caught over store-bought fish (although this was not universally true):

I may go to the store every blue moon and get some, but the majority of the time I eat whatever I catch ... up to an exception. I don't eat sheephead. And ... carp I don't eat. But I'll eat catfish. I eat the white perch even though it says don't eat them. I still eat them you know. A lot of fish I eat. (FG-3)

Some anglers observed that, while they avoided eating fish caught in certain urban locations themselves, they were aware that many other people eat the fish they caught in these locations – a group of anglers that was likely not well-represented in our focus groups:

I don't fish down here, ... [but] there are probably 20 guys along the bank here that fish almost every day, and they do eat the fish out of it. (FG-7)

Several participants observed that urban anglers came from diverse cultural backgrounds, and those who originated from outside the United States had different, and often broader, preferences for fish:

R1: Chinese guy, they put it right on the fire. Right on the bank. Lay the fish. Don't take no guts, nothing off of it... Them Chinese guys, they have a whole family and everybody be there feasting. Sheepheads. It didn't matter to them.

R2: Well, they like the sheephead.

R1: Oh, they love it ... All the sheepheads you catch they take every one of them ... And they cook 'em right there on the bank, and the whole family comes. (FG-3)

We caught 14 carp and then people would come through, different people, different nationalities, some would say: "Next carp you get, I want to bring it home." (FG-3)

A participant in one group who was born in an Asian country made a similar observation:

We love fish... The country I'm from, we are in the sweet water fishes. So we love fish no matter what. You know what kind of fish that we eat? All kind of fish. Small fish, big fish, large fish. (FG-3)

Generally, friends and family members ate the same types of fish as the anglers. Some, however, chose not to eat certain types of fish for health reasons:

My wife is a nurse but ... now she's paranoid about eating fish [out of the lake] because of all the talk about the fish and what she's hearing on the news and about the toxins and stuff in the fish. So now she just don't want any part of it. (FG-4)

I don't worry about eating fish myself because ... I'm a middle aged guy that doesn't have a lot to worry about... But should my kids eat it, you know? Can my wife eat it? ... I don't worry about it for myself, which I'm the one that eats the fish usually that is caught around here... My wife and kids eat store-bought stuff. (FG-7)

On the other hand, urban anglers sometimes gave away or sold fish they did not want themselves, and friends or acquaintances ate these fish – often in large amounts:

I have three ladies that I bring fish to... They eat fish every single day... I keep bringing them. They keep eating them... They love it that much, and it don't matter, for the most part, what kind... Like northern pike. I don't eat northern pike, but I know a lady that love it ... so I brings it to her when I catch them. (FG-3)

I even know people that will buy all the fish that you bring to them. Like sometimes I would go and catch two, three buckets of rock bass and ... they'd take all you got because it's cheaper to buy fish ... from an angler...than it is to go to the market to buy them. As a matter of fact, we got some people that come down to the fishing bank to buy fish. They'll come down, how much you want for that bucket? (FG-3)

Factors Influencing Fish Consumption

Opportunities and Constraints

Fish consumption by urban anglers is driven partly by opportunity. The amount of fish they eat is determined in part by the amount of fish they catch.

I eat fish. I eat fish when I catch them. (FG-3)

Indeed, obtaining food is an important motivation for fishing (although not the only motivation):

We generally fish to keep the fish if we can catch anything that's edible. (FG-4)

I do it to eat fish. (FG-7)

Because fishing is a major source of fish to eat, constraints on fishing can limit opportunities to eat fish. One constraint on urban fishing is access to fishing sites. In some cases, lack of access may limit them to sites they find less desirable:

I don't know if you're ever by the river right off the white buildings, right down here where the dam's at... That's the only place really that I can take them fishing because everywhere else, they don't have access to the water. It's too far up the bank or it's too weedy. So really that's my only choice right up there. (FG-7)

We fish anywhere we can find public access to fish. (FG-4)

Some anglers prefer to fish with others, and may be dissuaded from fishing if they do not have a fishing companion:

I haven't found anybody to go with lately, and it's kind of dangerous to do it by yourself. And so lately I haven't fished. (FG-4)

Those urban anglers who choose to buy fish may limit their consumption because of the price of fish:

Have you seen the price of fish in the grocery store? Perch is for \$5. Yikes. (FG-4)

Social Influences

Fish consumption is also influenced by family and friends. Many anglers referred to the ways in which they were raised when they discussed their reasons for eating fish:

We grew up in the Adirondacks, spent our summers up there, and my folks lauded, praised me, rewarded me every time I fed the family. So we grew up having fish for dinner, and I started catching them when I was three years old. Dad promised me a

fishing pole when I quit sucking my thumb so, three years old I started catching fish for the family. (FG-3)

As suggested above, country of origin was also identified as having a considerable influence on fish consumed:

You got so many different nationalities of people that's fishing these waters, and everybody has a different opinion about the different types of fish that they catch. (FG-3)

The Asian people, they eat a lot of fish, you know. Any type of fish they prepare differently, different seasoning. They can grill, fry, make soup... So they eat a lot more fish... They make it taste good... Any type of fish they catch, they eat. (FG-7)

These differing patterns of behaviors for people from different ethnic backgrounds may make it particularly challenging to communicate effectively with urban anglers as a group.

Fish Consumption Outcomes

Focus group participants identified a number of outcomes that influenced their fish consumption. These included: their enjoyment of fish, need for food, wanting knowledge of their food, conserving fish stocks, and health benefits and risks.

Enjoyment. An important influence on the amount and type of fish eaten is how much people enjoy it. Taste preferences were viewed as subjective:

***R1:** Certain fish have certain tastes and it's just that whatever your taste is, you're going to like that particular species of fish. And if you don't like the taste, you're just not going to...*

***R2:** A lot of people be raving about black bass and ... I don't particularly care for black bass personally. (FG-3)*

The taste of fish was a reason both for eating it and for not eating it:

I love fish. I can eat fish every day. (FG-7)

I think I ate from the Flint River maybe about 30 years ago when I first came and it didn't taste too good so I haven't eaten any more. (FG-7)

Need for Food. Besides enjoying fish, many urban anglers indicated that they fished, at least in part, because they needed food:

For the most part, in terms of most fishermen that fishes especially these waters, most of us fish for food. (FG-3)

Participants in one focus group noted that fishing for food was likely to be particularly important for immigrant groups:

R1: Especially with the way that the economy has been ... we're seeing more and more people come down there that's fishing for food.

R2: I see families come down here. I don't know what country they were from. They were white people like myself, but they were speaking some foreign language. (FG-3)

One participant noted that some people eat potentially contaminated fish because they do not have other sources of food:

I know that there are a couple down there right now that that is their only means of food ... that fish out of that river and donation from the farmer's market... They don't have a choice whether it's healthy or good for them or not. That's what they're doing to survive. (FG-7)

Knowledge of Food. One important reason urban anglers ate their catch was because they trusted its quality, whereas purchased fish was of unknown quality.

R1: I personally don't buy fish out of the store because I know when they catch those fish... They freeze them in a big old room ... and they might hold them for ten years before they let them go to start putting them in the market...

R2: Or they get dumped on the deck of a boat in 100° weather and it takes two hours to ... get the last ones off...

R1: But I tell them fresh is right out of the water, right into your plate.

R3: When you catch 'em on the bay, they're still jumping sometimes...

R1: There ain't no fresher than that. (FG-3)

Now one other thing I'd like to add about ... going out and catching fish vs. buying them in the store. You know how fresh those fish are you've caught. The store, who knows. And my understanding is ... they throw them in the bottom of the boat. They throw ice on top of them, okay? Well now it's my understanding they don't put the ice on until they get all the fish in the boat, and they just put the ice over the top layer. So if you have caught fish that was in the first batch, it's down at the bottom. That fish isn't going to have the quality and taste and firmness and goodness for your body that the fish that were properly iced would have. (FG-4)

More generally, sport-caught fish was viewed as a better-understood, healthier alternative to other types of food that were available:

When you ask about eating the fish... I'm so glad to be eating something fresh caught. And we have hunters in our family so when we eat at home, we eat fish or venison. Versus a cow, that really scares me these days... So for me the healthy eating is the fish and the venison because I know where it came from. I know how it was raised... I'd rather have my kid eating five pieces of fish than a McDonald's hamburger today... So for me that's healthy eating. (FG-4)

Some focus group participants articulated the same type of reasoning about potential contaminants in the fish they caught. While they recognized that fish might contain contaminants, they argued that other types of food might have even more contaminants:

We're very well versed on exactly what the problem with contaminants is in the fish we're catching around here because we've been living it and reading it... But a lot of the fish in the store ... comes from all other points in the country and in the world. We don't know what that fish contains or doesn't contain. It may be dirtier than the fish we're catching out here. (FG-3)

With a lot of things that are coming from overseas, you're really not sure about them. There are so many discrepancies as labeling is concerned on even candy. Now ... my granddaughter picks it up and ... I look at it. "China." I put it back because I don't know what they put in there. I don't know. You can't even hang the dry wall in your house because it's contaminated... And well if they don't care about that, what ... about your food? (FG-4)

Health Benefits. Fish consumption was motivated partly by the perceived health benefits of eating fish. Some people discussed fish being healthy in general terms:

But fish is kind of like one of the healthiest meats though right? It's easier to digest right? ... I mean just the texture of it alone, it seem like it's much easier to digest yeah. (FG-7)

I always thought fish was a healthy food. I ate it when I was pregnant a lot... I used to hear people say it's a brain food... I don't know if it's true or not but I really think fish is a healthy food. I really do. (FG-7)

Others spoke specifically about omega-3 fatty acids:

R1: *Oh yeah, a lot of benefits from eating fish.*

R2: *It's all full of what do they call those...*

R3: *Omega-3s?*

R2: *Omega-3s. It's a high quality protein. It's got nutrients. You can eat fish. It'll make you feel good, help you relax through the evening. (FG-3)*

It was my understanding that on bigger fish, particularly the salmon and of course the big steelheads and that, you want that oil. You want the fish oil in your system... It's supposed to lubricate your system. It's good. That's why people take fish oil pills. (FG-4)

Health Risks. Perceptions of health risks, however, clearly limited fish consumption by some urban anglers:

One of the biggest disappointments when I got here and I learned how to catch salmon is that these salmon ... aren't safe to eat. And that was real disappointing because ... that would be an important part of my diet ... if they were safer to eat. (FG-3)

I'll never eat the fish, but ... I have caught some nice fish in it, in the Flint River... If it was safe, I would eat it. (FG-7)

Participants tended to attribute the health risks to contaminants in the water:

It's just the idea of all the toxins that are being absorbed into that fish from sitting in water. That's not good. That makes it so unappealing to want to eat that fish. (FG-7)

The specific types of health risks associated with fish were often only vaguely understood:

You're going to wake up one morning, there's going to be a leg growing out of your neck. (FG-3)

R1: *Cancer ...*

R2: *No, the mercury...*

R3: *You know the term that always seems to come up associated with PCBs and so forth. I don't know what kind of cancer. That's really my concern. (FG-4)*

Other urban anglers, however, had no concerns whatsoever about health risks associated with fish consumption:

I have no hesitation. I think that we can become so over-wrought and incredibly concerned with contamination that we become obsessive-compulsive. (FG-3)

Or they knew others who had no concern about it:

A lot of people that you see every day going down there to fish, they have no concern about what we're talking about. (FG-7)

A number of focus group participants relied on their own personal experience when dismissing the potential health risks of fish consumption.

Well, I've been eating fish from this area I can say all my life, and I don't think nothing wrong with me yet. (FG-3)

How many of us know people who are over 81 that have eaten more fish than we are? I know a lot. A lot. (FG-4)

I'll trust ... if the Lord put it here on the God-given earth, well, I eat it and trust him. (FG-3)

Factors Affecting Health Risks and Benefits.

Urban anglers perceived that the health risks associated with fish consumption were influenced by several factors. One of these factors was water quality:

I have fished in the Flint River, but when I catch something I just let it go back... The water's just so dirty. (FG-7)

As in the focus groups with women of childbearing age, some urban anglers incorrectly judged the safety of fish by the appearance of a water body:

R1: *Bethlehem Steel. You get to canoeing down there, and it looks like something out of a Mad Max movie. There's ... culverts and ... old broken down machinery from the '50s. And if it just doesn't look right, I just won't eat the fish....*

Interviewer: *What doesn't look right?...*

R1: *Industrial, anything that I think might leach ... toxins....*

R2: *Smell...*

R1: *Could be smell. It could be just ... if I see a lot of trash or I see ... landfill vents or ... culverts or anything like that... Even a lot of industry. If I'm going by a lot of factories or something like that I won't eat [the fish]. (FG-3)*

Water clarity determines where I would fish in. It's got to be clean water. It appears to be clean anyway. (FG-7)

One participant noted, however, that water that looked clearer was not necessarily healthier:

R1: *Any of us that fish in the lake know that the lake keeps getting cleaner and cleaner because we can look and see the bottom deeper and deeper...*

R2: *Mentally it makes you feel better.*

R3: *Yeah, it makes you feel better but clear water isn't always the ... healthiest water. (FG-4)*

Some anglers judged water quality in part by the location of the waters in which they fished:

Now for the most part we're talking about fish caught in Lake Erie, but if you go inland to the lakes, we don't have all these PCB problems and so forth for the most part. I mean your streams, yeah, I can understand that. But your smaller inland lakes you, don't have the industries around them. (FG-4)

Some people have a name for the bay and they call it the toilet. "Well, I'm going to fish the toilet today." And ... they know they're going to fish the toilet, but they're still going to catch fish and they bring them home. I don't understand it. (FG-7)

Focus group participants attributed the cleanliness of waters in part to physical characteristics of the water:

R1: *My understanding ... on this, this is running water... So even if somebody poured something, it's not staying here. It's continuously washing away the things because it's running water.*

R2: *Well, you know nature has a way of purifying, cleaning this up.*

R3: *Water cleans itself. (FG-3)*

Interviewer: *You were more concerned about [Lake] Ontario?...*

R1: *It's a deeper lake than ours... I'm going to come to Lake Erie, a more shallower lake and we clean up quicker.*

R2: *You know all the contamination from the Great Lakes starting with Superior end up in Ontario because it's the deepest lake. Everything, all the sediment down there, everything that is bad settles. All the metallic properties that we don't want to ingest settle on the bottom of Ontario. The fish are bigger, but they're worse to eat ... as far as advisory concerns. (FG-4)*

I've been fishing in the Flint River for a long time, and I have seen it in some real horrible conditions where the water is standing water and all. You know water's not circulating right, and I'll never eat the fish. (FG-7)

Another factor that was frequently discussed as contributing to the health risks of fish consumption was the type of fish consumed. Bottom feeders were characterized as less healthy than other fish:

R1: *Catfish eat off the bottom. Suckers, carp eat off the bottom ... Anything that has a mouth that turns down, you just leave it alone... Whatever's on the bottom it's going to suck it up no matter what...*

R2: *The pollutants that's down there. (FG-3)*

R1: *Any of the bottom feeders I have to be concerned about.*

R2: *I won't eat a bottom feeder either. (FG-4)*

One participant argued that “greasier” fish were less healthy:

I don't think all fish are equally good for you. Like you mentioned orange roughy, that's typically a really greasy fish. I think that like cod would be better for you than orange roughy or some of the other greasier fish. (FG-7)

But another pointed out that fats in fish were not necessarily bad:

It's not bad grease ... It's healthy for you. (FG-7)

Some anglers also were aware that eating predators or larger, older fish was less safe:

I tend to eat smaller fish that are not top predator-type fish because I know that they accumulate, you know the bioaccumulation of the contaminations through the food chain. (FG-3)

Age of the fish makes a difference, too, I think... The smaller ones ... haven't been around as long and theoretically have not eaten as much ... PCBs as the ... 25 to 30 inch walleyes that have been hanging around out there a long time, eating a lot of fish. (FG-4)

The bigger the fish, the longer it's been absorbing all those toxins... A little, tiny one hasn't had time to soak up too much yet. (FG-7)

Others ate smaller fish, but for reasons that had nothing to do with health risks. For these anglers, the motivation was conserving the fish populations:

You shouldn't eat the big fish anyway because they're the ones that are making the babies. (FG-3)

One angler argued that farm-raised fish were healthier than wild fish, but this perspective was unusual:

If we try to eat the cleanest fish anybody can eat ... it's farm raised... That's about the cleanest you're going to find, farm raised fish. (FG-3)

Many anglers considered appearance heavily when judging which fish were safe to eat, but the criteria they used were not reliable:

The color, the shape and form of those fish is so deeply colored and beautiful and perfect I would not hesitate. (FG-3)

R1: *You see all kind of gross ... bottoms hanging off of 'em.*

R2: *I caught walleye the other night. He had, I don't know what they were, those big knots on the side of them and worms.*

R3: *Yeah like a cancer of some kind. We caught one down there, it was a walleye but it was completely yellow. (FG-3)*

A bass is kind of ... a distinctive green, but every now and then you get one, he's kind of... You see the green but he's pale. And then his eyes... If the eyes aren't white, he's not a good fish to me. (FG-3)

Part of their eyes are dull. They have dull eyes, something's wrong with that fish. It's not going to be any good. (FG-7)

One angler argued that the taste of a fish was a good indicator of how healthy it was.

We go by the general rule ... if it tastes good we eat it. (FG-4)

Some focus group participants, however, realized that the health risks associated with fish consumption could not be judged by superficial characteristics of the fish:

If you were out on a charter in May on Lake Ontario this year, and you'd be catching salmon and they would be perfectly pure silver ... And the fillets are the most perfect pink. There's no lesions, no parasites, no yellowing, no nothing. But we still don't know about the presence of trace elements of different metals... Though they look absolutely perfect, we don't have a real good read on the presence of heavy metals and such contaminants. (FG-3)

One person argued that fish would only be found in good quality water, and so he tended to trust the quality of any fish he caught:

If there's fish there, it's relatively healthy... In other words there's oxygen in the water and so forth and so on. There is no silt to plug up the fish's gills, that sort of thing. So ... if the fish is there, they're relatively safe as far as ... edibility. (FG-4)

Some anglers recognized that cooking methods could reduce the risks of contaminants, although they did not generally recognize that these methods were effective at reducing PCBs but not heavy metals:

Well, if you clean the fish properly, you know, you always cut the stomach part out where the fat's at because that's where the most accumulation of ... the heavy metals, the PCBs, and the worms. (FG-4)

Oily fish like steelhead, which I will fillet it properly, just the back meat, debone it, no belly meat, no side meat, no mud vein, and broil it. Broil it's the best way... You want all that fat, from what I understand, to drain away. The worst thing you do is to fry that so that's what I've been doing is broiling or even bake it. But then again broiling is the best if you're going to eat it. But you know a lot of guys like it ... fried, but that oily fish is not good to fry anymore. (FG-4)

When you do fillet a fish, I understand that most skin contaminants are in the belly of the fish... So when I fillet fish, there's no belly meat whatsoever on the fillet. (FG-7)

When focus group participants discussed the risks of fish consumption, they often argued that those risks were lower than (or at least similar to) other types of risks to which they were exposed:

It's better than eating beef and pork, 'cause I don't eat beef or pork. (FG-3)

R1: *You can catch cancer from eating fish.*

R2: *You can get cancer from walking up the street. It's in the air. (FG-3)*

R1: *I think fish is a much healthier choice than eating beef or pork....*

R2: *Chicken...*

R3: *Chicken's got so many drugs in it. Chicken is probably the worst of them all you know.*

RI: [Fish] is leaner. It doesn't have all the fat and... the bad chemicals ... that you will find in the other animals that we eat. (FG-4)

Information about Fish Consumption

Amount of Information

Focus group participants did not directly state how well-informed they believed they were about the health risks and benefits associated with eating fish, but they occasionally indicated some uncertainty:

We're not chemists. We're just fishermen. (FG-4)

One immigrant stated that he had little information about fish contaminants because fish contaminants were not a concern in his country of origin:

I'd like to know ... what is the contamination here? ... Back in our country, I left my country a long time ago, but over there we don't have this kind of problem. (FG-3)

In one of the focus groups, urban anglers argued that those people who were most likely to be ill-informed about the risks and benefits of fish consumption were the people who depended on fish they caught for food:

It isn't us that needs this information. I think it's the people who have no option, or they're fishing to feed their family, or they're fishing to feed a generation. Those are the ones that need to be touched. (FG-3)

Sources of Information

Focus group participants reported receiving information about fish consumption from several key sources:

- State health advisories. (One person said he had to sign his name indicating he had read the advisory before getting his fishing license.)
- Newspapers, television, and radio. (Particularly shows or articles about fishing or health.)
- Word of mouth.

None mentioned receiving information from health care providers.

Some participants appreciated and had confidence in the state health advisories:

The book is a bible to me, somewhat of a bible. When the book says eat none, that means [eat none]. (FG-3)

So now we're advised what to do, and I think that's a very good approach to the fish that we're consuming at this point in our lives. (FG-4)

Others, however, questioned the credibility and the neutrality of state agencies responsible for promulgating the advisories:

Last year or the year before, they said you can eat the perch. Perch didn't have a restriction. Bluegills and sunfish didn't have a restriction... They said that the crappies and the bass, they're restricted. Perch, bluegills, sunfish - no restriction... So I don't know if that's just because ... the industry that we have brings a lot of people. Tourism comes in. A lot of people come up to fish for perch. (FG-4)

RI: *Our Fish Commission got a couple black eyes. They were raising the trout and ... the water that was coming out of their sluices where the fish were was destroying the environment, the stream, because it was too poisonous. They fought for years... They kept on saying: "No, no, no, we're not polluting the streams..." They finally got a court order, and they had to change their cleaning system and the runways for the pollutants coming from the fish itself. So it's our own Fish Commission saying one thing, an independent group saying something else, and eventually the government authority is brought in line... So they were lying... They closed some of the fish hatcheries because of that... It does come into play as to what they're saying and put out there to newspeople.*
R2: *I don't want to trust the Fish Commission. (FG-4)*

Key Messages

One of the primary messages urban anglers had received about fish consumption was to limit fish consumption:

I look at it. I say: "Well, okay, how much are you supposed to eat ... of our fish?..." Like your hand, or they say four ounces... There's only just a little bit you can eat even if it's prepared properly. You can't eat all you want... You're going over the advisory's limit because ... they tell you you can only eat this much. (FG-4)

Many also understood that they should in particular limit consumption of certain species:

They was talking about the fish ... about perch. About you should eat only about one meal a week or less. (FG-4)

The other day on the news was about the walleye. You should only eat one a month. (FG-4)

Some also recognized that certain types of people were particularly vulnerable to the risks associated with fish consumption:

They really worry about pregnant women. I worked ... in the OB department and they recommended pregnant women don't eat any fish because of the risk of birth defects for the kids... So don't eat any at all when you're pregnant. (FG-7)

However, not all had the same understanding of recommended consumption limits:

R1: *In the book [it says] don't eat white perch.*

R2: *Oh yeah, it say don't eat a lot of them.*

R1: *In the book it said eat none.*

R2: *Really? Where? In the ... river?*

R1: *White perch period.*

R2: *Probably Lake Erie.*

R3: *All over or just the river?*

R1: *Niagara, Erie, all down the Niagara... The book says eat none. (FG-3)*

For one, any warning whatsoever about fish consumption was enough to dissuade him from eating fish at all, which would result in him foregoing the potential health benefits of fish consumption:

It say don't eat more than one a week, so it can't be good. So if I know it ain't good if I consume so much of it, I wouldn't even get started with it. (FG-7)

Another key message received by many anglers was that some types and sizes of fish were less risky than others:

They tell you what kind of fish ... not to eat. (FG-7)

The book does say you know that large predator fish are more risky. (FG-3)

There were different, depending on the size of the [fish] ... The big ones was once a month. The smaller ones ... it had to do with size. (FG-4)

Some anglers had received messages about the preferred methods of cooking fish:

Now the advisory is ... no belly meat. And take this off, the mud vein, remove that. (FG-4)

One angler misunderstood messages intended to reduce the spread of viral hemorrhagic septicemia virus (VHS) – a fish disease that has no effect on humans. Regulations designed to limit the spread of this disease by restricting the use of live bait were misinterpreted to mean that fish with VHS were unsafe to eat:

R1: *Another thing, the minnows that they have out here, they say that it has some kind of a disease...*

R2: *VHS?...*

R1: *If you catch your minnows right here, you can't take them down the street. You've got to fish with them right there because they've some kind of contamination... But the book does not tell you the effect it has on you... So I'm saying, if they got this minnow here that's supposed to be contaminated, and all these bass and everybody's eating them, you eating the fish – I mean I don't know. (FG-3)*

Information Clarity

Focus group participants articulated several points of confusion regarding fish consumption advisories or topics on which they would like more information. Information is available on some of these topics, but not on others.

In one group, anglers were confused about why advisories were different for different bodies of water when those bodies of water were connected:

R1: *This is what I need to figure out. How do they determine that the fish that's coming past the foot of ferry is not the same fish that's coming...*

R2: *Up Lake Erie...*

R1: *To the place where you fish.*

R2: *They are the same fish.*

R1: *They are the same fish. Right.*

R3: *So in terms of the difference of eating them in different areas, it's like you said. You won't eat a bullhead from certain water, but that same bullhead swim down to wherever you're fishing. (FG-3)*

One person incorrectly believed that information specific to a water body in which he fished was unavailable:

You can see all these advisories for some of the bigger rivers and stuff, but there's not a thing for the Flint River. (FG-7)

One participant was unsure of recommendations for species that were not mentioned in consumption advisories. If species were not mentioned, did that mean that they were safe to eat or that they simply had not been tested? This person wanted clear statements about which types of fish were safe to eat.

One thing I always wondered about that book ... is ... you'll read certain fish on a given body of water, but then they won't mention certain others. And I wonder, does that mean the others are okay or does that mean the others weren't tested for that particular... Because ... I would like them to tell me: "Don't eat carp. Don't eat ... bullhead out of here. But bass are okay, or bluegills are okay..." Instead they just say "Don't eat this." (FG-3)

Other anglers also expressed interest in information about what types of fish were safe to consume:

I want to know what fish that I could eat. (FG-7)

Several anglers had questions about cooking methods and how they influenced the risks associated with fish consumption, although this information is often readily available.

Now does cooking, depending upon which way you cook them, does cooking alter any of the chemistry? (FG-4)

I leave my skins on. I like the skin, and it makes them curl up. And I think the flavor is in the skin. But are the chemicals in the skin, too? That's what I'm wondering about. (FG-4)

One participant was confused as to what constituted a meal, even though many advisory materials define meal size:

RI: *But when they say one meal a week...what's a meal?...*

I don't think it's ever determined what a meal is.

R2: *Yes, it is. Oh yeah...*

RI: *That's not clear to me. (FG-4)*

Several participants were uncertain what types of effects contaminants in fish could have on people:

I guess it does say ... eat none or once a month or something like that, but it doesn't tell you the effect it has on a human being. Now that's a problem in itself. (FG-3)

I'd like to hear more of the effects, Like you said cancer. What else you know?... On health. (FG-4)

Two anglers were particularly concerned about safe consumption levels for children:

My little grandchildren come over and say: "Pep, Pep, what you making?" "I'm making perch." Okay, and they say: "Oh, can I have another piece?" Can she have another piece? I don't know. I really don't know. And she's: "Pep you ate three or four of these. Can I have another one?"... Because I'm old now and ... well, I don't care. I made it this far. Another piece won't hurt me... But for her. (FG-4)

It's my granddaughter. She's only 3, and we're real concerned that she's eating healthy and nutritious. I mean this is a kid that loves food. She'll eat fruit over candy. You don't have to offer a chocolate... She loves broccoli, and she'll eat fish. But then I worry about it. Is she eating a fish that's going to be good for her because you ... shouldn't let her have more than a little bit? ... Is it dangerous for her to have it? (FG-7)

Participants in two groups had questions about how the testing was done to determine safe consumption levels:

We read these fish advisories, but I've never seen the results of how they're tested... Do they take samples of people, blood samples and contents of their stomach samples, PCB levels, and then let them feed on fish for a year? ... I don't know how they come up with them, so I don't put a lot of credibility in them really personally. (FG-4)

I'd like to know which bodies of water haven't been tested... Like if they test three species, put the ones that they don't test, too. But I'd also like them to put in that book ... such and such stream or whatever didn't get tested. Such and such lake didn't get tested. (FG-3)

In one group, participants were interested in information about the actual levels of contaminants in fish and how they were changing over time:

Do they have any report that they put out with how much PCBs there are in fish here? ... That would be a real good thing if somebody ... say: "Hey, five years ago there was this much in it. Two years ago there's this much in it. Now there's this much in it." (FG-4)

Preferred Sources and Types of Information

When asked about preferred sources of information, urban anglers brainstormed several types:

- Websites
- Fishing regulations guides
- Posters at fishing sites
- Newspapers and television
- Printed material distributed at bait stores and elsewhere
- Community groups
- Telephone hotlines

One participant argued that different sources of information were needed to reach all anglers, and that depending on computers alone would be less effective for low-income populations:

The other thing you have to consider, a lot of the folks ... don't have that technology so it may be necessary to bring information ... that can be passed out. Because I know a lot of the fishing, a lot of fishermen that's down, especially down at Broderick Park and some of the other areas, they probably never even seen a computer... You could pass it out at the fishing sites. (FG-3)

Some discussion took place as to which sources of information would be most trustworthy with regard to fish consumption recommendations. Consensus was not reached on this point. In one group, the federal government was considered more neutral than the state government:

You don't want the ... State of Pennsylvania Fish Commission telling you everything that's going on because politics comes into play. But if you have an independent overseer like the federal government coming to say something. Well, now ... maybe you'll get a little bit different story that's closer to the facts. (FG-4)

Universities and fishing clubs were also viewed as neutral sources of information by some participants.

Terminology

Sport-caught Fish. We asked focus group participants how they interpreted various terms that could be used to describe the types of fish to which advisories applied. As in the focus groups with women of childbearing age, the term “sport-caught fish” was ambiguous. Some anglers interpreted the term as applying to any fish that anglers might catch:

R1: Hook and line.

R2: Sport-caught. Hook and line. Exactly. A pole and line. (FG-3)

More frequently, however, anglers interpreted “sport-caught fish” as applying only to game fish and top predators:

Probably the top predators would be the sport fish. (FG-3)

When I think of sport-caught I think of mostly game fish. You know that's my thought. I don't really consider panfish, things of that nature, as sport-caught to me. (FG-3)

R1: Bass ... and trout.

R2: I wouldn't consider perch and walleye...

R3: No, no they're not sport fish. Perch. That's panfish.

R4: Panfish. Yeah. (FG-4)

Predator fish. (FG-7)

To me that envisions a picture of the guy that's strapped to the chair and reeling and reeling and reeling for like hours and hours at a time. Like big swordfish and big fish like that. (FG-7)

One angler drew a distinction between “sport-caught fish” and “sport fish.”

Sport-caught fish are anything you catch when you're out enjoying the sport of fishing – big, little, green, red, blue, whatever they happen to be. Sport fish are your predators, the game fish. Sport-caught fish ... you catch with a line, pole. (FG-3)

An alternative term, “locally caught fish,” was interpreted as applying to fish from a particular geographic area:

R1: Fish caught around this area...

R2: Yeah, in the county. (FG-3)

[What] comes to my mind would be Lake Erie, Presque Isle Bay, or any of the tributaries near here. (FG-4)

I think within a 10 mile radius of your house. (FG-7)

One participant argued that the term was ambiguous, however:

I would question locally because I don't know what that means... And I know that it has meant different things in produce, and ... it doesn't necessarily mean Lake Erie. (FG-4)

The term “fish you or someone you know catches” was understood as any type of fish anglers might catch:

Not store bought. (FG-4)

R1: *Well if someone had a boat and that this came out of a live well or it was somebody's neighbor that caught one locally, to me close by.*

R2: *Or somebody's fishing off the bank of a river somewhere nearby where they live. (FG-7)*

The term “wild-caught fish,” which was asked about in two focus groups, was interpreted differently by different anglers. Some believed it described fish from natural waters (as opposed to farmed fish):

Wild caught I would think ... would be natural waters. Local, natural waters rather than farm fish. Farm fish, where they control the environment and they might feed them chicken stock. (FG-4)

Others only applied the term to commercially caught fish:

R1: *It wasn't farm raised.*

R2: *They're commercially caught. (FG-7)*

It's more commercially. When you see the phrase wild caught it's always usually on package, and that's where you will see the terminology 'wild caught'... You're buying that type of fish, you're not catching that. When you see that phrase 'wild caught,' it's always purchased. (FG-7)

CONCLUSIONS AND RECOMMENDATIONS: URBAN ANGLERS

Several conclusions emerge from our results about factors influencing urban anglers' fish consumption and their understanding of the risks and benefits of eating fish.

- As in the focus groups with women of childbearing age, some urban anglers appeared to consume fish in excess of advisory recommendations, but others restricted their fish consumption unnecessarily, therefore foregoing the potential health benefits of fish

consumption. Some anglers indicated that they believed if fish consumption had to be limited, fish probably were not safe at all.

- A number of anglers held misconceptions about how to judge whether or not fish were safe to eat (similar to those held by women of childbearing age). A lot of emphasis was placed on the characteristics of the water in which fish were caught (such as clarity), the proximity of fishing sites to industrial development, and the appearance (often the color) of fish.
- Although many recognized that fish preparation methods could reduce the likelihood of consuming contaminants, they did not indicate that they were aware that these methods worked for PCBs, but not for mercury. Some anglers, therefore, may mistakenly assume that they are reducing their contaminant risks more than they are.
- Some urban sites have significant subpopulations of anglers from different ethnic and cultural backgrounds. The fish consumption norms (species and amount of fish eat) can differ considerably from group to group.
- Poverty is perceived as having a considerable effect on fish consumption. Urban anglers may consume a lot of fish if they can not obtain food easily in other ways.
- Because sites for fishing were often limited, urban anglers could not always fish at sites with the characteristics they preferred.

We drew additional conclusions about how urban anglers respond to fish consumption advisory information.

- Some audiences are difficult to reach with advisory information. They were not well-represented in the focus groups, but might consume a considerable amount of fish from urban fishing sites. These audiences include: immigrants, very low-income anglers who depend heavily on fish for food, and people who are given fish by anglers.
- Anglers had a variety of questions related to fish advisories and many of the answers to their questions were already readily available in advisory materials. This material is not reaching them effectively.
- Some anglers expressed a strong interest in having more information about which fish were safe to eat rather than which fish were not safe to eat.
- As with women of childbearing age, the term “sport-caught fish” was widely interpreted to apply only to those fish that were valued game or trophy fish (rather than any caught fish).

Based on these results, we formulated several recommendations regarding possible emphases in fish consumption advisory programs.

- Some at-risk urban audiences may be easiest to reach through community-based communication programs conducted in partnership with local organizations. Immigrant groups, which may have common norms regarding fish consumption that are reinforced within their communities, may be easiest to reach through community organizations serving these populations. Similarly, low income anglers depending on fish they catch for food may be easiest to reach through organizations providing services for them.
- Because some urban anglers may not have any choice but to eat fish, focusing advisories on communicating risk-reduction strategies may be worthwhile. Such an approach would

involve communicating positive messages about actions to take that may not eliminate, but at least would reduce, known risks.

- Since warnings about fish consumption risks discourage some anglers from eating fish at all, positive advisory messages that encourage them to eat particular species may make it more likely that they will get the health benefits of fish consumption.
- Because certain misconceptions are common about which factors influence whether or not fish are safe to consume, developing advisory materials that identify and refute these misconceptions could be helpful.
- The term “sport-caught fish” will likely be misunderstood by many. Identification of an alternative term may be beneficial. “Fish that you or someone you know catches” is more cumbersome but seemed to promote the clearest understanding, both among urban anglers and (as summarized earlier) women of childbearing age.

These recommendations are intended only as starting points for discussion within the Consortium. Final decisions about preferred approaches to communicating fish consumption advice should follow such discussion.

RESULTS: RETIREES

Fish Consumption

All of the retired anglers who participated in our pilot focus group ate fish and ate fish they caught. The amount and type of fish varied from person to person. Some deliberately chose to keep and eat smaller rather than larger fish:

So now if I get one 24 inches ... I might keep one if the freezer were empty, but usually it's 20 inches and under that I keep. And over that ... they go back. I've thrown a lot back. (FG-2)

Typically, they shared whatever fish they caught and ate with their families regardless of individuals' ages or genders:

Some of my relatives just don't like fish ... but the majority of everyone that's in our family will eat fish any time we have it without worrying or thinking about where it came from... Just because we've served it. Maybe they're trusting us. I don't know. They're gambling on us. (FG-2)

I think the family just trusts whatever opinion I make and they just eat it. They like it. (FG-2)

Factors Influencing Fish Consumption

Opportunities and Constraints

The amount of fish our focus group participants ate depended in part on how many they caught. Obtaining food was one motivation (but not the only one) for fishing:

I enjoy [fishing] ... just for food. (FG-2)

Since they had retired, many participants had more opportunity to fish and eat fish, and they took advantage of those opportunities:

Well I probably fish ten times more than I did when I was working because I spend a lot of time out on the big lake. Not only that but the inland lakes and the ... other places. (FG-2)

I fish more now than I did prior to that when I was working but I'm a little more selective. The weather has to be a little nicer because I have the opportunity to get out more often so I'm a little more selective. (FG-2)

Now that I've retired I'm probably fishing more than I did ... during the working years but not quite as much as when I was younger. (FG-2)

On the other hand, other participants fished less than when they were younger:

I had more time to fish when I worked seventy hours a week. I don't know. I'm getting older and a little slower and maybe ... time is going by faster. (FG-2)

The reasons that some anglers fished less varied, however. One no longer had access to sites with good fishing opportunities, which did not seem to be related to his age:

There was so much fishing going on that they were fished out, and the only ones you get are really tiny ones. So that kind of turned me off of that, and so I don't fish so very often now... I fish a lot less now than I used to. (FG-2)

The other factor that influenced how much people fished was the availability of fishing companions:

I'm fishing more Lake Superior since I retired than I do inland lakes, but that's only because my inland lake buddy has moved away and so ... there's just one other person I can fish with now... I think your friendships have something to do with it... Who you fish with. (FG-2)

In addition to the fish they caught, many anglers also purchased fish to eat. In these cases, the cost of the fish influenced how much and what type of fish they ate:

Who up here keeps catfish? Well, they're fantastic catching. I mean what a game fish! Wow! ... They are good eating, and you find them in the store and they're about \$7 a pound. They're almost more than walleye. (FG-2)

That's where cost does come in. When I can buy good salmon for say \$7 something a pound, and I see they want \$14.95 for walleye, I'll buy the salmon. (FG-2)

Social Influences

Retired anglers' fish consumption was influenced by family and peer groups. Several spoke of their upbringing as having an influence on how much fish they ate:

I think a lot of it is just how you were raised as a child. How your dad took you out... That was during the depression, so they went fishing. We kept everything. Everything was a food source per se. You didn't waste anything. You were very conservative. I don't think we were poor. I think we had everything we needed, but I think the children like myself pick up on that and we carry it forward. (FG-2)

One referred to the influence of his religion on his fish consumption:

A lot of it ... I was raised Catholic... And of course that was fish every Friday. And I think that carried through a lot. And even though I may stop eating that ten years later, I got back into it again. (FG-2)

Participants also spoke of how their peers influenced how much fish they ate:

Maybe I hang around with more of a lower class fisherman or something like that, but we don't get concerned about it. We're out to have a good time and fish, and we eat what we catch. (FG-2)

Fish Consumption Outcomes

Focus group participants identified a variety of outcomes that affected whether they ate fish. These included: their enjoyment of fish, preferring to eat food they caught, and health benefits and risks.

Enjoyment: Most participants indicated that they simply liked eating fish:

I don't eat it for health purposes. I just enjoy eating fish. (FG-2)

Some choices about the types of fish they ate were, therefore, influenced by how much they enjoyed those types of fish:

The biggest walleye I've ever had on, it could have been twelve pounds... I took him home and you could hardly get the filleting knife through him... Who cares about mercury? ... They just weren't that good eating. (FG-2)

RI: *There's nothing wrong with a northern but most people stay away...*

Interviewer: *So most people stay away for what reason?*

RI: *Because of the bones. (FG-2)*

Catching Own Food. Most of our focus group participants liked to eat food they caught. Some of this preference seemed to be solely a matter of enjoyment:

I usually keep what I catch because ... even though it may be in a more mercury lake ... it's part of the whole pleasure of fishing. And then you get to eat what you caught. (FG-2)

Other anglers enjoyed catching their food because they had more knowledge about that food and trusted it more:

I don't like the farm-raised stuff. I'd rather eat the fish out of the St. Louis than the farm-raised fish. It's just a preference... To me there's a distinct taste to it. It's like wheat and white bread... And the idea that ... I don't know what they've been feeding them ... what they're actually throwing in those pellets so to get them to grow fast. (FG-2)

Some participants, however, were quite willing to trust commercial fish:

They're taking these things out of the ocean wherever up there in the Pacific, and they go right straight into their freezer. And they package it and sent off to McDonald's. And

whoever right there, they're froze instantly, and I don't think we could do any better here. It's great fish and certainly again better than anything that comes in the can or your lunch meats and Spam and hot dogs. (FG-2)

Health Benefits. One reason some participants ate fish was because they believed it was healthy:

We believe in eating fish because we think it's very healthy in general. (FG-2)

And the reason I do eat a lot of fish is for health reasons. The omega-3 oil is very healthful for everybody, and that's one of the reasons I do it. (FG-2)

Little discussion, however, of the specific health benefits of fish consumption occurred.

Health Risks. Concern about the risks of fish consumption also was evident in the focus group:

I do get kind of concerned with some of the mercury that they're talking about in the fishing the St. Louis River. You know, that's what I hate up there. (FG-2)

This concern clearly influenced how much fish some anglers consumed:

I've been fishing less, and that's one reason I want to be here. One reason I'm fishing less is I guess I fall into the category of catch and eat 'em... I would like to fish more now that I'm retired, but I'm a little worried about the whole deal of all the time eat one meal a week, and you only need one fish a week. That's not much. (FG-2)

Growing up nobody looked at anything. Everybody ate what they shot, ate what they caught. And me, I was one of these people... When you start coming out decades ago talking about eating lots of red meat was not good for you, fish is healthier I thought, "Yeah," because I frankly would rather eat fish than meat. I used to eat fish four times a week, and now I only eat 1 time a week. Why? Because scientific community came out and said they're poison basically. (FG-2)

Concern about contaminants also influenced what type of fish anglers were willing to feed their families:

I was on the lake finder the other day looking up some of the lakes around my area to double check because my grandkids are coming for a week next month, and I want to make sure what they're eating. (FG-2)

Mercury was the contaminant discussed most frequently, but it was not a concern for all participants:

I don't worry about the mercury and stuff, although I don't fish in the St. Louis River that much... But ... I've never considered worrying about what's in the fish. (FG-2)

When I want to go fishing, it's nice out. I don't think of mercury, I don't think of the lake being polluted. I don't think anything. It's a nice day, I've got my rod in hand. I'm going fishing. (FG-2)

Factors Affecting Health Risks and Benefits. Retired anglers perceived that the health risks associated with fish consumption were influenced by several factors. Some pointed out that some bodies of water were more likely to have contaminated fish than others:

R1: *There's a fact that every lake is not the same ...*

R2: *That's why the DNR site tells you the lake by lake. (FG-2)*

Several associated less contaminated fish with cleaner waters:

Now they say the St. Louis River is much cleaner than it was back then, so it easier to assume the fish should be better ... should be cleaner. (FG-2)

In addition, participants in our focus group maintained that some types of fish were less likely to be contaminated than others. Some anglers avoided eating bottom feeders:

I think what convinced me early on that the bullheads, the suckers, the burbot ... were not edible ... they were bottom feeders. That's what I was told and ... you probably heard that same. Why are you going to eat a bottom feeder if you can have a healthy walleye or northern that's not a bottom feeder? (FG-2)

Another angler recognized that younger fish were less likely to be contaminated:

Our favorite fish to eat is salmon mainly because it's a short-lived fish, and it's less likely to be accumulating very much of contaminants. Although I'm not a salmon fisherman, but we like them. (FG-2)

Some argued mistakenly, however, that if a fish lived a long time, it must be relatively healthy and healthy to eat:

R1: *We have a fish ... called sturgeon ... that's ... in many cases over 100 years old. Are these fish full of mercury? And how did they live that long if that is the case? ...*

R2: *Oh, if it didn't kill the fish and they're 150 years old, maybe it's safe to eat ... or good to eat it. (FG-2)*

Participants discussed a variety of ways of distinguishing fish that were safe to eat from those that were not:

Back in the '70s I knew some people that would fish on the St. Louis because it was good fishing. And they tried to keep some, but as soon as that fish hit the pan you could smell it. Mostly it'd smell like the petrol from the paper mill. It smelled like paper mill. I'm not going to eat that. (FG-2)

Others based their judgments about whether fish were safe to eat on appearance, which is not a reliable guide, but this was a point of contention within the group:

R1: I don't consider what chemicals are in it, just how it looks. Is the belly still white?...

R2: You can't see the things that are in there. (FG-2)

R1: Well, there's so much water that flows there from all these pristine lakes... There's such... a flow of water through there, you wonder well how can these fish have mercury in them even? ... But I guess that ... the little critters bury into the sand and whatnot, and it's under that soil that they're picking up the nasties. And then they come up, and the little minnows eat them, and then they get ate, and so on up the food chain.

R2: Well, I guess I assume those are the yellow ones.

R3: I think that's a myth. Just like you get lake trout, one is white, one is pink. And salmon, same thing. You go up north and them walleyes are going to be yellow belly ... depends on the lake. (FG-2)

Some participants considered the risks of fish consumption to be lower than other risks with which they were faced:

It's also a whole lot better to have a fish, piece of fish, than it is a piece of lunch meat with all the nitrates in it. That really could kill you quickly. (FG-2)

These anglers tended to be unconcerned in particular because of their age:

But I'm also to the point in life where ... I grew up in an age where I worked at an asbestos tile factory where we were always exposed, and I worked in the steel plant in hazardous chemicals for a number of years, and been exposed to all kinds of other things that are probably eating at my insides already. So at this point, being as old as I am, I'm not worried about mercury for me. (FG-2)

R1: I think we all enjoyed life a lot more, and we just ate whatever we felt, and then we dropped dead. But now it's like a warning on this and warning on that and warning on this. And how do you even enjoy life anymore?

R2: Well, all you're going to do is go visit some of these nursing homes and you'll realize we certainly do have people live too long today. (FG-2)

Information about Fish Consumption

Sources of Information

Retired anglers relied on a variety of sources of information about the health risks and benefits of fish consumption. The chief sources mentioned included:

- Fish and wildlife agency websites (including Minnesota's "Lakefinder")
- Newspapers
- Outdoor magazines

- Posters at fishing sites
- an Ipad app (Seafood Watch)
- Word of mouth

Health care providers were not mentioned.

Key Messages

The primary messages retired anglers recalled receiving about fish consumption focused on restricting consumption:

To not eat it on a daily basis. (FG-2)

They perceived that these messages focused more on the health risks of fish consumption than the health benefits:

R1: *More warnings than encouragement, isn't it?*

R2: *Correct. Yep.*

R3: *It seems that way. (FG-2)*

Some participants also recalled messages aimed specifically at pregnant women:

That says: "State of Wisconsin warns pregnant woman or so and such should not eat more than one meal a week." (FG-2)

On the other hand, one angler believed that messages about the health benefits of fish were more common than those about health risks – at least with regard to commercially available fish:

I'm just going to say commercially you're going to see much more advertisement ... on benefits of fish vs. warnings about it. (FG-2)

Information Clarity

Some focus group participants believed the available fish consumption advisory information was very useful and clear:

They distinguish between big and small fish and walleyes and northerns and panfish, and so there's pretty decent information there. (FG-2)

One believed that information about how to clean fish appropriately was not widely enough available, and so that many anglers did not have this information:

One of the things that isn't out there ... enough is how to clean the fish to get rid of some of the deposits and to avoid the fat and the fatty area around the dorsal fin and some of the other places where you can cut away, where the mercury is most likely to deposit. And a lot of people don't know anything about that so they clean fish in the same old

standard way and probably end up consuming some of the parts that are the most dangerous. (FG-2)

This angler, however, incorrectly believed that these cleaning methods would reduce mercury consumed.

One maintained that the methods used to develop the advisories were not appropriate. He argued that they were likely to overestimate the amount of mercury in fish.

I've had a friend tell me that the way that they test the mercury in the fish is they take the whole fish and they grind it up. And then at the ... PCA lab or whatever, then they look at the mercury in it. Well, none of us do that. I mean we've carefully filleted the fish out, and if it's a trout particularly we cut some of the belly fat off and ... don't leave skin on about any fish. I skin them and make sure to get rid of that mud line, and then I'd like to have a test to see how much mercury there really is in it. And you know that enters into it... Is there really that much mercury in a small walleye caught in the St. Louis River? Well, you know I don't worry about it. (FG-2)

Another expressed general distrust of the information he received through the mass media:

That's of course one of the things that gets me... Because we've all learned oftentimes now we can't actually trust what the media tells us. They like to sensationalize things so what's the truth is what I'd really like to know. (FG-2)

Preferred Sources of Information

Focus group participants had few suggestions regarding the most appropriate ways of distributing fish advisory information. Some preferred to receive information from the U.S. Environmental Protection Agency, but more appeared to prefer receiving it from their state fish and wildlife agency:

Well, I trust the DNR more than I would federal government... They're just local... Because you get somebody that's sitting in a high chair some place up in their ivy tower and ... they're telling you what to do, but they don't really know what's going on in the local area. (FG-2)

Another angler argued that while distributing information by computer worked well for many people, it was still important to maintain fish advisory information in print form:

R1: *There's a tendency by government to computerize everything nowadays because that reaches supposedly the most people, but there's still a lot of people left out. So even if in cooperation with the Department of Health they put out a brochure or something about fish consumption in Minnesota... Are those brochures then also ... available for ... when people buy their fishing licenses and comes right with them?*

R2: *They should be anywhere where you're going to get a license or pick up bait.*

Terminology

Sport-caught Fish. We asked focus group participants how they interpreted various terms that could be used to describe the types of fish to which advisories applied. As with the other audiences with which we conducted focus groups, the term “sport-caught fish” was ambiguous. Some interpreted it as applying to any fish that individual anglers might catch:

To me ... sport fish could be ... of any size all the way up to swordfish or whatever... I always consider just hook and a line, and it could be any size fish, sport fish. (FG-2)

Others, however, tended to think primarily of game fish that were valued for sport:

I think of muskie and bass. (FG-2)

An alternative term, locally caught fish, was viewed as applying to particular geographic areas. One participant argued, however, that that geographic area could be quite large:

Somewhere in the United States. Well, you've probably [had] transportation ... change from when you were kids because they can bring in from ... far away, you know, fresh. (FG-2)

SUMMARY: RETIREES

The purpose of this pilot focus group with anglers was not to draw reliable conclusions about retirees; one focus group is not sufficient for that purpose. The purpose was to determine whether preliminary data suggested that retirees might be at particular risk from fish consumption making it worthwhile to conduct additional focus groups. Relevant themes that emerged during this focus group included:

- Some retirees fished more now than when they were working. Because many liked to eat the fish they caught, they might very well be eating more fish.
- Some had concerns about health risks of fish consumption, but many did not because they believed at their age they were unlikely to experience negative effects from fish contaminants. None expressed an awareness that mercury could contribute to heart ailments.
- Although some awareness existed that cleaning methods could reduce contaminants consumed, anglers showed no recognition that these methods were not effective for reducing mercury.
- Misconceptions about how to determine which type of fish were safest to eat existed. Some anglers relied on characteristics such as the clarity of the water and the color of the fish.
- Retirees tended to trust the fish they caught more than other sources of food because they had greater knowledge of where the food came from.

Based on these preliminary findings, it is possible that retired anglers may be consuming potentially contaminated fish without full awareness of the risks it poses to them or how to reduce that risk.

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APPENDIX A

Focus Group Questions

Introduction

At the beginning of each focus group, we conveyed the following information to focus group participants:

- The purpose of the focus group is to help us understand how people make decisions about whether to eat fish and how much fish to eat. Depending on who you talk to, people have reasons for eating fish and reasons for not eating fish. We'd like to understand what you think about when you decide whether or not to eat different kinds of fish. Your ideas will help us figure out what kinds of information would help people make informed decisions about whether or not to eat different kinds of fish.
- We will ask a series of questions for discussion, with no right or wrong answers. 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 may check in with different people to find out if they agree or disagree with points that have been made.
- Participation in this focus 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 you will receive a \$25 Visa gift card if you complete the focus group.
- Your identity will remain completely confidential. 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 determine who made particular comments to us. We may use direct quotations from some people in reports or publications, but we will delete any information that could be used to identify specific people before we do.
- The session will be audio-recorded and the recording will be transcribed.

Are there any questions before we get started?

Women of Childbearing Age Questions

- Let's start by going around the table and have everyone introduce themselves and tell me how you came to take part in this focus group.
- First, I'd like to get a sense of how much fish you eat. How often do you eat fish? In what types of situations do you usually eat fish? At home? In a restaurant? At friends' or relatives' homes? On vacation?
- Is the fish you eat: Fish you catch yourself? Fish caught by someone in your family? Fish caught by one of your friends? Fish you buy in the supermarket? Fish you buy elsewhere? Which of these do you eat most frequently?
- Thinking about the different species or types of fish that are available what varieties of fish do you eat most frequently?
- Does everyone in your family eat the same type of fish? If not, how are they different?

In the next set of questions, I'll ask you about your reasons for eating or not eating different kinds of fish. Then I'll ask you about particular reasons that might or might not be important to you.

- When you think about whether or not to eat fish, what are the things you consider? (*For this and other questions, ask specifically about fish that you or someone else catches, fish you buy in the supermarket, and fish you buy in a restaurant as appropriate.*)
- When you decide to eat fish, what are your usual reasons for eating it? When you decide not to eat fish, what are your usual reasons for not eating it?
- How much do you enjoy eating fish? How important is it to you to eat food from the area in which you live?
- What do you think are the benefits to you of eating fish? What do you think are the risks to you of eating fish? (*If health benefits are not mentioned, ask about these specifically.*)
- How much do other people in your family or people you live with eat fish? How much do your friends eat fish? What are the reasons they eat fish or don't eat fish?
- What do you think other people you know think about the risks and benefits of eating fish? Your family? Your friends? Your doctor? Other experts?
- How easy is it for you to get fish to eat? How often do you have access to fish that you or someone in your family catches? How often do friends share some of the fish they catch with you? How often are you served fish by friends? How often can you eat fish at community events? How easy is it for you to buy fish at grocery stores or other places in your community? How affordable is fish where you live?
- How much do you think you know about the risks and benefits to you of eating fish? Where do you get information about the risks and benefits of eating fish? Family? Friends? Has your health provider talked to you about the risks and benefits of eating fish? Your local health department? Your state fish and wildlife agency? Newspapers or magazines? Internet?
- What do these different sources of information tell you about the risks and benefits of eating fish? How helpful is this information?
- How similar is the information you get from different sources about the risks and benefits of eating fish? If the information is not always similar, how is it different?

- What questions do you still have about the risks and benefits of eating fish? What other types of information would you like to have about the risks and benefits of eating fish?
- Where would you like to be able to get information about the risks and benefits of eating fish? What sources would be most convenient for you to get this information?
 - Who would you prefer to be able to get information about the risks and benefits of eating fish from? Government agencies? (State? Federal? Local?) Your doctor? Your local health department? Your friends? People you fish with?
 - What form of information works best for you? Printed? (Brochures? Wallet cards?) Someone telling you something verbally?
 - How do you prefer to receive this information? Radio? TV? Newspapers? Magazines? Computer? (Facebook? Agency web sites? News sites?) Twitter? Smart phone apps? Pick it up somewhere? (Grocery stores? Other stores? Doctor's office? County health offices? State agency offices? Tourist offices?)
 - What time of year do you prefer to receive this information?
- When health departments distribute information about the risks and benefits of eating fish, some of that information is specifically intended for certain women. I'm interested in who you think this advice is intended for when certain terms are used. When health departments offer advice to "women of child-bearing age," who do you think this advice applies to? (Other terms we could ask about given time, include: women who are or may become pregnant, women planning to become pregnant, and women that will become pregnant.)
- When health departments distribute information about the risks and benefits of eating fish, they use certain words to describe certain types of fish. I'm interested in what kinds of fish you think them mean when certain words are used. When health departments offer advice about "sport-caught fish," what type of fish do you think they mean? (Other terms we will ask about, include: locally caught fish, fish you or someone you know catches.)

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?

If you're interested in receiving a copy of the report we prepare based on this study, provide me with your address or email address. (*Provide them with my business cards.*)

THANK YOU!

Urban Anglers Questions

- Let's start by going around the table and have everyone introduce themselves and tell me how you came to take part in this focus group.
- First, I'd like to ask you about the fishing that you do. What are the reasons that you fish? Food? Fun? Relaxation? Way to get outside? Something to do with other people?
- Where do you go fishing? Where do you prefer to fish? What are the reasons you prefer some locations over others?
 - Easier to get to? How do you get there? What other locations would you prefer to go to if they were easier to get to?
 - Like some waters better than others? What are the reasons you like some waters better? Cleaner? Less contaminated? (How can you tell?) More natural or quieter? More likely to catch fish?
- How often can you get to those locations that you prefer to fish most? When you can't get to those locations you prefer to fish, are there other places you can go?
- Now I'd like to get a sense of how much fish you eat. How often do you eat fish? In what types of situations do you usually eat fish? At home? In a restaurant? At friends' or relatives' homes? On vacation?
- Is the fish you eat: Fish you catch yourself? Fish caught by someone in your family? Fish caught by one of your friends? Fish you buy in the supermarket? Fish you buy elsewhere? Which of these do you eat most frequently?
- Thinking about the different species or types of fish that are available what varieties of fish do you eat most frequently?

In the next set of questions, I'll ask you about your reasons for eating or not eating different kinds of fish. Then I'll ask you about particular reasons that might or might not be important to you.

- When you think about whether or not to eat fish, what are the things you consider? (*For this and other questions, ask specifically about fish that you or someone else catches, fish you buy in the supermarket, and fish you buy in a restaurant as appropriate.*)
- When you decide to eat fish, what are your usual reasons for eating it? When you decide not to eat fish, what are your usual reasons for not eating it?
- How much do you enjoy eating fish? How important is it to you to catch your own food? How important is it to you to eat food from the area in which you live?
- What do you think are the benefits to you of eating fish? What do you think are the risks to you of eating fish? (*If health benefits are not mentioned, ask about these specifically.*)
- How much do other people in your family or people you live with eat fish? How much do your friends eat fish? What are the reasons they eat fish or don't eat fish?
- What do you think other people you know think about the risks and benefits of eating fish? Your family? Your friends? Your health care providers? Other experts?
- How easy is it for you to get fish to eat? How often do you have access to fish that you or someone in your family catches? How often do friends share some of the fish they catch with you? How often are you served fish by friends? How often can you eat fish at

- How much do you think you know about the risks and benefits to you of eating fish? Where do you get information about the risks and benefits of eating fish? Family? Friends? Your doctor? Your local health department? Your state fish and wildlife agency? Newspapers or magazines? Internet?
- What do these different sources of information tell you about the risks and benefits of eating fish? How helpful is this information?
- How similar is the information you get from different sources about the risks and benefits of eating fish? If the information is not always similar, how is it different?
- What questions do you still have about the risks and benefits of eating fish? What other types of information would you like to have about the risks and benefits of eating fish?
- Where would you like to be able to get information about the risks and benefits of eating fish? What sources would be most convenient for you to get this information?

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?

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THANK YOU!

Retirees Questions

- Let's start by going around the table and have everyone introduce themselves and tell me how you came to take part in this focus group.
 - First, I'd like to ask you about the fishing that you do. What are the reasons that you fish? Food? Fun? Relaxation? Way to get outside? Something to do with other people?
 - How often do you fish now compared to before you retired?
 - Where do you go fishing? Great Lakes? Rivers and streams? Inland lakes? Where do you prefer to fish? What are the reasons you prefer some locations over others?
 - How often can you get to those locations that you prefer to fish most? When you can't get to those locations you prefer to fish, are there other places you can go?
-
- Now I'd like to get a sense of how much fish you eat. How often do you eat fish? In what types of situations do you usually eat fish? At home? In a restaurant? At friends' or relatives' homes? On vacation? How often do you eat fish now compared to before you retired?
 - Is the fish you eat: Fish you catch yourself? Fish caught by someone in your family? Fish caught by one of your friends? Fish you buy in the supermarket? Fish you buy elsewhere? Which of these do you eat most frequently?
 - Thinking about the different species or types of fish that are available what varieties of fish do you eat most frequently?

In the next set of questions, I'll ask you about your reasons for eating or not eating different kinds of fish. Then I'll ask you about particular reasons that might or might not be important to you.

- When you think about whether or not to eat fish, what are the things you consider? *(For this and other questions, ask specifically about fish that you or someone else catches, fish you buy in the supermarket, and fish you buy in a restaurant as appropriate.)*
- When you decide to eat fish, what are your usual reasons for eating it? When you decide not to eat fish, what are your usual reasons for not eating it?
- How much do you enjoy eating fish? How important is it to you to catch your own food? How important is it to you to eat food from the area in which you live?
- What do you think are the benefits to you of eating fish? What do you think are the risks to you of eating fish? *(If health benefits are not mentioned, ask about these specifically.)*
- How much do other people in your family or people you live with eat fish? How much do your friends eat fish? What are the reasons they eat fish or don't eat fish?
- What do you think other people you know think about the risks and benefits of eating fish? Your family? Your friends? Your health care providers? Other experts?
- How easy is it for you to get fish to eat? How often do you have access to fish that you or someone in your family catches? How often do friends share some of the fish they catch with you? How often are you served fish by friends? How often can you eat fish at community events? How easy is it for you to buy fish at grocery stores or other places in your community? How affordable is fish where you live?

- How much do you think you know about the risks and benefits to you of eating fish? Where do you get information about the risks and benefits of eating fish? Family? Friends? Your doctor? Your local health department? Your state fish and wildlife agency? Newspapers or magazines? Internet?
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- What questions do you still have about the risks and benefits of eating fish? What other types of information would you like to have about the risks and benefits of eating fish?
- Where would you like to be able to get information about the risks and benefits of eating fish? What sources would be most convenient for you to get this information?

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?

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