Great Lakes Swim Safety Risk Communication
for 18-24 year-old Males: Review of Key Literature and
Results of a Focus Group Study
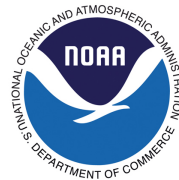## *Final Report*

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Executive Summary

Disclaimer: The statements, findings, conclusions, and recommendations in this report are those of the authors or Michigan State University and do not necessarily reflect the views of the Michigan Department of Environmental Quality and NOAA.

This report describes the results of focus groups conducted with 18-24 year-old males (*N*=55) from five coastal communities along the Michigan side of Lake Michigan and Lake Superior. Thematic analysis was used to assess major themes in the data and supplemented with quantitative self-report data. Based on this data, a series of key recommendations for communication with this population are addressed.

Key Findings

- Participants identified a large number of risks in the Great Lakes. Drowning and currents were foremost among those risks. Piers and other structures were recognized as spots where risk behaviors occur and accidents happen.

- Many participants had first-hand experience with water safety events. "Stay calm", "don't fight the current" and "swim parallel" were the most common behaviors described to help remove oneself from a current.

- Participants discussed social aspects of risk extensively. Several groups discussed "other people" as a risk in the Great Lakes largely because of social pressure that they indicated drove young men to do risky things. People reported rarely going to the beach alone and typically decided when and how to go in the water with other people, usually with friends or a significant other.

- Participants talked openly about risky behavior and swimming. Groups regularly raised the use of alcohol use while pier or cliff jumping and swimming. Many participants reported swimming on red flag days or seeking out red flag conditions as well as diving and jumping off piers. The use of alcohol and intentional risk-taking cannot be ignored in any effort to communicate risks to this group.

- Consistent with other studies of this age group conducted in geographical locations other than the Great Lakes, our sample indicated they believe currents and rip currents in particular are dangerous, but most believe, because of their long history around lakes, that they can "handle" themselves in the water and so didn't perceive that they were susceptible to drowning.

- Analysis of the draft signs indicated several key things, but these effects could be a result of order effects and should be tested more rigorously after being redesigned and rethought based on these findings. First, the participants pointed out that the signs addressed different concepts therefore it was hard to compare them and make choices between them with sign 3 fundamentally different from 1 and 2. All signs are pictured in the report below.

- **Sign 1** Text Only ("**Stay Alive!**"): Participants perceived it would gain attention and make people feel the risk (of jumping off a pier) is scary, but the sign doesn't make them feel like it will happen to them or that they can do anything about it. There is no recommended behavioral response (doesn't say what to do). This is a classic fear appeal, but is missing key components to motivate action.

- **Sign 2** Text ("**Stay Alive!**" and **Graphic**): Participants generally liked the presence of the graphic showing how to get out of a current, but were confused by it. There were mixed perceptions about whether the sign indicated the risk was scary and likely. People said the sign made them think there was clearly something they can do to protect themselves from drowning if caught in a current by giving a plan and recommended response. Also a classic fear appeal, but this one provided a recommended behavior and seemed to portray efficacy (something I can do and something that works to keep me safe!) better than Sign 1. Promoting efficacy is linked to behavioral response.

- **Sign 3** (**Flags and Text**): Participants believe that the colorful flag system would catch their attention. Olympic swimmer information was intriguing to many participants and caused them to rethink their susceptibility to the risk of currents and their ability to escape them. Perceptions of danger were lower than other signs. Clear recommended responses: Take a boogie board and swim with a friend were identified; most indicated they wouldn't be caught dead with a boogie board and always swim with others.

- The feedback in the detailed report can be used to revise and redesign the signs. Additional points about signs made by participants:

  - Terms "dangerous currents" seen as vague
  - Small print/too many words a concern
  - Potential for "boomerang" (doing the opposite of sign/flag recommendations) was discussed by participants

Overarching Recommendations

Our study and knowledge of the existing literature lead us to several key points and recommendations regarding risk communication for this population.

1. Risk communication (e.g., signs or flags) cannot be the only strategy employed to reduce risks. Historical examples (e.g., seatbelt use) show that a combination of messaging, policy change and modifications to the environment may be necessary to influence behaviors. This was clearly recognized by our participants. Patrolling and intervention by lifeguards were raised as key ways to reduce risky behaviors.

2. Changing "knowledge" and raising "awareness" is not typically linked to behavior. That is, people can be aware of a risk ("I have heard about rip currents") and be knowledgeable about a risk ("I can define a rip current"), yet they do not take steps to avoid the risk. In even the most rational models of behavior change, knowledge is a few steps from enacting behavior — further, many behaviors are not rational.

3. Promotion of information seeking (e.g., "Know Before you Go") might not be an appropriate approach to use with this target audience. Because our population largely thinks rip currents and drowning are scary but think they are not likely to drown because of their swimming skill and knowledge of currents (due to lifetime spent living near lakes) this makes it less likely that they will seek out additional information about risks. Any strategy that involves promoting information seeking will likely be most effective if the information about risks is embedded in information about weather and surf conditions in apps or other channels already used by participants. Participants themselves highlighted low-tech information channels –signs and intervention by lifeguards as ways to reduce risks, but also contradictory information about their use of these channels.

4. Families and particularly, mothers, play a key role in communication of risk information to boys. Additional recommendations that can be made to parents about appropriate communication of swimming risks and protective behaviors should be considered. All children living near water should be trained to be proficient swimmers. The complexity of currents in the Great Lakes and the complex nature of skills needed to escape has to be considered; our literature review suggests that the "Flip, Float, Follow" concept might be the best message to address the appropriate action for self-rescue although it has drawbacks. Importantly, we heard very little about this concept from our participants and did not formally test the concept, so additional research might uncover the potential efficacy of this phrase to influence behavior.

5. Swimming while drinking is something that was discussed regularly by participants and cannot be ignored. It may be the case that recommending that parents of kids who live near bodies of water make explicit statements to their children about not drinking and swimming is an appropriate intervention strategy. There might be lessons to draw from literatures where communication between parents and kids on substance use and risk behavior have been considered extensively (sexual activity and HIV prevention for one). Both this issue and #4 above suggest early communication with boys about swimming safety is important.

6. Signs and flags were raised as valuable sources of information about swimming risks. *It is clear from our data that there are many times that our target audience would not use the information from signs to make their decision about whether to swim/jump off structures or not*. It is very clear that there is information about swimming risk that will never be communicated through signs but that sometimes signs can serve as a prompt for communication.

   When signs are crafted, the communication literature suggests that if a specific behavioral response is recommended or needed to prevent drowning, that information should be explicitly stated on the sign. The question could be posed in this way: What should people DO or NOT DO to reduce their risk for drowning? It is worth considering whether these are the same/different for different beaches or different areas on the beaches. There is a tradeoff between consistency and tailored messages. Novelty is also a key tool used in message design as a tool for gaining attention.

Overview

This document reports on the findings of a survey of the literature on risk communication for swim safety for young males and focus groups with 18-24 year-old males who live around the State of Michigan coasts of Lake Michigan and Lake Superior. This population was chosen for the present research for several key reasons. First, historical data in Michigan suggests they are a high-risk population for drowning. Second, there is research to indicate that members of this demographic perceive risks differently from other groups and that they may be more prone to sensation seeking than other populations. Third, relative to females, young males spend more time in the water, are more likely to use surfing equipment, and are more likely to swim in deeper waters (Morgan et al, 2008) making the opportunities for risky events more probable for this population. The social scientific literature provides a great deal of information about this population and some of it will be reviewed here. Yet, important questions remain about how to communicate risks to this age group, particularly about swimming risks in the Great Lakes. These questions are the focus for this study in the hopes of providing some guidance on communication with this audience segment.

The following sections include:

- A brief overview and analysis of the literature on the swimming risk and risk communication literature for young men;
- An overview of some of the theory on the relationship between risk perception and risk communication;
- The study research questions, method, and results; and
- Recommendations based on the focus group data and literature.

Relevant Literature and Theory

Following is a review of several key areas of literature on risk perception and risk communication for 18-24 year old males. This literature forms the basis for the research questions in the subsequent section. There are several broad areas of the literature that should be considered when thinking about beach safety among this population. First, some studies indicate that young men perceive risks differently from other populations. Second, the literature shows that risky behaviors (e.g., pier jumping or swimming on "red flag" days) are a function of both propensity — characteristics of a person — and opportunity —characteristics of the environment. Third, it is clear that we often make decisions about whether or not to do something, with input from other people. Following a review of this literature, the report will present some of the ways in which people perceive the Great Lakes and the risks associated with them. These perceptions may be different from research about beach safety, public perception and risk communication related to other large bodies of water.

Young Men Perceive Risk Differently from Other Populations

It is well established in the literature that perceptions of risks can drive behavior. It is also clear that strategically designed messages can influence risk perceptions, information seeking about risks, and actual risk behavior. Choosing a message strategy is dependent on a thorough understanding of the ways the target population thinks about the behavior and the risks associated with it. One way to better understand a target population is to narrow that population based on some demographic characteristic that is important for the issue at hand (e.g., males vs. females) and then further understand the behaviors and attitudes of that population. In this case our interest is in young males (18 to 24 years old) because of their known swimming risk. The literature shows two key things: males are generally more likely to take risks than females (Byrnes, Miller, & Schafer, 1999) and young men and women perceive risk differently.

Young men are more likely to overestimate their abilities and underestimate risks when compared to other populations. Moran (2006) found that males aged 15-19 tended to overestimate their swimming ability while also reporting lower perceptions of drowning risk associated with different water safety situations relative to other populations. McCool, Ameratunga, Moran, and Robinson (2009), in a study of New Zealand beachgoers that most closely parallels our interest here, found that males perceived less severity, vulnerability, response efficacy, and concern regarding their risk of drowning while also reporting higher self-efficacy scores compared to females. Findings such as these seem to support the notion that young males do not perceive the water as dangerous as females, but they also believe that their swimming ability is great enough to overcome any potential risks they encounter.

Howland, Hingson, Mangione, Bell, and Bak (1996) proposed that compared to females, males were more likely to overestimate their ability to swim which would make them more likely to place themselves in potentially dangerous swimming conditions. Moran (2006) found similar results that showed that males aged 15-19 rated their swimming ability as greater than that of similar aged females and rated their risk of drowning associated with various swimming activities as lower than that of similar aged females. Gulliver and Begg (2005) found a similar trend in 21-year old males where that demographic reported a higher level of water confidence and higher exposure to risk behaviors when compared to females. In short, it appears from the literature that males are more likely to overestimate their swimming ability and underestimate the potential risks associated with swimming (Goya, Teramoto, Matsui, Shimongata, Doi, & Moran, 2011; McCool et al., 2008) and that sex differences are a key part of understanding swimming risk issues (Howland et al., 1996; Woodward, Beaumont, Russell, Wooler, & Macleod, 2013).

Several things are notable about these findings. First, these findings do not indicate young men think they are *invulnerable* to risks associated with swimming, just *less vulnerable* when their estimates are compared to other populations. It is also important to note young people aren't necessarily any worse at decision-making than adults regarding risks; they just take into account different factors (Reyna & Farley, 2006). For example, Quadrel, Fischhoff, & Davis (1993) showed that adolescents were **not** more optimistically biased (thought bad things were not likely to happen to them) than adults; it's just that what the two groups considered risky differed. It is also important to point out that because young men spend more time in the water, may be more likely to drink alcohol before swimming, and may swim alone more than other groups they may

be objectively putting themselves at risk more often than others. They might also be objectively better swimmers than other groups. Finally, the existing research provides a great deal of information about risk perception specifically and about behaviors, but little information that deals directly with the Great Lakes risks and little about communication preferences and responses. The most comprehensive discussion of this issue to date, is a survey of Michigan beach goer's communication preferences and recommendations for specific communications strategies, the findings of which were released during the data analysis phase of the this project (ERG, 2014). The findings of this study can be used as a complement to the ERG investigation, supported by NOAA, but represent fundamentally different methodologies for understanding communication patterns and needs. The ERG study involved multiple methods including a self-report survey of beachgoers at the beach. Findings from this study reflect a "deep-dive" into how people in a particular demographic category think about and communicate about risks in the Great Lakes. Together, these documents provide a great deal of information that can be useful for crafting a risk communication approach.

Risk Behaviors are a Function of Opportunity and Propensity

Risk taking is a function of opportunity and propensity to take risk when given an opportunity. Efforts to curb risk taking can focus on reducing opportunity or changing propensity (Byrne, 2003). Risk-taking in one behavioral domain does not necessarily result in risk taking in another domain. For example, one might be willing to take extreme risks in the water but not willing to do so in a car. One personality-based driver (or individual-level propensity) that is important when thinking about young males is sensation seeking. The target population for this study tends to be higher on sensation seeking than other populations.

In terms of water safety specifically, there are studies that link surfing specifically with high sensation-seeking scores. Diehm, R., & Armatas, C. (2004) found SSS-V scores of surfers were higher than those of golfers. Morgan et al (2009) study that showed that young males were more likely to be involved in a dangerous water situations because they are more likely to go in the water than other populations (opportunity). In an observation study, Morgan et al found that relative to females, young males spent more time in the water, more likely to use surfing equipment, more likely to be in deeper and more dangerous waters (Morgan et al., 2009). In terms of risk protection, this opportunity means two key things. It means a young man may be a competent swimmer and may have better actual and perceived ability to prevent swimming risks. On the flip side, more time in the water means more opportunity to have bad things happen. Importantly, taking risks can result in positive emotional, social, and personal outcomes. As such, risk taking is not categorically bad but may have positive consequences that promote additional risk-taking (Lapinski et al., 2012).

Risk Decisions are Often Social

Importantly, people don't make behavioral decisions in a vacuum. Along with our psychological drivers, other people, the situation, the environment, etc. have an influence on the decisions people make (Lapinski and Rimal; 2005). Culturally, in communities who have access to lakes and other waterways, bodies of water serve as gathering places making swimming-related decisions inherently social. We could not find any data on social norms and risky behavior for swimming, but there is a mass of research about other types of behaviors that shows how other people influence our behaviors (Mollen, Rimal, and Lapinski; 2012). Importantly, both what we

see other people do (e.g., the number of people in the water on a red flag day) and what we know about what other people think we should do (e.g., my friends think I should jump off the peer) influences our actions. Information about what others are doing, or descriptive norms, can occur by observation (I see people swimming on a red flag day.), by interpersonal communication (My friends tell me they jump off the pier every time they go to the beach.), or through mediated messages (I see a sign that says most people don't swim on red flag days). Information about what others think about my behavior most often (and perhaps most effectively) comes directly from other peoples expressions of approval or disapproval (e.g., my father beams at me when I jump off a pier. Or my grandmother admonishes me for swimming alone.)

Sometimes, merely the presence of another person can change our behavior. In the case of the behaviors of young men, it may be the presence of some who they find attractive or want to impress. For example, a study of young male skate boarders showed that that they were more likely to take risks when an attractive female was filming them than when a male experimenter was filming them while skating (Ronay & von Hipple, 2010).

For the issue of swimming risk, there are several factors to highlight. First, we suspect that our population rarely goes to the beach alone. Second, there is no reason to suspect peer influences should be different for this behavior than it is for other behavioral decisions so these influences will effect swimming decisions and behaviors.

Unique Aspects of Great Lakes Risk Perception and Communication

Oceans vs. the Great Lakes. Much of the research on risk taking and risk perceptions associated with swimming risks has been done on ocean-related risks. There are several ecological reasons that perceptions of the risks associated with swimming in the Great Lakes might be different than those for oceans or other large bodies of water. The most obvious ecological risk information people have about water safety is wave height and wind speed at the shore. For fairly sophisticated swimmers, the wave period (how closely together they are spaced) is a factor in determining their level of risk. Obviously, the wave height in the Great Lakes is, on average, smaller than is typically seen in oceans. This cue alone may make people believe that swimming in the Great Lakes is less risky than swimming in the ocean and attenuate risk perception. Objectively, there are fewer dangers present in Great Lakes than in oceans, so the risk calculus will be different. That is, I may decide not to go in the ocean because I consider the wave height, the presence of rip currents, the number of sharks, the potential for sea urchins, etc. In the Great Lakes there are fewer of these risks (perceived and actual). Water and air temperature are also a factor in swimming decisions. Also, hypothermia remains a risk for both swimmers and boaters. Thus, the Great Lakes are often prohibitively cold for swimming and as such it is likely more common to go to the beach and not swim than in other warmer bodies of water.

Some Existing (Risk) Communication Strategies in the Great Lakes. Much of the risk communication associated with swimming in the Great Lakes is not narrowly targeted but designed to reach anyone using the lakes. Existing communication associated with swimming risks includes activities at the beaches, information online available through targeted searches, educational programs at parks for boaters and other groups, and brochures available at some parks. The MDEQ Coastal Management Program conducted an inventory of beach safety communication activities and water rescue equipment available at beaches among the Lake

Michigan coast in Michigan in 2013-2014; communication activities on Lake Superior appear to be less well documented. The most common risk communication strategy along Lake Michigan in the State of Michigan is the three-color (Green, Yellow, Red) flag warning system. Managers at DNR-operated public beaches use this system. There are a variety of styles of flags represented at these public beaches and most are accompanied by a sign legend describing the meaning of each color.   The State of Michigan Designated Beach Policy requires that the flag warning system be maintained and displayed at the entrances to the state parks and every 150 yards along the shoreline during the swimming season. The color flag warning system targets beachgoers who are already at the beach or entering a park with information rating risks of currents to swimmers or others who enter the water. There are also signs posted at some of the beaches and entrances about currents and advising people when not to swim and the steps to take if caught in a rip current. The "Break the Grip of the Rip" is the most commonly used sign, developed by NOAA, National Sea Grant USLA and others. In total 64 signs were documented at 13 different beaches (Warner, MDEQ Coastal Management Program; 2013).

The National Weather Service has real-time data on beach conditions for certain beaches in the Great Lakes region, known as the Recreational Beach Forecast. They utilize the three-color flag system as well. There are apps that have been developed to give people real time information, but they have not been widely used for the Great Lakes and if they are, then the information tends to be primarily surf reports and not dangerous conditions. At the beaches there are also emergency call boxes, beach safety kits, lifeguards and others patrolling the area to help reduce risks.

In short, there is extensive beach-based warning information available at beaches along the eastern coast of Lake Michigan. Less is documented regarding the existence of communication activities in the Upper Peninsula coastal areas. Yet, there is concern that the sign and flag recommendations are not being followed and that most focus on one particular kind of risk (e.g., Rip Currents). **Importantly, a number of the existing risk communication activities require information seeking and presume that the intervention point is at the beach. From a risk communication standpoint, understanding when the decision to swim occurs is important for knowing the best point to intervene.** For example, people may have decided whether or not they will swim prior to going to the beach; making beach signage less relevant and opening the door for other possible types of communication activities.

Risk Message Design

Message design for communication campaigns is most effective when it is data-driven, informed by communication theories and human behavior, tailored to the characteristics of the intended audience, tested with the target population, and regularly revised using surveys and other feedback mechanisms. There are a number of different theories that may inform the ways in which messages are designed. One of the most common approaches is to use emotional appeals in messages. Research has studied the ways in which moods and emotional responses can be elicited by messages. Much of this work has focused on fear-based messages, as it is clear from previous research that fear can motivate action. Researchers have also studied a host of positive and negative emotions including warmth, humor, anger, guilt, disgust, etc. A review of prior

messaging associated with dangerous currents indicates a mix of fear-based and knowledge-based messages.

Risk message design provides a framework for helping to understand responses to the draft water safety signs as well as for understanding the psychological underpinnings of how people will respond to the risks associated with dangerous currents. The study of fear appeals as a persuasive tactic to encourage audiences to engage in healthy behaviors has been ongoing for over 55 years (Boster and Mongeau, 1984; Witte and Allen, 2000). In order to help explain inconsistent results on the effects of fear-based messages, Witte (1992a) put forth the Extended Parallel Process Model (EPPM), which integrated earlier perspectives on fear appeals. The EPPM explains and predicts the possible responses people may have to a fear appeal message: non-response, danger control responses, and fear control responses. The EPPM is a message design theory that provides a framework for effective communication of health and risk-related information. The EPPM framework offers predictions about people's behavioral responses to fear appeal messages based on their assessments of two central constructs: threat and efficacy.

Threat. A threat is ''A danger or harm that exists in the environment, whether we know it or not'' (Witte, Cameron, McKeon, and Berkowitz, 1996; p. 320). It is not the actual threat posed, but rather people's perception of the threat, that motivates them to action. Drawing from the literature on the health belief model (Becker, 1974), perceived threat is comprised of two elements: perceived severity, beliefs about the magnitude of the threat (e.g., I think currents in the Great Lakes are really scary.), and perceived susceptibility, beliefs about the likelihood of experiencing the threat (Witte et al., 1996; p. 320; e.g., It is possible that I could get caught in a rip current in the Great Lakes.).

Witte (1992a) proposed message components were exogenous variables to the EPPM that have a direct impact on perceived threat. This means threat perceptions can be increased or decreased through the use of simple messaging. The EPPM maintains that because perceived threat motivates people to action, and messages directly affect threat perceptions, fear appeal messages will incite action to the degree that they successfully convince message recipients that they are susceptible to severe consequences associated with the threat. *What type of action* is motivated by the threat perception is the key to successful fear-based messages. Perceived efficacy plays a critical role in determining whether a subsequent response is adaptive (gets the person out of harm's way) or not.

Efficacy. Drawing from earlier literature in health behavior change, Witte defined efficacy as an element pertaining to ''…the effectiveness, feasibility, and ease with which a recommended response impedes or averts a threat,'' (Witte et al., 1996, p. 320). It is perceived efficacy that has an impact on people's actions, and these perceptions may be directly affected by message components. Perceived self-efficacy refers to ''beliefs about one's ability to perform the recommended response to avert the threat'' (Witte et al., 1996; p. 320). Perceived response efficacy is ''beliefs about the effectiveness of the recommended response in deterring the threat,'' (Witte et al., 1996; p. 320). For example, perceived response efficacy (e.g., "I believe not swimming near structures will make it less likely I will drown." or "Swimming parallel to the shore is the best way to save yourself if you are caught in a rip current.") and perceived self-efficacy (e.g., ''I think I can easily swim parallel to the shore if I am caught in a rip current." Or "I am confident I will stay calm if I am caught in a current.")

Outcomes. Motivation to take action in response to a fear appeal message depends on the degree to which the message increases a receiver's perceptions of a threat; the type of action individuals take depends upon the degree of perceived efficacy to avert the threat. If a threat is perceived, the fear appeal message will be successful in motivating people to engage in the recommended protective behaviors if it successfully increases people's confidence that they are capable of engaging in the recommended behavior, and the this behavior is an effective means of avoiding the threat. The EPPM maintains that upon exposure to a fear appeal, individuals may respond to the threat addressed in one of three different ways:

(i)   Non-response-if a person believes that a threat is not scary or not likely, they will ignore additional information about the threat, will not experience fear, and do nothing about it.

(ii)   Danger control responses-if a person thinks a threat is scary and likely to happen to them, they will figure out whether or not they can do anything about it and if so, be more likely to follow message recommendations about it

(iii)   Fear control responses –if a person thinks a threat is scary but that they can't do anything about it, they will just try to make the emotion go away (make themselves feel better about the threat) by avoiding additional information about the risk

Notice that many of these responses can be information-seeking responses and an extension of the EPPM, the Risk Perception Attitude (RPA) framework addresses the extent to which people fall into 4 categories, based on the combination of perceived risk and perceived efficacy. The basic tenet of the RPA is that the relationship between risk perceptions and health outcomes is moderated by perceived efficacy. Unlike the EPPM, the RPA characterizes risk perception as ''…a property not of the message, but rather of the individual'' (Rimal & Real, 2003; p. 372). Thus, the RPA does not include message components as exogenous elements of the model in the way the EPPM does. Also, ''[the RPA] personalizes risk perception by basing it on individuals' own history and prior behaviors'' (Rimal & Real, 2003; p. 372). The RPA allows for segmentation of audiences to determine how likely they are to seek out additional information about a risk (in order from most likely to least likely).

- **Responsive Attitude: High risk, high efficacy**
    - Most highly motivated to receive and seek information about a risk and to engage in healthy behaviors.
- **Proactive Attitude: Low risk, high efficacy**
    - Somewhat likely to seek out information about a risk; desire to remain risk free
- **Avoidance Attitude: High risk, low efficacy**
    - Low motivation to get more information about a risk; low motivation and knowledge to avoid
- **Indifference Attitude: Low risk, low efficacy**
    - Least motivated to get more information about a risk

In short, this literature suggests that understanding perceptions of risk and efficacy can help us understand two issues:

1) The kind of messages that should be salient to people; and

2) Whether or not people in our target group will be motivated to seek out and process more information about the risk.

Research Questions

This research was undertaken to address several key research question. These questions can be grouped into three types: questions about beliefs and attitudes about risks and risk protective behaviors (RQ1, 4); questions about risk communication and the social aspects of risk decisions (RQ2, 3, 5, 6,7), and questions about specific draft signs (RQ8, 9).

1. What is existing knowledge about the risks associated with swimming? About rip currents in particular?
2. How and when do people make decisions about swimming? What information do they use? What is the role of flags?
3. How do people make decisions about risk protective actions associated with swimming risks? What information do they have?
4. What are attitudes, perceived severity, susceptibility, and efficacy, and emotions associated with swimming hazards? With rip currents?
5. Can participants be classified as primarily part of one of the RPA risk dimensions?
6. With whom do people talk with about swimming risks?
7. Where do they get information about swimming risks? (Both interpersonal and mediated channels) What messages can they recall?
8. How do people perceive the risk and efficacy messages in the proposed signs?
9. Which signs resonate with the sample and why?

Methods

Participants and Procedures

Focus groups (FG) were utilized to provide an in-depth method for investigating issues surrounding swimming-related risk perceptions. Eight focus groups ($N = 55$; typically 6 to 10 participants) were conducted in the state of Michigan during October-May 2013 -14. Participants (Table 1) were recruited through network non-probability sampling in Holland, Marquette, Grand Haven, St. Joseph, and East Lansing (pilot $n=5$; students from Michigan coastal cities $n=5$); two trained moderators conducted focus groups in local community centers.

The sample was comprised of 55 males (18-24 years; $M = 19.43, SD = 1.65$). Most participants (87%) reported high school as their highest level of completed education. Informed consent was obtained from all participants and focus groups were audiotaped for transcription purposes. Focus group participants received an honorarium and food during the group discussion. The Michigan State University Institutional Review Board approved all procedures.

Table 1. Location in which the focus group was conducted

Location of Focus Group

		Frequency	Percent
Valid	Pilot (E. Lans.)	5	9.1
	St. Joseph	4	7.3
	Holland 1	7	12.7
	Holland 2	4	7.3
	Marquette	7	12.7
	All Cities (E. Lans.)	5	9.1
	Grand Haven 1	12	21.8
	Grand Haven 2	11	20.0
	Total	55	100.0

Moderator Guide

The first step in development of the moderator guide was to conduct a systematic review of the literature on existing research on rip currents, how to communicate swimming risks, and risk perceptions of our population. Researchers utilized the information gathered from the relevant research literature and the research questions to inform the development of the moderator guide. They also used several theoretical frameworks as the basis for designing the questions. The moderator guide included an introduction and icebreaker to facilitate and encourage discussion. The moderator guide is presented in Appendix A. The guide and all procedures were pilot tested with an initial focus group. Minor modifications were made to the procedures as a result of the pilot. As such, the pilot data is included in the final analysis reported here.

Analysis Approach

The audiotaped content of the focus groups was transcribed verbatim into typed transcripts. Numbers were assigned in place of participants' names to ensure participant confidentiality. Researchers unitized and coded the transcripts based on operational and contextual definitions contained in a moderator guide. The coding scheme included codes for all the variables of interest. Two coders were trained and given a portion of one focus group to serve as the basis for unitization. The coding was not completed due to problems establishing reliability; thematic analysis was used as the basis for the conclusions presented here. Two independent researchers conducted thematic analysis of the content of the transcripts. These results are presented here along with quotes that were illustrative of the research questions. The researchers also analyzed the brief survey that subjects filled out after participating in the focus groups.

Results

Qualitative and quantitative results are presented. Qualitative results are presented as they related to each of the study research questions. Descriptive results of the questionnaire are also included to provide further information about study participants.

In the quotations described below, each focus group is identified with a unique identifier ranging from 1-8 (e.g., FG#4) and speech by participants (P) and interviewer (I) is identified as such.

The following sections cover participant's knowledge of risks in the Great Lakes and how to get out of currents, swimming decisions and communication about risks, flags and signs as a key risk communication medium, risk perceptions and efficacy, and perceptions of draft signs.

Knowledge of Risks in the Great Lakes

Local knowledge of risks was elicited early in the focus group protocol in order to identify risks most salient to the participants. Thematic analysis indicated a number of common risks associated with swimming in the Great Lakes that focus group participants discussed: those focusing on the *dynamics of the water* (choppy water, big waves, riptides, caught by tide, cold water, undertow, sudden depth changes, "thermal climb"), those that dealt with *objects* in the water (old posts from piers or fishing line) or the interaction of these objects with the water (piers or rocks most commonly), and those that dealt with *behaviors* likely to cause risks (swimming in the dark, swimming on red flag days, drinking alcohol and swimming). For example, one participant said this: "My friend lives on Lake Michigan and every now and then, a bunch of us go out there at night. We have bonfires and stuff. A lot of people will go out and swim in the dark and that always made me… I never did it. It always made me really nervous but the whole time they're out there, I was paranoid because you can't see them. You don't hear them." (FG#1)

Pollution or contamination of the water (radioactivity, e coli, medical waste, and other "pollution") was another category of risk that a number of people raised. Many people mentioned *drowning* without a stated cause as a general risk. A number of groups specifically discussed *other people* as a risk in the Great Lakes; including women known and not known to the men and male friends as one exchange illustrates:

> P: "It is a guy thing. Guys like to show off, too. I mean, I don't know if that's a future question but I mean, I know when you mentioned like our age, 18 to 24, you know, I hear about that like with driving, too. 16 to 24, you have the highest like insurance prices and that's because guys like to show off and I mean, I think that's probably the same reason why maybe our age group is the most like, has the most incidents. Trust me, I don't think it's because we're not like the best swimmers. I think our age group, we're probably actually pretty good swimmers but it's because we probably take the most risks and like to show off. So…

P: It's the hormones

P: It's girls at the beach, that's what it is

P: That's what it is.

I: So girls at the beach are the danger in the Great Lakes

P: In my opinion, yes

P: Distractions

(Group talking together)

P: Watch this, ladies. I'm gonna jump off this pier.

P: Who cares if there's a rock?

P: I got this. " (FG#6)

In short, participants had a fairly thorough and nuanced understanding of possible risks in the Great Lakes including the role of social groups and other people as a key driver of risky behaviors. Some groups identified risks that are not likely to pose much of a danger to people or not likely to be truly risks (e.g., fishing lines and radioactivity). Currents were a risk that was raised spontaneously by participants and then asked about specifically through the moderator guide.

Currents or rip currents were mentioned spontaneously by several participants as a risk; in each of the quotes described below it is challenging to know whether the currents being described are rip currents or some other form of current. For example, when asked about the dangers in and around the Great Lakes, one participant talked about currents associated with a pier where a number of people had drowned:

> "Especially around the pier, there's a lot of like, currents, that people don't know about and so like which is why they don't want you swimming on the inside of the pier especially. But like just a lot of stuff, like people don't know about riptides. Like don't fight the current, like let it take you out before you just like exhaust yourself. But like I don't know. There's a lot of stuff that's like hidden about it that you wouldn't be able to see from just like looking. Like it could be a normal day but the riptides could be really bad and the currents could be bad." (FG#3)

Participants talked specifically about the risks regarding currents at their home beaches, as one participant said about Grand Haven beach and its pier: "It's also well known for injuries, actually. A lot of people jump off of there and if you jump off the wrong part into rocks, it can hurt you pretty quick. Actually, we'll probably talk about that a lot cuz that's probably the biggest area for injuries in Grand Haven. Or rip current, like taking you out. People will jump out there, they'll go out too far and then on a wavy day, it'll just take them right out. " (FG#7)

When asked specifically to define a rip current, most descriptions of rip currents were rambling and technically incomplete relative to Michigan Sea Grant's definition: "Rip currents form when waves break over a sandbar near the shoreline (1), piling up water between breaking waves and the beach (2). They are a narrow but powerful stream of water and sand moving (ripping) swiftly away from shore (3)." But all groups were able to describe something about the characteristics of a rip current. Most groups referred to rip currents as the *"undertow"*. In every group, there were a number of people who said they *did not know* what a rip current was or how to identify one.

When describing a rip current, many people, talked about *characteristics of the water* that help you identify a rip current. For example, "Isn't that the currents that are under water, like, I don't know how to describe it." And "It's like when currents come together and start going out and like people get caught in it," (FG#3). Another person said: "Walking across, I mean, just see the water just flowing through there and if there's wave action, it'll be sort of like lines of breakers, they'll be really choppy and like different, like variations in the waves. Cuz (sic) it's like coming around the islands and especially if there's like more of a blow, like say if it's coming from the northwest, it'll like push along and get bumped up towards shore and just like create a current in there," (FG#5). There was significant discussion in a number of the groups about whether there were *visual* signs of rip currents; many people felt there was no way to visually identify a rip current, but some discussed both accurate and inaccurate signs of rip currents that they believed they could identify from the water.

Often people described rip currents by their *effects*; pulling a person out or under the water; for example: "…how I always understood it is you kinda (sic) lose, you don't have as much control, like it'll pull you under or start pulling you but I always heard it pulled you away from shore so how you got out of it is you swim to the side because this current is so strong, you're not able to swim back into it so back towards shore," (FG#6).

People knew less about other kinds of currents. Indeed, when prompted, very few groups brought up other known currents by name; in one group, one participant discussed the different types of currents at length.

In sum, among our participants, the term "rip currents" "rip tides" and "undertow" appears to have been integrated into common thinking about current-related risks. Participants discussed very few other types of currents and terms (e.g., structural currents, channel currents, dangerous currents, etc.). We did not have any groups who completely and accurately described a rip current, as defined by Michigan Sea Grant. There was tremendous group variability in knowledge currents with several groups expressing very little knowledge of the dynamics of currents.

Escaping Currents

All groups discussed a number of methods for escaping rip currents and provided examples of times they had been taken by a current. They also described how they escaped from a current or how they assisted friends in escaping one. Participants overwhelmingly discussed *swimming sideways* or *parallel* as the best way to escape a rip current or other current-related situation. *Stay calm, don't fight the current,* and *let it take you out* were also raised regularly by

participants. As one participant said: "Like, don't fight the current, like let it take you out before you like exhaust yourself. …There is a lot of stuff that's like hidden about it that you wouldn't be able to see just from looking. Like it could be a normal day but the riptides could be really bad and the currents could be bad," (FG#3). And another said: "I just know it's a current that pulls you out and it pulls straight out so the only way to escape it is to like swim to the sides. And I've heard like Olympic swimmers couldn't, couldn't, wouldn't be able to compensate for the pull," (FG#1).

There were a number of other ways to protect oneself if caught in a current that were mentioned by one or two participants. One person mentioned flipping on one's back and doing a "corkscrew" technique where one's arms spin around in the water; learned from a reality television show, (FG#2). A few other people mentioned floating as a way to avoid the strength of the current. At least one participant recognized that it was necessary to understand the nature of the current in order to identify the best way to get out of it, but no one else discussed this issue.

Participants often told stories about times when they or their friends were in dangerous situations with currents involved and how they were able to take action to pull themselves or someone else out of a current. Importantly, they identified swimming with friends as a protective action; that is, they trusted their friends to recognize they were in trouble and help them. The following exchange is indicative of a typical discussion about rip currents and risk protective actions associated with them. It illustrates recognition of dangers, the use of alcohol while swimming, and talks about beliefs about risk protection. Further it illustrates parents as a key conduit of information about swimming protective actions.

(FG#6):

> P: "I think also (sic) me and my friends this whole last summer, we'd be, we'd be drinking and then we'd go jump off the pier so we'd be pretty hammered, jumping into this water and then that rip current comes… that's pretty dangerous. But I mean, only one time, like one person was drowning and we had to go get him. It was pretty scary but like we were all fine."
>
> I: Were you drinking that time?
>
> P: Yeah.
>
> I: Yeah. Do you guys ever talk about rip currents when you're drinking?
>
> P: Nope, that's usually the last thing on our minds.
>
> P: Definitely
>
> P: I wouldn't say I talk about it. I feel like I've just kind of grown up knowing like to swim to the side and stuff
>
> (Talking together, general consensus)
>
> P4: I agree with that. It's just kinda like living so close, I mean, it's kinda just something… my parents will still like remind me, like if you're going out, it's really

windy or wavy, they're like, oh, be careful but that's all they have to say cuz you know what they're talking about for the most part.

In short, the concept of swimming parallel to the shore is an important risk protective action raised by all groups. It is clear that participants recognize the possibility for exhausting oneself if stuck in a current. The concepts in the "flip, float, follow" behavioral recommendation was raised in pieces by participants but never in its entirety. There were a number of other strategies identified by people and there was some discussion in one group about the fact that currents do not all function in the same way.

Swimming Decisions and Communication about Risks

Participants discussed visits to the beach with their friends, girlfriend, or a team/club and as such, making swimming decisions with these people. *Rarely, participants mentioned going to the beach alone and if they mentioned going with family, it was generally in the past. Going to the beach alone (and swimming alone) was generally talked about as something to be avoided.* However, in the questionnaire data, 65% of participants indicated that they do swim alone on occasion.

A number of participants specifically indicated that decisions to swim or jump off piers were made *collaboratively*, with their friends, swimming as a group or entering water together. As one participant said: "Last time, I went was probably like end of summer right before school started. And we, like my friends, like weekends or weekdays we don't work, we usually just go to the beach and hang out and just chill all day out there. Like swim out to the pier, jump off, swim back, whatever, mess around. I mean, nothing really too exciting but… I don't know. We just like meet all our friends out there and just hang out," (FG#4).

Many participants cited specific examples of cases where they made a decision to swim based on friends' advice or encouragement despite having personal reservations about swimming or jumping off a pier. A participant from one group talked about not wanting to jump off a pier but his friends encouraged him until he finally did: "Two kids kept saying it as fun and stuff and the water wasn't cold once you got into it," (FG#2). Several participants talked explicitly about having gone swimming on red flag days; at least one person did so rather sheepishly. For example, one participant talked about a trip to Grand Haven "Last time I went, it was kind of chilly. I went with two of my high school buddies and two of their girl interests. I was the 5th wheel. But it was a little chilly. It was a red flag day. And we did swim. We were all fine but…we all were kind of like a little scared at first but, I don't know. We didn't go too far in. We got in far enough to ride the waves and have some fun," (FG#1). Addressing the kind of communication they receive regarding swimming risks one participant said this: "There's really nothing (no signs or warnings) wherever we go. There's always that one person (who says): "don't do this" or "dumb idea" about as much as we have for signage," (FG#5).

Many participants reported making the decision to swim (or not) *prior to going to the beach* (for example, deciding with friends to go to jump of pier) and going for that purpose specifically. However, people talked about things that would change their mind about their decision to go swimming: most often, it had to do with the temperature of the water or air. Sometimes it was something to do with water conditions that they determined made swimming unsafe. People

talked about going to the beach to hang out (but not swim) as time to bond with friends even when they knew it was too cold to swim.

When asked specifically about how they learned about swimming risks or risk protective actions, participants described a number of interpersonal and mediated sources of information about swimming risks. Many participants talked about their parents, most often their *mothers*, as a primary source of information about swimming-related risks in general, and about rip currents in particular. A number of participants talked about their knowledge of risks and what to do as something that has been discussed since they were young children. For example, one person talked specifically about how he learned about rip currents from his *family*: "I guess I've just been living near the beach my whole life but like probably from my parents or like my family's like lived here for a while so like my like great aunt has a, her daughter actually drowned when she was 17 and she was like an experienced swimmer and stuff in a rip current, like on the south side of the pier. Like, like just through all of that and like hearing that story, like you learn from it and like there's, there's like been a lot of stories about people drowning and stuff and I feel like you get educated from learning that," (FG#3).

Several groups discussed *boater safety and lifesaving courses* as a key source of risk information (including about how to interpret flags); high school geography classes and YMCA camps were also mentioned. Participants also discussed events, such as college orientation (FG #5) or beach challenge (FG#7) as opportunities that helped them understand swimming risks. For example:

> P: "At orientation, freshman orientation, I remember that, them being really specific about this is what happens. These are how often this happens, like how many people we've lost in the current and all that.
>
> P: Yeah, send out emails like every year as warnings.
>
> P: The dean sends it out, just, I'm sure it's just the office but it's like, hey, a reminder, this is the undertow, this is the current. Like be safe out there, be smart," (FG#5).

Participants reported getting information about currents generally from a variety of mediated sources including entertainment television and the Internet; much of which was *unplanned exposure* rather than information seeking or scanning. Several participants talked about specifically seeking out information on currents online including using Google to learn about the definition of an "undertow" but this was rare. *Entertainment television and local news coverage* was also a source of information raised by a few participants as both a source of information about risks as well as risk protective actions.

Planned information-seeking through the Internet using various apps or websites was the primary mediated source of information about *real time* weather information; but **few reported information seeking online regarding risky conditions**; preferring to find out for themselves what beach conditions were like. Several groups talked about leaving their phones in the car or at home when they go the beach. Those who sought out information typically did so around weather conditions for particular sports (surfing, boating, or kiteboarding): "My friend kiteboards and they just, he'll have, like he'll go online (sic) they usually give out warnings, like how the wind's going to be, how the water's going to be that day just to give a clear idea if it's safe to go out that day, " (FG#5).

Flags

Each participant group spontaneously mentioned warning flags at the beaches as a source of risk information. The extent to which participants perceived flags as a useful source of information varied tremendously. People reported using them as their *primary source of information* about water conditions, *skepticism about their effectiveness*, and discussed both themselves and others *deliberately ignoring them*. There were also people in nearly every group *who did not accurately understand* the flag system (e.g., discussing a white flag or no flag when swimming was safe), *did not know about* it or had *not seen* flags at the beaches where they swim. Also, some reported "figuring them out" over time.

Flag as Primary Source. For some participants, posted flags served as a key source of real time information about water safety. It served as their way of understanding whether or not dangerous currents were likely to be present and the primary visual cue for whether or not to inter the water. For example:

"…other than the flag, I personally cannot tell if there's rip current or not. So that's why I think like indicators and some form of a way to tell people that there is one would be the best way to prevent it because I don't know if it's just me, but I can't tell," (FG#6).

And another person said: "I mean like I, if you're like accustomed to seeing them (flags), like I know when we go to the beach, like we'll check the flag and that's what we like base like if we're gonna swim or what not off of. But I guess for somebody that's not from around here, I mean, the flag doesn't mean much." Participants talked about how if people had come some distance to the beach, they would be more likely to ignore the flags than locals. Others reported using the flags in concert with their own observations of water conditions and other swimmers as the way they made decisions about whether or not to swim, as the following exchange illustrates:

> P: "Yeah, like I mean, we use our, we see the flag but then we still like check the water ourselves. I feel like we know pretty well what's good to swim in and what's not.
>
> P: I think people coming from a distance, who are going, like spending the time to go to the beach and I think flags are gonna make a little less of a difference for them, just because of the effort involved. But they don't wanta be disappointed or let down so they'll go swimming, they'll be a little bit more willing to take that risk, (FG#4).

Skepticism. Many participants reported skepticism that flags are an effective way to communicate risks. For example: "Like I know at Holland State Park, they have like flags, like green flag, like water's fine to swim. Yellow, it's like be cautionary and then red's like probably shouldn't. And then they have like the… I don't know what they are. Poles sticking out, like the swim area kinda thing and I don't know. There are like no swimming signs but I feel that's kind of ironic that they have those out there cuz nobody like follows along so…" (FG#4). A few people indicated skepticism because the flag colors were always the same, but this was isolated to one group.

Deliberately Ignoring. Several groups discussed times when they or their friends had deliberately ignored the flag system and speculated that the presence of a red flag may serve to encourage people to swim in some cases. For example, when asked about the flag system as a

mechanism for warning: "…I think everybody knows drowning could happen. So I think that goes back to like the cockiness thing. Like if it's red and, you know, say I'm some, you know, __ beach for a while and I'm between 18 and 24, I'm male and I've had a few beers or whatever, I don't care if it's red. I'm gonna go in the water. You know what I mean?" (FG#6)

Similarly, when asked about the efficacy of flags, this exchange occurred:

I: "Okay. Great. So do you guys think these flags are effective? Do you think people pay attention to them?

P: I think they work opposite for a lot of people.

I: how's that?

P: A lot of people see a red flag and they're like, oh, yes, there's big waves. And which I mean, it's fun shooting big waves but they're still up there to tell you that it's dangerous and not to swim. But they don't have anything keeping you from doing it so…

I: like they don't warn you or anything?

P: They tell you that it's a red flag but you can still swim," (FG#3).

Signs

Signs were the second most commonly discussed issue when participants were asked about systems used in Michigan to warn people of water safety. Some participants could recall specific sign content. For example: "There's also signs down at the beach that like, there's like, it shows a three step process of like what happens and what happens, how rip currents form and like what's actually happening and then what to do in that case but it's not very big." (FG#7) and "There's the one that shows like what it looks like. I think it's on the back of the sign with the kids on it actually. It might be. But there's one, it's like the same kind of sign, it shows it, a diagram." (FG#7) Signs will be addressed extensively below.

To summarize, the participants reported a significant social dimension to their swimming activities and decision-making. That is, in many cases decisions to swim or not were often prompted by specific interpersonal communication with friends regarding the risks of swimming. In other cases, observation of others enacting the behavior (what is called descriptive norms) or the mere presence of others, were enough to prompt risky decisions; especially when the young man reported uncertainty. Friends also serve a risk protective function for our participants: a number of people discussed the reassurance they felt when friends were there to help them if they got in trouble. Many participants discussed receiving risk protection information as a result of direct communication with family members or a "taken for granted" aspect of living near the beach (i.e., We just "know" what to do if we get caught in a current.). Flags serve an important function for some of our participants and many could mention signs and their content. All groups expressed extensive skepticism and deliberate flouting of flags.

Perceived Risk and Efficacy

Participant generally felt that currents and rip currents in particular are scary and dangerous (what is termed "perceived severity"), but many felt that they were not likely to be a victim of them (called "perceived susceptibility"). The quantitative data were consistent with this with perceived susceptibility items clustering around mid-point. Of the people who talked about currents as very dangerous it was largely because of people that they heard drowned as a result of them or from their own experiences either getting caught in one or helping to rescue someone. For example, "I just remember like I was gonna go out to the beach one day and my parents told me like two kids had died from the rip currents that weekend or something on the lakes so I was… yeah, that's why I'm concerned." (FG#1)

When asked whether rip currents are dangerous, one participant said:

> P: "Extremely
>
> I: Extremely? Why?
>
> P: Because they can kill people. And most people can't see where they are, so you don't, you don't even notice, like T. (name removed) said, you don't notice when you're in one and so it'll just deceive you until you can't swim." (FG#3)

Another person said: "Pretty dangerous. I mean, you hear of people getting sucked under by these undertows at least like once or twice a year. And I mean, they're nothing to play around with. You can't swim through that. And if you don't know about it, then it's tough." (FG#6)

Many participants indicated they thought it was not likely that they or people "like them" would be caught in a current. "I've grown up around here so once again, I think that… we're not the greatest majority of people that would get hurt out here," (FG #7). Another person said: "Yeah, it's kinda, and if I saw that like say at Dead River at that rope swing, like hey, be careful. Like this is what's gonna happen. I'd just be like I've been here 1000 times before. It's not gonna happen to me kinda thing," (FG#5). The quantitative data also indicated that our participants exhibited fairly low perceived susceptibility with mean scores at or below the scale mid-point on the items designed to measure this construct.

Table 2. Scaled perceived risk, efficacy, and sensation-seeking means and standard deviations. Response efficacy items are single items that could not be summed.

	Mean	Std. Deviation
Perceived Susceptibility (2 items; α=.62)	3.9259	1.49024
Perceived Self-Efficacy (4 items; α=.87)	4.6296	1.37424
Swimming Alone Response Efficacy	5.26	1.320
Structure Response Efficacy	4.61	1.406
Flag Response Efficacy	6.00	1.116
Sensation Seeking (8 items; α=.77)	5.2176	1.00886

Self-efficacy in this case is the degree to which people feel they can protect themselves from drowning. Most people indicated a strong sense that if they were caught in a current they would be able to take steps to successfully perform a self-rescue. Self-efficacy was above the mid-point with post people indicating they felt they would be able to take steps to get themselves out of a current. Another person indicated that they felt prepared to deal with a current if they were caught in one. "I was (sic) gonna say, I think if you're like well-educated on it and you're careful and use common sense, then it's not as dangerous as to someone who has no idea and just goes in the water blind. (FG #6) The quantitative data were consistent with this, with self-efficacy scores above the midpoint on the 7-point scale (*M*=4.62, *SD* =1.37). Another person said the following: "Cuz that's something that since we live here, it's something important to know and a lot of classes, like personally I'm a lifeguard so that's something I learned in that class, but then even if you're not a lifeguard, I know a lot of people around here have taken safety courses of some sort and that helps you with that. But that also one important thing is when you're out in the water, it's harder to see the waves converging together," (FG#7).

Response efficacy is the extent to which people believed that possible responses to currents (e.g., swimming parallel, not panicking, etc.) would be effective at protecting one from drowning. Quantitative data indicated that response efficacy was also above the midpoint on the 7-point scale across for each of the 3 items.

Table 3. Item means and standard deviations for individual items, 1=Strongly Disagree to 7=Strongly Agree response scale.

Item Mean and Standard Deviation

	Mean	Std. Deviation
I think I can avoid dangerous currents in the Great Lakes.	4.78	1.819
I think staying safe in the water is easy.	4.41	1.434
I am confident that I can avoid dangerous currents in the Great Lakes.	4.70	1.550
I am able to avoid dangerous currents in the Great Lakes.	4.63	1.640
Following the instructions of signs posted on the beach would keep me safe.	5.26	1.320
Not swimming near piers or other structures would help me avoid dangerous currents.	4.61	1.406
Knowing what the various colors of flags on the beach mean will help me stay safe.	6.00	1.116
It is likely that I will get harmed if I swim near piers or other structures.	3.72	1.816
I am at risk for getting seriously injured or killed if I swim alone.	4.13	1.672
It is possible that I will drown if I ignore warning signs on the beach.	4.94	1.406

Perceptions of Signs

The focus groups also provided feedback regarding potential signs that could be posted on beaches warning people about the risks associated with swimming in the Great Lakes. Three signs were provided by Michigan Sea Grant to be evaluated by the target demographic (see figures 1-3). The first two signs were similar in that they have the same text warnings, but the second sign has an additional diagram on top describing what to do if caught in a structural current. The third sign is different and provides a description the flag system utilized on some Michigan beaches with additional risk information.

In the focus groups, researchers wanted to ascertain what messages resonate with 18-24 year old males who swim in the Great Lakes. Each sign was presented to the focus groups individually and the participants were asked about what they noticed initially on the signs and the extent to which the signs portrayed severity, susceptibility, response efficacy, and self-efficacy. After that, all three signs were compared to determine which sign's instructions the target demographic felt they would be most likely to follow.

Sign 1 (Figure 1)
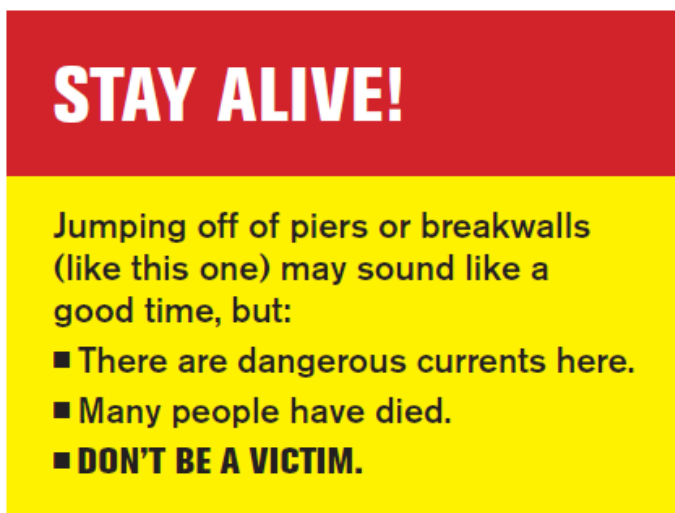
Summary of the participants' perceptions for Sign 1: It gets attention, make people feel risk is scary, doesn't make them feel like it will happen to them or that they can do anything about it; there is no recommended behavioral response (doesn't say what to do). It is a classic fear appeal but is missing these key things.

Across most of the focus groups, the first thing that stood out regarding Sign 1 was the "STAY ALIVE!" text. In fact, every focus group conducted stated that the "STAY ALIVE!" text was the first or second thing mentioned as standing out in Sign 1. A few participants in the focus groups mentioned the colors as also standing out to them on Sign 1. One participant said: "Like the sign, to grab someone's attention, red and white, right away, I think of stop sign so it's like, oh, gotta pay attention to that". (FG#5) Across most of the focus groups, the participants seemed to think that Sign 1 would get their attention. However, there were a number of people who

raised the possibility that no sign would be efficacious for them, in reaction to Sign 1, one participant said: "Four guys, let's go jump off the pier. Are they gonna stop and look at that? No, they're talking about girls, video games, what they're gonna do, who's gonna jump furthest. They're not gonna stop and look at that," (FG#8).

When determining if Sign 1 would convince people that there was a danger or that there was a way to avoid the danger, several other factors had to be determined. Many of the participants did respond that this sign makes them feel like there are scary risks associated with swimming where the sign is posted. A participant specifically stated that the first thing that stands out about Sign 1 is "How scary it is. It's just scaring me," (FG#8). Many participants indicated that the sign did not make them feel susceptible to the risks put forth in the sign. One participant mentioned that while Sign 1 may indicate a frightening risk to some, people his age would not be as susceptible to the risk. "Middle age people, yeah. Like maybe kids, [but] like high schoolers, college kids are gonna [sic] go out and be like I can do it. I'm strong. You know," (FG#1). This sentiment was repeated by a participant who stated, "This demographic, I think, has a lot of, has a bit of an invincibility complex so staying alive doesn't sound that hard." (FG#4) "I feel like it's gonna [sic] be oh, that won't be me though. That's what the sign is gonna [sic] be. It's just like okay, yeah, these are the dangers but that won't happen to me". Feedback from these focus groups seems to indicate that Sign 1 would not be adequate to elicit a sense of risk from the target demographic because they might not feel like they are susceptible to the risks portrayed in the sign.

As far as the efficacy factors for Sign 1, the participants generally did not perceive the sign as suggesting a specific behavioral response. A participant mentioned that, "I mean, it doesn't really make any recommendations if you're caught. Just don't die and be a victim," (FG#2). This view was repeated by a participant that mentioned that other than the recommendation to not jump off piers, "I don't really see much other than that,"(FG#4). It was a common theme with Sign 1 that the participants did not see many specific responses suggested past simply staying alive. With a lack of specific responses suggested, it was difficult to determine if the target demographic felt they had the ability to perform the desired response (self-efficacy). When asked if they could perform the behaviors indicated on the sign, two participants mentioned, "If they explained how" and "Yeah, I was gonna [sic] say, it doesn't inform you anymore than you already know going into it," (FG#6).

Sign 2 (Figure 2)

STAY ALIVE!

Call for help and have someone throw life ring if available.

Try to make way to ladder on breakwall.

STRUCTURAL CURRENT

Jumping off of piers or breakwalls (like this one) may sound like a good time, but:
- There are dangerous currents here.
- Many people have died.
- **DON'T BE A VICTIM.**

Summary of participant perceptions of Sign 2: They generally like the picture but were confused by it, mixed perceptions about severity and susceptibility. Indicated it makes them think there is clearly something they can do by giving a plan and recommended response. Also a classic fear appeal, but this one builds efficacy better than first.

As mentioned, Sign 2 has the same text as Sign 1, but it has an additional diagram on top showing a structural current. Across all of the focus groups, the thing that stood out the most about Sign 2 to the target demographic was the inclusion of the diagram (picture). One participant said: "Yeah, the picture. Everybody likes looking at pictures." (FG#2) Another participant mentioned, "Yeah, at first glance, I just see the picture"(FG#4). It might be noted that the diagram standing out could be a result of it being the only thing changed between Sign 1 and Sign 2. However, several participants did mention that they preferred signs with pictures or diagrams as opposed to reading text. In several of the groups, people reported being confused by the picture and mentioned that they thought the sign was "boring".

The participants were mixed in their perceptions of whether Sign 2 really conveyed the severity of the risks associated with swimming where the sign is posted. One participant said: "Yeah, it looks very unsafe," (FG#5). Another mentioned that "It helps people be more aware that it's more dangerous,"(FG#7). Interestingly, the inclusion of the diagram in Sign 2 did make some participants view themselves as more susceptible to the risks associated with swimming. He stated "A little bit more of a connection to imagine yourself, if I was out there, what would I be... Yeah, because there's actually like a person out in it, like in the picture,"(FG#3). A participant echoed this sentiment about Sign 2 by stating: "I think it does a better job of like actually saying this could happen to you instead of like the other one just kinda [sic], yeah, it happens, but not to me, it won't happen to me," (FG#4).

Most participants were able to clearly identify the recommendations stated on Sign 2. Participants indicated that Sign 2 provided more instruction on what to do if caught in a current, when compared to sign one. A participant from Focus Group #2 mentioned "Yeah. It gives more idea of what you should do if you do get caught" and a participant in Focus Group #3 said that, "I think it'd help a lot more than the last sign. It gives you something to do if something happens." Another person from the same group disagreed: "I still don't think it like tells you what to do. It's just kinda [sic] showing like, it just says try to get to the ladder if you can. Or whatever." (FG#3) The inclusion of the diagram had instructions on what to do if caught in a structural current and the participants were able to identify the recommendations that the sign was making. The two most frequent answers were to call for help and to swim towards the breakwall and ladder.

However, even though the participants were able to identify the recommended responses, not everyone agreed that the sign would necessarily be helpful. One participant in Focus Group #3 mentioned that calling for help or swimming towards the wall would be obvious. "...anyone in their right mind would do that anyway if they're drowning. They're gonna [sic] call for help and swim towards something they can grab onto. So I mean, it helps you understand what's happening but I don't think it really educates you that much because naturally, I feel like your mind would do that." However, other participants felt that including the diagram would help prevent people from drowning. A participant from Focus Group #2 said regarding Sign 2, "I think that'd help a lot...Cuz [sic] you'll be more aware and looking for it instead of panicking in some situations. Or people just don't know what to do".

It should also be noted that the participants viewed the text in the green boxes as too small to be effective. Multiple participants noted that the text was too difficult to read. A participant from Focus Group #7 mentioned making the sign bigger in order to "Yeah, because then the green box would be bigger and you'd be able to read it" and a participant from Focus Group #8 mentioned "I would make it bigger" in reference to Sign 2.

Overall, most participants did indicate that they would be able to perform the recommended behaviors presented in Sign 2. One a participant reiterated this: "Yeah. I mean, if I read the sign, I would have a better idea than I did before I read the sign so…" (FG#1) and another said: "Yeah, if I was in that… that exact instance, I could do it", (FG#6). The perceptions of self-efficacy were higher for Sign 2 than Sign 1. This makes logical sense, because Sign 1 did not have explicit recommendations, so participants were not as able to say that they possessed the ability to perform actions that were not listed.
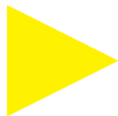
Sign 3 (Figure 3)

STAY SAFE!

There are dangerous currents at this beach.
Use the flags as a guideline for when to swim
and when to stay on the beach. That means:

GREEN = GO
- Always swim with a friend.
- Take a boogie board with you.

YELLOW = WATCH
- Dangerous currents can develop quickly.
- When in doubt, stay on the beach.

RED = STOP
- Dangerous currents are present: stay out of the water.
- Even an Olympic swimmer couldn't win a race with a dangerous current.

Summary of participant perceptions of Sign 3: Colorful flag system caught their attention. Olympic swimmer information was intriguing to many participants and might cue perceptions that drowning could happen to them. Perceptions of the seriousness of the risk was lower compared to other signs. Clear recommended responses: Take a boogie board and swim with a friend were noticed; participants indicated they wouldn't be caught dead with a boogie board. This sign has specific behavioral responses for each flag.

The last sign on which the participants gave feedback on was Sign 3. This sign is different than the first and second sign in that it provides a brief explanation of the colored flag system employed at some Michigan beaches while providing additional risk information. Common responses to what stands out the most about Sign 3 were the three colored flags and the Olympic swimmer fact. As discussed above, the three colored flag system was widely well known. Many participants knew what the flags mean and a participant in Focus Group #1 specifically equated the three flag system to traffic lights by saying, "Just the color system, green means go and yellow's slow down and red's stop. I think that's, because everybody's familiar with the lights, driving and stuff so makes sense". Interestingly, the different colored flags seemed to be an effective warning system because even if the participants did not know specifically what the flags indicated, they were familiar with the green=go, yellow=yield, and red=stop concept from driving.

The other thing that stood out to participants about Sign 3 was the statement that "Even an Olympic swimmer couldn't win a race with a dangerous current". One participant said: "It gives you a better visualization, like somebody who actually like trains like in the water all the time and like is basically built for swimming couldn't outswim it...Don't try it. I'm not Michael

Phelps." (FG#5) Another participant from Focus Group #7 said something similar that "And the whole, even an Olympic swimmer couldn't win a race with a dangerous current, I think that's pretty good cuz [sic] then the people who are like, oh, I'm so bad ass, like I can do it. It's like no, you can't". The Olympic swimmer fact seemed to resonate with the participants possibly because they do have an elevated assessment of their own swimming abilities and this statement is a way of quantifying that they are not proficient enough swimmers to beat a dangerous current. One participant stated: "Cuz [sic] that's kind of like hits your ego. You're like, oh, you see like a safety warning. Like oh, I'm fine, then you see someone who you know is a better swimmer. Like okay, like I would stop and maybe think about it for a second," (FG#3) .

With regard to perceptions of the risk based on this sign, a participant from focus group #5 stated that "I think definitely gives a sense of warning", but a different participant from Focus Group #6 thought that Sign 3 did not make the risks sound as intimidating or bad by claiming "Not as much as the other ones...the last one [Sign 2] made the risks seem worse just cuz it said like, it focused so much on the bad instances. This gives you the green and the yellow and stuff." So, perceived severity was present for Sign 3, but overall, it was not as high as the previous signs. Some participants attributed this to the change from "STAY ALIVE!" in Signs 1 and 2 to "STAY SAFE!" in sign 3. Staying safe does imply that there can be risks, but the risks might not be as frightening as ones on a sign advising to stay alive. This was supported by a participant in Focus Group #3 that stated "The first one [Sign 1] had you more worried than the other two [Signs 2 & 3] because this one [Sign 3] just says stay safe but it says you have a possibility of coming out okay. But this one means that you could get hurt, you should also stay safe but the first one's saying if you don't make, if you don't come out safe, you're possibly dead".

As for the participants' perceived susceptibility to Sign 3, there were mixed responses. After viewing Sign 3, some participants did not perceive they could be a dangerous currents victim. For instance, one participant stated: "you don't necessarily think it's going to happen to you," (FG#7). Others did think that Sign 3 made them perceive that they are susceptible to dangerous currents such as a participant from Focus Group 6 that stated "Yeah. I mean, I'm not an Olympic swimmer" referencing the bullet point from Sign 3. Some participants mentioned that Sign 3 was more of an instructional warning sign telling them about the flag system, so they did not see Sign 3 itself as changing their perceptions of susceptibility. However, the moderator only asked about susceptibility in reference to Sign 3 itself; not Sign 3 plus a red flag. Because Sign 3 was designed to be used in conjunction with a flag system, it would be interesting to see what effects both the sign and a red flag would have on the target demographics' perceptions.

Overall, the participants were easily able to identify the specific responses that Sign 3 recommended. The most common responses were to "swim with a friend" and to "take a boogie board with you". The participants did view the recommended responses from Sign 3 could prevent people from drowning. Although, some of the responses were described as common sense, the participants did think that Sign 3's recommendations would be effective. One participant from Focus Group #6 stated: "I think they're good. I mean things like swim with a friend, you know, take a boogie board with you. That's, a flotation device, you know. When in doubt, stay on the beach. I think the advice it gives you is valid advice. It's good advice". Another participant from Focus Group #4 when asked if the Sign 3's recommended responses could prevent people from drowning responded: "Yeah, definitely, cuz they'll know the way the water is. Having a sense of precaution is always good."

There were mixed responses on whether or not the participants thought that they could perform the behaviors recommended by Sign 3. On one hand, most of the participants already go to the beach with a group of friends, so they are already swimming with a friend. A participant from Focus Group #2 stated "I'm already with friends. If I'm going to the beach, I wouldn't just go by myself". A number of participants said they would not take a boogie board out into the water. There were multiple rationales for not using a boogie board given in Focus Group #2 including "I wouldn't feel like carrying it [boogie board] around", "Probably wouldn't feel like I needed it [boogie board]", and "But it's [boogie board] more for little kids". So, while the participants did think that were *able* to perform the responses that Sign 3 suggests, they were not necessarily *willing* to perform all of them.

Overall Perceptions of the Signs

This finding should be taken with serious caveats due to the possibility of order effects, group pressure, etc. In order to determine which sign the participants would be most likely to follow, all three signs were shown together and the subjects were asked which sign they thought they would be most likely to obey. The majority (~71%) of participants indicated that they would be most likely to follow Sign 3 (flags) sign. Sign 2 (text and diagram) was rated second with approximately 20% of participants saying that they'd be more likely to follow it while Sign 1 (text) was the sign that the least of the participants said they would follow (~9%). It should be noted that the two focus groups with the largest number of participants (FG#7 and FG#8) both unanimously chose Sign 3 with the color warning flags, as the one they would be most likely to follow.

The reason for preferring sign 3 appeared to be fairly consistent between groups. The flag sign was chosen because of the group members' familiarity with the green, yellow, red color scheme both from knowing the flag system and from stoplights. A participant from Focus Group #7 mentioned "Especially cuz [sic] people relate it, like everybody knows those colors. It's like a stoplight and so they're gonna [sic] see it and be like, oh, what does that mean?". While the most common reason for participants choosing Sign 2 was because the inclusion of a picture along with the text. A participant explained why he preferred Sign 2 by stating "my favorite one so far would be the second one, with the picture, because one, it catches people's eye, it's kind of like relatable because it kinda [sic] shows a picture of a pier,"(FG#1).

This point leads to an interesting finding gleaned from these data. Many of the young men in our sample indicated they did not like to read and found that signs with pictures and few words were preferred. This sentiment was repeated throughout the focus groups. A participant from Focus Group #3 put it bluntly by saying that "People would rather look at a picture than read". This was repeated by two different participants in Focus Group #2 that stated "I hate to read so I'm just gonna [sic] look at the picture" and "I hate reading. After I read structural currents, I would stop probably. Especially cuz [sic] I wear glasses and the green part, I couldn't read". Two participants made similar claims by stating "Words are hard" and "We don't read anymore" (FG#5). So, it may possibly not be that the target demographic prefers signs with pictures; it may be that they dislike signs with words. One participant suggested "I almost wonder if it's possible to have a sort of sign that has like no words on it...Just some sort of very minimalistic sign that's just very clear, like this is what you should do". (FG#8) This is important information

to keep in mind when crafting communication materials aimed at communicating risk information to 18-24 year old males.

Another interesting finding that arose in the focus groups was that many participants felt that having warning signs that personalized the risks associated with swimming in the Great Lakes would be more effective than purely informational signs. This was a recurring theme across many of the focus groups. One participant from Focus Group #4 stated: "Maybe if you used personal, I think personal stories are good. Like they do in driver's ed with drunk driving. I think that could be helpful because you hear about people drowning or getting hurt but you don't really hear them talk or their families or anything and you kinda [sic] just assume… it's kinda [sic] just a number. But if you put a face to that, I think it could help". A number of participants were in favor of having the signs include information about people who have actually died on the beach where the sign is posted. A participant from Focus Group #1 echoed this sentiment by stating "Like people need an emotional response to stop doing something...if you did like a statue of someone that passed away at the end of the pier and like included a sign with it, like it would look nice on the pier but at the same time, it would warn people".

Having a "real life" example of a person that died on a warning sign would not be likely to influence the participants' efficacy perceptions, but it might influence their perceptions of severity or susceptibility. This is illustrated by a comment made by a participant in Focus Group #4, "if I saw like a post that would like commemorate the lives of people that were lost or a memorial thing. Like this person drowned this way and like something like that. You would put it more to heart and you'd just feel like the way you look about reading the signs, you'd just be like, I don't wanta be that person or like I don't want… like I wouldn't wish that for anybody, something like that. So you really wanta pass a message of safety, stuff like that". The effect of a memorial type warning sign was brought up in Focus Group #8 as well. One participant commented on the "I'd hate to say this but like everyone's different and all I'd have to see is like a picture of somebody who died to convince me. You know, somebody might've known that person...So the memorial is definitely, works a lot better than this for me because… it hits home the trauma. It gets brought up in my brain more." A number of participants mentioned that having warning signs with actual victims of dangerous currents would make the signs more effective for their target demographic.

Findings and Recommendations

Key Findings

- Participants identified a large number of risks in the Great Lakes. Drowning and currents were foremost among those risks. Piers and other structures were recognized as spots where risk behaviors occur and accidents happen.

- Many participants had first-hand experience with water safety events. "Stay calm", "don't fight the current" and "swim parallel" were the most common behaviors described to help remove oneself from a current.

- Participants discussed social aspects of risk extensively. Several groups discussed "other people" as a risk in the Great Lakes largely because of social pressure that they indicated drove young men to do risky things. People reported rarely going to the beach alone and typically decided when and how to go in the water with other people, usually with friends or a significant other.

- Participants talked openly about risky behavior and swimming. Groups regularly raised the use of alcohol use while pier or cliff jumping and swimming. Many participants reported swimming on red flag days or seeking out red flag conditions as well as diving and jumping off piers. The use of alcohol and intentional risk-taking cannot be ignored in any effort to communicate risks to this group.

- Consistent with other studies of this age group conducted in geographical locations other than the Great Lakes, our sample indicated they believe currents and rip currents in particular are dangerous, but most believe, because of their long history around lakes, that they can "handle" themselves in the water and so didn't perceive that they were susceptible to drowning.

- Analysis of the draft signs indicated several key things, but these effects could be a result of order effects and should be tested more rigorously after being redesigned and rethought based on these findings. First, the participants pointed out that the signs addressed different concepts therefore it was hard to compare them and make choices between them with sign 3 fundamentally different from 1 and 2. All signs are pictured in the report below.

- **Sign 1 Text Only: "Stay Alive!"** Participants perceived it would gain attention and make people feel the risk (of jumping off a pier) is scary, but the sign doesn't make them feel like it will happen to them or that they can do anything about it. There is no recommended behavioral response (doesn't say what to do). This is a classic fear appeal, but is missing key components to motivate action.

- **Sign 2 Text: "Stay Alive!" and Graphic:** Participants generally liked the presence of the graphic showing how to get out of a current, but were confused by it. There were mixed perceptions about whether the sign indicated the risk was scary and likely. People said the sign made them think there was clearly something they can do to protect themselves from drowning if caught in a current by giving a plan and recommended response. Also a classic fear appeal, but this one provided a recommended behavior and seemed to portray efficacy (something I can do and something that works to keep me safe!) better than Sign 1. Promoting efficacy is linked to behavioral response.

- **Sign 3 Flags and Text:** Participants believe that the colorful flag system would catch their attention. Olympic swimmer information was intriguing to many participants and caused them to rethink their susceptibility to the risk of currents and their ability to escape them. Perceptions of danger were lower than other signs. Clear recommended responses: Take a boogie board and swim with a friend were identified; most indicated they wouldn't be caught dead with a boogie board and always swim with others.

- The feedback in the detailed report can be used to revise and redesign the signs. Additional points about signs made by participants:

    o Terms "dangerous currents" seen as vague
    o Small print/too many words a concern
    o Potential for "boomerang" (doing the opposite of sign/flag recommendations) was discussed by participants

Overarching Recommendations

Or study and knowledge of the existing literature lead us to several key points and recommendations regarding risk communication for this population.

1. Risk communication (through signs or flags) cannot be the only strategy employed to reduce risks. Historical examples (like seatbelt use) show that a combination of messaging, policy change, and modifications to the environment can be necessary to influence behaviors. This was clearly recognized by our participants. Patrolling and intervention by lifeguards were raised as key ways to reduce risky behaviors.

2. Changing "knowledge" and raising "awareness" is not typically linked to behavior. That is, people can be aware of a risk (I have heard about rip currents) and be knowledgeable about a risk (I can define a rip current) yet they do not take steps to avoid the risk. In even the most rational models of behavior change, knowledge is a few steps from enacting behavior; further, many behaviors are not rational.

3. Promotion of information seeking (such as "Know Before you Go") might not be an appropriate approach to use with this target audience. Because our population largely thinks rip currents and drowning are scary but think they are not likely to drown because of their swimming skill and knowledge of currents (due to lifetime spent living near lakes) this makes it less likely that they will seek out additional information about risks. Any strategy that involves promoting information seeking

will likely be most effective if the information about risks is embedded in information about weather and surf conditions in apps or other channels already used by participants. Participants themselves highlighted low-tech information channels – signs and intervention by lifeguards as ways to reduce risks, but also contradictory information about their use of these channels.

4. Families and particularly, mothers, play a key role in communication of risk information to boys. Additional recommendations that can be made to parents about appropriate communication of swimming risks and protective behaviors should be considered. All children living near water should be trained to be proficient swimmers. The complexity of currents in the Great Lakes and the complex nature of skills needed to escape has to be considered; our literature review suggests that the "Flip, Float, Follow" concept might be the best message to address the appropriate action for self-rescue although it has drawbacks. Importantly, we heard very little about this concept from our participants and did not formally test the concept, so additional research might uncover its potential for effectiveness in influencing behavior.

5. Swimming while drinking is something that was discussed regularly by participants and cannot be ignored. It may be the case that recommending that parents of kids who live near bodies of water make explicit statements to their children about not drinking and swimming is an appropriate intervention strategy. There might be lessons to draw from literatures where communication between parents and kids on substance use and risk behavior have been considered extensively (sexual activity and HIV prevention for one). Both this issue and #4 above suggest early communication with boys about swimming safety is important.

6. Signs and flags were raised as valuable sources of information about swimming risks. **It is clear from our data that there are many times that our target audience would not use the information from signs to make their decision about whether to swim/jump off structures or not.** It is very clear that there is information about swimming risk that will never be communicated through signs but that sometimes signs can serve as a prompt for communication.

When signs are crafted, the communication literature suggests that if a specific behavioral response is recommended or needed to prevent drowning, that information should be explicitly stated on the sign. The question could be posed in this way: What should people DO or NOT DO to reduce their risk for drowning? It is worth considering whether these are the same/different for different beaches or different areas on the beaches. There is a tradeoff between consistency and tailored messages. Novelty is also a key tool used in message design as a tool for gaining attention.

Study Limitations

The choice of focus groups as a method for examining our research questions was a good one because of the desire for deep information about how young men make decisions about swimming risks. It is important to point out, that like all research methods, focus groups have a number of weaknesses as a tool for understanding human perception and action. In short, this method has clear limitations including the sampling strategy (network sampling which does not yield a probability sample and is therefore not generalizable), the potential for significant differences between groups (a problem to which the researchers were attentive in the sampling and analysis), and groups are challenging to assemble. Indeed, gathering the data for these groups, particularly given the population of interest (18-24 year old men), was difficult.

Because of the need to use a network sample, these findings should not be generalized beyond the study sample. The sample size, however, appears adequate as we reached saturation in the types of information and themes emerging from the groups. That is, researchers began to see similarities across the groups in the issues that were raised. A further limitation is that the analysis of qualitative data can be challenging; we have used multiple analysis strategies here to understand the data primarily thematic analysis, but also coding and quantitative analysis of questionnaire responses from the participants.

Despite these limitations, we feel confident that the study results hold important information for people who are conducting risk communication activities associated with swimming in Lake Michigan and Lake Superior, particularly for young men.

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Appendix A

Focus Group Protocol

    I.   **CONSENT**
    II.   **WELCOME**
    III.   **INTRODUCTIONS**
    IV.   **PURPOSE OF FOCUS GROUP and GROUND RULES**
    V.   **QUESTIONS**

1. What is your favorite beach in Michigan? Why?

    1a. Are there any structures there like breakwalls or piers? Do you dive off those?

2. Think back to your last visit to a beach on the Great Lakes and tell me about that visit; for example, who were the people you went with, did you swim, etc.

    2a. Probe: When did you make the decision whether or not to swim that day?

    2b. Probe: What about other people, can you recall the last time you went to the lake to swim? Please tell us about that.

    2b. Probe: Do any of you remember seeing anything around the beach or when you entered the park that told you about the safety of the water conditions at that beach? What was it and what did it say?

3. What kinds of dangers can you encounter in the Great Lakes?

    Probe: What else?

4. What type of warning system does Michigan use to tell people if it is safe to swim at a beach?

    4a. (probe) Where have you seen or heard about this?

    4b. (probe) Do you think this warning system is effective? Explain.

We now want to ask you a little about currents in the Great Lakes.

5. What is a rip current?

    5a. (probe): What do they look like?

    5b. (probe): Where do they occur?

    5c. (probe): How do you know if there is a rip current in the water?

5d. (probe): Are there other kinds of currents that can pose a risk to people? What are they? Are they the same or different from rip currents?

6. What are you supposed to do when caught in a rip current?

   6a. (probe): Do you remember where you heard that?

   6b. (probe): What about others – what do you know about what you are supposed to do when you're caught in a rip current?

   6c. (probe): Where did you hear this?

   6d. (probe): What is likely to happen if you get caught in a rip current?

7. How dangerous are rip currents in the Great Lakes? Why do you think this?

8. Have any of you ever been caught in a rip current in the Great Lakes and if so, what was the experience like?

9. If you could suggest any way to give people information about currents in the Great Lakes (e.g. signs, text messages, a website, etc.), what would you suggest and why?

Thanks for these interesting suggestions, now we'd like to get your "gut reactions" to some specific signs.

SHOW SIGN #1 (text only)

10. What stands out to you about this sign?

       Probe: How does it make you feel?

11. What does this sign tell you about the risks associated with swimming?

       11a. Do you think this message would make people think that this is a scary/bad risk? Tell me about why you think this.

       11b. Do you think this sign would make people think that drowning could happen to them? Why do you think this?

12. What kinds of responses does this sign recommend?

       12a. Probe: Do you think these responses would prevent people from drowning? Why or why not?

       12b. Probe: Does this sign make you feel like you have the ability do any of these responses? Which one? How so?

SHOW SIGN #2 (text and diagram) HERE

13. What stands out to you about this sign?

   13a. Probe: How does it make you feel?

14. What does this sign tell you about the risks associated with swimming?

14a. Do you think this message would make people think that this is a scary/bad risk? Tell me about why you think this.

14b. Do you think this sign would make people think that drowning could happen to them? Why do you think this?

15. What kinds of responses does this sign recommend?

   15a. Probe: Do you think these responses would prevent people from drowning? Why or why not?

   15b. Probe: Does this sign make you feel like you have the ability do any of these responses? Which one? How so?

SHOW BOTH SIGNS #1 and #2 HERE

16. Which of these signs (text vs. text + diagram) do you think you'd be more likely to follow if you saw it on the beach? Why?

SHOW SIGN #3 (flags) HERE

17. What stands out to you about this sign?

   17a.Probe: How does it make you feel?

18. What does this sign tell you about the risks associated with swimming?

18a. Do you think this message would make people think that this is a scary/bad risk? Tell me about why you think this.

18b. Do you think this sign would make people think that drowning could happen to them? Why do you think this?

19. What kinds of responses does this sign recommend?

   19a. Probe: Do you think these responses would prevent people from drowning? Why or why not?

   19b. Probe: Do these signs make you feel like you have the ability do this response? How so?

PUT UP ALL SIGNS AND ASK THEM TO GO STAND BY THE SIGN THAT YOU WOULD BE MOST LIKELY TO FOLLOW. RECORD THE NUMBER OF PEOPLE WHO GO TO EACH SIGN.

20. Which sign do you think you would be most likely to follow its instructions? Why?

(ASK THEM TO RETURN TO THEIR SEAT)

21. Which of these signs would make you less likely to swim where they are posted? Why?

22. Any last thoughts or opinions you want to share about the dangers of currents in the Great Lakes?

Appendix B

Additional Quotes from Participants

Potential Boomerang Effect of Signs

FG2 "I agree. I mean, I feel like with this one, I'd be more tempted to jump in cuz [sic] it tells me what to do... Cuz [sic] it shows that people die from it but there's a way to get away from it, if you do get caught in it"

FG2" Like I said earlier, I'd be more tempted to do it. The picture told me how to get out...I would pick the one without the picture because if I had a picture and it showed me how to do it, I would do it but if it doesn't tell me what to do, I wouldn't do it."

FG3 "I think they [flags] work opposite for a lot of people...A lot of people see a red flag and they're like, oh, yes, there's big waves. And which I mean, it's fun shooting big waves but they're still up there to tell you that it's dangerous and not to swim. But they don't have anything keeping you from doing it so…"

FG1" I notice like when the red flag days come out, like my girlfriend will boogie board...I think they like, most people just know, like me, I'm not gonna [sic] wan to go in the water when the weather's that bad. Not be enjoyable. But for the people who are really extreme, that specific kind of weather, for the waves or what not, they're going to go."

FG8" I mean, for people our age, like big waves mean more fun...So I mean, a red flag just means like hurry up and get out here". "Go grab like your paddle board or [boogie] board"

Personalization of Signs

FG1 "I think maybe if they had a picture of a real person who died there or just had something happen to them, maybe that would make people stop.

"There are like plaques on piers, like in Muskegon, at least. There's a plaque that like has somebody's name, somebody who jumped off the pier and died, hit a rock and died. So you always see that"

Sign Placement

"I think that'd be like one I'd read if I was gonna read something. I think more times than not, I probably just wouldn't. Like just wouldn't see it. Like when I'm going out on a pier and stuff, typically I'm going with friends and we're joking around, hanging out, talking, kinda just like running out. So I think like even more of like the sign placement, putting it somewhere like I don't know exactly where that would be but whether it's like in a parking lot or on the pier, but like a place where I'm gonna see it, where I'm not gonna be like in the moment, distracted with my friends, like running to jump off." (FG#3)

Vague Dangerous Currents

"I think some parts of it are kind of vague. I mean, just says there's dangerous currents. Like what does that really mean? Some people might question that." (#4)

"Like it says there are dangerous currents here but I wish it would've said like the rip tide or like an undertow, instead of just dangerous currents. And then have it like, the many people have died and don't be a victim, like part of that instead of… cuz when I read that, it says jumping off piers and boardwalk, it makes me skip that there are dangerous currents here. So like I don't really see it and I just see don't be a victim. So I just think of as jumping off piers, I don't, I don't, when I associate it, I don't even think of the undertows or the rip current." (FG#6)

Getting Injured is More Likely than Dying

"I think… people are more afraid, people identify with getting hurt easier than dying."

Sign Placement

"I think also they need to like really position their signs better cuz there's like the way that they have their signs set up, it's right at the entrance and right at the pier. Like we said earlier, only a certain amount of people will come through the entrance. And on like Coast Guard, on the days like there's just multiple thousands of people, they don't have a single sign for anything in like the square where like 90% of the people are. And so like I think they should have signs there, like that you can't move over or else people are gonna just like mess with them. Put a big rock and then put a _ on it. Like on the rocks they have down there. Cuz like most of the people won't even see the signs." (#7)

Holland Discussion about Sign 2

P: I think, sorry, on a sign like this, I mean, one like the guy would be swimming on the wrong side of the pier. You know, when you see the lake current coming in, like that's gonna throw you into something in the pier. So like a sign like that, it could show swim of the other side. Cuz that way, even if you're getting pushed, you're not getting pushed, like into the pier and so, cuz like that's what like kills you or hurts you.

I: What was that?

P: I think it'd still suck you down, even if you're on the other side of the pier.

P: Yeah, but it doesn't. Sucking you down is different than like smashing you against something

P: It doesn't show that it's sucking you out

P: Yeah, but do you see where the waves are?

P: I get it, but that's talking about the current.

P: Yeah, but that, it's the same thing still. Like you know at Holland State Park, how you can't swim on the inside and you can't, technically, you're not allowed to go on the other one. It's because of that.

P: We go on the south pier

P: Yeah, but like you have to get through private property. Like you're not supposed to. You can but

P: If you live on the south side, you can. (talking together)

I: Okay, so this sign could have some more information on it, right?

P: Right.

P: I think it gets it in the head a little bit more though

I: Okay. What, because of?

P: Because like the currents and being caught out there, like with the other one, it didn't really like show, like in the other picture so it didn't really, to me, it didn't feel like it in my mind but…

I: The picture helps you maybe to imagine?

P: Yeah.

P: So it's definitely a step in the right direction. Just not quite there yet with all the information like on the sign

Sign 3

"I think it's fine because you at least see the stay safe, green equals go, yellow equals watch, red equals stop. So you can go by the sign and even see those pretty clearly and so like, oh, well, at least you know that but if you're a certain age or you have time waiting for somebody or something, you might stop and read it and say, oh, I wonder why red equals stop. I wonder why yellow equals watch and green equals go. But it won't work every time. I just feel like it might. If I was walking by this, I would stop to see what green and the yellow and the red and the bullet points beneath it, (FG #6).