

ISSC

VIBRIO VULNIFICUS EDUCATION

On Point

ARTICLE

**A Baseline Survey of
Raw Oyster Consumers
in Four States**

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Contents

Survey in Brief.....Page 1

Survey in Detail.....Page 2

Questionnaire.....Page 18

List of Tables

- Table 1:** Comparison Between Raw Oyster Consumer’s Race And Race By State Population
- Table 2:** Raw Oyster Consumer Ethnicity By Race
- Table 3:** Risk Factor Comparison Raw Oyster Consumers And General Population
- Table 4:** Average Raw Oyster Meals Per Year By State
- Table 5:** Average Raw Oyster Meals Last 12 Months
- Table 6:** Changes In Raw Oyster Consumption In Last Year By State
- Table 7:** Changes In Raw Oyster Consumption In Last Year By Risk Factor
- Table 8:** Raw Oyster Consumption In Last Year By Risk Factor
- Table 9:** Raw Oyster Consumer Knowledge Of Health Risks By State
- Table 10:** Where Consumers Learned Who Should Avoid Eating Raw Oysters
- Table 11:** Where Consumers Learned About Liver Disease Or Diabetes Risks
- Table 12:** Where At-Risk Consumers Learned About Liver Disease Or Diabetes Risks
- Table 13:** Percent Of Raw Oyster Consumers Using Strategy For Reducing Risk Of Infection
- Table 14:** Consumers’ Reasons For Eating Raw Oysters Less Frequently

SURVEY IN BRIEF

In 2002, the Interstate Shellfish Sanitation Conference (ISSC) adopted new National Shellfish Sanitation Program Guidelines for reducing illness from *Vibrio vulnificus*. These standards require states with two or more reported cases of *Vibrio vulnificus* from raw oysters to implement a *Vibrio vulnificus* Risk Management Plan for oysters. Educating raw-oyster consumers is a mandatory element of state plans.

The new National Shellfish Sanitation Program (NSSP) defined two success criteria for consumer information programs:

- 1) Increase raw-oyster consumer awareness of the risks of eating raw shellfish 40 percent above baseline levels; and,
- 2) Increase the proportion of high-risk consumers who stop eating raw oysters 15 percent above baseline levels.

The purpose of this survey is to establish a baseline for consumers' beliefs, consumption patterns and knowledge of risks before states intensify *Vibrio vulnificus* education activities. The ISSC contracted with Clearwater Research Inc. to conduct telephone interviews in California, Florida, Louisiana and Texas. Between September 27, 2001 and February 28, 2002 Clearwater Research completed 1,963 interviews with raw oyster consumers. A follow-up survey will be conducted in 24-months. Changes from baseline levels will reflect state's

progress toward meeting these objectives.

Key Findings

The following results pertain to raw oyster consumers in all four states.

Awareness of Who Should Not Eat Raw Oysters

- **Nearly half (43 percent) of all consumers are unfamiliar with any at-risk group;** 57 percent know of one; 20 percent know of two; and 14 percent know of all three groups.
- **Consumer awareness that people with liver disease are at higher risk of illness is moderate.** Half of raw oyster consumers in all four states are aware that people with liver disease should not eat raw oysters.
- **Consumer awareness that people with diabetes are at higher risk of illness is minimal.** Only 19 percent know that diabetics should not eat raw oysters.
- Consumers with any risk factor are significantly more aware of who should avoid raw oysters than consumers with no known risk factor.

Risk Reduction Measures

- Among at-risk consumers, 37 percent are eating raw oysters less often—primarily for health reasons.
- **42 percent of at-risk consumers are doing “nothing” to reduce their risk of illness.**

- **While those at-risk were more likely to report doing something to reduce their risk of illness, that action was usually an ineffective**

Misconceptions about how to reduce one's risk of *Vibrio vulnificus* infection are widespread.

Conclusions

- Consumer awareness of who should not eat raw oysters is moderate at best. Half of all consumers do not know about liver disease and raw oysters. Very few know that diabetic consumers are at high risk of *Vibrio vulnificus* infection. This limited awareness is particularly worrisome with the accelerating rates of diabetes and liver disease in America.
- Many of those at-risk are already taking some action to avoid illness. These actions, however, are usually ineffective ones. By emphasizing

consumers to adopt more effective behaviors.

- One in three consumers are eating raw oysters less often. There is no statistically significant difference between those at-risk and those with no known risk factors. Programs face the challenge of reducing raw oyster consumption among those at-risk, while maintaining overall consumer demand.
- Key messages should address 1) which groups are at risk; 2) effective actions to prevent illness; 3) popular myths about preventing illness.
- Health care providers such as diabetes care managers; dieticians and nurses offer another avenue for reaching those at-risk. Educational efforts should address a broad range of professionals with direct contact with those at risk.

SURVEY IN DETAIL

Background & Objectives

Controlling *Vibrio vulnificus* reemerged as a focus of national attention in 2002, with the passage of new National Shellfish Sanitation Program (NSSP) guidelines. The NSSP Guide for the Control of Molluscan Shellfish required states with two or more reported cases of *Vibrio vulnificus* to implement a *Vibrio vulnificus* Risk Management Plan for oysters. At a minimum, these plans were required to include four elements:

- 1) Administrative procedures and resources to accomplish a collective *V. vulnificus* illness reduction from the baseline rate of 0.036/million;
- 2) A consumer education program targeting raw oyster consumers and consumers with health conditions that increase their risk of *V. vulnificus* infection;
- 3) A process to collect standardized case information, and;

- 4) A process to track products implicated in *Vibrio vulnificus* illnesses.

Educating raw oyster consumers is a pivotal strategy for states to reach illness reduction goals defined in the Guidelines.

By 12/31/06, states must reduce *Vibrio vulnificus* cases by 40 percent or implement additional, mandatory controls such as increasing post harvest treatment capacity, labeling for shucking by certified dealer, and closing shellfish growing areas. According to the Guidelines, educational efforts should target both raw oyster consumers and high-risk consumers. Consumers considered “high-risk” include those with liver disease, diabetes, or weakened immunity, health conditions that make them highly vulnerable to *Vibrio vulnificus* infection.

The Guidelines specify two objectives for consumer education programs:

- At the end of 24-months:
- Increase consumer awareness of the risks of eating raw oysters 40 percent above baseline levels;
 - Increase the proportion of high-risk consumers who refrain from eating raw oysters for health reasons 15 percent above baseline levels.

The Interstate Shellfish Sanitation Conference (ISSC) undertook this

survey to establish a statistical baseline for raw oyster consumers' beliefs, consumption patterns and knowledge of the risks of consuming

oysters raw. These data represent a starting point, before intensive state educational

activities began. An identical follow-up survey will be conducted in 24 months. The difference between baseline and follow-up results will reflect states' progress toward achieving these consumer education objectives.

Survey statistics are critical for evaluating the impact of health communication programs. Case counts are useful for establishing rates of *Vibrio vulnificus* infection. With an average of 35 illnesses per year, however, cases of illness are very rare events. These numbers are too small to reflect changes resulting from educational programs. Annual case counts can also vary greatly as the result of extraneous factors such as temperature, rainfall, growing area closures, chance, etc. While cases of illness represent final outcomes, surveys can capture information on a broad range of factors (risks, beliefs, behaviors), prior to illness. With these considerations in mind, a before-and-after survey of raw oyster consumers was selected to measure the effectiveness of communication programs in four states.

The ISSC chose a telephone survey format because it is simpler to design and

carry out and less expensive than individual interviews or mail surveys. Telephone surveys also have much higher response rates than written ones. A larger cross-section of respondents tends to be more representative of the respondent group (in this case raw oyster eaters) and is therefore more accurate.

The survey was conducted in the four states required to develop Risk Management Plans for oysters: Florida, Louisiana, Texas and California. The questionnaire elicited new information about raw oyster consumers' attitudes, media exposure and consumption behavior. These data are useful to state programs for understanding target audiences, prioritizing potential audiences, and shaping effective messages. State and national programs will use this information to develop and refine messages targeting consumers and those at risk

Increasing consumer awareness is an important first step toward behavior change. The ultimate purpose of *Vibrio vulnificus* education programs, however, is to convince those at-risk to stop eating raw oysters.

By changing high-risk consumers' habits, education programs can contribute to decreased rates of illness and death from *Vibrio vulnificus* infection.

Throughout the report, the term “consumer” refers to raw oyster

consumers and “oyster” refers to raw oysters. “At-risk” and “high-risk” consumers are defined as persons with one or more known risk factors for *Vibrio vulnificus* infection. “Low-risk” refers to individuals with no known risk factors.

Who Eats Raw Oysters? Consumer Profile

Age: On balance, raw oyster eaters in the four states surveyed are slightly older than the US population. The median age of raw oyster consumers is 40 years, compared to 36 years for the population as a whole. Consumer age differs between states. In California, raw oyster eaters are significantly younger than the median age; while in Florida, they are significantly older.

Race: The survey approaches race and ethnicity separately. Respondents chose from a list of the following races: African American, Asian, White, Native American and Other. Ethnicity is defined as either Hispanic or Non-Hispanic. By separating ethnicity and race, Hispanic ethnicity can be combined with White, Black, Asian, etc. rather than treated as a separate race altogether. Respondents can therefore define themselves as White Hispanic, White Non-Hispanic, Black Hispanic, etc. This is the current standard for defining these demographics.

Raw oyster consumers are predominantly White. In the four states

combined, Caucasians account for three out of every four consumers. Whites are over-represented among raw oyster eaters in individual states and in all states combined. The proportion of White consumers differs from state to state.

African Americans on the other hand, make up a very small proportion of raw oyster eaters (6 percent), far less than in the overall population. In Louisiana for example, African Americans accounted for 10 percent of oyster eaters, but make up 33 percent of the state's population. (See Table 1.)

Asians accounted for another 6 percent of raw oyster consumers. Native Americans make up a surprising 2 percent of raw oyster consumers. This compares with just 0.7 percent representation in the population at large. While interesting, this finding must be cautiously interpreted because the total number of Native Americans surveyed was very small (36 respondents). The remaining 11 percent of consumers gave their race as "Other". A closer look at these respondents revealed that 90% subsequently described their ethnicity as

Hispanic.

Ethnicity: After race, another question inquired about Hispanic background. In ethnic terms, Hispanics comprise nearly a quarter of raw oyster consumers in the four states combined. California had a significantly larger proportion of Hispanic consumers (32 percent) than did any other state. Hispanics also make up 32 percent of the state's population. In Texas, only 21 percent of raw oyster consumers are Hispanic, yet Hispanics comprise 32 percent of the state's population. Table 2 gives the proportion of respondents in each racial group who identified themselves as Hispanic.

Table 1: Comparison between Raw Oyster Consumer's Race And Race by State Population

	CA	FL	LA	TX
White Consumers	65%	86%	85%	81%
% White Population	63%	80%	65%	73%
Black Consumers	5%	6%	10%	8%
% Black Population	7%	16%	33%	12%
Asian/Pacific Island Consumers	10%	1%	1%	2%
Asian/Pacific Island Population	12%	2%	2%	3%
Native American Consumers	3%	2%	2%	1%
Native American Population	2%	1%	1%	1%
Other Consumers	18%	5%	2%	8%
Other Population	19%	4%	1%	7%

Table 2: Raw Oyster Consumer Ethnicity by Race

Race	% Hispanic	% Non-Hispanic	Total
White	13.8	86.2	100%
Black	9.5	90.5	100%
Asian/Pacific Islander	5.7	94.3	100%
Native American	55.3	44.7	100%
Other	88.9	11.1	100%

P<.00001

Gender: In every state, raw oyster consumers were predominantly male, with 60 percent male and 40 percent female. While it is commonly accepted that men eat raw oysters more than women do, these data confirm that the difference is substantial.

High-Risk: Overall, 12.8 percent of raw oyster consumers belonged to one or

more of the three high-risk groups: liver disease, diabetes or weakened immunity. Some 4.3 percent of respondents reported having been diagnosed with **liver disease**. While this is well below the American Liver Association's national estimate of 9 percent, under-reporting is to be expected because liver disease is widely asymptomatic and often undiagnosed until its later stages. Among survey respondents, raw oyster consumers with liver disease were typically White males in their mid-50's. Native Americans and Hispanics were significantly over-represented among those with a liver disease diagnosis.

Some 6.6 percent of raw oyster consumers reported having been diagnosed with **diabetes**. This prevalence is comparable to diabetes rates in the overall US population. The American Diabetes Association estimates a national diabetes prevalence of 6.2 percent. Older survey respondents were more likely to report a diabetes diagnosis. This finding is consistent with national trends. Diabetes usually develops in adults over age 40 and is most common among adults over age 55.

About 4 percent of respondents reported having been told by a health professional that they had **weakened immunity**. National estimates are problematic because this term can be so broadly interpreted. Among raw oyster consumers, the typical immunocompromised respondent was middle aged (45 to 64), White and female.

**Table 3: Risk Factor Comparison
Raw Oyster Consumers & General Population**

Risk Factor	Oyster Consumers	U.S. Population
Liver Dz	4.3%	9%
Diabetes	6.6%	6.2%
Weak Immunity	4%	-

Taking only liver disease and diabetes into account, about 15 percent of the adult population, or about 1 in 7 adults, are at-risk. Including cancer or HIV as types of weak immunity would increase this percentage considerably.

Consumption Patterns

In 1998, the U.S. Food & Drug Administration (FDA) estimates that raw oyster consumers represented 33.6 percent of the population in Louisiana, 16.5 percent in Texas, 11.4 percent in Florida, 11.2 percent in Southern California. This survey found an overall prevalence of 17.5 percent in the four states combined.

Love of oysters appears to be a family affair. In households where raw oysters are eaten, usually more than one (1.6) person ate them. There was a statistically significant difference between states, with Florida and Louisiana averaging more consumers per household.

How Often & How Many: Three-quarters of all respondents had eaten raw oysters in the past 12 months. These respondents reported having eaten raw oysters an average of six times in the past year. High-risk consumers ate raw oysters much more frequently, reporting an average of 10 times.

Because averaging obscures the extremes, a closer look at these responses is informative. While three-quarters of the respondents ate oysters about every other month, 2.1 percent (102 people) ate them at least once a week (≥ 52 times) and 1.7 percent (84 people) ate raw oysters more than once a week (≥ 76 times). One implication is that 4 percent of consumers may be exposed to risk of *Vibrio vulnificus* infection very frequently.

Consumption varies considerably by race and age. While African Americans comprise a small proportion of raw oyster consumers, they reported eating oysters much more often than any other group—11 times on average in the past year. Adults age 65+ followed close behind, eating an average of 10 oyster meals in the last twelve months. Men eat raw oysters significantly more often than women do: seven times compared to five. In geographic terms, consumers in Louisiana and Florida eat raw oysters significantly more often than consumers in California or Texas.

Table 4: Average Raw Oyster Meals Consumed by State

State	Annual Times Eaten
California	5.5
Florida	6.8
Louisiana	8.1
Texas	5.6

Table 5: Average Frequency of Raw Oyster Meals Last 12 Months

Consumer Characteristic	Freq. Eaten Per Year
Known Risk Factor	10
White	6
African American	11
Asian	3
Hispanic	6
<30 years	7
30-44 years	5
45-54 years	6
65+ years	10

Changes in Consumption

Most consumers in the four states have not recently changed their raw oyster eating habits. About half (56 percent) eat about as many raw oysters today as they did a year ago.

This was especially true among older respondents and among consumers in Louisiana. Stable consumption also held true for people with liver disease and those with diabetes. Most people in these two high-risk groups had not recently changed in their raw oyster consumption.

A third of consumers reported eating raw oysters less often than over the past year.

Some 35 percent of both Californians and Texans were eating fewer oysters. Declines were also considerable in Florida where 31 percent of consumers reported eating raw oysters less often.

Among consumer groups, reduced consumption was greatest among African Americans and those with weak immunity.

Some 10 percent of respondents eat raw oysters **more often** now than last year. Younger people (< 30 years old) were much more likely to report eating raw oysters more frequently. Those eating raw oysters more often tended to come from Florida and Texas.

Table 6: Raw Oyster Consumption in Last Year by State

State	Eat More	Eat Less	Eat Same
CA	10%	35%	55%
FL	11%	31%	58%
LA	7%	29%	64%
TX	10%	35%	55%
ALL	10%	34%	56%

Reasons for Eating Less: “Personal health concerns” was the principal reason consumers gave for eating raw oysters less often. Diabetics and those with weakened immunity were also more likely to cite health concerns than other reasons. African Americans were significantly less likely to mention “health concerns” as their reason for eating fewer oysters, as were Asians, Native Americans and Hispanics. Among African Americans and Asians, “availability” was the most common rationale. Hispanics were more likely to mention “cost” and “other” than were non-Hispanics. Note: These findings on race and reasons for eating less should be

cautiously considered because of the small number of respondents.

In three out of the four states, “personal health concerns” was the primary reason for eating raw oysters less often. “Health concerns” was mentioned by 48 percent of Florida consumers who are eating less, compared to 30 percent of California consumers. Californians cited “availability” more often (34 percent) than “health concerns” (30 percent). Women tended to eat less because of “taste” and “health concerns”, while men tended to mention “availability”.

Table 7: Raw Oyster Consumption in Last Year by Risk Factor

Risk	Eat More	Eat Less	Eat Same
Liver Disease	10%	31%	59%
Diabetes	10%	34%	56%
Immunity	8%	44%	48%
At-Risk	8%	37%	55%

Nearly half (48 percent) of at-risk consumers said “health concerns” was the reason for reducing their raw oyster consumption.

Those with liver disease alone, however, were no more likely to mention “health concerns” than consumers with no known risk factors.

Knowledge of Risk

Respondents were asked whether they were aware that eating raw oysters was dangerous for 1) those with liver

disease, 2) persons with diabetes, and, 3) those with weak immunity.

Nearly half of all consumers (43 percent) **did not know** that raw oysters pose a health risk to any at-risk group.

Table 8: Raw Oyster Consumption Last Year by Risk Factor

State	Eat More
Know No Risk Factors	43%
Know 1	23%
Know 2y	20%
Know 3	14%

Half the consumers surveyed know that persons with **liver disease** should not eat raw oysters. Awareness varies considerably by state. It is significantly greater in Florida and Louisiana (62 and 65 percent) where public health programs have been active in *Vibrio vulnificus* education.

Yet in every state, a large proportion of consumers remain **uninformed**. Knowledge is especially low in California where consumers have the lowest awareness of every at-risk group

Table 9: Raw Oyster Consumer Knowledge of Health Risk by State

State	Know About Liver	Know About Diabetes	Know About Immunity
California	40%	13%	25%
Florida	62%	26%	47%
Louisiana	65%	32%	47%
Texas	52%	19%	36%

Conveying information about liver disease risk is critical for two reasons. First, liver disease is a risk factor for severe illness. Liver disease appears more often than any other pre-existing condition in *Vibrio vulnificus* case data collected by the FDA. Second, liver disease is a very common condition. The American Liver Foundation estimates that 9 percent of the nation's adult population is affected. This widespread disease prevalence translates into millions at-risk.

Consumer awareness of risks to persons with **diabetes** is particularly limited. Just 19 percent of consumers know that diabetics should never eat raw oysters. Again, awareness in Louisiana and Florida is somewhat higher than elsewhere, but the vast majority of consumers still know nothing about diabetes and raw oysters. With the incidence of diabetes rapidly increasing, more people enter this at-risk group every year.

Informing diabetics may be

considerably easier for state programs than educating other groups. Diabetes control depends greatly on dietary choices. Diabetes education programs already approach dietary habits as a fundamental part of disease management. Because diet is so crucial to maintaining health, diabetics may be receptive to information about specific food choices. Diabetes management may open new avenues for *Vibrio vulnificus* prevention.

Finally, only a third (34 percent) of raw oyster consumers know about risks to those with **weakened immunity**. Because this category is so broad, educational programs may benefit from focusing on a few, well-defined groups such as the HIV-positive and those in cancer treatment. These groups may also be more reachable than others through health professionals and health care organizations.

Surprisingly, those who had eaten raw oysters in the last year were much more aware of the health risks than those who had eaten oysters over a year ago.

Consumers with any risk factor are far more likely to know about high-risk groups than those with no known risk factor.

African Americans were far less likely to know about risk from liver disease and diabetes than other racial groups. Men were significantly more likely to know about liver disease risk than women. African Americans, Asians and Hispanics were all less likely than Whites to know

about increased risk from weakened immunity, while women were more aware of this risk group.

Almost half (46 percent) of aware consumers had heard about them more than a year ago. In states with greater consumer awareness, respondents had significantly more recent exposure to this information than consumers in states with low awareness.

Californians, for example, not only had the lowest awareness among the four states, but also were also significantly more likely to have heard about the risks over a year ago. Consumers in Louisiana and Florida were both better informed about groups at-risk and more likely to have heard about them in the last six months. Only about a third of respondents (37 percent) had heard about these risks in the last six months. Consumer recall of messages is expected to grow as states increase educational activities.

Concern about Raw Oysters & Health
The majority of raw oyster consumers (54 percent) reported that they are “concerned” about raw oysters and health. Of this group, 11 percent are “very concerned”. African American consumers expressed the highest level of concern, with 19 percent “very concerned”. Hispanics follow closely, with 14 percent “very concerned”. A smaller proportion of Whites and Native Americans (10 percent) were “very concerned”.

Concern was much greater among aware consumers. Of those who knew

about liver disease, 60 percent are “concerned” and 13 percent of these are “very concerned”. Consumers aware of diabetes or immunity risks had very comparable responses.

Consumers with at least one known risk factor are more concerned than other consumers. Among those with liver disease, 20 percent are “very concerned”. This compares to 11 percent of low-risk consumers. Heightened concern is also true for diabetics, with 17 percent “very concerned” versus 11 percent of the low-risk. A large proportion of those at-risk (43 percent) are “not at all concerned”, compared to 46 percent of low-risk consumers. Consumers who learned about risks from their provider are more concerned than other consumers, 67 percent concerned versus 59 percent.

Concern has impacted consumption. Concerned consumers reported eating raw oysters less often in the past year than those who are not. Those who are “not at all concerned” ate oysters 6.5 times per year, compared to 5.7 for “somewhat concerned” and 5.6 for “very concerned”.

Consumer concern also varied by state, with California consumers much less concerned. Florida consumers were much more likely to be “very concerned”. Californians and Louisianans have the largest proportion of consumers who are “not at all concerned”: 50 percent and 48 percent respectively.

Sources of Information

In the four states combined, respondents cited “newspapers” more often than any other media for information on raw oyster risk. Just over half (54 percent) reported reading about these risks in the paper. The next most frequent sources of information were television, posted notices and magazines, each mentioned by just under half of all consumers.

Table 10: Where Consumers Learned Whom Should Avoid Eating Raw Oysters

Newspaper	54%
TV	47%
Posted Notice	44%
Magazine	43%
Doctor	26%
Radio	20%

Consumer rankings of media sources differed by state. Californians mentioned newspapers and “health care provider” more often than consumers other states. Florida consumers were far more likely to report seeing posted notices. A greater proportion of Louisianans reported TV, radio and newspaper sources than did consumers in the other states.

Table 11: Where Consumers Learned About Liver Disease or Diabetes Risks

Media	CA	FL	LA	TX
TV	45%	47%	50%	48%
Radio	21%	21%	23%	16%
Newspaper	43%	60%	63%	59%
Magazine	40%	45%	38%	48%
Doctor	31%	23%	27%	22%
Posted notice	43%	52%	47%	35%

At-risk consumers mentioned similar informational sources, with one important exception-- “health care provider”.

Some 39 percent reported learning about groups at risk from their provider, significantly more than did consumers with no known risk factor (24 percent).

Table 12: Where At-Risk Consumers Learned About Liver Disease or Diabetes Risk

Newspaper	55%
TV	42%
Posted Notice	44%
Magazine	52%
Doctor	39%
Radio	25%

Risk Reduction “Strategies”

When presented with a list of steps to reduce risk of illness from eating raw oysters, consumers selected “nothing” more often than any other response. **Nearly half (42 percent) of at-risk respondents are taking no action to avoid exposure to *Vibrio vulnificus* infection.**

Consumers who are attempting to avoid illness employ a variety of approaches. Unfortunately, most of these methods do little or nothing to reduce the risk of *Vibrio vulnificus* exposure. The following table ranks the most popular strategies.

Table 13: Percent of Raw Oyster Consumers Using Strategy for Reducing Risk of Infection

Strategy	%
Choose vendor carefully	16%
Stop eating/eating less	10%
Only eat “in season”	9%
Avoid oysters from polluted waters & areas with recent outbreaks	7%
Judge by look or smell	6%
Use sauce (Tabasco, lemon)	4%
Cook	3%
Only eat fresh	3%
Drink alcohol	2%

Among all these strategies, only “cooking” and “stop eating” offer consumers complete protection from *Vibrio vulnificus* illness. The other approaches give consumers a false security that the oysters they eat are safe.

Many people mentioned eating oysters “in season” as a way to avoid illness. Others follow the adage about not eating oysters in months without an “R” While many are familiar with this advice, not everyone described it in the same way. Some said they eat oysters only in these months, while others avoid them then, reflecting considerable confusion about “safe” times of year.

Strategies of Persons At-Risk: High-risk consumers were more likely to report doing *something* to reduce risk than were low-risk consumers. Most measures high-risk consumers employed, however, are unreliable *Vibrio vulnificus* risk reduction

measures. These strategies included seasonality, familiarity with vendors and avoiding oysters from areas where illness had recently occurred. The proportion of high-risk consumers who reported reducing their risk by “eating less” was no greater than for low-risk consumers.

Geographic Differences: Risk reduction approaches differed significantly by state, with the exception of the predominant “doing nothing” strategy. Consumers were inclined to do nothing regardless where they lived. The popularity of other approaches varied by state. Californians and Texans were most likely to report “eating less” and “using hot sauce” than consumers in the other two states. Consumers in Florida and Louisiana more often reported “cooking” and eating “in season” to reduce risk.

Implications for Educational Programs

The new NSSP Guidelines include specific disease reduction goals and timelines. Should states fall short of these rates, the Guidelines require implementation of progressively more restrictive *Vibrio vulnificus* control measures. Both the goals and consequences create new urgency for states to implement effective communication programs. Programs that increase awareness are necessary but not sufficient for illness reduction. Only programs that convince high-risk consumers to stop eating raw oysters will reduce rates of illness.

Improving Consumer Knowledge

Improved consumer awareness about

who should not eat raw oysters is the NSSP Guidelines' first consumer information objective, **Increase the proportion of raw oyster consumers' awareness of the risks of eating raw oysters 40 percent above baseline levels.**

Achieving a 40 percent change in consumer awareness presents a challenging goal for state programs. Overall consumer knowledge of who should avoid raw oysters is moderate at best, with 43 percent of consumers unfamiliar with a single at-risk group. To achieve this objective, state programs must decrease the percentage of unaware consumers from 43 to 16 percent. With diabetes, liver disease and immunodeficiency affecting large segments of the US population, millions of consumers belong to groups at-risk. Improved consumer knowledge of risk groups is a critical first step toward illness prevention.

Awareness is highest in Florida and Louisiana where *Vibrio vulnificus* is a longstanding subject of public health and mass media attention. In these states, two-thirds of consumers know about liver disease and almost half know of weakened-immunity risks. In all states, however, the vast majority of consumers remain unaware the risks diabetes poses to raw oyster consumers. As programs in California and Texas become more active, consumer knowledge of all three risk groups is expected to increase.

Changing Behavior of Consumers At-Risk

The NSSP Guidelines' second

objective focuses on changing the behavior of people at-risk.

Increase the proportion of high-risk consumers who refrain from eating raw oysters for health reasons 20 percent above baseline levels.

If human behavior-change follows a continuum beginning with awareness, changes in feelings and attitudes are the next steps toward action. Knowing about risks is not the same as caring about them. A person's emotional response to risk is much more powerful than his intellectual one. All these reasons make "concern" an important barometer of consumer readiness to change. In this case, many of those at-risk are already quite concerned. The majority of at-risk consumers (57 percent) are "concerned" or "very concerned" about raw oysters and health. One in five at-risk consumers is "very concerned", about twice as many as consumers in general.

The relationship between health concerns and raw oyster consumption is striking: half of the at-risk consumers who eat raw oysters less often attributed this change to health concerns. How many are eating raw oysters less often? One in three (33 percent) are. This proportion is no different for consumers at-risk than for those with no known risk factor. Among at-risk consumers, the principal reason for decreased consumption was "health concerns".

Consumers also express concern through risk-reduction behavior. Again, those at-risk act differently than other consumers. Over half of those at-risk are

taking some action that they believe reduces their risk of illness. Most of these actions, however, are ineffective ones. **Often based on popular misconceptions, measures such as knowing the oyster's origin, familiarity with retailers or eating oysters only in-season provide unreliable protection against infection at best.**

Priority Audiences

The NSSP Guidelines specify two audiences for educational programs: raw oyster consumers and at-risk consumers. Decreasing rates of infection depends on reaching and influencing high-risk consumers. These consumers are unique in their vulnerability to severe illness and death. Low-risk consumers are unlikely to become ill, and are therefore a lower-priority audience. With limited resources available for communication efforts, attention to those at-risk is not only cost-effective, but also more likely to produce results.

States should take these considerations into account when considering whether to target health professionals for *Vibrio vulnificus* education. The survey data suggest that providers are an important source of information for those at-risk. Consumers who were informed by their providers were more concerned about raw oysters and health than consumers who learned of these risks from other sources. Health care providers are clearly very influential educators.

Physician influence is difficult to harness, as doctors have very little time

per patient and many other issues to address. State programs may achieve greater success by targeting other health professionals who work with high-risk consumers, such as diabetes and HIV case managers, and dieticians. Time constraints are less severe for these clinicians. They often have a strong educational role, teaching patients how to manage illness. Professional organizations and associations are useful networks for educating these providers.

Message Content

The central message is: “For those with liver disease, diabetes or weak immunity raw oysters can be deadly. Cooked oysters are safe--and delicious.” Informing consumers about groups at-risk is still a critical step.

Consumer-focused messages should emphasize that raw oysters present a risk for people with certain health conditions, not for everyone.

These same messages should appear everywhere--on fact sheets, press kits, articles, etc.

Health programs should take advantage of at-risk consumer's desire to avoid illness, emphasizing truly protective actions. Programs can prevent illness among those at-risk by clarifying such misconceptions as “safe” times of year to eat oysters or choosing restaurants carefully. Illness and death can be prevented only if those at-risk stop eating oysters raw.

Table 14: Raw Oyster Consumers' Reasons For Eating Raw Oysters Less Frequently

Group	Health Concerns	Availability	Taste	Cost	Other
Male	35%	31%	10%	9%	15%
Female	38%	28%	13%	8%	11%
White	37%	29%	13%	8%	12%
African American	32%	33%	6%	2%	28%
Asian	39%	47%	--	12%	--
Native American	40%	53%	--	--	8%
Other	35%	23%	13%	--	16%
Hispanic	34%	25%	13%	10%	17%
Non-Hispanic	37%	32%	11%	8%	11%
California	30%	34%	11%	10%	15%
Florida	48%	24%	11%	9%	8%
Louisiana	40%	28%	7%	8%	14%
Texas	38%	27%	14%	6%	12%
Aware of Liver Disease	45%	30%	7%	9%	8%
Aware of Diabetes	41%	33%	5%	13%	5%
Aware of Weak Immunity	50%	28%	8%	7%	6%
High-Risk	47%	21%	6%	7%	18%
No Known Risk	34%	31%	12%	9%	12%



Questionnaire

Raw Oyster Survey

**(#01-066)
Questionnaire**

IntroQ

Hello, my name is <Your Name> calling from Clearwater Research on behalf of the Interstate Shellfish Sanitation Conference. We are interviewing adults in <STATE> to better understand what they know about oysters and health. Your participation is important to the success of this survey.

This telephone number was chosen at random to be included in the survey.

Just to double check that I've dialed correctly, is this <repeat phone number >?

1. CORRECT NUMBER (**GO TO PRIVRES**)
2. NO ANSWER
3. NORMAL BUSY
4. ANSWERING MACHINE (**LEAVE MESSAGE USE SCRIPT ONE TIME ONLY**)
5. DO NOT WISH TO DIAL THIS NUMBER (**NULL ATTEMPT**)
6. NUMBER IS NOT THE SAME

SHOW ANSWER MACHINE SCRIPT:

Hello, my name is <Your Name> calling from Clearwater Research on behalf of the Interstate Shellfish Sanitation Conference. We are interviewing adults in <STATE> to better understand what they know about oysters and health. This telephone number was chosen at random to be included in the survey. I would like to speak with an adult in your household and will be calling back within a couple of days. Your participation is important to the success of this survey. Thank you.

PrivRes

Is this a private residence?

1. YES, CONTINUE **SKIP TO ADULTS**
 2. NO, NON-RESIDENTIAL
-

NonRes - **Only get this if PrivRes = 2** (Non-Residential)

Thank you very much, but we are only interviewing private residences.

WrongNum - **ONLY GET THIS IF INTROQ = 6** (NUMBER IS NOT THE SAME)

I am sorry, but my computer seems to have miss-dialed. I am going to dial this telephone number by had to verify that I have reached the telephone number in my records. It is possible that I might reach this household again. Please be patient and than you for your time.

PRESS ANY KEY TO CONTINUE TO INTROQ HAND DIAL THIS NUMBER

Adults1 **EVERYONE GETS**

I would like to speak with a person 18 years or older to ask some questions regarding the consumption of raw oysters. May I speak with an adult 18 years or older please?

1. YES, I AM AN ADULT. **SKIP TO ADULTS**
 2. YES, ADULT COMING TO THE PHONE.
 3. NO, PRESS CTRL END AND SCHEDULE A CALL-BACK.
-

NewAdult

Hello, my name is <Your Name> calling from Clearwater Research on behalf of the Interstate Shellfish Sanitation Conference. We are interviewing adults in <STATE> to better understand what they know about oysters and health.

1. PERSON INTERESTED, CONTINUE
2. PERSON NOT INTERESTED, PRESS CTRL END AND SCHEDULE A CALL- BACK.

Adults

Our survey requires that we randomly select one adult to be interviewed who lives in your household. How many members of your household, including yourself, are 18 years of age or older?

__ ENTER THE NUMBER OF ADULTS **IF ANS = 1 SKIP TO ADULTS3b**

Adults3a - **ONLY IF ADULTS > 1**

Of these <NUMBER> adults, approximately how many have eaten raw oysters in the past three years? A raw oyster is any oyster that's uncooked, such as oysters on the half shell or raw oysters from a jar or can.

__ ENTER THE NUMBER OF RAW OYSTER-EATING ADULTS
IF NUMBER = 0 END, IF >1 SKIPTO MEN

Adults3b - **ONLY IF ADULTS = 1**

Have you eaten raw oysters in the past three years?

1. YES **SKIP TO ONEADULT**
 2. NO **SKIP TO CLOSING2**

 7. DON'T KNOW/I DON'T UNDERSTAND
 9. REFUSED
-

Men **ONLY GET IF ADULTS > 1**

How many of these adult oyster eaters are men?

0. None
1. One
2. Two
3. Three
4. Four
5. Five
6. Six
7. Seven
8. Eight
9. Nine

IF ANS = ADULTS3a SKIPTO SELECTED

Women

How many of these adult oyster eaters are women?

0. None
 1. One
 2. Two
 3. Three
 4. Four
 5. Five
 6. Six
 7. Seven
 8. Eight
 9. Nine
-

WrongTot **ONLY GET IF ADULTS>1 AND MEN+WOMEN<>ADULTS**

I'm sorry, something is not right.

Number of Men -

Number of Women -

Number of Adults

1. CORRECT THE NUMBER OF MEN
2. CORRECT THE NUMBER OF WOMEN
3. CORRECT THE NUMBER OF ADULTS

Selected **ONLY GET THIS IF MORE THAN ONE ADULT IN HOUSEHOLD**

The person in your household I need to speak with is the one that eats raw oysters.

Are you the one

1. YES **SKIP TO YOURTHE1**
2. NO **SKIP TO GETNEWAD**

OneAdult **ONLY GET THIS IF ONE ADULT IN HOUSEHOLD**

Are you male or female?

INTERVIEWER: Ask only if you can't determine.

1. RESPONDENT IS A MALE **SKIP TO YOURTHE1**
2. RESPONDENT IS A FEMALE **SKIP TO YOURTHE1**

GetNewAd - **ONLY GET IF SELECTED = 2**

May I speak with him or her?

1. YES, ADULT COMING TO THE PHONE
2. NO, GO TO NEXT SCREEN, PRESS CTRL-END AND SCHEDULE A CALL- BACK

DO NOT USE CTRL-END ON THIS SCREEN

YOURTHE1 - **ONLY GET IF ADULTS3b = 1 (YES) OR IF SELECTED = 1 (YES)**

Then you are the person I need to speak with.

The interview will only take a short time, and all the information obtained in this study will be confidential.

1. PERSON INTERESTED, CONTINUE **SKIP TO FIRST SECTION**
2. GO BACK TO ADULTS QUESTION. WARNING: A NEW RESPONDENT MAY BE SELECTED

NewAdult **ONLY GET THIS IF GETADULT=1**

Hello, my name is <Your Name> calling from Clearwater Research on behalf of the Interstate Shellfish Sanitation Conference. We are interviewing adults in <STATE> to better understand what they know about oysters and health.

Your participation is voluntary, but it is very important because you represent many other people in your community. We will hold your responses in the strictest confidence, and you may decline to answer any question you wish. If you have any questions at any point, please let me know.

This survey will take approximately 4-5 minutes, but may take longer based on your answers. I'll read as quickly as I can.

1. PERSON INTERESTED, CONTINUE
2. PERSON NOT INTERESTED, CLOSING2

Yourthe1 - **ONLY IF ADULTS1 = 1 AND ADULTS2 = 1 OR IF SELECTED = 1 (YES)**

Then you are the person I need to speak with. Your participation is voluntary, but it is very important because you represent many other people in your community. We will hold your responses in the strictest confidence, but you may decline to answer any question you wish. If you have any questions at any point, please let me know.

This survey will take approximately 4-5 minutes, but may take longer based on your answers. I'll read as quickly as I can.

1. PERSON INTERESTED, CONTINUE
 2. PERSON NOT INTERESTED, CLOSING2
-

FIRST Section

The following set of questions asks about your personal consumption of raw oysters.

IF NEW ADULT GET DEFINATION: A raw oyster is any oyster that's uncooked, such as oysters on the half shell or raw oysters from a jar or can.

Let me stress there are no correct answers.

Q005

Have you eaten raw oysters in the past 12 months? A raw oyster is any oyster that's uncooked, such as oysters on the half shell or raw oysters from a jar or can.

1. YES
 2. NO - **SKIP TO Q015**

 7. DON'T KNOW / I DO NOT UNDERSTAND
 9. REFUSED
-

Q010 **GET IF Q005 =1**

How many times have you eaten raw oysters in the past 12 months?

1. _____ TIMES

 7. DON'T KNOW / I DO NOT UNDERSTAND
 9. REFUSED
-

Q015

Compared to a year ago, would you say you eat raw oysters . . .

1. More often than before,
 2. Less often than before, or
 3. About the same

 7. DON'T KNOW / I DO NOT UNDERSTAND
 9. REFUSED
-

Q020 **GET IF Q015=2**

Do you eat raw oysters less often now mainly because of . . .

1. Unpleasant taste or appearance,
2. Cost,
3. Personal health concerns,
4. Availability
5. Or some other reason: _____

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

(RANDOMIZE LIST 1-4 FOR PRESENTATION)

Q025

Which of the following statements best describes your feelings about eating raw oysters and your health?

1. Not at all concerned
2. Somewhat concerned
3. Very concerned

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q030

Have you ever heard or read that people with liver disease can get extremely ill from eating raw oysters? Liver disease includes such diseases as Hepatitis, Cirrhosis and Liver Cancer.

1. YES
2. NO

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q035

Have you ever heard or read that people with diabetes can get extremely ill from eating raw oysters?

1. YES
2. NO

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q036

Have you ever heard or read that people with weakened immune systems can get extremely ill from eating raw oysters? People with weakened immune systems include those with cancer, HIV/AIDS or those receiving treatment for these diseases.

1. YES
2. NO

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q040 GET IF Q030 or Q035 or Q36 = 1

I'm going to read a list of media sources. Please answer yes to any source where you've heard or read that people with liver disease or diabetes should not eat raw oysters.

- Q040.1 Television
- Q040.2 Radio
- Q040.3 Newspaper
- Q040.4 Magazine
- Q040.5 Doctor, Nurse or other health professional
- Q040.6 Posted notice in fish market, raw oyster bar, or restaurant menu

1. Yes
2. No
8. OTHER: _____

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q041 **GET IF q040 = 1**

How long has it been since you heard or read that people with liver disease or diabetes can get extremely ill from eating raw oysters?

INTERVIEWER READ IF NECESSARY

1. 6 months or less
2. 7 months to one year
3. More than a year

7. DON'T KNOW / I DO NOT UNDERSTAND
9. REFUSED

Q042

What steps are you taking, if any, to decrease your health risk when eating raw oysters?

10. AVOID OR EAT FEWER OYSTERS IN THE SUMMER MONTHS.
11. AVOID OR EAT FEWER OYSTERS IN MONTHS WITHOUT AN "R"
12. AVOID OYSTERS FROM POLLUTED WATERS OR FROM PLACES WHERE OUTBREAKS HAVE RECENTLY OCCURRED.
13. CHOOSE RETAIL MARKETS CAREFULLY.
14. CHOOSE RESTAURANTS CAREFULLY.
15. CHECK THE WAY OYSTERS LOOK OR SMELL.
16. BUY ONLY OYSTERS WITH CLOSED SHELL.
17. EAT OYSTERS WITH TOBACCO SAUCE.
18. EAT OYSTERS WHILE DRINKING ALCOHOLIC BEVERAGE.
19. OTHER SPECIFY

77. NOT SURE / DON'T KNOW
99. REFUSED

SECOND Section

Demographics

Now, I'm going to ask a set of general questions about your personal characteristics. When I read each one, please answer to the best of your ability.

Q045

What is your age?

_____ Code age in years

07. DON'T KNOW/NOT SURE
09. REFUSED

Q050 **GET IF Q045 = 999**

I understand this may be a sensitive question. Would you be willing to tell me which of the following best describes your age range?

INTERVIEWER PLEASE READ 1-4 ONLY.

1. Under 30
2. 30 to 44
3. 45 to 64
4. 65 or older

7. DON'T KNOW / NOT SURE
9. REFUSED

Q055

[INTERVIEWER: RECORD GENDER, VERIFY IF NECESSARY]

1. MALE
2. FEMALE

7. DON'T KNOW / NOT SURE
9. REFUSED

Q060

Which racial or ethnic background best describes you?

Would you say: White, Black, Asian, Pacific Islander, American Indian, Alaska Native, or Other?

1. White or Caucasian
2. Black or African-American
4. Asian or Pacific Islander
5. Native American or Aleut (AI-Oot)?
6. OTHER (Specify?)

7. DON'T KNOW / NOT SURE
9. REFUSED

[INTERVIEWER: IF RESPONDENT SAYS 'Hispanic', ASK 'Are you white-Hispanic, black-Hispanic, Asian or Pacific Islander and Hispanic, American Indian or Alaska Native and Hispanic, or other race and Hispanic?']

Q065

[INTERVIEWER: IF RESPONDENT REPLIED 'Hispanic' TO THE PREVIOUS QUESTION, CODE THIS QUESTION "YES" AND CONTINUE]

Are you of Spanish or Hispanic origin?

1. YES
2. NO

7. NOT SURE / DON'T KNOW
9. REFUSED

Q070

Has a doctor ever told you that you have liver disease, such as hepatitis, cirrhosis, or liver cancer?

1. YES
2. NO

7. NOT SURE / DON'T KNOW
9. REFUSED

Q075

Has a doctor ever told you that you have diabetes?

1. YES
2. NO

7. NOT SURE / DON'T KNOW
9. REFUSED

Q080

Has a doctor ever told you that you have a weakened immune system?

1. YES
2. NO

7. NOT SURE / DON'T KNOW

9. REFUSED

CLOSING

Thank you very much for helping us in our study. In closing, the Interstate Shellfish Sanitation Conference urges people with liver disease, diabetes, or weakened immune systems never to eat raw oysters, or only eat oysters that have been thoroughly cooked. If you would like more information, please call 1-800-416-4772 to request a free brochure. Thank you again for your participation. This research project would not be possible without your contribution.

CLOSING2

Thank you very much for your time and consideration, but we are only interviewing people who eat raw oysters.