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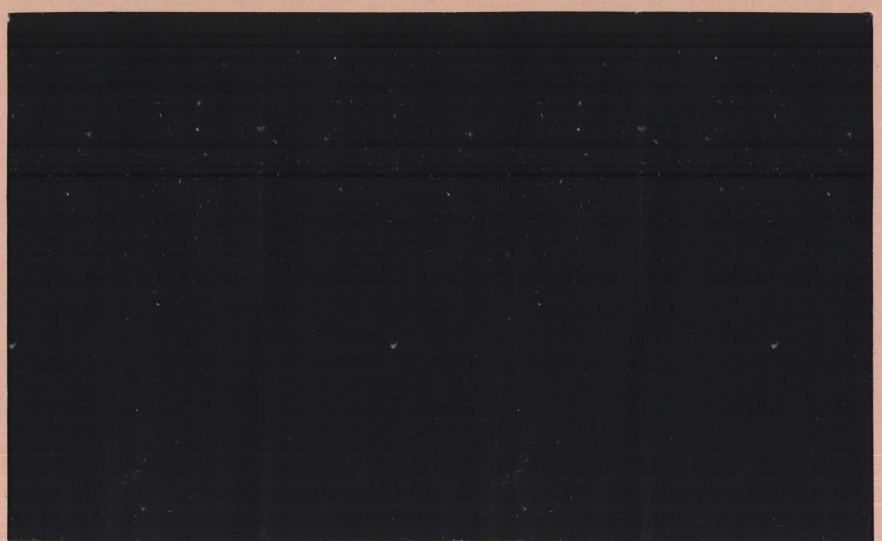
RAW SHELLFISH AND PUBLIC HEALTH: Are There Alternatives to a Cooking Requirement to Reduce Health Risks to an Acceptable Level?



RAW SHELLFISH AND PUBLIC HEALTH: Are There Alternatives to a Cooking Requirement to Reduce Health Risks to an Acceptable Level?

A Report of a Workshop
Organized by the
Coastal Ocean Science and Management Alternatives Program
and the
Living Marine Resources Institute

27 June 1985

Working Paper No. 15

Reference 85-7

Approved for Distribution

J. R. Schubel

INTRODUCTION

At the request of Dr. Lee E. Koppelman, Executive Director of the Long Island Regional Planning Board, a small workshop was convened (1) to discuss the health risks associated with the consumption of raw shellfish taken from New York's waters and (2) to explore ways of reducing this risk to an acceptable level. The workshop was prompted by requests from several baymen's groups to the Suffolk County Hard Clam Advisory Group to identify alternatives to the imposition of a cooking requirement for all shellfish sold in restaurants which the New York State Department of Health has considered recommending. All restaurants are regulated by the Department of Health.

The Suffolk County Hard Clam Advisory Group was established by the Suffolk County Planning Department to assist them in the development of a comprehensive management plan for the County's hard clam fishery. The development of a management plan is the second phase of a two phase project. The first phase consisted of an identification and technical assessment of the full range of management alternatives to rehabilitate and stabilize Suffolk County's hard clam fishery. The results of the first phase are contained in the report entitled "Suffolk County's Hard Clam Industry: An Overview and An Analysis of Management Alternatives."

The workshop was held on 11 June 1985 at the Marine Sciences Research Center. The participants are listed in Appendix A. The workshop was chaired by J. R. Schubel, Director of the Marine Sciences Research Center.

The starting point and the general agenda for the workshop are shown schematically below.

State Department of Health

Goal: To Protect Human Health

Shellfish Industry

Goal: To Protect the Shellfish Industry

CONFLICT

Health Incidents Related
to
Raw Shellfish

Identification and Preliminary Screening of Alternatives to Reduce Risk

1.

2. See Tables 1 and 2

3.

The goal of the New York State Department of Health is to protect the public health. The goal of the shellfish industry is to protect their industry. There have been a number of human disease outbreaks and incidents traced to eating of raw shellfish. To fulfill its goal, the New York State Department of Health is considering recommending that the sale of raw shellfish be prohibited in restaurants. This proposed "ban" is cast in euphemistic terms as a cooking requirement. Most of New York's commercially harvested shellfish are sold raw by restaurants. The industry is convinced that the health of their industry is dependent upon the uninterrupted sale of raw shellfish. Clearly, there is a potential conflict in the pursuit of the goals of the two groups--the New York State Department of Health and New York's shellfish industry. The goal of our Workshop was to attempt to mitigate this conflict by identifying alternatives to a "cooking requirement" which would reduce to an acceptable level the risks--real and perceived--associated with

the consumption of raw shellfish. In this case, the risk must be acceptable to the New York State Department of Health.

We identified a variety of alternatives which might be used in the short-term (from months to perhaps a year) and in the longer-term (years to decades) to significantly reduce health-related risks associated with the consumption of raw shellfish. These are listed in Tables 1 and 2. Our major findings and conclusions are summarized in the section that follows. The data upon which the proposed "cooking requirement" is based are summarized in Appendix B.

MAJOR FINDINGS AND CONCLUSIONS

- Since 1980 the New York State Department of Health has had the most extensive food-borne disease surveillance program in the Nation.

- The New York State Department of Health advocates a more stringent policy concerning the sale of raw shellfish than does any other state.

- There are no data available to compare the risks to human health from consuming raw shellfish harvested in New York with the risks associated with shellfish harvested in other states or countries.

- Problems of shellfish-borne diseases are not new.

- It is the conclusion of the New York State Department of Health that New York State has been implicated more often than any other state as the source of shellfish, or as a possible source of shellfish, in more of New York's health-related outbreaks and more incidents than any other state (Appendix B; NY State Department of Health, 1983).

- If one is going to solve a problem--or manage it--one first must recognize that a problem exists. Next, one must attempt to formulate it in a tractable way.

- New York's shellfish industry has a problem related to the sale of raw shellfish by restaurants. So long as the New York State

Department of Health perceives that there is an unacceptable health risk associated with the consumption of raw shellfish, the shellfish industry has a problem.

- The New York State Department of Health has identified and analyzed the alternatives for reducing health risks associated with consumption of raw shellfish and believes that the best (most appropriate) alternative to protect the public health would be to require that all shellfish served in restaurants be cooked.

- There is not sufficient information on the marketing of shellfish in New York to permit a reliable analysis of the distribution of shellfish among the various kinds of markets (restaurants, fish markets, etc.) and the economic impact of each of these market components. It has been estimated by the Health Department that between 70 and 80% of New York's hard clams are sold to restaurants and that of these 70 to 80% are eaten raw.

- Except in the case of a public health emergency, any action to impose a cooking requirement on clams sold in restaurants would require a lengthy administrative process with extensive opportunity for public and agency comment and review.

- It is the hypothesis of the New York State Department of Health that most of the outbreaks and incidents associated with New York's clams are attributable to illegal harvest from uncertified waters. This hypothesis is consistent with the limited data which exist.

- The extent of poaching (harvesting from closed areas) is a function of the relative abundances of clams in open and closed areas, integrity of the diggers, and the level of enforcement. Cynacism of diggers that clams harvested from closed areas represent a real threat to human health compounds the problem.

- If risk is to be reduced significantly and to an acceptable level, poaching must be virtually eliminated.

- The drastic reduction of poaching will require a marked improvement of enforcement and a change in the beliefs and behavior of some clammers.

- More conservation officers are needed who are assigned full-time to a comprehensive shellfish sanitation enforcement program, and who can not be reassigned without appropriate approvals and replacements.

- Most human-health problems associated with eating raw shellfish in the recent outbreaks in New York State were caused by viruses and not by bacteria. Bacteria, however, can cause gastrointestinal disorders and have been identified as the primary cause of outbreaks linked to eating raw shellfish in the Gulf of Mexico region.

- Coliforms are used as an "indicator" organism for other microorganisms.

- Viruses can and sometimes do occur where there are no pathogenic bacteria, and where legally acceptable numbers of bacteria are present.

- Some states (e.g., Massachusetts) allegedly are considering a standard for viruses in shellfish and shellfishing grounds.

- Viruses and bacteria are not the only health issues associated with shellfish that need to be addressed. The potential of PSP--paralytic shellfish poisoning--in New York's shellfish needs attention, as do the threats to public health from other contaminants such as metals and chlorinated hydrocarbons.

- Prohibiting the importation of out-of-state shellfish would not, in the opinion of the New York State Department of Health, reduce the risk of eating raw shellfish to an acceptable level.

- In the 88 outbreaks since 1982 for which a source could be identified, New York was either one of the states, or the only state, implicated. Rhode Island was implicated in 36 of the 88 outbreaks.

- New York State has been implicated as the source of shellfish, or as a possible source of shellfish, for more health-related outbreaks and for more incidents than any other state.

- Because of the dominance of New York hard clams in restaurant shellfish sales in New York, it is not surprising that New York has been implicated more often than any other state in outbreaks and incidents.

- Standard shellfish depuration techniques have been shown to be effective for bacteria. These techniques are less efficient and less effective for viruses than for bacteria, but significant reductions in viruses in all but the most heavily contaminated shellfish are attainable with existing depuration technology. Testing techniques need to be developed to ensure that the reductions in viruses are sufficient to protect the consumer.

- Depuration operations require constant and careful surveillance to ensure proper operation of the facility and to ensure that clams designated for depuration are indeed depurated and that the entire system from harvest to dupuration to market is not short circuited.

- Depuration process technology could and should be improved. In addition, diagnostic testing methods must be developed to ensure that the technology is working and that the final product is safe for human consumption.

- A better system is needed for tracking shellfish back to the digger and to the source area.

- Greater attention should be directed at developing and implementing diagnostic methods for classifying waters to ensure that shellfish harvested from certified waters are safe for human consumption when raw.

- Based upon our workshop discussion we believe that, if steps are taken promptly, there is time and that there are alternative strategies which could significantly reduce the risk associated with eating clams and other shellfish raw.

- Steps must be taken promptly to put into place a plan to reduce health risks associated with eating raw shellfish. The development and implementation of the plan--if it is to be effective--will require a greater degree of cooperation and coordination than has characterized the shellfish industry--at every step from digger to market--to the present time.

- Decreasing the public health risks--real and perceived--associated with eating raw shellfish is not a trivial task. The complexity of the task should not be underestimated nor should it be dismissed. The hard clam fishery is too important economically and as a life style to be sacrificed without a concerted effort to preserve it.

- The source of most of the problem organisms--viruses and bacteria--is human sewage. With increasing population comes increasing sewage. The most sophisticated sewage tertiary treatment technology available today does not <u>eliminate</u> viruses.

Even with a removal rate of 99%, the numbers of viruses remaining are enormous. Unless development in coastal areas is controlled tightly we should not be surprised to see an increase in the total area of waters uncertified for shellfishing.

TABLE 1

Strategies which could be implemented in the short-term (months to one year) to reduce health-related risks of eating raw shellfish.

Strategy	Comments
1. More effective enforcement to reduce illegal harvesting in uncertified areas.	This would require an increase in the number of dedicated enforcement officers; better boats and equipment; swifter and stiffer judicial action against offenders; and a more coordinated effort. Increased enforcement at the wholesaler/shipper level might be an effective pressure point.
2. More effective mechanisms for tracking shellfish back to individual diggers and to specific source areas.	This might take the form of an expanded and modified "Green-seal" type program. Authority and responsibility should be assigned to a specific agency.
3. Add viral monitoring to coliform monitoring in certified areas.	Available evidence indicates that coliform counts are not always reliable indicators of the presence and abundance of viruses (LIRPB 1978). Most health-related diseases are associated with viruses.

4. Add analyses of animals for viruses as a monitoring technique.	The concentration of viruses in the water is not always a good indicator of the levels of viruses in clams.
5. Reduce clam densities in uncertified areas to discourage poaching.	This practice has to be planned and supervised carefully to ensure that the clams end up at their designated destination. A further precaution needs to be taken. There is evidence that clams from heavily polluted areas may not cleanse themselves of viruses sufficiently for safe consumption even after prolonged periods (weeks or months). Clams from such areas might be used to stock spawner sanctuaries, however, since harvest from sanctuaries is prohibited.
6. Put cautionary labels on menus.	A modification of the strategy used by the tobacco industry. Alerts the consumer to a potential risk. Places the burden on the consumer.
7. Education of baymen and the public.	Enhance the understanding of all concerned of the threats to human health and to the industry associated with the harvest, sale and consumption of contaminated clams.

8. Depuration.	This practice is accepted by the State Department of Environmental Conservation. Despite its problems and short comings it is an alternative. Significant improvements would have to be made through depuration process technology, more careful supervision and development and application of appropriate testing methods to ensure purity of the product.
9. More economic information on the industry is critically needed.	Economic data on the industry and on the contributions that different components--for example, the sale of raw shellfish--make are scarce. In the absence of sound economic data, the importance of the sale of raw shellfish in restaurants and the effectiveness of a ban in reducing risk can not be evaluated unequivocally.

Summary Statement: A properly designed program that included most, or all, of the elements listed in Table 1 could significantly reduce public health risks associated with eating raw shellfish and could restore the public's confidence in the purity of New York's shellfish. All items in Table 1 are not given the same weight. We believe the first two items are most important in terms of their potential contributions to reducing the health-related risks associated with the harvest, sale and consumption of raw shellfish harvested from New York's waters.

TABLE 2

Strategies which could be implemented to reduce health-related risks of eating raw shellfish over the longer-term (years to decades).

Strategy	Comments
1-8 from Table 1	See Table 1
9. Increase standing stocks in certified areas.	If standing stocks of shellfish in certified areas are increased, the incentives to harvest illegally in uncertified areas will be reduced thereby reducing the health risks associated with eating raw shellfish. (See COSMA report.)
10. Halt further environmental degradation and rehabilitate areas where environmental quality is degraded.	Reduction in the total area of uncertified waters with significant shellfish stocks will decrease health-related risks associated with the harvest, sale and consumption of tainted shellfish.
11. Encourage formation of Shellfish Cooperatives	Cooperatives might foster a sense of communal, collective responsibility among diggers. Cooperatives would increase the ability to track clams to their source, and as a result, to assure purity of the product.

12. Improve depuration technology.	An improvement in depuration technology could substantially reduce risk of illness from eating raw clams.
13. Mariculture.	Mariculture improves the ability to track shellfish back to the individuals responsible and to the source areas. Mariculture activities can be restricted to clean waters.
14. Develop marketing standards.	Marketing standards that specify the quality of raw shellfish would increase product marketability and instill consumer confidence in New York shellfish.
15. Develop appropriate diagnostic microbiological--viral and coliform--standards for waters in the harvesting areas and for shellfish meats to reduce health risks to acceptable levels.	
16. Develop and implement national strategies and standards for the harvest, distribution and marketing of shellfish.	Since shellfish are transported in interstate commerce such regulations are required to protect public health.

CONCLUSION

It is the consensus of the members of this workshop that appropriate steps should be taken promptly to reduce the health risk associated with the consumption of raw shellfish. We have identified a number of alternative strategies that could be used in different combinations in the short-term and in the long-term to achieve a reduction in risk.

There is another problem. The New York State Department of Health has not defined what constitutes an acceptable health risk associated with the consumption of raw shellfish. Can risk be quantified in terms of the numbers of outbreaks or incidents of disease that are acceptable per unit time? If the only acceptable risk is zero, none of the strategies identified here would be successful, either individually or in combination. Neither would a cooking requirement.

There are several different sources of risk associated with the sale and consumption of raw shellfish. It is generally believed that poaching and improper storage and handling account for all, or nearly all, of the risk associated with the consumption of raw shellfish. The risk associated with clams harvested illegally from uncertified areas--areas known to be polluted--is a behavioral problem. Poaching is the act of law breakers and appropriate steps should be taken to reduce these illegal acts and the associated risk to as close to zero as is practical.

The risk resulting from contamination of pure clams through improper handling between the time of harvest the time of consumption also is primarily a behavioral problem and appropriate steps should be taken to reduce this risk to as close to zero as is practical. The

presumption is that if these two sources of risk were reduced substantially, close to zero, shellfish could be eaten raw at a level of risk of contracting enteric illness which would be very low and which would be acceptable. It is implicit that when transported, stored and handled properly, shellfish harvested from certified areas are pure and do not present an unacceptable risk of enteric illness if eaten raw. This hypothesis of the purity of shellfish from certified areas should be tested.

We recognize that it will be exceedingly difficult to implement an effective program which incorporates some combination of the strategies we have identified. It will require greater leadership and cooperation by management agencies at all levels than we have observed to date, and it will require of the total community of baymen, shellfish shippers, and purveyors a higher level of commitment to the preservation of their industry than has been characteristic in the past. Still, it may be the only alternative to the imposition of a "cooking requirement" which most of us believe would cripple the industry.

REFERENCES

Coastal Ocean Sciences and Management Alternatives (COSMA). 1985. Suffolk County's Hard Clam Industry: An Overview and An Analysis of Management Alternatives. Marine Sciences Research Center, SUNY Stony Brook, NY 11794-5000.

Long Island Regional Planning Board (LIRPB). 1978. Pages 103-151 in The Long Island Comprehensive Waste Treatment Management Plan, Vol. II: Summary Documentation.

New York State Department of Health. 1983. Clam Associated Enteric Illness in New York State. A Preliminary Report prepared by the Bureau of Communicable Disease Control and the Bureau of Community Sanitation and Food Protection in conjunction with County/District and Regional Health Departments, 10 pages plus 12 appendices.

APPENDIX A

List of Workshop Participants and Affiliations

Robert Cook	Interested Private Citizen
Dewitt Davies	Suffolk County Planning Department
Jack Guzewich	New York State Department of Health
Steven M. Lipson	Nassau County Medical Center
Robert Malouf	Marine Sciences Research Center
Robert Nuzzi	Suffolk County Department of Health Services
James Redman	New York State Department of Environmental Conservation
J. R. Schubel	Marine Sciences Research Center
James Vaughn	Brookhaven National Laboratory
Pieter van Volkenburgh	New York State Department of Environmental Conservation
William Wise	New York Sea Grant Institute

APPENDIX B

TABLE B-1

New York
Shellfish Outbreaks and Cases
1981 - 1985*

	Outbreaks	Cases
1981	1	234
1982	103	1029
1983	33	504
1984	15	256
	152	2023
1985 thru May	10	98
	162	2121

*State of New York Department of Health, Office of Public Health.

TABLE B-2

Source of Illness in New York
Shellfish Outbreaks and Cases, 1981-1985*

	Shellfish		Other Foods		Total	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
1981	1	234	54	918	55	1152
1982	103	1029	44	827	145	1856
1983	33	504	53	1160	86	1664
1984**	15	256	135	2450	150	2606

*State of New York, Department of Health, Office of Public Health

**1984 data are estimates

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TABLE B-3

Known Food Sources of Illness*
New York State 1981-1984

	Number of Outbreaks	Percent
Beef	33	7.5
Chicken	18	4.1
Turkey	11	2.5
Pork	11	2.5
Fish	29	6.6
Shellfish	152	34.7
Potato/Mac Salad	5	1.1
Baked Goods	10	2.3
Rice	7	1.6
Chinese Food	6	1.4
Vegetables	1	0.2
Mushrooms	8	1.8
Dairy	9	2.1
Multiple Foods	6	1.4
Other**	132	30.1
TOTAL	438	99.9

*46 Additional outbreaks had an unknown food.

**1984 values are estimates, most are grouped in "other" category (State of New York, Department of Health, Office of Public Health).

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TABLE B-4

Shellfish Outbreaks and Cases in Restaurants and Private Homes
1981 - 1984*

	Restaurants		Private Homes	
	Outbreaks	Cases	Outbreaks	Cases
1981	1	234		0
1982	26	590	77	439
1983	26	416	7	88
1984	11	212	4	44
	64	1452	88	571
1985 thru March	4	52	1	6
	68	1504	89	577

*State of New York, Department of Health, Office of Public Health

TABLE B-5

Number of Shellfish Outbreaks and Cases and States Implicated*

	New York		Rhode Island		Massachusetts		England		North Carolina		Prince Edward Island		Unknown	
	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases	Out-Breaks	Cases
1981	0	0	0	0	0	0	1	234	0	0	0	0	0	0
1982	69	490	31	625	3	32	0	0	1	5	2	78	6	34
1983	6	140	1	20	7	145	9	157	0	0	0	0	10	42
1984	8	217	3	22	0	0	0	0	0	0	0	0	4	17
1985 thru May	5	40	1	44	0	0	0	0	0	0	0	0	4	14
TOTAL	88	887	36	711	10	177	10	391	1	5	2	78	24	107

*More than one state was implicated in some outbreaks, therefore, some outbreaks are counted more than once.
State of New York, Department of Health, Office of Public Health.