

# Oyster Restaurant Recommendations to EHOs and Restaurant Operators



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RESULTS FROM A RISK-BASED AUDIT OF  
SELECTED RESTAURANTS IN BRITISH  
COLUMBIA SELLING RAW OYSTERS IN  
2016



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## EXECUTIVE SUMMARY

Following the *Vibrio parahaemolyticus* outbreak of 2015, an in-depth audit of restaurants selling oysters for raw consumption was conducted. The purpose of the audit was to (1) investigate how shellfish tags, invoices and forms were being handled in restaurants, (2) investigate additional documentation and methods that may inform illness trace-back investigations, and (3) pilot a prescriptive questionnaire to collect detailed information specifically about restaurants handling shellfish. The intent of the audit was to propose improved methods to restaurants and to health authorities for managing shellfish and shellfish records, and optimizing data collection for illness investigations.

The questionnaire was developed in collaboration with health authorities participating in a provincial *Vibrio* working group. Premises for the audit were selected by each health authority, and invitations sent via e-mail by the environmental health officer (EHO) to the owner or manager of the premises. Interviews were conducted by a food safety specialist and temperature and sanitation checks performed by EHOs.

Twelve audits were conducted between April 13 and July 4, 2016 (five in Vancouver Coastal Health, five in Fraser Health Authority and two in Island Health Authority), with interviews taking on average 96 min (range 80 to 110 mins).

We propose 36 recommendations for improving management of raw oysters in premises, and for investigating shellfish related illnesses. Recommendations are given for both the restaurant premises and for EHOs in three broad areas: (1) ordering and receiving practices, (2) handling, preparation and service, and (3) management of shellfish tags and associated information, as well as collection of information that may inform illness investigations.

Results from the audit suggest that temperature control in premises is very good (92% had coolers at temperatures at or below 4°C) however, monitoring and records for verification of temperature control could be improved. Two recommendations for premises to improve temperature control are to use temperature logs and to purchase an infrared laser thermometer to assess temperature of incoming shipments, delivery trucks and front of house oyster displays. A system for tag storage management is proposed based on the volume of oysters and shellfish received at the premises, where low volume premises (<70 dz oysters/week) store tags monthly, moderate volume premises (70 to 350 dz oysters/week) store tags weekly and high volume premises (>350 dz oysters/week) store tags daily. Premises receiving oysters more than twice weekly should use a shellfish log to record incoming shipments in addition to tag storage.

To improve illness investigations, we propose EHOs routinely collect day of shipment and monthly invoices at the same time that shellfish tags are collected during investigations. This will verify tag shipments and information and reduce visits back to the facility. Asking about till receipts to identify oyster varieties served to customers and standardizing information collected by premises when receiving incoming complaints may also inform investigations.

## Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>BACKGROUND .....</b>	<b>3</b>
Table 1. Gaps and recommendations related to restaurants from the national working group .....	3
<b>METHODS .....</b>	<b>4</b>
Development of questionnaire .....	4
Communication and premises selection.....	4
On-site interview and inspection.....	4
Communication of results .....	4
<b>RESULTS .....</b>	<b>5</b>
Restaurant interviews .....	5
Ordering and receiving practices .....	5
Table 2. Ordering and receiving practices for raw oysters .....	5
Table 3. Oyster sales volume by season .....	6
Recommendations for ordering and receiving practices.....	6
Additional recommendations for temperature control and tracking shipments.....	7
Handling and preparation of raw oysters .....	7
Recommendations for handling and preparation of raw oysters .....	8
Additional recommendations for temperature control, sanitation and food safety plans .....	9
Service of raw oysters.....	9
Recommendations for service of raw oysters.....	10
Shellfish tag management .....	10
Recommendations for shellfish tag management .....	11
Additional recommendations for shellfish tag management .....	13
Customer till receipts and premises system management of orders.....	13
Management of customer complaints and illnesses.....	14
Recommendations for collecting information during illness complaints and investigations..	14
Acknowledgements.....	15
Appendix 1. Questionnaire for restaurant premises selling raw oysters .....	16
Appendix 2. Refrigerated oyster storage and labelling methods.....	17
Appendix 3. Oyster tag storage methods .....	18

Cover photo illustrates a front of house display of oysters from a BC restaurant that is properly iced at top and bottom.

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## BACKGROUND

The largest outbreak of *Vibrio parahaemolyticus* in Canadian history occurred in the summer of 2015. Consumption of raw oysters harvested from British Columbia (BC) waters was identified as the cause of infections in BC and Alberta. In total, 73 cases of *V. parahaemolyticus* were detected in BC, 60 associated with the consumption of raw BC oysters and 13 associated with ocean water contact. Another 24 cases occurred elsewhere in Canada.

Outbreak control measures directly related to restaurants in 2015 included public communications, food safety advisories to restaurant operators, and an order to ban restaurant sales of raw oysters in Vancouver. Control measures for the shellfish industry included a voluntary recall of oysters in the marketplace during the outbreak period, and a subsequent requirement for lot testing of oysters before distribution.

A series of meetings between regulators and industry took place following the outbreak, including the formation of a national *Vibrio* working group. Recommendations arising from those meetings suggested a risk-based audit of restaurants would inform on how current practices could be improved. Gaps in restaurant and retail sectors noted by the national working group for *Vibrio* control identified risk awareness, illness surveillance and trace-back as areas of improvement. Seven of the 70 recommendations issued by the national working group related to restaurant activities are shown in table 1 below.

**Table 1. Gaps and recommendations related to restaurants from the national working group**

Gap description <sup>1</sup>	Recommendation (rec.#) <sup>1</sup>
Temperature control: lack of a standard protocol for temperature monitoring and verification throughout distribution (1.3.1)	Premises accepting oysters for raw consumption should check and record oyster meat temperatures, or delivery truck temperatures on arrival at the premises, and reject shipments exceeding 4°C during distribution or on arrival at restaurant/retail premises (rec.#13).
Risk awareness: restaurants, retailers and other end users are not aware of the importance of temperature control of <i>Vp</i> (1.6.1)	Business owners should ensure that staff involved in handling, distributing and the sale of oysters receive appropriate training on the importance of temperature control (rec.#20).
Illness surveillance: trace-back...do not include asking questions of the entire distribution chain ...there is no standardized questionnaire for this (3.1.4)	BCCDC should coordinate the development of a system to investigate loss of control ...(and) a standardized questionnaires for this purpose (rec.#50).
Trace-back: current traceback process relies on oyster tag collection...tag quality is sometimes too poor ...other information exist that could be collected improve traceback (3.3.2), and... keeping all tags in a single envelope can lead to an excessive number of tags for a single illness (3.3.2), and...not all restaurant receipts name the oysters that were consumed (3.3.3)	BCCDC should investigate shellfish tags at restaurant/retail levels and provide recommendations for standardization and improvement (rec.#61)...should investigate information that could be used in traceback investigations (rec.#62)... should conduct an on-site survey of restaurants tag collections to inform how practices could be improved (rec.#63)... assess if customer receipt information can be utilized during an investigation. Recommendations on changing practice should be communicated to all restaurants via the health authorities (rec.#64).

<sup>1</sup> – for a complete description of the gaps and recommendations consult the full report at <http://www.bccdc.ca/health-info/food-your-health/fish-shellfish/vibrio>

A separate provincial *Vibrio* working group comprised of health authority representatives and staff within the BCCDC was formed to address these recommendations. Recommendations arising from the work described in this report are proposed to address the gaps identified by the national *Vibrio* working group.

## METHODS

### Development of questionnaire

Members of the provincial *Vibrio* working group formed in 2016 that included senior food and communicable disease environmental health officers (EHOs) collaborated with BCCDC's fish and shellfish safety specialist (L. McIntyre) to develop a template of questions specific to premises serving and selling oysters for raw consumption. Two slightly different questionnaires were formatted with the same questions, one tailored for the interviewer with the questions to ask, and one tailored for the premises with details on the types of documents required to answer the questions (Appendix 1). Nine areas of interest were identified in the questionnaires: oyster purchasing practices, sales, receiving, preparation, service, receipts and documentation, food safety and sanitation plans, and operators' opinions on how illness trace-back and shellfish tag management could be improved.

### Communication and premises selection

We prepared generic e-mail requests for restaurant managers and owners requesting their voluntary participation in an on-site interview and review of their shellfish handling. The purpose of these interviews was to review how oysters and shellfish were managed, which included a review of shellfish tags, raw oysters handling procedures, records and how to improve illness trace-back. Interview requests were coordinated by health authority EHOs with premises owners and managers during dates and times convenient to all parties. Restaurants were selected for audit by the health authorities based on whether they served oysters for raw consumption, the sales volume and food safety history of the premises. Once a confirmed appointment was set, premises were sent a questionnaire template that outlined each question that would be asked, including a description of the documentation that would be requested for review.

### On-site interview and inspection

I conducted interviews of premises personnel with EHO participation and assistance. Photo-documentation of shellfish tags, invoices, log books and plans were taken with permission at all premises. Following each interview we conducted a walk-through of the premises to observe specific items that included temperature and sanitation, oyster receiving, storage and preparation areas. During the interview, educational documents specific to raw oysters were handed out and reviewed. These documents were updated by the provincial *Vibrio* working group and available on the [BCCDC web-site](#). They include a [notice to restaurants about raw oysters](#), a [food safety plan](#), a [shellfish receiving log](#) and [shellfish safety brochure](#).

### Communication of results

Following the meeting, we thanked each premises by e-mail, and sent additional information about *Vibrio* control methods that included links to the [shellfish harvesting map](#), [Vibrio calculator](#) and [sea surface temperatures of shellfish harvesting areas](#). Some premises were sent customized temperature charts for monitoring of their refrigerators and freezers.

A summary report of the interview was created from the notes and observations recorded during the interview and shared back with the EHO and senior food specialist at the health authority.

## RESULTS

### Restaurant interviews

A total of 12 restaurants were visited in three health authorities: five in Vancouver Coastal Health, five in Fraser Health and two in Island Health authorities. Audits were conducted between April 13 and July 4, 2016 with interview times taking on average 96 min (80 to 110 min). The types of personnel interviewed at the 12 premises were equally distributed between owners, managers, and chefs (4 each), collectively referred to as operators in this report. Chefs in two restaurants were consulted on questions about food preparation that one manager and one owner were not able to answer. The remainder of this report will refer to restaurants as premises.

### Ordering and receiving practices

All premises interviewed purchased oysters directly from local distributors: half reported ordering exclusively from distributors (e.g., Albion or 7 Seas), while the other half also ordered directly from shellfish farms (e.g., Sawmill Bay or Hollie Wood). While many premises do order east coast oysters, fewer order US oysters due to current higher costs associated with the exchange rate between US and Canadian currency. Overall total sales of oysters purchased from outside BC are low (Table 2).

Premises receive shellfish shipments an average of five times per week, ranging from two to seven times per week depending on the season and refrigeration capacity of the premises. Oyster sales also vary seasonally. While one premises reported discontinuing oyster sales in the slow season (Nov to Apr), average sales of approximately 200 dozen oysters per week were reported during slow seasons compared with approximately 375 dozen oysters per week during peak seasons (May to Oct). Higher volume premises reported peak sales of up to 1000 dozen oysters per week (Table 3); these premises have “buck-a-shuck” type sales.

**Table 2. Ordering and receiving practices for raw oysters**

Ordering practices for raw oysters (number (%) who declared they):	#	%
<i>Order raw oysters directly from the farmer (processor)</i>	6	50.0
<i>Order raw oysters from a distributor</i>	12	100
<i>Order east coast oysters</i>	7	58.3
<i>Order US oysters</i>	3	25.0
<i>Estimated their average sales from eastern and US oyster sources</i>	5	12.0
Receiving practices for raw oysters (number (%) who declared they):	#	%
<i>Check the temperature of shipments with a thermometer</i>	2	16.7
<i>Check the temperature of trucks delivering oysters and foods</i>	0	0
<i>Always received all shipments of oysters on ice</i>	10	83.3
<i>Always received all shipments of oysters with shellfish tags</i>	12	100
<i>Always keep all shellfish tags received</i>	10	83.3

All premises reported that shipments of oysters arrive with shellfish tags, and that they would refuse shipments without tags. However, not all of the tags are kept, and some premises (n=2) discard duplicate tags or tags that arrive shredded or unreadable. Occasionally shipments do not arrive on ice, and while two premises check with a thermometer that oysters arrive cold, most do not. One operator reported checking temperature of oysters by hand, to ensure it “feels” cold. No premises reported ever checking the temperature of delivery trucks.

When oysters are received, shipping invoices that accompany the product must be signed off before the delivery driver can leave. This dual invoice system appears to be standard practice throughout the distribution system. If orders arrive early, or during times when the driver must leave before sign-off, an inventory of the items received is done later, with missing or shorted items reported to the distributor within 24 hours. However order receipt without driver sign-off on delivery was reported as a rare practice.

**Table 3. Oyster sales volume by season**

	Sales volume (dozens of oysters per week)	
	Low Season	High Season
<i>average</i>	198	374
<i>range</i>	0 – 740	5 – 1000
<i>median</i>	126	243

During two of the inspections, a shellfish order arrived, was immediately counted, and invoices signed-off and handed back to the drivers. At least one distributor has instituted a secondary “Proof of delivery form” that records deliveries for that day. This form is also required to be signed off by the operator, and is kept by the driver. During one inspection, following inventory of the tote, the driver was responsible for emptying the tote and placing items in the refrigerator. On average, premises reported that orders were put into refrigerated storage within 17 min (ranging from immediately (within 1 min) to 60 min). In five of the premises visited, delivery orders are received in the customer area at the front of the house, where they must be handled immediately to minimize disruption to customers. One premises that received all shipments at the rear into a shaded hallway has a policy that all goods (including oysters and shellfish) must be received and put away within two hours, consistent with best practices.

**Recommendations for ordering and receiving practices**

All oysters for raw consumption and other shellfish:

1. must be received fully immersed in ice or by another method to keep products at 4°C or colder.
2. must be accompanied with an approved<sup>1</sup> shellfish tag.
3. must be received and quickly put under refrigerated control. When oysters are received in packaging that maintains temperatures at or below 4°C, best practices are to refrigerate oysters immediately or within 30 minutes following receipt with a maximum delay of two hours after receipt.<sup>2</sup> This applies only to oysters still contained within packaging that keeps the product at 4°C or colder. Oysters exposed to room temperature air for two hours but less than 4 hours must either be discarded or immediately diverted to cooked product. Oysters exposed to room temperature air for 4 hours or more must be discarded.

<sup>1</sup> Approved tags are compliant with the Canadian Shellfish Sanitation program shellstock labelling requirements in chapter 7.3, <http://www.inspection.gc.ca/food/fish-and-seafood/manuals/canadian-shellfish-sanitation-program/eng/1351609988326/1351610579883?chap=10>

<sup>2</sup> Per Canadian food retail and food services code (2016) 3.3.8 a room temperature holding for PHF

### Additional recommendations for temperature control and tracking shipments

4. Operators should purchase a temperature monitoring tool, such as an infrared laser thermometer. This can be used to quickly check the surface temperatures of incoming raw oysters and other perishable goods.
5. Operators are recommended to periodically check the temperatures of trucks delivering their perishable foods, and verify incoming shipments of fresh foods (e.g., oysters) are received at 4°C or colder.
6. Premises should use a shellfish log to track incoming shipments, especially when two or more shipments are received per week. Shellfish tag and receiving temperature should be recorded in this log. Corrective action should be taken when acceptance criteria is not met (i.e., if the shipment is rejected and what happens to the product). This should be incorporated into the premises food safety plan.

### Handling and preparation of raw oysters

Raw oysters are not a complicated menu item in terms of processing. Once received they may be pre-rinsed (66.7% of premises) before refrigerated storage and containers are usually labelled (75% of premises) before placing into the cooler. Premises which did not label the containers were lower volume, selling 5 to 200 dozen per week during the high season, but did retain tags with the product in the container. All premises observed in this study retained their shellfish tags with the product in mesh bags when first put under refrigerated storage. Three premises used the shellfish log to track incoming product. Before placing received oysters into cold storage, tags from bags of oysters would be removed, information recorded into the log, then the tags would be placed with the product into the container before transferring to cold storage. One premise took an additional step to photocopy the shellfish tags, and placed the photocopy in a sealed plastic bag with the oysters. The original tag was retained with the oyster tracking log. Labels for containers were either put onto masking tape or written on cardboard and placed into metal bus-bins or plastic buckets or bus-bins (photos of labelling observed are shown in Appendix 2).

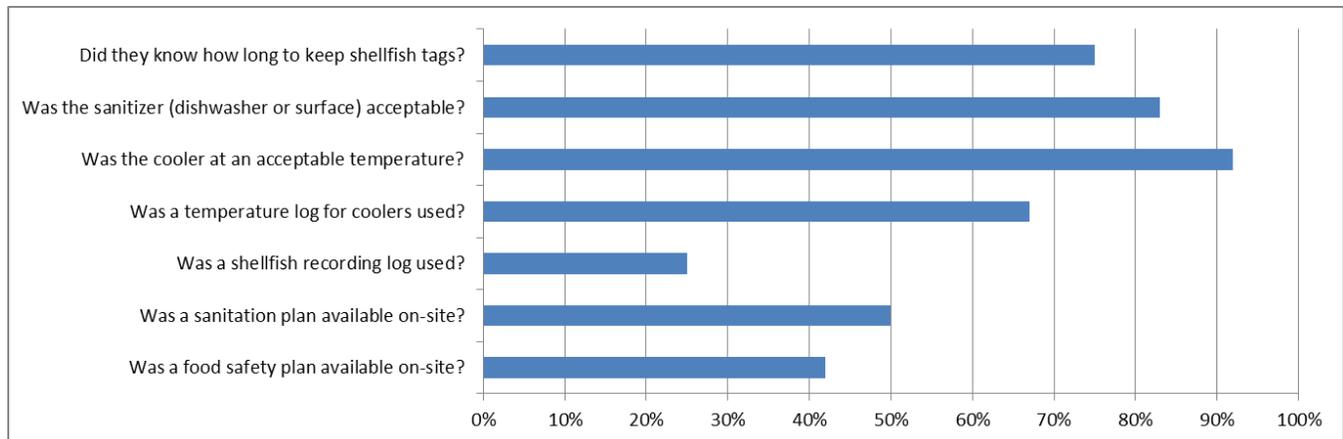
Information on labels always included oyster variety and date received, with some premises adding additional information such as supplier and date after which oysters should not be sold (i.e. an expiry date for discarding the oysters or date to track when product should be diverted to cooked dishes). Premises that discarded or diverted product tended to be lower volume. One low-volume premises that practiced pre-shucking created very detailed labels that included harvest date, harvest area/sub-area and/or purchase order no. and the date shucked in addition to the type of oyster. These oysters are pre-shucked, cleaned of excess shell fragments, covered with moistened paper towels, then carefully wrapped in plastic wrap with the label on a tray. The oysters are either sold within three days of shucking, diverted to cooked product, or discarded (photos in Appendix 2, premises #9).

A few premises place multiple oyster varieties into the same container. In one low volume premises, more than one type of oyster was found in a single container, separated by wet towels. Tags were retained with oysters in the layers. However if not all oysters from the display counter were served at the end of day, multiple varieties of oysters went back into the same container into refrigerated storage. The practice was to observe size and shape and to name the variety based on this rather than the information on the original tag, which was by this point, removed from the original container and put into storage.

**Temperature control observations.** One-third (33.3%) of premises iced the raw in-shell oysters stored in their cooler, and each of these premises used containers that would allow the melted ice to drain into a secondary container. Ice was either placed over the oysters loosely or in plastic bags. Most premises did not cover oysters in the cooler: rarely, a cloth or paper towel was used to reduce cross-contamination. The

majority of premises relied on the refrigerator to maintain cold temperatures. An acceptable cooler temperature was observed in 92% of the premises. Thermometers located on the outside of coolers were not always accurate (e.g., 10°C outside reading, 3°C inside reading by EHO premises #5). One premises which did not ice oysters in the cooler was checked by the EHO. The interior of the oyster bucket had a reading of 9.4°C using a stem thermometer however, the interior measurement using an infrared laser thermometer was 5.8°C, and 5°C was recorded in the log at noon for that day (photos in Appendix 3, premises #7). The majority of premises did have a temperature log (66.7%) but many were not being filled out. Several operators claim they check coolers daily by noting whether it felt cold but do not measure or record the temperature. Temperature and other observations are shown in Figure 1.

FIGURE 1. OBSERVATIONS FROM THE INTERVIEW AND WALK-THROUGH INSPECTION OF PREMISES. PROPORTION OF AFFIRMATIVE RESPONSES.



Half the premises had a raw oyster display in the customer area, and shucking of oysters was conducted at a counter area within sight of customers. Two of these premises were observed to not properly top ice oysters in the displays. In one premises, an infrared laser thermometer measurement by the EHO found the raw oysters to be at 10°C. The operator was advised to overtop with ice and immediately complied. After a few minutes the temperature dropped to below 4°C.

### Recommendations for handling and preparation of raw oysters

7. Oyster tag information and traceability must be maintained during refrigerated storage. The original tag or a reproduction must be retained with the raw oysters. If the original tag is not retained, a label on the oyster container must be traceable back to the shellfish log which is filled out at the time of receiving.
8. Labels on containers (e.g., plastic tubs, bus-boys) should, at minimum, indicate the date of receipt and oyster variety. These labels can be of any format (tape, cardboard, or photocopy of the original tag etc.) as long as the information is readable.
9. Each storage container should contain only one variety of oysters. If required, premises should purchase smaller containers.
10. Refrigerated storage of oysters should prevent oysters from contaminating other foods and oysters should be protected from contamination by other foods or sources, such as by covering with a wet cloth or paper towel. Best practices are to use single use wetted paper towels, alternatively clean wetted cloths may be used if they are washed and sanitized following each use.
11. Ice containers used to hold oysters must allow for excess melted liquid to drain away from the oyster.
12. Pre-shucking of raw oysters for same day service is acceptable when the oysters are stored under refrigerated conditions at or below 4°C. Shucked oysters should be covered with plastic wrap if not served within 2 hours of shucking. Pre-shucking oysters for storage longer than one day is not recommended. Oysters should be shucked in small batches to meet the demand, quality and safety of

the operation. Once shucked, oysters are vulnerable to cross-contamination from external and internal sources (if digestive glands are nicked during the process of shucking, naturally present bacteria can migrate to other nutrient dense tissues and potentially multiply). Quality of the raw oyster will deteriorate once oyster tissue and liquor is exposed to air.

13. Best practice is to pre-rinse all incoming oysters prior to shucking to remove visible dirt or debris.

During the walk-through inspection, EHOs checked sanitation per normal inspection practice. In two premises, issues were observed. One premises had a fairly new sanitizer dispenser, but the tube in the unit had an air plug. The inspector did not detect sanitizer in the spray bottle and was able to diagnose the problem. In the second premises, the dishwasher was out of sanitizer and the EHO was told it was on order and had just run out. Half of premises were able to show a sanitation plan and less than half were able to show a food safety plan that mentioned oysters for raw consumption (Figure 1). Although these plans are regulated requirements, they are not being consulted or used by operators or staff. Sanitation plans should describe how to verify that a sanitizer is working (testing with a quat or bleach strip) and food safety plans can describe how to manage time and temperature requirements for oysters and other foods products. Verification of activities are demonstrated through record-keeping on logs.

#### **Additional recommendations for temperature control, sanitation and food safety plans**

14. All premises serving oysters for raw consumption must monitor and record temperatures of the refrigerated storage coolers where raw oysters are stored, at a minimum frequency of once daily, with twice daily monitoring or more as optimal.
15. Oysters being processed (e.g., rinsed, labelled, shucked etc.) should not be removed from refrigerated temperature control for more than one hour.
16. All premises that have front of house raw oyster displays must use ice to keep in-shell oysters cold. Melted ice-water must be allowed to drain. Ice must be below and overtop the oysters to ensure oysters are maintained at or below 4°C .
17. Premises are recommended to periodically check temperatures of oysters on display using a temperature monitoring tool (e.g., an infrared laser thermometer) to verify the oysters are cold, at least every four hours, with more frequent checks recommended. Verification of the activity by recording the time/date and temperature onto a temperature control log is recommended, and this should be incorporated into the premises food safety plan.
18. Sanitation and food safety plans should cover basic requirements to control hazards. The plans need to be kept up to date and accessible to all staff. EHOs should request plans during inspections for review and to suggest improvements for compliance and should encourage operators to use these documents as tools for staff education.

### **Service of raw oysters**

Raw oysters are usually shucked per order. However, pre-shucking practices were observed twice— once in a high-volume premises with buck-a-shuck service and once in a low-volume premises as previously described. In-shell raw oysters are served on top of cubed or shaved ice with lemon and various sauces.

All premises reported serving oysters as an appetizer: premises that can be defined as an oyster bar (n=4) also served oysters as a main meal. The typical serving size for an appetizer portion was a median of 6 oysters (range 2 to 12) per person. Larger portion sizes were a median of 12 oysters (range 3 to 24) per person. Plates of raw oysters served usually include small to extra-small size oysters. These smaller varieties are less expensive and are most suitable for buck-a-shuck sales. Higher volume premises handled more

varieties of oysters. A typical plate of one dozen oysters usually has two to three varieties of oysters, meaning six or four of each type of oyster in one plate. Most premises (75%) serve Kusshi oysters, a particular variety from one shellfish supplier.

In some premises oyster servers are trained to recognize the oyster varieties being served and name them for customers as they are serving them. Oyster variety recognition is important in case a consumer later becomes ill. Food recall is often challenging, and servers who describe the oyster varieties being served will aid in consumers' memory recall. A few premises have only two types or varieties of oysters on their menu — "premium" versus "regular" or "beach" or some lesser cost variety. They do not name the variety of oyster to the customer, resulting in lack of recognition of the variety served to the consumer. This is also reflected in the menu descriptions.

Seven (58%) premises served raw oysters solely as an appetizer dish. In the remaining five premises, operators reported serving raw oysters as main meal sometimes, but predominantly as an appetizer dish. Appetizer orders are typically communicated to the kitchen with a period of 20 minutes allotted between service of an appetizer and delivery of a main meal. All operators were asked the maximum length of time an order of raw oysters might be sitting out at a table. A median time of 20 min was given, ranging from 6 min to one hour. Premises that have buck-a-shuck on their menus reported the longest times. Operators from several premises reported that their EHO (health authority) asked them to limit the size of orders served last year, and that they have implemented this practice. Even if large orders are taken during a buck-a-shuck or sale event, operators affirmed that not all would be served at the same time.

### **Recommendations for service of raw oysters**

19. Oysters should be served over shaved or small cubed ice to keep them cold during service.
20. Large orders of oysters should be served in smaller batches to customers who pre-order large volumes (e.g., during buck-a-shuck hours).
21. Operators are encouraged to describe the varieties they serve, both on their menu and to their customers, even if the varieties change seasonally. Servers are similarly encouraged to name the varieties of oysters served to the customer.

### **Shellfish tag management**

Tags were organized by a variety of time intervals: by day, week, biweekly, monthly, bimonthly and annually. Storage methods also varied, photos are shown in Appendix 3. One premises that organized shellfish tags daily removed tags once the oysters were put out on display. Oysters and other shellfish tags used that day were kept together with the shellfish log, then the tag bundle was wrapped in paper towels, secured with a plastic band, with the paper towel dated then stored monthly in paper bags. Two premises collected tags by week in a bucket in the customer area, then transferred to another box for holding. Stored tags were also observed on a spike, held biweekly in plastic bags in preparation areas, or by month in boxes, expandable file folders or loose in a drawer under the service area counter.

One premises reported discarding duplicate tags from large orders (i.e. if several 5 dozen count oyster bags are received with the same shellfish tag information, only one representative tag would be kept). Two premises used methods that did not allow the wet tags to dry, further deteriorating the quality of the information on the tag. In one, tags with adhered ice were placed into plastic buckets where melted ice water pooling in the bucket caused tag deterioration. In another premises, an expandable file envelope used to store tags had a damp interior with wet tags. These tags were also misfiled into the wrong month. To avoid tags becoming wet in refrigerated storage one premises photo-copied tags before placing them into plastic bags. The photo-copied tags were kept with the oysters and the original tags stored with the shellfish log in a binder.

Sorting of tags was also observed in some of the premises visited. Tags were sorted by shellfish type (e.g., oyster kept separate from clam tags), or supplier. This is not necessary from a food safety standpoint, but may serve some administrative purpose for the operator.

**Shellfish logs and tags tracking.** Two premises observed using the shellfish log did not follow their own stated criteria for rejection of lots. Although a thorough evaluation of shellfish receiving log history was not conducted, we observed that oyster tags were not in fact received with every bag of shellfish (and no indication of whether product was rejected was made). We observed this in the log tracking sheet of a premises that stated they always received shellfish tags with every order. The second premises had developed a very specific oyster handling procedure that outlined the expectation for oyster receipt and service. This procedure was very detailed, and review of records in the log showed staff were not following or did not fully understand the procedure. This premises had the best training materials for their staff, and very safe oyster handling procedures. This observation highlighted the confusion associated with the information on shellfish tags and how to use it for food quality assessment.

When asked how long to keep shellfish tags, 75% of operators knew the answer was for 90 days (3 months). One operator of a high volume premises kept tags for only 60 days, which is a concern. Other operators kept tags for longer periods (both were low volume premises, and tags did not take up too much space). It was not widely known why we stipulate a 90-day retention (i.e., the incubation period for Hepatitis A). General knowledge of foodborne illnesses other than *Vibrio* that could be acquired from shellfish requires improvement.

**Recommendations for shellfish tag management**

- 22. Premises must keep all shellfish tags for a minimum of 90 days. Premises must not discard duplicate tags.
- 23. Premises should organize all shellfish tags (oyster and other bivalve shellfish) by date and by volume. Shellfish tags can be grouped in daily, weekly and monthly increments based on the premises sales volume, which is used as a proxy for how many shellfish tags are received. The following guidance is proposed for low, moderate and high volume premises:

Volume Category	Oysters received per week	Expected # of Tags*	Time Interval for Tag Storage
Low	Up to 70 dozen	14	By Month
Moderate	Up to 350 dozen	70	By Week
High	More than 350 dozen	Up to 200	By Day

\*one tag received for every 5 dozen oysters

In this format, the maximum number of tags received by a low volume premises in 1 week would equal 14, based on one tag received for every 5 dozen oysters. Moderate volume premises would have up to 70 tags per week. High volume premises (e.g., sales of 1000 dozen per week) would have up to 200 tags per week for oysters, but this number of tags is likely lower because larger orders will be received as 10 or more dozen oysters per bag. Note these volume estimates do not include other shellfish tags, such as mussels or clams. These premises will still receive many tags in frequent shipments.

Seasonal variation in sales may require adjustment. Time intervals for collection and separation of tags shown below are based on best practice observations made during this study in addition to sales volume. Sequential ordering of tags BY DATE RECEIVED/SERVED is strongly recommended.

24. Shellfish tags should be kept dry or protected from moisture and deterioration. Any system used to store and manage tags should not allow excess moisture from the tags or oysters to cause further tag deterioration. For example, tags kept in small plastic buckets should have holes in the bottom of the bucket; tags stored in plastic envelopes should also have small holes to allow for drainage. Expandable file folders are not recommended.
25. Stored shellfish tags should specify the date range of the tags by date used or served. For example a day's worth of tags on August 10, 2016 could be labelled "10" as long as it was stored in a receptacle that included the month. A week's worth of tags from Aug 10<sup>th</sup> to Aug 17<sup>th</sup> should be labelled "Aug 10 to 17", or "10-17" if stored in a receptacle that included the month.
26. Premises not currently grouping shellfish tags based on the above time interval can upgrade their existing procedures with minimal effort by using an elastic band to bundle tags daily (if normal practice is to bundle weekly) then placing tags in the weekly container at the beginning of each morning shift or bundle weekly (if normal practice is to bundle monthly) then placing tags in the monthly container every Monday.

Operators were asked if they could think of a more efficient or better way to manage shellfish tags. They made suggestions to improve their own internal practices and shared ideas for better systems of tag management.

**Electronic / scannable shellfish tags and online database.**

Three operators independently suggested this approach.

- Develop an app that scans with a QR code to an online database for tracking. The tag is just a little piece of paper, and you can't guarantee you have every single tag. For example, a tag was found one evening in the hotel pan in the dishwasher area. With an electronic system, you could scan the tags on arrival and when it is served, so that you know exactly when you started serving those oysters.
- Make the tags scannable or electronic.
- Put on a bar code or ID# that could be scanned by a smart phone, could scan info in, then rescan when tag in use.

**Other comments about tags**

- Make them more durable, with better ink, and easier to read
- Many tags are too wet, and get shredded, then discarded
- Improve the information on the tags
- Difficult to track mussel information

### Additional recommendations for shellfish tag management

27. The concept of having a shellfish tag that has a bar code, QR code or identifier that can be electronically tracked and recorded makes sense and has the potential to significantly eliminate manual recording of information by operators. BCCDC should bring this forward to all stakeholders.
28. Leftover tags that were collected during these audits should be reviewed for compliance with the Canadian Shellfish Sanitation Program (CSSP) tag requirements (CSSP 7.3)<sup>3</sup>. Any issues should be brought forward by BCCDC to regulators and stakeholders.
29. Operator knowledge of the hazards associated with food products they serve should be improved. Operators should be encouraged to learn more about *Vibrio* and other foodborne illnesses. One of the hand-outs given to operators during the audit contained a table of shellfish illnesses that may assist with this knowledge. EHOs are also encouraged to discuss food safety improvements with operators using the rationale of preventing foodborne illnesses, with descriptions of what the illnesses are and what operators can do to minimize risk in their facility. (This recommendation is not specific to shellfish tag management, but arose during review of operator knowledge of tag retention times.)

### Customer till receipts and premises system management of orders

One goal of the audit was to investigate whether any additional information, other than shellfish tags, could inform a potential illness investigation. This might include verification of the actual oysters eaten, verification of the date the customer consumed the meal, and invoices associated with the oysters received.

Seven premises (58%) reported they name the variety of oysters on the till receipts given to customers. This information could assist in verifying types and varieties of oysters ingested during investigations involving premises that stock many varieties. The objective would be to use a till receipt to narrow down the pool of varieties being served in the premises to only those varieties identified on the till receipt, and served to the customer. However, till receipts are not always tied to credit card purchases: for cash sales, till receipts would only be of use if retained by the customer. Many customers do not retain receipts or credit card slips. Still, oyster varieties listed on a till receipt is one question that EHOs could ask during an interview with an ill person. Premises with till receipts that name oyster varieties could be identified prior to an interview to inform questions that could be asked by EHOs.

Operators were also asked whether they could trace a customer's order through their system, either to a reservation system, a credit card number or a table number. Many till receipts state the table number where the customer sat on the receipt, and this is linked to the credit card in some point-of-sales (POS) systems. In such systems a detailed list of the meal could be obtained regardless of whether the customer retained the till receipt if a credit card was used to pay the bill. Reservations systems can also trace the name of the person who made the reservation and link to the POS to obtain a detailed list of the meal. Some premises use the name of the person calling and information about the reservation to verify the meal eaten and assist their own internal investigation when they receive an illness or complaint.

As described earlier, all premises receive orders with a dual-invoicing system. This allows them to count the incoming product. With some shellfish distributors or processors, this may be the only invoice they receive. Usually, however, the companies will provide an additional monthly invoice for all orders for that period. These invoices do not always list lot numbers, but do list dates and quantities for oyster varieties. Premises should retain all of these invoices. They may not be on hand, as operators will often forward the invoices onto

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<sup>3</sup> Approved tags are compliant with the Canadian Shellfish Sanitation program shellstock labelling requirements in chapter 7.3, <http://www.inspection.gc.ca/food/fish-and-seafood/manuals/canadian-shellfish-sanitation-program/eng/1351609988326/1351610579883?chap=10>

the accounting department for data entry, but the volume and a detailed record should be available on-line. A request for the original records can be made and scanned copies can be sent to the EHO as required for an investigation.

One recommendation from the national *Vibrio* working group was to investigate whether volume information could be obtained from premises to inform risk. While all premises have invoices for oyster, shellfish, and food purchases, a smaller number (n=8, 67%) have a method to track their inventory. However, not all premises with inventory tracking systems track volume by oyster variety name. For example, one premises tracks by premium, regular, or buck-a-shuck sales throughout the year. This sales analysis and report is not designed to count inventory; rather it adds up the monthly sales. This type of tracking adds up order types, such as how many ½ dozens, dozens and singles were sold as appetizers. The operators use this to assess successful sales throughout the year. Tallying oyster volume per dozen is challenging, and there is no way to tie them to the actual oysters purchased without also looking at the sales invoices. A few premises do have very sophisticated tracking systems and can provide tallies by type of business and by type of food product, however when asked if they would share this information one operator declined. While general volume information is available, volume by oyster variety and harvest site (i.e., by shellfish farm location) to assess risk is not. Shellfish farm location information is available on most (not all) tags, but tallying this up would require huge resources in terms of time and effort and is therefore not feasible.

## Management of customer complaints and illnesses

Seven of the premises have either a form (n=6) or a log-book (n=1) to collect information when they receive a customer complaint or report of illness. The type of information collected varies widely, and more detailed information is requested from premises that are part of larger chains than from independent premises. Most independent premises were receptive to the idea of having a more standard approach, but operators were not sure what information to collect. Responses ranged from using the on-line BCCDC *Vibrio* illness case information form designed for EHO use to one premises where complaints are never recorded. Not all premises report illnesses to their Health Authority.

Useful practices observed in this study include collecting an email address of the complainant (ill person) for follow-up and including the name and phone number of the EHO either on the complainant intake form or in the log book. This allows the person handling the complaint, while they are on the phone with the complainant, to easily refer them to their EHO. Information collected by premises able to query their system to investigate how many other servings of the meal implicated in the illness served on that day or can determine how many other guests were present in the group that included the complainant is also useful.

Operators were asked how we might improve illness investigations. This question elicited more reflective responses focused on improving internal practices, such as doing more temperature monitoring, improving staff training, or going to a shellfish farm to see the operations. Two suggestions supported recommendations shown below.

- Have an illness collection form on-line
- Ask for a customer receipt trace by table reservation or credit card

## Recommendations for collecting information during illness complaints and investigations

30. During complaint and illness investigations, operators and EHOs should ask complainants if they received a till receipt that described the variety of oyster eaten. This can help inform traceback investigation and potentially narrow down the number of varieties implicated in the complaint.
31. EHOs should always collect all shellfish tags (including duplicate tags) as well as invoices that relate to shellfish tags collected for an illness investigation. This will save a secondary trip back to the premises if this information is needed. The monthly invoices will also describe the dates of deliveries, and may

fill information missing from the tags. If the invoices are not available onsite, EHOs should request a query of the system to describe the oyster purchases during the period in question. Often, a printout can be done in store or the report can be e-mailed. This information should be relayed to BCCDC and CFIA per routine practice.

32. Premises with the capability of tracing information back to the customer order should be asked to provide:
  - Date and time meal was eaten
  - Oyster varieties and quantities that were consumed
33. Premises that do not currently collect complaint information should implement a system to record customer complaints and illness incidents. All premises should report illnesses to their health authority.
34. Information that should be collected in a premises illness form that would be helpful for EHOs to initiate their investigation should be reviewed and communicated to all premises. An illness report form is available on the FOODSAFE web-site ([http://www.foodsafe.ca/resources/Foodborne\\_Illness\\_Report.pdf](http://www.foodsafe.ca/resources/Foodborne_Illness_Report.pdf)). However, this form does not contain helpful information, such as contact email for the complainant. It is recommended that the EHO contact name and information is also on such a form, so that it is easy for the premises to refer both the complainant and the information back to the responsible EHO and Health Authority.
35. Illness information collected by premises helpful to an illness investigation should be requested. Examples of information that can be requested include:
  - How many other meals of the same type were consumed
  - Email and phone contact for the consumer
  - How many guests were in the group that included the complainant
36. Volume information is not always available at the premises in electronic form and it is not detailed enough to be useful in assessing harvest site risk. This information should be communicated to the national *Vibrio* working group.

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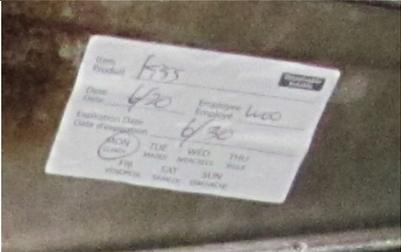
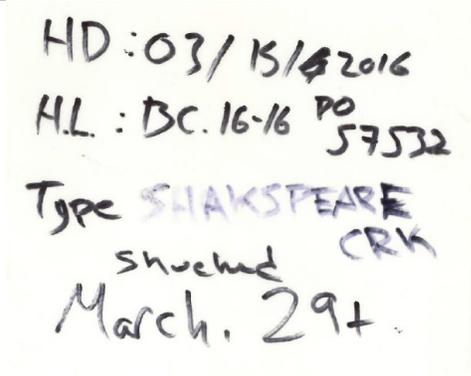
## Appendix 1. Questionnaire for restaurant premises selling raw oysters

This table and list of questions details the information we are looking for when we visit your business. Our aim is to improve our understanding of how oysters for raw consumption are handled. You will be asked about general topics, such as receiving of goods, temperature control, and storage of receipts and records, as well as specific information about raw oysters.

At the meeting we will request to see the documents and records on this list, please have them available and ready for review for the meeting. In the table, **bolded text in brackets are the records of interest for review**. At the end of the meeting, we would also like to discuss a proposal for Vp testing of raw oysters collected at retail and for temperature tracking.

Area to examine	Types of questions we have
Oyster purchasing	a. What BC processors do you purchase oysters from? <b>[Invoice and purchase records from processors/ suppliers of oysters]</b>
	b. Do you typically buy BC oysters year-round?
Oyster sales	c. Do you know the volume of sales oysters for raw consumption from your restaurant? <b>[Sales receipts or other records: by week, month or annual]</b>
	d. Do you know the % of raw oyster product you sell that is imported from outside of BC? <b>[Invoice and purchase records from processors/ suppliers of oysters]</b>
Oyster receiving	e. How many times per week do you get shipments of oysters? <ul style="list-style-type: none"> <li>○ in the fall/winter (Nov to Apr)?</li> <li>○ in the spring/summer (May to Oct)?</li> </ul>
	f. How do you check that oysters are at an acceptable temperature when they arrive? What is an acceptable temperature? <b>[Receiving records, temperatures records at receipt]</b>
	g. What paperwork accompanies oyster shipments, and what do you do with the paperwork when it arrives? <b>[Any other records that comes with product, e.g., shellfish tags used to trace oysters and other types of shellfish OR Any other logs or documents you create to track]</b>
	h. Do shellfish tags accompany every bag / shipment of oysters? What other types of information comes with the oysters? <b>[Records: invoices, shipping docs]</b>
	i. What trucking companies deliver the raw oysters or food ingredients for your restaurant? <b>[Any documentation that identifies trucking suppliers/companies]</b>
	j. How do you know if trucks have kept your oysters properly cold before delivering? <b>[Any temperature records of trucks or places where this might be written down?]</b>
	k. How do you know when a shipment of raw oysters has arrived? How long does it take before the oysters are put under temperature control?
Oyster preparation before service	l. For raw oysters only, please describe the process of what you do with the oysters prior to serving them?
Oysters at service	m. Once raw oysters are served to the customer as an appetizer or main course, what is the maximum time they might be sitting out on the table?
	n. What is a typical serving size for raw oysters –i.e. how many do people normally eat? <ul style="list-style-type: none"> <li>○ As an appetizer</li> <li>○ As a main course</li> </ul>
Oyster customer receipts	o. When customers pay for their meal, what kind of detail is on the receipt that they get? <b>[Show an example customer receipt]</b> Is there a method or way to list out or print the oysters from receipts?
Plans	p. Do you have a food safety plan that outlines how you handle raw oysters? Do you have a sanitation plan? <b>[plans]</b>
General opinion on raw oysters – info to trace back illness	q. Is there a better way for us to collect information from you to pinpoint where the problem is causing these illnesses?
General opinion on raw oysters – how to manage shellfish tags	r. Can you think of a more efficient way or better way to manage shellfish tags?
	s. How long do you need to keep shellfish tags?

Appendix 2. Refrigerated oyster storage and labelling methods

		
<p>Pr. #11</p>	<p>Pr. # 5</p>	<p>Pr. # 6</p>
		
<p>Pr. # 10</p>	<p>Pr. #10</p>	<p>Pr. #3</p>
		
<p>Pr. # 7</p>	<p>Pr. #7</p>	<p>Pr. #9</p>
		
<p>Pr. #9</p>	<p>Pr. #9</p>	

Appendix 3. Oyster tag storage methods

		
<p>(a) Daily tag sorting</p>	<p>(b) Accumulation of tags on spike and held loosely in bucket</p>	
		
<p>(c) Weekly tags stored in downstairs office</p>		<p>(d) Monthly file folder</p>
		
<p>(e) Tag bucket in service area</p>	<p>(f) Examples of tags collected in buckets in preparation area</p>	
		
<p>(g) Monthly tags stored in bucket</p>		<p>(h) Plastic envelope</p>