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Title of Poster Presentation: Validity and Reliability of the Direct  
Observation Methodology: A Focus on Ohio Local Public Health

Meeting/Workshop: Graduate Student Symposium

Organization Holding Meeting: Case Western Reserve University

Date: April 4, 2012

Place: Wolstein Research Building, Cleveland, OH

# Validity and Reliability of the Direct Observation Methodology: A Focus on Ohio Local Public Health

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## Abstract

**PURPOSE:** To examine the reliability, validity, and acceptability of a novel direct observation methodology to investigate the role of local health departments (LHDs) in prevention of foodborne illness.

**BACKGROUND:** Trained public health student observers will shadow Registered Sanitarians (RS) during food inspections completing a structured observational form that will be the main instrument used in the analysis.

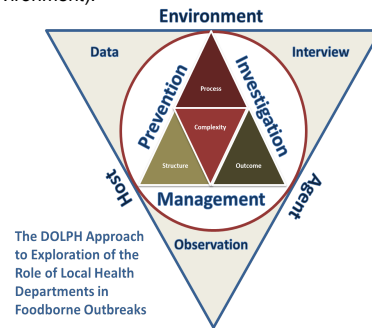
**METHODS:** Inter-rater reliability of the observational form will be assessed 1) using shared viewing of an inspection video (25 responses); and, 2) through student observers functioning in pairs during early observational sessions, jointly observing the same inspections (anticipate a total of >120 observations). In addition, RS and student observers will be interviewed to determine their perceptions of the intrusiveness, effectiveness and accuracy of the direct observation methodology. Inter-rater reliability will be examined for the observations through the use of Cohen's kappa to assess observer consensus on all observations. Interviews will be transcribed and analyzed for themes.

**RESULTS:** It is anticipated that there will be strong concordance on most observations, with higher levels of variability guiding changes in the observational protocol. We expect analysis to show that RS and student observers perceive the direct observation methodology as useful, unobtrusive, and accurate. Analysis will also examine the level of professional behavior among observers; whether observational bias occurs, causing changes in RS behavior; and whether error variation is reduced through direct observation.

**CONCLUSIONS:** Direct observation is a novel methodology in the public health setting and its validity and reliability are crucial for its future application in research.

## Background

This project builds on the Direct Observation of Local Public Health (DOLPH) study, which investigates the structure, process, and outcome (Donabedian Model) of the Local Health Department (LHD) role in prevention of foodborne outbreaks (FBOs) in a collaborative effort among the seven public health programs in Ohio in the context of the Public Health Model (Host, Agent, Environment).



The direct observation approach, a successful methodology in primary care settings, will provide crucial insight into the process of foodborne illness prevention efforts. Foodborne illness represents an ideal topic to allow detailed focus on not just the content, but also the process and quality of public health practice. The use of a mixed methods approach stems from the lack public health practice based research to address issues related to local health department organizational structure and staffing.

Foodborne illness represents a problem of increasing relevance in the US and is an issue that embodies nearly all essential public health services (Tauxe, 1997). While the incidence of foodborne illness has increased, there has been little investigation of the process or quality of LHD involvement.

Training of 24 student observers included the use of mock inspection video scenarios in order to standardize training and gain preliminary assurance of inter-rater reliability.

## Methods

The FBO observational protocol is the main instrument completed by the observer after each food service establishment inspection. The instrument asks the students to make observations on establishment characteristics, person-in-charge (PIC) demographics, PIC and RS interactions and the physical inspection. The section of questions shown below were adapted from a direct observation study in primary care.

Interaction	Not at all	Once	More than once
During the interaction(s), does: The PIC/Employee Admits Uncertainty: The Sanitarian Admits Uncertainty: "I don't know?"	Not at all	Once	More than once
The PIC/Employee Use Humor: The Sanitarian Use Humor: Either party says or does something that causes the other to laugh.	Not at all	Once	More than once
The PIC/Employee Interrupts the Sanitarian: The Sanitarian Interrupts the PIC: Even if the interruptions seem "justified" to you.	Not at all	Once	More than once
The Sanitarian Use Unexplained Jargon: Technical jargon without explaining the meaning or confirming that the food service operator understands the meaning.	Not at all	Once	More than once
Argumentation/Conflict Occur: Disagreement resulting in the Sanitarian and food service operator appearing to be on "different teams", rather than cooperative or collaborative. Note nature of conflict under "Field Notes".	Not at all	Once	More than once
The Sanitarian Give Positive Feedback to PIC: Compliments food service operator or food service establishment.	Not at all	Once	More than once
The Sanitarian Give Feedback in a Negative way to PIC: Criticizes food service operator or food service establishment in a negative manner.	Not at all	Once	More than once

The second excerpt from the protocol show questions related to the physical inspection.

During the inspection, did the Sanitarian check:	Apparently	Observed	Comment Made	No or Not Explicitly
Refrigerator Check	Apparently	Observed	Comment Made	No or Not Explicitly
Dishwasher Check	Apparently	Observed	Comment Made	No or Not Explicitly
Ice machine	Apparently	Observed	Comment Made	No or Not Explicitly
Other Equipment Check (Meat slicer)	Apparently	Observed	Comment Made	No or Not Explicitly
First Aid	Apparently	Observed	Comment Made	No or Not Explicitly
Thermometer calibration	Apparently	Observed	Comment Made	No or Not Explicitly
Food Storage Food stored, prepared, displayed in a manner that did adequately protects it from contamination.	Apparently	Observed	Comment Made	No or Not Explicitly
Food Holding Temp or Time	Apparently	Observed	Comment Made	No or Not Explicitly
Check Sanitizing Fluids (pH paper) Temperature, concentration, or cleanliness of sanitizing rinse solutions meet the standards of the food code.	Apparently	Observed	Comment Made	No or Not Explicitly
Hand-washing facilities adequate and/or accessible.	Apparently	Observed	Comment Made	No or Not Explicitly
Cleanliness of clothes, surfaces, cleaning sponges	Apparently	Observed	Comment Made	No or Not Explicitly
Date marking/Date stamping of prepared foods	Apparently	Observed	Comment Made	No or Not Explicitly
Presence of vermin and/or excrement	Apparently	Observed	Comment Made	No or Not Explicitly

Descriptive statistics and inter-rater reliability (Cohen's kappa) will be performed to determine observer consensus. Additionally, a subset of student observers and Registered Sanitarians will be interviewed to gauge their perceptions of the strengths and challenges of the direct observation methodology.

## Results

**Table 1.** Descriptive statistics for select dichotomous variables obtained from the observational protocols completed during the observer trainings.

Variable	N	Percentage
PIC Age	24	66.7% (31-40)
PIC and RS Shake Hands	24	91.7% (Yes)
Check-In Time	23	95.8% (1-5 minutes)
RS uses humor	24	87.5% (More than once)
RS admits uncertainty	23	87% (Not at all)
RS uses unexplained jargon	24	100% (Not at all)
Sanitation	24	79.2% (Comment made)
Cross Contamination	24	87.5% (Comment made)
RS gave clear feedback	24	91.7% (More than once)
RS discuss improvement plan	24	83.3% (More than once)
RS elicits questions	24	75% (Once or more)
Inspection results discussed privately	24	54.2% (No)
Hand on Doorknob Syndrome	24	58.3% (No)

**Table 2.** Select numerical responses obtained from the observational protocol

Variable	N	Mean +/- SD	Min	Max
# Employees RS interacts	24	7.58 ± 2.92	4	13
# Countertop inspections	21	3.00 ± 1.79	1	8
# Prep area inspections	24	4.58 ± 1.66	2	9
Equipment Check	24	6.96 ± 3.53	1	15
RS squats/bends over	24	9.75 ± 4.06	4	17
# Verbal Warnings given	24	2.94 ± 1.77	0	5

## Discussion

Based on the descriptive statistics, many of the instrument items had great concordance among the observers.

Some limitations with the direct observation methodology could include the observer being unable to read the mind of RS as they conduct the inspection, as well as the lack of dialogue between the observer and Registered Sanitarian. Many RS examine multiple characteristics of a food service establishment that may be difficult for the observer to ascertain.

Future directions for the direct observation methodology in public health can include its application to issues outside of foodborne illness.

## Conclusion

Direct observation is a novel methodology that is useful in public health settings. DOLPH is a crucial evidence based project with a goal to test direct observation of local public health methods to establish a richer and more accurate depiction of LHD structure, process and outcome, ultimately resulting in improved performance, greater accountability, and more stable funding.