

**PUBLIC AWARENESS OF PUBLIC HEALTH &
ENVIRONMENTAL HEALTH OFFICERS IN BRITISH
COLUMBIA, CANADA**

by

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ABSTRACT

Environmental Health Officers (EHOs) are public servants who play a vital role in safeguarding the public health of Canadians. EHOs are both enforcers and consultants in public health. They inspect food premises, public facilities, waste disposal systems, residential houses, and recreational facilities to ensure compliance with government regulations. A survey determined level of knowledge with respect to public health in Canada and its EHOs. The survey included 458 participants selected randomly from White Pages for Vancouver, Burnaby and Surrey although only forty-two agreed to participate (response rate=9.1%). The study assessed associations between awareness of the role of EHO and gender, age, occupation, and level of education of respondents. The purpose of the survey was to increase the public awareness of the EHOs and to be a foundation study to create an effective public relations program in the province. Results failed to show any associations between awareness of the role of EHO and gender, age, occupation, and level of education of respondents. In conclusion, gender, age, occupation, and level of education are not major contributing factors in knowing the EHOs.

TABLE OF CONTENTS:

<u>Content</u>	<u>Page Number</u>
INTRODUCTION	4
STATEMENT OF PROBLEM	4
PURPOSE OF THE STUDY AND HYPOTHESIS OR RESEARCH QUESTION	5
REVIEW OF THE LITERATURE	5
EXPERIMENTAL PROCEDURES	12
RESULTS AND ANALYSIS	16
DISCUSSION	24
LIMITATIONS	28
CONCLUSIONS AND RECOMMENDATIONS	28
LIST OF REFERENCES	30
APPENDICES	33
A) Survey Script	
B) Data Result and Analysis	

INTRODUCTION

Canadians have been concerned greatly about public health since the Walkerton water tragedy in 2000 (Clark *et al.*, 2003), the *Cryptosporidium* outbreak in North Battleford in 2001 (Public Health, 2001) and the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 (Centers for Disease, 2003). Dr. David Butler-Jones, Canadian Chief Public Health Officer, explained, “SARS was tragic but if there is a silver lining, it is that it underlined that public health is absolutely crucial, that it is the foundation for everything we do” (Sornberger, 2004). Recently, the emergence of West Nile Virus has created great uncertainty in Canadian public health.

Environmental Health Officers (EHOs) are public servants and have vital roles in protecting Canadian public health. Under British Columbia’s Health Act, section 1 defines that EHOs are the people who are appointed under the Act and have a Public Health Inspector (PHI) certification from the Board of Certification of Public Health Inspectors of the Canadian Institute of Public Health Inspectors (Ministry of Labour, 2004). EHOs have at least a bachelor’s degree in environmental health/science as well (Saskatchewan Health, 2005). Under sections 33 and 41 in BC Health Act, a Medical Health Officer delegates EHOs to protect public health (Canadian Institute, 2005). Despite of having such an indispensable duty, EHOs are not as well known as other public servants such as police officers and firefighters. This project assessed the level of knowledge of the general public in BC with respect to the EHOs’ roles.

STATEMENT OF PROBLEM

To the author’s knowledge, no studies have been performed investigating public awareness of the roles of EHOs. As mentioned above, EHOs work significantly for public health

protection, yet and there is not enough media or public attention for their work. The survey determined the level of public knowledge with respect to public health in Canada and its EHOs.

PURPOSE OF STUDY AND HYPOTHESIS OR RESEARCH QUESTION

The purpose of the survey was to increase the public awareness of the EHO's and to be a foundation study to create an effective public relations program in the lower mainland. A good public relations program would establish and promote a favorable relationship with the public.

The null hypothesis is that there is no association between the genders and the awareness of an environmental health officer. The alternative hypothesis is that there is an association between the genders and the awareness. The reason to find out whether there is an association between gender and the awareness is to determine whether gender can impact on interests in public health.

REVIEW OF LITERATURE

1. Role

EHOs are the ones “in the frontline of public health [and safety] ... [improving] environmental and social conditions for their communities” (Canadian Institute, 2005). They try to ensure that everyone has “safe food, safe water, safe housing, clean air, and healthy environments free of the threat of disease or injury” (Canadian Institute, 2005). The EHOs are both enforcers and consultants in public health. As enforcers, they investigate and remove physical, chemical and biological hazards such as in the case of disease outbreaks. As consultants, they are involved in educating people on how to live a healthy life and ultimately preventing disease. EHOs work with groups and communities to resolve environmental health

problems and assess plans and specifications for building. They perform environmental surveys and inspections and identify sources of pollution (Saskatchewan Health, 2005).

EHOs also conduct “communicable disease surveillance; investigation & management; risk assessment, management & communication; health hazard complaint investigations; sampling, analysis & interpretation of data; permitting & licensing of developments; enforcement of environmental & public health legislation; public education & health promotion; and emergency preparedness & response” (Canadian Institute, 2005).

EHOs have important roles in ensuring food safety and protecting public health. EHOs “check how food is prepared, stored, how machines are serviced and the general cleanliness of the premises” (Canadian Broadcasting, 2003). Then, the restaurant inspection reports are posted on the Internet. Making the report available to the public helps the potential customers to choose clean and safe restaurant and provides incentive for the operators to keep their premise free of health hazards (Canadian Broadcasting, 2003). The EHOs also need to educate general public about “the principles of transmission of food borne-disease etiological agents and their control” (Bryan, 2002).

Vancouver is a popular tourist destination, and food service is an integral part of the community. The city has wide variety of restaurants, and residents and visitors enjoy eating out often. EHOs must monitor the “conditions, cleanliness and business practices of every restaurant” (Canadian Broadcasting, 2003) in the city and must ensure that both the tourists and the locals do not get sick.

2. Food Safety

Centers for Disease Control and Prevention (Centers for Disease) monitor food-borne disease outbreaks in the United States and have determined that commercial food establishments such as restaurants are the major contributor of disease outbreaks (Jones *et al.*, 2004). The epidemiologists estimated the 325,000 hospitalizations and 5,000 deaths each year in the United States are solely due to food-borne disease (Simon *et al.*, 2005). In 1993-1997, almost 50% of food-borne diseases were associated with food consumed in commercial food establishments (Simon *et al.*, 2005).

In one study, restaurant inspection reports in Tennessee were analyzed (Jones *et al.*, 2004). The EHOs who were appointed by the state laws and regulations completed the reports. The EHOs used standardized forms including 44 scored items with maximum of 100 points. The items are the known contributing factors of “food contamination, illness, or environmental degradation” and may cause potential food-borne disease transmission. Thus, violating one or more of the items, the food premise is considered as public health hazard. The lower the score the restaurant receives, the fewer violations of the items (Jones *et al.*, 2004). Two hundred and forty eight inspectors provided 167,574 restaurant inspection reports from 29,008 restaurants in Tennessee from January 1993 to April 2000. Customer complaints and the follow-up on deficiencies noted in semiannual reports were not included. Schools, correctional facilities, and bars that did not serve food were excluded. The mean scores of the restaurant reports were increased during the period. However, the restaurants experiencing food-borne disease outbreaks and the restaurants with no reported outbreaks had similar scores. No statistical analysis was done to determine the statistical significance. The study concludes that the inspection reports

should not be used as a sole measure of the restaurant in terms of food safety. Various factors should be considered in preventing food-borne disease (Jones *et al.*, 2004).

A grade-score program was developed and implemented to test whether the availability of restaurant hygiene quality information to the public is associated with the incidence of food-related illness. The grade cards generally provide information on food safety practices when the people select restaurants. Restaurants with a high grade would attract more customers than the ones with a low grade. Thus, the program gives an incentive for the operators to maintain their premises clean and safe. The program requires food premises to post their grade (or numeric score if below 70) at the entrance. Information on inspection grades, numeric scores, a listing of specific violations at last inspection, and restaurant closures were also posted in the Internet (Simon *et al.* 2005).

The program has increased the rate of compliance with the food regulations, “improved inspection scores, and influenced consumers' restaurant choices” (Jin & Leslie, 2003). However, the effectiveness of the program in preventing food-borne disease was not tested. Jin & Leslie (2003) show the program also has decreased in food-borne disease hospitalizations. However, the study had many limitations such as a short follow up period, and a broad definition of food-borne illness. Simon *et al.*, (2005) minimize the mentioned limitations and assess the impact of the grading program on food-borne disease hospitalizations, using recent hospitalization data and a refined definition of food-borne disease. Any hospitalization with Salmonella, Campylobacter, Escherichia coli, Listeria, Yersinia, staphylococcal food poisoning, and other bacterial food poisoning was considered as a food-borne disease hospitalization. The diseases were chosen because they have more than 70% probability of food-borne transmission. Children less than five years of age are likely to have the disease without food-borne transmission, so their

hospitalizations were excluded. The rates of the hospitalizations before and after the implementation of grade cards program were compared. The program has decreased the number of food-borne disease hospitalizations at a rate of 13.1% decrease ($p < 0.01$). The statistical analysis shows that the result is significant. The study concludes that introducing grade cards program decreases food-borne disease hospitalizations significantly. (Simon *et al.*, 2005)

Several restaurants consider food safety to some extent because they could lose business when their customers get sick. However, the operators are not experts in food safety. The EHOs have to educate them about food safety and help them to prevent public health hazards such as food-borne disease (Pallaske, 2005). The EHOs do not just point out what needs to be corrected, but as consultants, they help the operators fix the problem permanently through education. The EHOs prevent a food-borne illness indirectly and the operators have the ultimate influence on the food-borne outbreaks. The EHOs translate lengthy food codes and regulations and help operators to run their business “smoothly, strongly, and safely” (Pallaske, 2005). Moreover, the EHOs are both enforcers and consultants of the codes “related to temporary events, public lodging, swimming, recreation, and body art” (Pallaske, 2005). The EHOs provide the same services to those businesses, as do for the food service operators.

3. Emergency: Disaster

EHOs also take a significant role in an emergency situation. The prevention of disease outbreaks, during and after such disaster is the primary goal of public health. EHOs are involved in ensuring the safety of potable water, food safety, excreta and liquid waste, solid waste, vector control, housing and personal hygiene to achieve the goal. When EHOs are involved in preparing for natural disasters such as hurricanes, they will review Environmental Health Hurricane

Disaster Plan. The EHOs also inspect designated shelters and advise on site selection for burial of the dead and solid waste disposal. The EHOs check that all Public Health Bureau equipment, files, materials and supplies are properly packaged, labeled and ready to be used when the disaster occurs. During the hurricane, the EHOs are on stand-by for emergency duties and monitor the environmental health conditions in the shelters and report to the coordinating center.

After a natural disaster, the EHOs play an important role in restoring environmental health conditions and services to approved Public Health Standards. The EHOs evaluate environmental health conditions in designated shelters and their respective sanitary districts. They monitor domestic water supplies at shelters and carry out free residual chlorine tests on water supply and water distribution system. The EHOs inspect the public's food supply, storage, and preparation areas. They monitor mass burial of the dead at designated sites and solid waste management. (National Medical, 2004)

4. Trend

Canada is in the process of reforming public health. Recently, the government established the Public Health Agency of Canada and appointed Dr. David Butler-Jones as the first Chief Public Health Officer, and Dr. Carolyn Bennett as the Minister of State (Public Health). The Walkerton outbreak, SARS emergency, West Nile Virus, and threats of biological terrorism certainly raised the importance of public health service (Canadian Institute, 2005).

EHOs have served BC over 110 years. They are highly trained and qualified professionals. Over time, the role of the EHOs has changed dramatically. Mr. Pallaske, the chief of food safety and recreational licensing at the Wisconsin Bureau of Environmental & Occupational Health explains that the EHOs have evolved from inspecting floors, walls, and

ceilings to focusing on risk factors that can cause an illness. The factors can be unsafe sources, inadequate cooking, improper holding temperatures, cross-contamination, and personal hygiene (Pallaske, 2005).

5. Public Relations

EHOs should have good communication skills, good analytical skills, capacity for independent critical thinking, scientific orientation, and concern for the health and well-being of the community (Saskatchewan Health, 2005). EHOs work at regional health Authorities, government, industry, sewage and water treatment plants and agencies interested in industrial health as public health consultants (Saskatchewan Health, 2005).

Mr. Pallaske emphasized that less than 10% of food-borne illnesses are reported. The general public needs to be aware the importance of reporting the illness to their public health agencies. Under reporting may lead more operators getting away with violations and pose major public health threats. To achieve better reporting rate of the diseases, the EHO's need to establish and promote a favorable relationship with the public (Pallaske, 2005).

EXPERIMENTAL PROCEDURES

1. Description of standard methods

The United States and other countries including Canada use Computer-Assisted Telephone Interviewing (CATI) as the standard method for collecting data in telephone surveys (Cheong, 2003). CATI uses a computer program that provides the questions to the interviewers on the computer screen. Then they read the questions to the participant and enter the response into the computer. Its advantage is that it minimizes variability in interviewers' behavior.

Therefore it reduces any human bias on the response from the participants (Cheong, 2003). However, due to lack of access to CATI and limited financial and human resources, a conventional telephone interviewing was used.

2. Alternative methods

For survey research, two kinds of methods are available: pen-and-pencil and computer-assisted (Cheung, 2003). Pen-and-pencil includes conventional telephone interviewing, self-administered questionnaires, paper-and-pencil interviewing (face- to-face), and audio self-administered questionnaire. Human error and bias are the main downfalls of using pen-and-pencil method. Computer-assisted includes computer-assisted personal interviewing, voice recognition entry, touchtone data entry, disk by mail, web surveys, computer-assisted telephone interviewing (CATI), computer-assisted self-administered interviewing and audio computer-assisted self-administered interviewing (Cheung, 2003). Setting up the computer software and making survey online are beyond the scope of this research project.

3. Justification for methods selected

Interviews by telephone were used to collect data for the study (see Appendix I for survey script). A telephone survey was used because it has many advantages in terms of cost, time, availability of materials and response rate (Heacock & Chiodo, 2005). The calls were made locally free of charge. The investigator has local phone connection at home and has access to use the phone at BCIT. With the telephone interview, responses from the study participants are instant and waiting for the response such as in self-administered mailed questionnaires does not occur. Traveling was not required and thus the cost of gas and time were saved. Interview by

telephone gives relatively high response rate compared to other alternative methods (Heacock & Chiodo, 2005). Moreover, the interviewer answered any of respondents' questions, and clarified queries on the phone. The interviewer made sure all questions were responded to before hanging up (Social and Economic, 2005).

4. Reliability & validity of measures

Reliability can be measured by asking the same question twice (once at beginning and once at end) or by giving the questionnaire to the same person twice (leaving a few days in between) and determining whether answers are the same (Heacock & Chiodo, 2005). Both techniques were used during the interviews to increase the reliability of the data. Validity refers to the instrument accurately measuring what is it supposed to measure (Heacock & Chiodo, 2005). The questions were concise, straightforward and easy to understand so that the validity of the data was not compromised.

5. Inclusion and exclusion criteria

Vancouver is the largest city in B.C. and the third largest in Canada (City of Vancouver, 2005). Vancouver has a population of 583,296, Surrey has 383,831 and Burnaby has 202,966 (Ministry of Management, 2004). They are the three most populated cities in the province. 250 residents from Vancouver, 108 from Surrey, and 100 from Burnaby, in total 458 people, were contacted and asked to participate the study. White Pages for 2005 for the three cities were used. Therefore, the people who do not have telephone numbers were excluded. The number of names from the White Pages was selected proportional to the number of pages of the first letter of the last names (Heacock, 2005). Since there are twenty-six letters in the alphabet and 458 people,

about twenty people were randomly chosen for each letter of alphabet. The investigator for the study is fluent in English and Korean; therefore, whoever cannot understand those languages was excluded. Anyone under the age of 14 was excluded. If the participants require translation by their children, it was allowed only if the translator is 14 years old or more.

The standard interviewing times were from 10am to 5pm on weekdays, and 10am to 4pm on weekends Pacific Standard Time. The survey started on January 10, 2006 and ended on March 10, 2006. These hours were adjusted for participants who wished to participate other times (Social and Economic, 2005). The participants who were not available at those hours because of work, being sick, taking vacation or other matters were excluded. A minimum of two telephone call attempts for some people at different times were made in order to ensure that telephone numbers were attempted at various times of the day and days of the week (Social and Economic, 2005). The maximum number of times the investigator tried to reach a household was two.

6. Ethical considerations

Risk for completing the survey was not more than the normal risks of day-to-day living (Heacock & Chiodo, 2005). To minimize any potential discomfort and protect privacy of the participants, all data, especially personal contact information, would remain confidential and be destroyed upon completion of the study. The result of the survey would be available to the participants who wished to see at the study end. In the beginning of the interview, the investigator explained the purpose of the study and informed the participants that the study is voluntary and confidential (University of Massachusetts, 2005).

7. Pilot studies

The survey was tested on two pilot subjects: the investigator's friend and the BCIT instructor who has over thirty years of experience in Environmental Health field. The investigator administered the questionnaire to both of them in exactly the same manner (University of Massachusetts, 2005). The subjects provided feedback that some words during the survey were ambiguous and difficult to understand (Potter, 2005). The amount of time to complete the questionnaire was estimated to be less than five minutes. However it varied during the pilot studies. The friend took six minutes and the instructor, three and a half minutes. The friend said that some terms were unclear to him and asked for clarification, and thus the survey took longer than expected. Moreover, many questions were re-worded and shortened so that they were concise, straightforward and not too ambiguous or difficult to understand (Potter, 2005).

8. Complete description of materials used

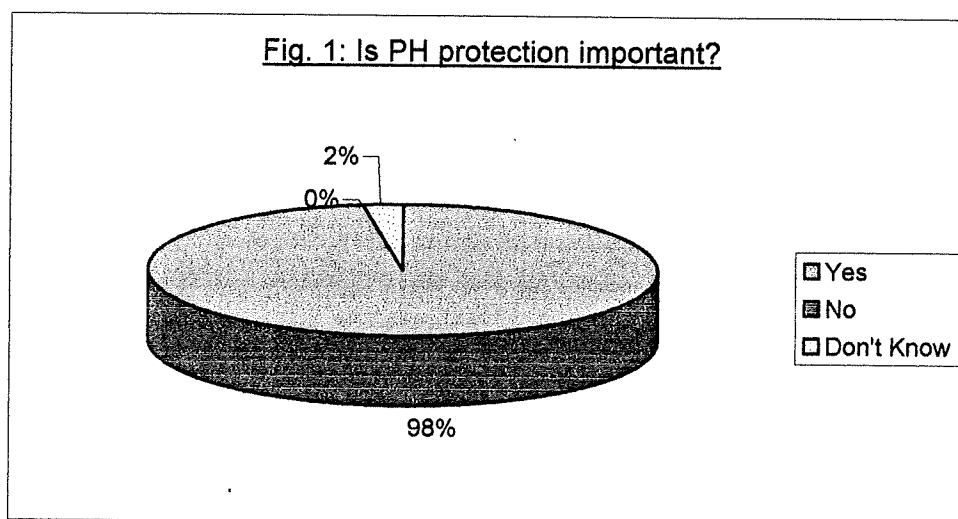
White Page telephone books for 2005 for Vancouver, Burnaby (Yellow Pages for Burnaby *et al.*, 2005) and Surrey (Yellow Pages for Langley *et al.*, 2005), NCSS 2004 (Hintz, 2004) computer software and a telephone with local phone connection were used for the survey.

RESULTS AND ANALYSIS

The survey was responded to by 42 persons. This represents a 9% response rate. Reasons given for not participating include that some people did not have time for survey, were not interested, worried about sharing personal information, were working at the time of call, were sick and could not speak English or Korean. Survey Scores can be found in Appendix II. The survey collected nominal data. Chi-square tests were used to analyze data and to determine

whether an association exists between gender and the perception of public health and the awareness of EHOs. NCSS 2004 was used for statistical analysis. However, if the proportions of groups or responses are small (i.e. less than ten percent), statistical analysis is not conducted. Raw data and data analysis can be found in Appendices.

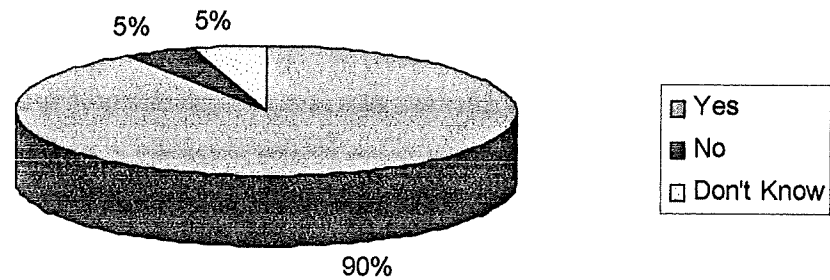
Q1. Importance of public health protection



41(98%) of the respondents said that public health protection is an essential service in Canada, and one (2%) said he or she does not know. No one (0%) said the public health protection is not essential.

Q2. Need for governmental intervention for communicable disease

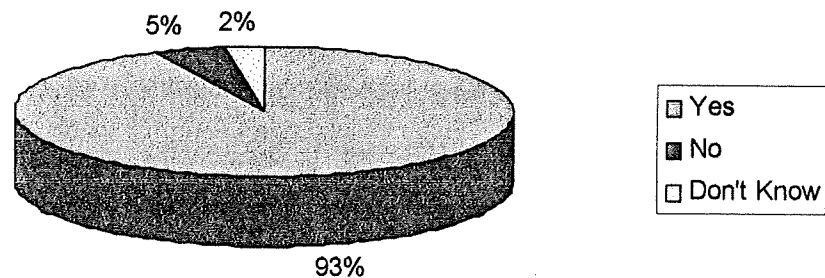
Fig. 2: Government intervention for communicable disease?



38(90%) of them responded that government intervention is required to protect Canadians from communicable disease. 2(5%) of the people said the government intervention is not required. 2(5%) said they do not know. One of the respondents explained that the government should not endorse vaccinations.

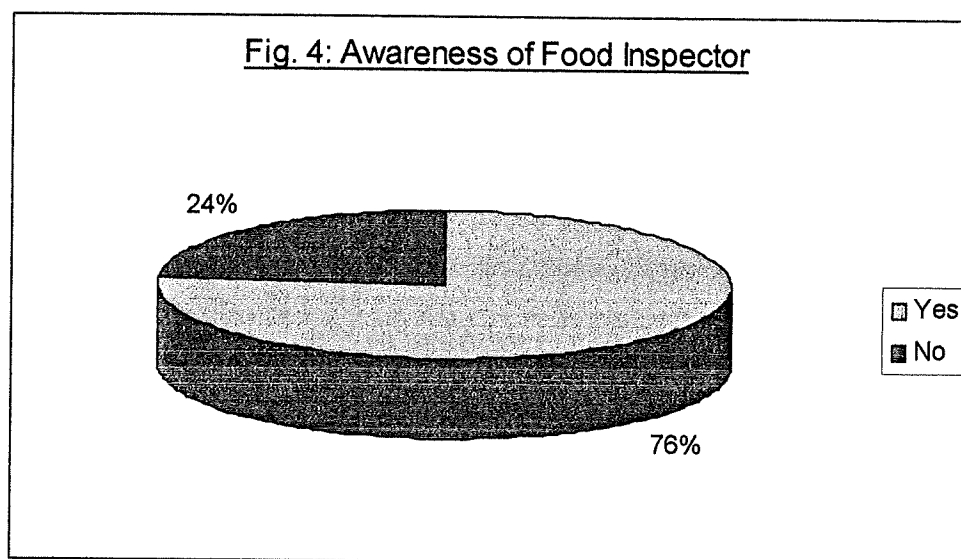
Q3. Need for governmental intervention for water-/food-borne disease

Fig. 3: Government Intervention for water/food-borne disease?



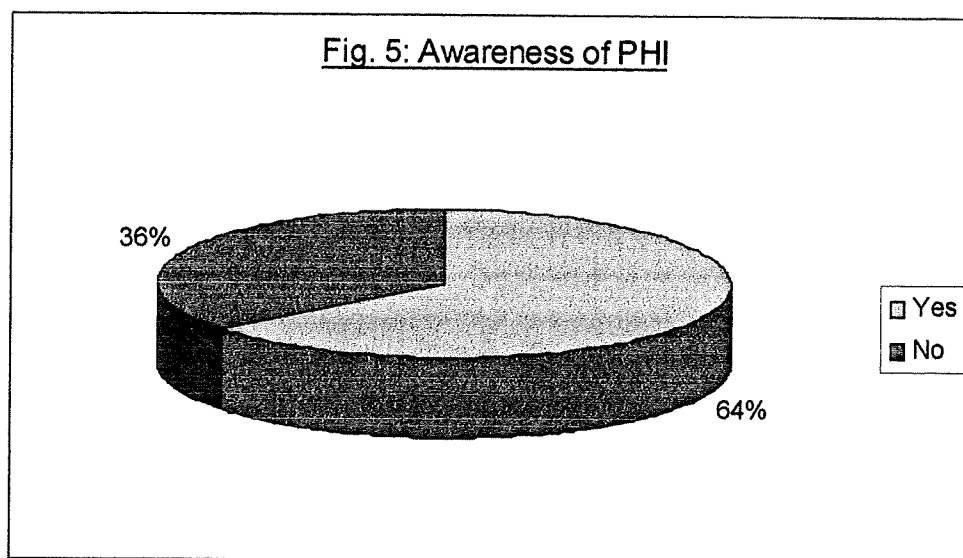
39(93%) of the respondents said that government intervention is required to protect Canadians from water/food-borne disease. 2(5%) answered, "no". 1(2%) responded that they do not know or are not sure.

Q4. Awareness of Food Inspector



32(76%) of the respondents knew what Food Inspectors do. 10(24%) did not know the term. Between the awareness of food inspector and gender, the chi-square was 0.525000 with the probability level of 0.468717, thus the null hypothesis was not rejected. Thus, There was no association between gender and the awareness.

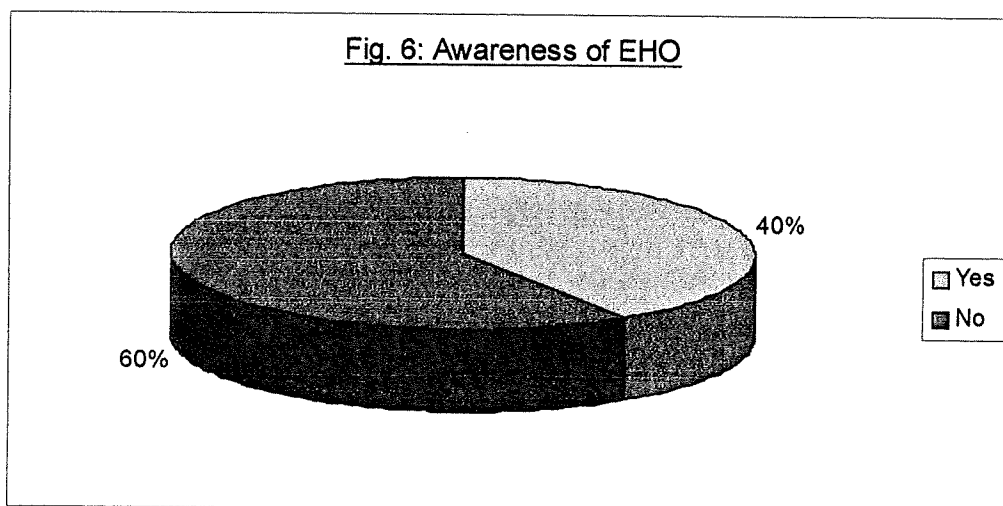
Q5. Awareness of Public Health Inspector



27(64%) knew what a Public Health Inspector does, and 15(36%) did not.

Between the awareness of PHI and gender, the chi-square was 0.933333 with the probability level of 0.333998, thus the null hypothesis was not rejected. There was no association between gender and the awareness.

Q6. Awareness of EHO



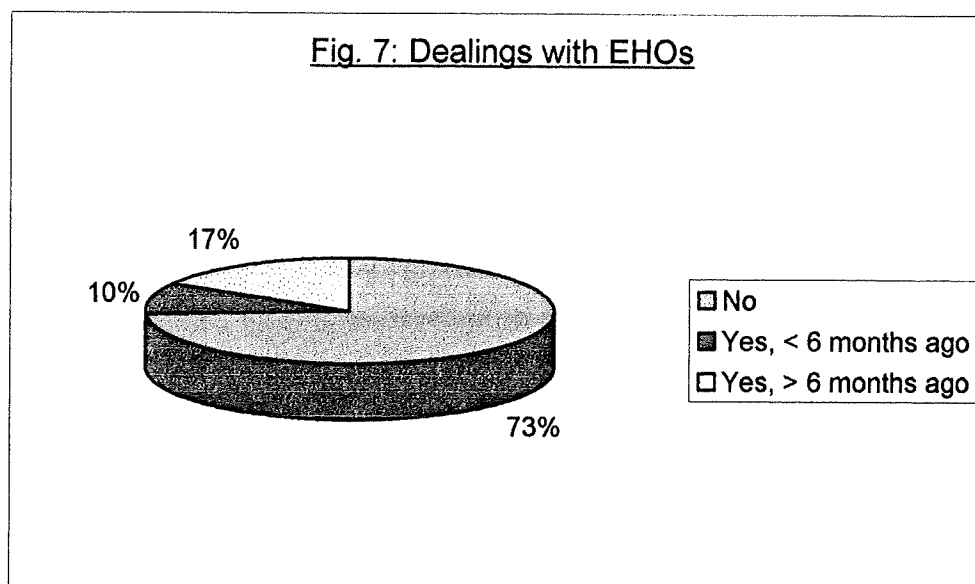
17(40%) of the respondents knew what Environmental Health Officers do and 25(60%) did not know. Between the awareness of EHO and gender, the chi-square was 0.098824 with the probability level of 0.753246, thus the null hypothesis was not rejected. There was no association between gender and the awareness.

Q7. Is EHO necessary?

All the 42(100%) respondents felt that EHOs are necessary in public health.

Q8. Functions of EHO that public aware of

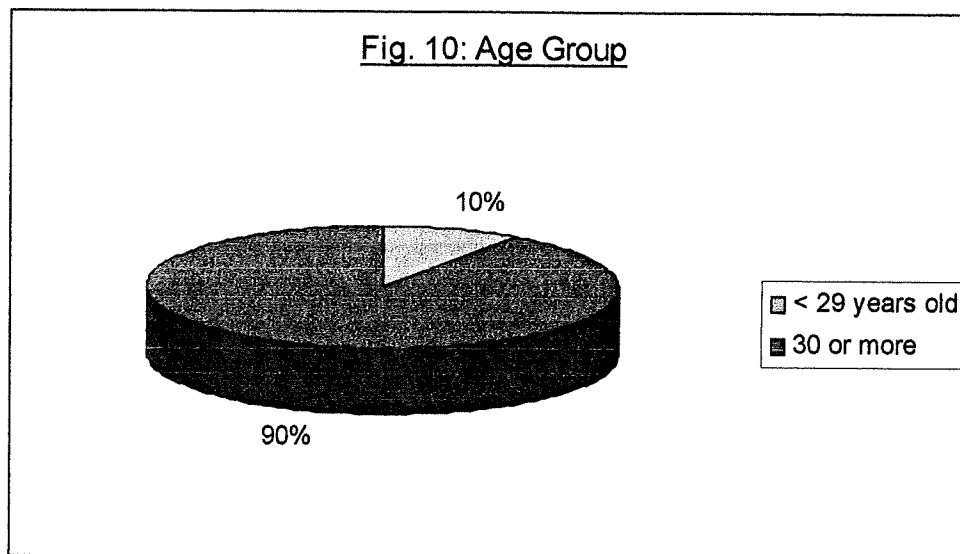
Some of the people who knew what an EHO do already were able to respond the question 8 in the script. They said that EHOs are involved in: restaurant inspection for food safety and staff hygiene, hospital inspection, regulation enforcement, building inspection, oil contamination, water pollution, animal control, environmental control, residential inspection, chemical spill, vaccination program, outbreak investigation, dairy, meat inspection (including meat packaging), hazard assessment, food market inspection, water sample, imported food inspection, pest management; daycare inspection, disease investigation, testing the levels of toxins in river, lake, and land (e.g. mining), complaints regarding noise, water and air, school inspection and others.

Q9. Dealing with EHO

31(73%) of the respondents never had dealt with EHOs. However, 4(10%) and 7(17%) had dealt with EHOs less than six months ago and more than six months ago, respectively. Those who had dealings with EHO did so because of the following: workplace safety, restaurant inspection, food packaging inspection, lighting in the street, house issue, air discharge pollution issue, business issue and others. Some of the responses were too specific and thus, were not included because of confidentiality.

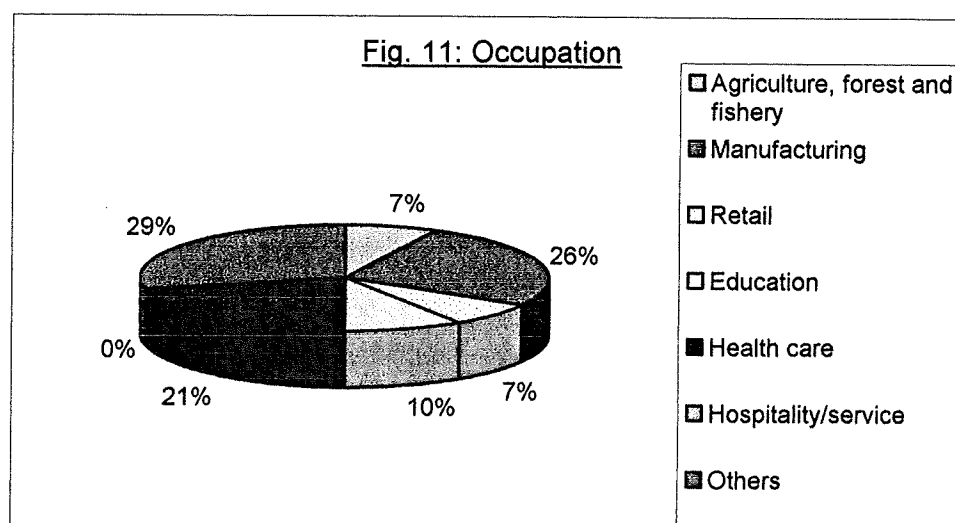
21(50%) of the respondents were female. 21(50%) of the respondents were male.

Q12. Participants: Age



4(10%) of the respondents were less than 30 years old and 38(90%) were 30 or over.

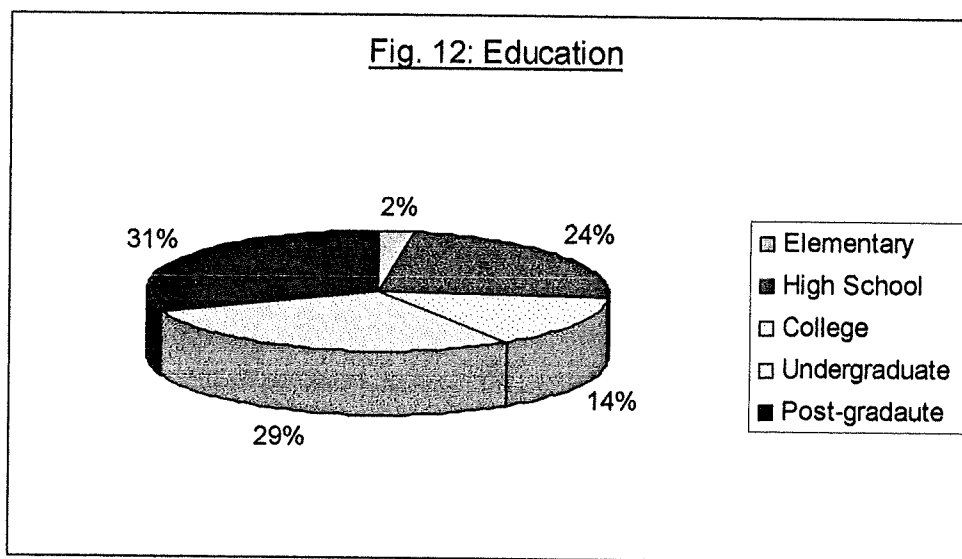
Q13. Participants: Occupation



3(7%) of the respondents work in agriculture, forest and fishery. 11(26%) of them are involved in manufacturing. 3(7%) are in retail, 4(10%) are in education, 9(21%) are in health

care, 12(29%) are in other fields such as real estate, management, engineering, journalism, pulp and paper mill, urban planning, consulting, architecture and transportation.

Q14. Participants: Level of Education



1(2%) of the respondents have elementary school education. 10(24%) have high school completion, 6(14%) have college diplomas, 12(29%) have university undergraduate degrees and 13(31%) have post-graduate degrees.

DISCUSSION

Dr. Butler-Jones dedicated the week of January 2 to 8, 2006 as Canada's first Environmental Public Health Week. The initiative was promoted by Canadian Institute of Public Health Inspectors (CIPHI) (Butler-Jones, 2006). The Canadian Chief Public Health Officer adds that CIPHI takes vital roles of "[improving] Canada's public health workforce" (Butler-Jones, 2006). The purposes of celebrating the week as Environmental Public Health Week are "1) to recognize the important work of Environmental Public Health Professionals in Canada, 2) to

increase the public's knowledge and awareness of the role of Environmental Public Health Professionals in the health of their communities, and 3) to celebrate the achievements of Environmental Public Health Professionals with our members and partners” (Sudbury, 2006). As mentioned, the survey started on January 10, 2006 that is after the monumental week, the study represents a valuable evaluation of the impact of promoting Environmental Public Health Week.

Ninety-eight percents of respondents consider that public health protection is an essential service and must be provided for everyone. According to Maslow's Hierarchy of Needs theory, being safe from doing activities including simply eating food or drinking water is one of human's basic needs (Simons *et al.* 1987). The result validates the theory.

The majority of people answered that government should be the agency that coordinates intervention programs for communicable disease and water-/food-borne disease. Their response can be interpreted that they do not want to see private sectors taking care and control of their safety. Often private companies work towards profit, not people's health concern. Thus, people foresee that government is best suited to work in order to attain good public health protection and would have minimal hindrance such as financial issues in achieving the goal.

The term “Food Inspector” is well known by Canadians, maybe because the term is self-explanatory or has been used for a long period of time by the media. Even if a person has never heard about a food inspector, she/he can easily assume that food inspector is a person who inspects food and food service establishment such as restaurants. Over seventy percent of the people knew what they are. However, the term does not fully describe the public health professionals who do more than just food inspection. One hypothesizes that there is association between gender and the awareness of the term. With 95% confidence, one fails to say there was

association between gender and the awareness. Either being male or female does not affect knowing food inspectors.

Seventy-six percent of the people know about what a public health inspector does. The people who knew about a public health inspector described the public health inspector's roles: restaurant inspection, daycare inspection, public institution (e.g. school) inspection, vaccination program, outbreak investigation and other non-food complaints such as noise and complaints. From observing the responses, one can say that some people may not even know what public health inspectors do but could have guessed from looking at the term that the public health inspector would be a person who deals with any public health issues such as handling outbreaks. With 95% confidence, one fails to say there was association between gender and the awareness. Either being female or male does not affect knowing public health inspectors.

For the awareness of an environmental health officer, less people were aware of the term and its function in public health compared to food inspectors and public health inspectors. The title, environmental health officer is relatively new compared to the other two. Thus, this can be one of the contributing factors that people are not aware of the term. Those who know about the title said that the health officers are involved in environmental control, oil contamination, pest management, water samplings, land (e.g. mining), and restaurant inspections. Again, some may not know the term and assume the roles by looking at the words, environmental health. Currently, the health departments in Vancouver and Burnaby use the titles but not in Surrey office. Surrey Health Unit uses the term, "Public Health Officer". Again, with 95% confidence, one fails to say there was association between gender and the awareness. Either being male or female does not impact on the knowledge of environmental health officers.

Over seventy percent of the respondents have never dealt with environmental health officers. Since forty percent of them did not know about the existence of such profession, even if the general public had some legitimate public health concern, they would not or could not report to the health officers. Most of those people, who had experience dealing with the officers, are involved in food services where the officers go and meet the operators and staff there.

Less than fifteen percent of the participants were interested in working as an environmental health officer. To determine whether more men or women are interested in public health and have sufficient passion about the issue to pursue their career in public health, one attempts to figure out the association between gender and the consideration of becoming the health officers. One fails to say there was association between gender and the consideration. Moreover, the class of 2006 for Environmental Health program in British Columbia Institute of Technology consists of nine men and twelve women. The ratio is 3:4. This shows that gender takes minimal impact on choosing career as an environmental health officer.

Coincidentally, the gender split was equal among the participants. Having equal numbers of each gender prevents from getting skewed data that may arise from one particular gender. Ninety percent of the people were over thirty years of age. This could give skewed data that may arise from the age group. Often the older a person gets, he/she has more exposure to public issues and has more interest in them, which may skew the results. The study included respondents involved in a variety of occupations. This is one of the strengths in the study, because people from different fields, not just food service, participated, which makes the study more validated and applicable to public. Over fifty percent of the people have at least an undergraduate degree from university. This is another strength in the study, because it shows that the responses were from educated communities.

LIMITATIONS

Even though the sample size is more than thirty, the response rate was only nine percent. The main reasons include language barriers and time of the callings. Most people, whom the investigator contacted, were not able to participate because they could not speak English or Korean. Because the three cities in the lower mainland contain many immigrants who speak different languages, getting responses from English and Korean-speaking people may have decreased the response rate. The interviewing times on weekdays were made during the usual business hours. Thus, the people, who work during those hours, did not even have a chance to be asked to participate the survey. Due to time constraints, the investigator could not reach the every household at least twice when the call was busy or had no answer first time. The majority of the respondents were over thirty years old, and most of them already had careers they were passionate about. Thus, question 10 was more useful to the people who were young and are in the process of choosing a career.

CONCLUSIONS AND RECOMMENDATIONS

Environmental health officers may to be a new term for residents in Vancouver, Burnaby and Surrey; however, they have been around and worked for the public for long time. One can say that the officers are the people who work in behind the scenes and seldom get credit for their work. Because the health officers are working in prevention of public health hazards, there is seldom publicity in the media. However, in the past few years, outbreaks of West Nile Virus, Norwalk Virus, SARS, and Avian flu have brought the work of EHOs to the forefront. Given this the newly initiated Environmental Public Health Week and results of the survey, the important role of EHOs is beginning to be more widely recognized.

The study focuses on the association of gender and awareness of health officers. The investigator wanted to determine whether there was an association between men and women in term of the perception of public health. However, the results suggest there is no association between gender and awareness of health officers.

Further studies are highly recommended. Future studies should attempt to obtain higher response rates (e.g. 80%) and respondents from multiple locations (not only from urban cities but also rural areas). To increase the response rate, Internet surveys would be highly recommended. The investigators should also consider the people who speak languages other than English. Further studies can assess the public perception between the terms, a public health inspector and an environmental health officer. Because both terms describe same type of profession, and often used interchangeably, which sometimes creates confusion, asking public which of the title is more approachable and makes more sense would be helpful for the health units in other municipalities to either keep using the title, a public health inspector or to change to an environmental health officer.

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APPENDIX I

Script

Surveyor: Hello, May I speak with Mr./Mrs. (name shown in the telephone book)?

(If a child answers and says parents are out, ask his/her age. If the child is over the age of 14, proceed with the survey.)

(For permission and participation)

Surveyor: Hello, my name is Joseph Lim and I am a student at BCIT in the Environmental Health Program. As part of my course work, I am conducting a survey to assess the level of knowledge of the general public with respect to the public health and Environmental Health Officers. Your name was chosen at random from White Pages for (Vancouver/Burnaby/Surrey). The information you provide for the survey does not require you to identify yourself and will be kept entirely confidential. Your participation is completely voluntary. The survey takes approximately less than 5 minutes. Would this be possible now or would you like me to call back at a more convenient time? Do you have any questions?

Surveyor: May I continue with the survey?

(If "no"... "Is there a reason I can write down for why you do not wish to participate? ... Thank you")

(If "yes"... continue with survey.)

1. In your view is public health protection (e.g. ensuring safe water) an essential service in Canada?
 - a. Yes.
 - b. No.
 - c. Do not know
2. Is it important that government intervention (e.g. giving EHO authority to isolate infected individuals) be required to protect Canadians from communicable disease? (Centers for Disease, 2003; Jones *et al.*, 2004)
 - a. Yes.
 - b. No.
 - c. Do not know.
3. ...from water/food-borne disease (e.g. inspecting restaurant an swimming pool)? (Bryan, 2002; Fielding *et al.*, 1999; Jin *et al.*, 2003)
 - a. Yes.
 - b. No.
 - c. Do not know.
4. What do Food Inspectors do?
 - a. I know and they ...
 - b. I don't know.
5. What do Public Health Inspectors do?
 - a. I know and they ...
 - b. I don't know.
6. What do Environmental Health Officers (EHOs) do?
 - a. I know and they are ...
 - b. I don't know.

(If "b." ... read the following paragraph and ask only question 7)

Surveyor: EHOs are the food inspectors and public health inspectors. EHOs are public servants who enforce and educate in order to protect public health. For example, in any outbreak, they are

heavily involved in the investigation. Also, if you have any health-related complaints on restaurants, they are ones you should call. You can contact them through your local health department. (Saskatchewan Health, 2005)

7. In your opinion, are EHOs necessary in public health?
 - a. Yes.
 - b. No.
8. Describe the functions of EHOs. Specify: _____
9. Have you ever had dealings with EHOs?
 - a. Yes
 - i. Less than 6 month ago
 - ii. More than 6 month ago

If yes, what was the reason for the contact? _____
10. Have you ever considered being an EHO?
 - a. Yes.
 - b. No.
11. Are you male or female?
12. Are you...
 - a. Less than 30 years old?
 - b. 30 years old or more?
13. Which field of work do you do?
 - a. Agriculture, forest, fishery
 - b. Manufacturing
 - c. Retail
 - d. Education
 - e. Health care
 - f. Hospitality/ Service
 - g. Others, specify: _____
14. What is your level of education?
 - a. Elementary school education
 - b. High school completion
 - c. College diploma program completion
 - d. University undergraduate degree completion
 - e. University post-graduate degree completion
 - f. Other, specify: _____

Surveyor: Any comments about public health, the role of EHOs, or suggestions on how EHOs can provide better service to protect public health? Thank you for participating. If you need more information about the study, I can send you the cover letter for the study by fax. If you would like to receive a copy of the result of the study, I would be glad to provide one for you. Good-bye.

APPENDIX II

Data Result and Analysis:

1. Data Result: Survey Score (Raw Data) and Value Label
2. Statistical Analysis: Cross Tabulation Reports

	Public he	Gov Inter	Gov Inter	Food Ins	PHI	EHO	Necessary	C8	Dealing	Consider	Gender	Age	Work	Education
1	0	0	0	0	1	1	1	0	1	1	0	1	0	0
2	0	0	0	0	0	0	0	0	2	1	1	1	4	4
3	0	0	0	0	0	0	1	0	1	1	0	1	1	2
4	0	0	0	0	0	0	1	0	1	1	0	1	6	1
5	0	0	0	0	0	0	1	0	3	1	1	0	1	2
6	0	2	0	0	0	1	1	0	3	1	0	1	6	1
7	0	0	0	0	0	0	1	0	1	1	0	1	1	2
8	0	0	0	0	1	0	0	0	3	0	1	1	4	1
9	0	0	0	0	0	0	0	0	2	1	0	1	1	3
10	0	0	0	0	0	0	0	0	1	1	1	0	1	2
11	0	0	0	0	0	0	1	0	1	1	1	1	3	3
12	0	0	0	0	0	0	0	0	1	1	1	1	1	1
13	0	0	0	0	0	0	1	0	1	1	1	1	4	3
14	0	1	0	0	0	0	1	0	1	1	0	0	4	3
15	0	0	0	0	0	0	0	0	3	0	1	0	2	1
16	0	0	0	0	0	1	0	0	1	1	0	1	6	3
17	0	0	0	0	1	0	0	0	1	1	1	1	6	3
18	0	0	0	0	0	0	1	0	1	1	0	1	6	4
19	0	0	0	0	0	1	1	0	1	1	1	1	2	1
20	0	0	0	0	1	1	1	0	1	1	1	1	3	4
21	0	0	0	0	0	1	1	0	1	1	1	1	4	4
22	0	0	0	1	0	0	1	0	1	0	1	1	1	1
23	0	0	0	0	0	0	1	0	1	1	0	1	1	1
24	0	0	0	0	0	0	0	0	1	1	0	1	3	4
25	0	0	0	0	0	0	0	0	1	1	0	1	4	4
26	0	0	0	0	0	0	1	0	2	1	1	1	6	4
27	0	0	0	0	1	1	1	0	1	1	0	1	3	4
28	0	0	0	0	0	0	0	0	3	1	0	1	6	4
29	2	0	0	0	0	1	0	0	2	1	0	1	2	3
30	0	0	0	0	1	1	1	0	1	1	0	1	6	3
31	0	0	0	0	0	1	1	0	1	1	0	1	1	1
32	0	0	0	0	1	1	1	0	1	1	1	1	1	3
33	0	0	0	0	1	1	0	0	1	1	1	1	4	2
34	0	0	0	0	0	0	1	0	1	1	0	1	6	3
35	0	0	0	0	0	1	0	0	1	1	0	1	0	3
36	0	1	0	0	0	0	0	0	1	1	0	1	6	4
37	0	0	0	1	0	0	1	0	3	1	1	1	6	1
38	0	0	0	0	0	0	0	0	3	1	1	1	1	2
39	0	2	2	1	1	1	0	0	1	0	1	1	0	3
40	0	0	0	0	1	1	1	0	1	0	0	1	4	4
41	0	0	0	0	0	0	1	0	1	1	1	1	4	4
42	0	0	0	0	0	0	0	0	1	0	1	1	6	4

	Name	Label	Transformation	Format	Data Type	Value Label
1	Public_he	Public health				0 = yes; 1 = no; 2 = don't know
2	Gov_Inter	Gov Inter Disease				0 = yes; 1 = no; 2 = don't know
3	Gov_Inter	Gov Inter H2OFood				0 = yes; 1 = no; 2 = don't know
4	Food_insp	Food Inspector				0 = yes; 1 = no; 2 = don't know
5	PHI	PHI				0 = yes; 1 = no; 2 = don't know
6	EHO	EHO				0 = yes; 1 = no; 2 = don't know
7	Necessary	Necessary				0 = yes; 1 = no; 2 = don't know
8	C8					
9	Dealing	Dealing				1 = no; 2 = yes, less than 6 mon; 3 = yes, more than 6
10	Consider_	Consider being				Food_Inspector
11	Gender	Gender				0 = male; 1 = female
12	Age	Age				0 = < 29 yrs old; 1 = 30 yrs old more
13	Work	Work				0 = agr; 1 = manu; 2 = retail; 3 = edu; 4 = health; 5 = s
14	Education	Education				0 = elemen; 1 = high; 2 = col; 3 = under; 4 = post; 5 =
15	C15					
16	C16					
17	C17					
18	C18					
19	C19					
20	C20					
21	C21					
22	C22					
23	C23					
24	C24					
25	C25					
26	C26					
27	C27					
28	C28					
29	C29					
30	C30					
31	C31					
32	C32					
33	C33					
34	C34					
35	C35					
36	C36					
37	C37					
38	C38					
39	C39					
40	C40					
41	C41					
42	C42					
43	C43					
44	C44					
45	C45					
46	C46					
47	C47					
48	C48					
49	C49					
50	C50					
51	C51					
52	C52					
53	C53					
54	C54					
55	C55					
56	C56					
57	C57					
58	C58					
59	C59					
60	C60					
61	C61					
62	C62					

Cross Tabulation Report

Page/Date/Time 1 2006-04-30 오후 6:54:49
Database C:\Documents and Settings\Li ... osep\ENVH\Research\data3.S0

Counts Section

	Gender		
Food_Inspector	0	1	Total
0	17	15	32
1	4	6	10
Total	21	21	42

The number of rows with at least one missing value is 0

Expected Counts Assuming Independence Section

	Gender		
Food_Inspector	0	1	Total
0	16.0	16.0	32.0
1	5.0	5.0	10.0
Total	21.0	21.0	42.0

The number of rows with at least one missing value is 0

Chi-Square Statistics Section

Chi-Square	0.525000	
Degrees of Freedom	1	
Probability Level	0.468717	Accept Ho

WARNING: At least one cell had a value less than 5.

Cross Tabulation Report

Page/Date/Time 1 2006-04-30 오후 6:54:05
Database C:\Documents and Settings\Li ... oseph\ENVH\Research\data3.S0

Counts Section

	Gender		
PHI	0	1	Total
0	12	15	27
1	9	6	15
Total	21	21	42

The number of rows with at least one missing value is 0

Expected Counts Assuming Independence Section

	Gender		
PHI	0	1	Total
0	13.5	13.5	27.0
1	7.5	7.5	15.0
Total	21.0	21.0	42.0

The number of rows with at least one missing value is 0

Chi-Square Statistics Section

Chi-Square	0.933333	
Degrees of Freedom	1	
Probability Level	0.333998	Accept Ho

Cross Tabulation Report

Page/Date/Time 1 2006-04-30 오후 6:53:24
Database C:\Documents and Settings\Li ... osep\ENVH\Research\data3.S0

Counts Section

	Gender		
EHO	0	1	Total
0	8	9	17
1	13	12	25
Total	21	21	42

The number of rows with at least one missing value is 0

Expected Counts Assuming Independence Section

	Gender		
EHO	0	1	Total
0	8.5	8.5	17.0
1	12.5	12.5	25.0
Total	21.0	21.0	42.0

The number of rows with at least one missing value is 0

Chi-Square Statistics Section

Chi-Square	0.098824	
Degrees of Freedom	1	
Probability Level	0.753246	Accept Ho

Cross Tabulation Report

Page/Date/Time 1 2006-04-30 오후 6:52:08
Database C:\Documents and Settings\Li ... oseph\ENVH\Research\data3.S0

Counts Section

	Gender		
Consider_being	0	1	Total
0	1	5	6
1	20	16	36
Total	21	21	42

The number of rows with at least one missing value is 0

Expected Counts Assuming Independence Section

	Gender		
Consider_being	0	1	Total
0	3.0	3.0	6.0
1	18.0	18.0	36.0
Total	21.0	21.0	42.0

The number of rows with at least one missing value is 0

Chi-Square Statistics Section

Chi-Square	3.111111	
Degrees of Freedom	1	
Probability Level	0.077760	Accept Ho

WARNING: At least one cell had an expected value less than 5.