

Title 5 Guam Code Annotated, Chapter 9, Article 3
ECONOMIC IMPACT STATEMENT
GUAM FOOD CODE

SUMMARY

The Department of Public Health and Social Services (DPHSS) is proposing to adopt the Guam Food Code to replace the existing "*Rules and Regulations Relative to Eating and Drinking Establishments*" and apply this document for the regulation of all retail food facilities on Guam. Retail food facilities (RFF) are those commercial establishments which prepare and provide packaged and non-packaged foods directly to consumers; it does not include food manufacturers and distributors.

DPHSS issues approximately 3,000 Sanitary Permits annually to various health-regulated establishments, and just over half are for retail food facilities. In Fiscal Year 2011, 1,092 and 561 Sanitary Permits were issued to RFFs in the categories of Eating and Drinking Establishments and Food Establishments, respectively, for a total of 1,653 permits. If adopted, the Guam Food Code will govern the sanitary operation of these 1,653 facilities and the compliance inspections conducted by the Division of Environmental Health (DEH) of DPHSS.

Because the total financial impact is expected to exceed \$500,000, this economic impact statement was prepared by DEH, pursuant to Article 3 of Title 5 GCA Chapter 9, using available local and national data and the collection of survey data from sampled establishments. A survey questionnaire was distributed to over 300 establishments that would be affected by the adoption of the Guam Food Code; one-hundred responses were received. The survey focused on four specific requirements of the code that DEH believes would have the biggest financial impact to the regulated facilities. These four provisions were the no bare-hands contact; consumer advisory; manager certification; and the reduced cold holding temperature requirements. DPHSS also reviewed the local morbidity reports of the past decade and national statistics on food-borne illnesses.

As a result of the survey, it is estimated that the adoption of the Guam Food Code will have a direct total financial impact of \$1,888,914.80 to the industry and DEH in the first year of its implementation. In subsequent years, the financial cost will be reduced to about \$1,142,943.30 a year as the one-time costs for the replacement of the refrigeration units and the training of industry by DEH will no longer be applicable.

- No bare-hands contact (Projected annual cost: \$482,308.80)
- Consumer advisory (Projected annual cost: \$478,804.50)
- Manager certification (Projected annual cost: \$181,830)
- Reduced cold holding temperature (Projected one-time cost: \$719,051.50)
- Training workshops (Projected one-time cost: *\$26,920)

*\$6,000 incurred by DPHSS for securing training venue sites

The anticipated costs given by the respondents in the survey were liberally interpreted by calculating the upper ends of their estimates. The projected one-time cost of \$719,051.50 that may result from the implementation of the reduced cold-holding temperature provision of the code may actually be much less than reported by the survey respondents based on the observations of DEH personnel during inspections of these facilities and the findings of the State of North Carolina in their own economic impact study for their adoption of the FDA Food Code.

The economic impact to the industry is nominal (\$3.07/day for the first year and \$1.86/day the following years) if the costs are equally distributed to all the affected retail food facilities. Thus, it is unlikely the increased cost from implementing the Guam Food Code will be passed down to the employees or customers, or result in any substantial increase in the cost of business. Adverse impact to employment is also not expected. Instead, there may be an increase in employment as establishments may need to recruit a certified manager or additional certified managers to ensure one is on duty during the entire operation of the their establishments

While the increased costs that will result from the adoption of the Guam Food Code may be deemed as an adverse impact to the affected businesses, the overall impact will be beneficial to the economy and the health of the population from the expected reduction in the number of foodborne illness incidents on the island and its associated economic burden. The collective reduction of the economic burden derived from food-borne illness through the implementation of preventive measures mandated in the Guam Food Code will outweigh the actual and imagined cost that the industry will experience in the adoption of the code.

From the period of 2002-2011, there were 1,584 diseases reported in Guam that were of types associated with the consumption of contaminated food or water. The largest food-borne illness outbreak ever recorded on Guam in the past 20 years occurred in May 2011; it involved over 350 elementary school students in five public schools, and was linked to a regulated commercial food facility. The island also averages over 1,000 gastroenteritis cases a year, and if 20% of the infections are caused by the norovirus, as reported by U.S. Centers for Disease Control and Prevention, then it may be assumed that about 200 of the island's reported incidents are due to the virus. Norovirus infections account for nearly 60% of all known foodborne illnesses in the U.S.

The economic burden of food-borne diseases in the U.S. annually has been estimated to be \$77.7 billion resulting from the 48 million food-borne illnesses occurring every year in America. This equates to \$1,626 per case. If the annual estimate is applied to Guam using the island's 2010 census, Guam's share of the economic cost for food-borne illnesses would be approximately \$41.3 million a year. The May 2011 outbreak at the five public schools is estimated to have had an economic burden of \$257,150 from the health impact alone, and does not include the cost incurred by the government in responding to the outbreak. While the implementation of the Guam Food Code will not assure that all food-borne illnesses will be prevented on Guam, and thus eliminating the estimated \$41.3 million economic burden, it will however reduce the potential for this type of illnesses from occurring. If the Guam Food Code can prevent even a single case of listeriosis on island, which has an economic burden that is estimated to be over \$1

million a case, through the lowering of the cold holding temperature provision, then the code can theoretically offset much of the economic impact to Guam's retail food facilities.

I. Purpose and Need

The lawful operation of businesses regulated by the Department of Public Health and Social Services (DPHSS) requires the acquisition of a Sanitary Permit from the Division of Environmental Health (DEH) of the Department pursuant to Title 10 GCA Chapter 21. The issuance of a Sanitary Permit enables DEH to regulate the applicable establishments to ensure that these facilities are sanitary and operate in such a manner as to prevent the transmission of communicable diseases, which include food-borne illness, to the public. Businesses possessing a Sanitary Permit are required to allow the access and inspection of its regulated facility by DEH. One type of regulated business is the retail food facility (RFF), which provides food directly to consumers. RFF includes restaurants, bars, stall stands, caterers, cafeterias, grocery stores, mobile food carts, and other similar permanent and temporary establishments, but does not include wholesalers/distributors which do not provide food directly to consumers.

DEH conducts compliance inspections of RFF to ensure these establishments operate in a manner, and possess the physical assets, to prevent food-borne illness in those who consume their food products. These regulatory inspections are conducted through the implementation of adopted rules and regulations that provide the sanitary operation and physical requirements that RFF must comply with, such as:

- Construction and maintenance of the establishment
- Preparation, display, transportation, storage, and protection of food
- Health, personal cleanliness, clothing, and practices of food employees
- Equipment installation and usage
- Cleaning and sanitization of equipment and utensils
- Water supply and plumbing of the establishment
- Hand-washing and toilet facilities
- Waste removal
- Insect and rodent control
- Lighting and ventilation of the establishment

Currently, DEH imposes the "*Rules and Regulations Relative to Eating and Drinking Establishments*" and the "*Rules and Regulations Relative to Retail Food Store Sanitation*" for the regulatory control of all RFFs on Guam. The two regulatory documents were adopted in the years 1984 and 1987, respectively. Since the adoptions of the two regulations, over twenty years ago, there has been increased knowledge about food pathogens and improvements in the technology and practice of food safety. To incorporate and apply the new information and improved practices for the purpose of better protecting the public from food-borne diseases that could occur from consuming commercially available food products and meals, DEH seeks to update its existing rules and regulations by adopting the "Guam Food Code," which closely mirrors the Model Food Code that was developed by the U.S. Food and Drug Administration (FDA). The Model Food Code is a science-based guide for food protection that FDA encourages

all U.S. jurisdictions to adopt for uniformity. The document guide is reviewed every 2 years. Many states have adopted the model code in parts or in whole.

According to the U.S. Centers for Disease Control and Prevention (CDC), it is estimated that there are 48 million food-borne illnesses in the U.S. annually with 128,000 hospitalizations and about 3,000 deaths¹. Norovirus accounts for the most food-borne illness (58%) in the U.S. for all known pathogens. It is also one of the leading food-borne pathogens that cause hospitalizations. The five known food-borne pathogens that cause the most deaths in the nation are *Salmonella*, *Toxoplasma*, *Listeria*, norovirus, and *Campylobacter*. Collectively, they contribute to 88% of all food-borne illness deaths.

From 2002 to 2011, Guam had 698 reported cases that were identified as “food poisoning” over the ten year period². If other reported diseases, which can be acquired through the ingestion of contaminated food, water, or other vehicles, were included (i.e., cholera, Hepatitis A, *Vibrio*, etc.), this number would be 1,584 over the same period. These figures exclude the number of reported “gastroenteritis” cases, which averaged 1,093 *a year* (or 10,093 total cases) for the ten year time span³. In a March 21, 2013 press release, CDC reported that norovirus is now the leading cause of severe gastroenteritis in U.S. children⁴. The press release noted that 21% of the total acute gastroenteritis cases they examined were caused by norovirus.

The true number of food-borne illnesses recorded on Guam is likely much greater since most go unreported. Regardless of the actual number of incidents that may occur on Guam, food-borne illness is a significant public health concern and a single outbreak can include hundreds of individuals, such as the one that sickened over 350 students at five public schools in May 2011. It was the largest recorded food-borne illness outbreak on Guam in the last twenty years. Two more separate outbreaks involving more than 20 individuals each also occurred in 2011.

With the adoption of the Guam Food Code, the Department of Public Health and Social Services seeks to prevent and reduce the number of food-borne diseases occurring on island. Two specific provisions - reduced cold-holding temperature and no bare-hands contact - in the proposed code will place additional safeguards to protect the public from listeriosis and norovirus, respectively. The Guam Food Code will also ensure that managers of all RFFs become certified as possessing food safety knowledge and its application.

II. Financial Impact

The Department of Public Health and Social Services (DPHSS) issues approximately 3,000 Sanitary Permits annually to various regulated businesses on Guam. Of the total number of permits issued, nearly 75% are for food-related facilities, and of that, approximately three-fourths are retail food facilities (RFF). Therefore, over 1,600 permitted establishments would be governed, and thus impacted, by the adoption of the Guam Food Code.

The Guam Food Code (the “Code”) essentially has the same requirements as the existing rules and regulations, but is much more detailed and comprehensive. More importantly, it also places additional safeguards, thus, further requirements on the industry, to protect consumers from

potential food-borne diseases. The most significant changes that would likely have the greatest financial impact to the RFF are the no bare-hand contact provision; reduction in cold-holding temperature; implementation of the consumer advisory; and the requirement of a managerial certification of all RFF managers on duty:

- a. The Guam Food Code will prohibit the use of bare hands when handling ready-to-eat foods to reduce the likelihood of illnesses caused by those pathogens that have high infectivity and are associated with poor hygiene, such as norovirus and shigella. As a result, ready-to-eat meals cannot be touched with bare hands. Consequently, establishments will need to implement practices that may result in additional costs, such as procurement of (disposable) gloves and additional utensils.
- b. The Code will lower the cold-holding temperature from 45 °F to 41 °F to control the growth of the pathogenic bacteria, *Listeria monocytogenes*, which can grow at temperatures lower than most pathogenic bacteria. To meet the new requirement, some establishments may need to retrofit, repair, or replace their refrigeration unit(s) so that it may keep food at lower temperatures than currently required. Such correction or change will cause the affected facilities to incur additional costs with the biggest financial impact to those possessing larger refrigeration units, such as the walk-in chillers.
- c. Consumer advisory is a provision in the Guam Food Code that requires retail food establishments to inform their customers of the increased risk from pathogens if the establishment serves or sells raw or undercooked beef, egg, pork, fish, lamb, milk, poultry, or shellfish in a ready-to-eat form or as an ingredient of a food item in ready-to-eat form. Such notification must be in writing through brochures, label statements, menu advisory, placards, or other effective written manner. The cost of compliance will most likely derive from the printing of the notices or stickers and the manpower to place these notices on pre-packaged, retail products.
- d. The proposed Code will require the person-in-charge to be present during all hours of operation of the RFF, and that the person-in-charge is a “certified food protection manager” who has passed a food protection manager certification program. The Code will be placing greater responsibilities on the manager of the RFF for its sanitary operation and the food it provides. The certified manager may be orally quizzed on his/her food safety knowledge by DEH staff during compliance inspections. The certification will require the manager to attend a brief course and pass its written examination. The cost of the certification course will be borne by the attendees, while the RFF may incur additional expenses from having its manager away from the worksite to attend the course.

To assess the direct financial impact the Guam Food Code may have on the 1,653 retail food facilities on island as a result of the adoption and implementation of the four specific provisions noted above, DPHSS conducted a survey. This survey, which was prepared in the form of a questionnaire (**Attachment A**), asked the following eleven questions of 312 randomly selected RFFs currently possessing a Sanitary Permit with the Department:

Part I: Consumer Advisory

1. Does your establishment serve or sell ready-to-eat undercooked meat, seafood, and poultry products?
2. If “YES” and the Guam Food Code is adopted, how do you plan to advise your customers?
3. What is the anticipated cost your business will incur in developing and providing the written advisory to your customers?

Part II: Manager’s Certificate

4. What are your hours of operation at this location?
5. How many shifts do you have during these hours?
6. How many of your shift supervisors have a current Manager’s Certificate?

Part III: Cold Holding

7. Does your facility have existing refrigeration equipment that is capable of maintaining food at 41 °F or less?
8. If “No,” how many refrigeration units will you need to purchase to be sufficient in number and capacity for your operation?
9. What is the total cost your business will likely incur to purchase new refrigeration equipment that is capable of maintaining food at 41 °F?

Part IV: No Bare-Hands Contact

10. Do your employees use their bare hands when handling ready-to-eat foods?
11. What is the total monthly cost your business has incurred, or will likely incur, to implement the “no-bare hands” provision, including anticipated expenses to purchase items checked in #2 above and any other associated costs.

The methodology of the survey and the determination of the sampling size of 312 establishments from a total of 1,653 RFFs are provided in **Attachment B**. Anticipating no response from some of 312 sampled establishments, DPHSS distributed the questionnaire to an additional 88 other randomly selected establishments for a total of 400 surveys.

In the two weeks given to the establishments to submit their completed survey, DPHSS received 100 responses. Not all of the respondents answered every question or followed the instructions given. Because the number of responses received was well below the determined sampling size of 312, the results are not statistically reliable. However, the findings did provide insight into the possible financial impact the implementation of the proposed Guam Food Code would have on the retail food establishments. Graphical results of the survey are provided in **Attachment C**.

Consumer Advisory

- Seventy respondents (70%) indicated that their facility did not serve or sell ready-to-eat raw or undercooked meat, seafood, and poultry products. Two respondents

did not answer the question, which suggested they too did not serve or sell these types of item.

- Twenty-eight respondents (28%) that noted that their facilities did serve or sell ready-to-eat raw or undercooked meat, seafood, and poultry products revealed that the written advisory would be provided by the following means (*Note: Several respondents checked multiple answers*):
 - Menu: 13
 - Placard: 7
 - Label: 23
 - Brochure: 4
 - Other: 5
- When asked what is the anticipated cost their business may incur to provide the written advisory to their customers, most (19 respondents – 57.6%) selected the cost-range of \$0.00 - \$499, which was followed by \$500 - \$999 (7 respondents – 21.2%). Around 9.1% (3 respondents) indicated that the impact would be from \$1,000 to \$1,499. Four respondents (12.1%) noted that their anticipated cost would be \$1,500 or greater. Twenty-eight responses were expected for this question since that was the number of respondents who had indicated that they would need to provide written consumer advisory; however, thirty-three had actually responded to this question about the anticipated cost.

Based on the results of the survey, most retail food facilities do not serve or sell raw or undercooked ready-to-eat meat, seafood, or poultry products; thus, the majority would not be impacted by this particular provision. For those facilities affected, just over half would not expect to expend more than \$500 to effectuate the provision, but because it was not made clear in the questionnaire, it is unknown if such cost is a monthly, yearly, or other date-related expense, or if this is a one-time cost. For those facilities needing, or wanting, to place its advisory on labels for their raw or undercooked RTE foods, such as grocery stores, the expenses will very likely be a recurring event.

Assuming that the reported, anticipated cost is a yearly expense and reflects the entire RFF population, the direct annual impact of the Consumer Advisory requirement to these facilities will be approximately \$478,804 if the upper end of each cost range was used for the assessment, as determined from the survey (Table 1).

Cost Range	Respondents	Number of RFF	Financial Impact
\$0.00 - \$499	19 = (19/100) = 19%	19% x 1,653 = 314.1	\$499 x 314.1 = \$156,735.90
\$500 - \$999	7 = (7/100) = 7%	7% x 1,653 = 115.7	\$999 x 115.7 = \$115,584.30
\$1,000 - \$1,499	3 = (3/100) = 3%	3% x 1,653 = 49.6	\$1,499 x 49.6 = \$74,350.40
\$1,500 and over	4 = (4/100) = 4%	4% x 1,653 = 66.1	\$1,999 x 66.1 = \$132,133.90
TOTAL	33%	545.9	\$478,804.50

Table 1. Estimated financial impact to Guam's Retail Food Facilities (RFF) to implement the consumer advisory provision of the proposed Guam Food Code.

Manager's Certificate

- While some RFFs operate 3 hours a day, others remain open 24 hours, but on the average, the facilities operate 12 hours a day. Five respondents had failed to respond to the question.
- Between 35 - 48% of RFFs have two shifts in their operation, while 16% to 21% had only one shift. Eleven did not provide a response.
- Nineteen to twenty percent (19% - 20%) of the RFFs have one or two shift supervisors possessing a manager's certification of some kind. No response was received for this question from forty-six respondents.

The daily 12-hour operation of many RFFs was consistent with what's commonly observed in the food industry (open at 10:00 a.m. and close at 10:00 p.m.), which reflected the existence of two work shifts for several of the RFFs. Because over 70% of the respondents indicated the presence of 1 or 2 supervisors with a manager's certificate, it appears most RFFs have at least one certified manager on duty during half or full day of their operation. However, lack of response to the question by 46% of the participants may also suggest that nearly half of the RFFs operate without the presence of any certified manager.

Current DPHSS rules and regulations require food facilities with 5 or more employees to have present at all time when operating, a manager with a Manager's Certificate from the Guam Community College (GCC). This particular certification is valid for 3 years. With the implementation of the Guam Food Code, all RFFs, regardless of the number of employees, will require that a certified manager be present when in operation. Assuming that all 1,653 RFFs on island will need a certified manager, and each have two shifts, there will be a need for 3,306 certified managers, but since about half have at least one manager who is currently certified, it is expected that about 1,653 managers will require certification. With GCC assessing a fee of \$110 per applicant for the certified manager course, DPHSS anticipates that the cost impact to the industry for this provision will be \$181,940 in the first year:

- 1,653 total RFFs have two shifts on the average and each shift requires a certified manager:
 - $1,653 \times 2 = 3,306$ Certified Managers needed
- Nearly 50% of all RFFs have at least one certified manager
 - $3,306 \div 2 = 1,653$ RFFs with one certified manager
- Remaining managers without certification
 - $1,653 \times \$110$ per applicant = \$181,830
 - \$181,830 = Anticipated impact cost to RFFs

Cold Holding

- Eighty-one respondents (81%) revealed that their refrigeration unit(s) had the capability to maintain food at 41°F or less. Twelve percent (12%) did not answer this question. Seven percent (7%) responded that their refrigeration units were not able to hold food at 41°F or less.
- Half of the respondents (4 out of 8) to the question that had asked the number of refrigeration unit(s) they will need to purchase to comply with the proposed requirement replied that 1 unit will be bought. *(Note: Although 7 responded that their units would not meet the new cold holding requirement, 8 answered the question on the number of units that will need to be purchased.)*
- One responded that as many as four units would need to be purchased to meet the new requirement.
- Sixteen (16), instead of the expected 7, responded to the question about the anticipated cost to replace their refrigeration units.
 - 4 respondents indicated that the costs would be \$5,000 or greater; however, three of them had not indicated that they would need to replace any refrigeration units in the previous question
 - The lone respondent who did answer the need to replace his/her refrigeration unit indicated that 2 units would need to be purchased
 - Three (3) indicated that the costs would be \$1,000 to \$4,999
 - Two of the three noted that they would need to replace 1 and 2 refrigeration units, while the third did not indicate such need
 - Remaining 9 respondents noted that their anticipated costs to replace 1 to 6 refrigeration units would be between \$500 to \$4,999

The majority of the respondents had indicated that their refrigeration units did have the capability to cool their food products to the proposed cold holding temperature of 41 °F or lower; this was not unexpected. It has been the observation of DPHSS' compliance officers that most, if not all, of the RFFs that have been inspected possess refrigeration units that are able to meet the new requirement, and those facilities that couldn't were utilizing equipment that were damaged or improperly maintained. Furthermore, not all RFFs would require refrigeration of their food products since they may carry only non-perishable foods (i.e., dry and canned goods), as suggested by the lack of response by 12% of the respondents to this particular question.

Refrigeration units observed in the island RFFs have ranged from a small tabletop refrigerator or reach-in chiller to the large industrial-grade walk-in chiller. Thus, the cost differences between one unit and another can be extremely wide and varied, which may explain the broad distribution of responses in the question about the anticipated cost to comply with this provision in the survey.

In determining the projected direct economic impact the RFFs will sustain in the implementation of this provision, the highest end of each price range (Question 3 of Part III) was multiplied by the number of affected RFFs, which was determined by the number of respondents for each range and its corresponding percentage to the total number of RFFs. For responses of "\$5,000 and above," the lower end of the range was used in the calculation. As a result, it is estimated that the cost would be \$719,051.50 based on the survey responses (Table 2).

Cost Range	Respondents	Number of RFF	Financial Impact
\$1.00 - \$499	3 = (3/100) = 3%	3% x 1,653 = 49.6	\$499 x 49.6 = \$24,750.40
\$500 - \$999	2 = (2/100) = 2%	2% x 1,653 = 33.1	\$999 x 33.1 = \$33,066.90
\$1,000 - \$1,499	2 = (2/100) = 2%	2% x 1,653 = 33.1	\$1,499 x 33.1 = \$49,616.90
\$1,500 - \$1,999	2 = (2/100) = 2%	2% x 1,653 = 33.1	\$1,999 x 33.1 = \$66,166.90
\$2,000 - \$2,999	1 = (1/100) = 1%	1% x 1,653 = 16.5	\$2,999 x 16.5 = \$49,483.50
\$3,000 - \$4,999	2 = (2/100) = 2%	2% x 1,653 = 33.1	\$4,999 x 33.1 = \$165,466.90
\$5,000 and over	4 = (4/100) = 4%	4% x 1,653 = 66.1	\$5,000 x 66.1 = \$330,500
TOTAL	16%	264.7	\$719,051.50

Table 2. Estimated financial impact to Guam's Retail Food Facilities (RFF) to implement the reduced hold holding temperature provision of the proposed Guam Food Code.

No Bare-Hands Contact

- Seventy-nine percent (79%) of those responding to the survey indicated that they did not use bare hands when handling ready-to-eat foods, while 14% acknowledged using bare hands. Seven respondents did not provide a response to this question.
- For those not using bare hands when handling ready-to-eat meals, most used either single-use gloves or utensils.
- More than half indicated that the cost to implement the no bare-hands practice is, or expected to be, less than \$200 a month.

The direct financial impact that will be borne by the RFFs for implementing the no bare-hands contact provision will derive from the purchase of disposable gloves and/or additional utensils. The indirect cost associated with no bare-hands contact may occur through the expenditure of non-monetary resources (i.e., time and effort) by the RFFs seeking and receiving waivers from this requirement. Such establishments, which will likely include manufacturers and dining facilities that provide/serve sushi, will be required to implement alternate safeguards and the Hazard Analysis Critical Control Point (HACCP) that will require additional time and effort by the RFF.

Using the results of the survey, it is assumed that 14% of all RFFs (232) will need to begin implementing the no bare-hands requirement upon the adoption of the Guam Food Code. Further assuming that these affected 14% will be incurring costs for the purchase of disposable gloves and/or utensils at the same costs as the survey results,

the direct monetary effect to the island's RFFs will be about \$38,266.80 per month. This equates to \$482,308.80 a year (Table 3).

Cost Range	Respondents	Number of RFF	Financial Impact
\$1 - \$49	19 = (19/100) = 19%	19% * [(14%)*(1,653)] = 43.9	\$49 x 43.9 = \$2,151.10
\$50 - \$99	19 = (19/100) = 19%	19% * [(14%)*(1,653)] = 43.9	\$99 x 43.9 = \$4,346.10
\$100 - \$199	13 = (13/100) = 13%	13% * [(14%)*(1,653)] = 30.1	\$199 x 30.1 = \$5,989.90
\$200 - \$399	12 = (12/100) = 12%	12% * [(14%)*(1,653)] = 27.8	\$399 x 27.8 = \$11,092.20
\$400 - \$599	03 = (03/100) = 3%	3% * [(14%)*(1,653)] = 6.9	\$599 x 6.9 = \$4,133.10
\$600 - Up	09 = (09/100) = 9%	9% * [(14%)*(1,653)] = 20.8	\$600 x 20.8 = \$12,480.00
TOTAL	75%	173.4	\$40,192.40
\$40,192.40 x 12 months = \$482,308.80/year			

Table 3. Estimated financial impact to Guam's Retail Food Facilities (RFF) to implement the no bare-hands contact provision of the proposed Guam Food Code.

DPHSS Training

The financial impact to the Division of Environmental Health was also evaluated based on the multiple workshops the Division is expected to provide to the RFFs to orient and educate the industry on the Guam Food Code. Consequently, the monetary impact to the industry to participate in these workshops was also examined.

In September of 2011, DEH provided three separate training sessions to over 200 industry representatives on the provisions of the 2005 Model Food Code in preparation for the adoption of the Guam Food Code. All RFFs with Sanitary Permits with the Division were invited, and while not all took advantage of the free course most did attend. The Division anticipates that the same type of workshops will need to be provided once again upon the adoption of the Guam Food Code. In calculating the projected cost to provide these training workshops, DEH examined the resources that were expended in 2011 and determined that the cost to provide the same would be \$6,000 for the rental of the venue sites to nearly 250 industry representatives:

- Number of expected industry participants: 250
- Number of full-day (8 hours) training sessions: 5
- Venue cost to accommodate 50 participants: \$1,200
- Total cost: 5 x 1,200/50pax = \$6,000

The total financial impact is applicable to only the first year of the Code's implementation. Further training of RFF representatives will occur through the required certification of managers who oversee the operation of their RFFs. The personnel cost incurred by DEH to provide the training workshops was not determined since such activity is part of the Division's mission and responsibilities.

Note: The 1,653 permitted RFFs will not reflect the total number of individuals that DEH is expecting to train because: some attendees will be representing multiple RFFs since their respective business owns/operates one or more facilities; many RFFs are

temporary establishments without permanent representatives; and some will not be taking advantage of the opportunity for whatever reason.

According to the U.S. Department of Labor, Bureau of Labor Statistics, the average wage of first-line supervisors in food preparation facilities, who are the probable participants of the training workshops, is \$10.46 per hour⁵. Thus, the total financial impact to the industry of attending the training presented by DEH will be approximately \$20,920:

- Number of hours attending the training: 8 hrs
- Number of participants: 250
- Total hours attending the training: 8 hrs. x 250 = 2,000 hours
- Average wage of attendee: \$10.46/hr
- Total cost: \$10.46/hr x 2,000 hours = \$20,920

Summing the projected costs of DEH providing the training and the industry representatives attending the workshops, the total cost will be about \$26,920.

Total Financial Impact

Among the four provisions of the proposed Guam Food Code evaluated in the survey, reduced cold-holding temperature requirement appears likely to have the greatest financial impact to the retail food facilities as 7% - 8% of all RFFs will need to purchase one or more refrigeration units at the total estimated cost of nearly \$720,000 to meet the proposed new requirement. Consumer advisory is expected to cost 463 RFFs almost \$480,000. This was followed by the annual cost of about \$482,000 by 232 RFFs to comply with the no bare-hands contact provision. The manager's certification requirement will have the least monetary impact to the RFFs at \$181,830.

The following year and thereafter, the amount will be reduced as the cost of the refrigeration units will no longer be applicable. Because these estimates are based on the results of the survey questionnaire, which did not represent the ideal sample number of the population, the data should be viewed only as an approximation.

The monetary impact to the Division of Environmental Health of DPHSS will occur through the training workshops the Division will be providing to the industry representatives to orient and train them in the Guam Food Code. The cost of hosting the five separate 8-hour workshops at a rented venue for 250 attendees by DEH personal, who will be providing the training, will have a financial impact of \$6,000. For industry representatives to attend these workshops, they will experience an additional total cost of \$20,920. Thus, the total cost to present and attend the training workshops will have a one-time economic impact of \$26,920.

The grand total of the direct financial impact to the island for the adoption and implementation of the Guam Food Code is determined to be \$1,888,914.80 in the first year and \$1,142,943.30 in subsequent years (Table 4).

Total Direct Cost of Adopting the Guam Food Code		
Requirement	Anticipated Cost	Comments
Consumer Advisory	*\$478,804.50	Requires retail food establishments to inform their customers of the increased risk from pathogens when consuming certain raw or undercooked foods
Manager's Certificate	\$181,830.00	Person-in-Charge of a retail food establishment will be required to possess certification of his/her knowledge of food safety
Cold Holding	**\$719,051.50	Cold holding temperature will be reduced from 45 °F to 41 °F to control the growth of the pathogenic bacteria, <i>Listeria monocytogenes</i>
No Bare-hands Contact	\$482,308.80	Prohibits the use of bare hands when handling ready-to-eat foods to reduce the likelihood of illnesses caused by those pathogens that have high infectivity and are associated with poor hygiene
Training Workshops	**\$26,920	DEH-DPHSS to provide five separate 8-hr training workshops to industry representatives on the Guam Food Code
ANTICIPATED TOTAL DIRECT COST IN THE FIRST YEAR = \$1,888,914.80		
ANTICIPATED TOTAL DIRECT COST IN SUBSEQUENT YEARS = \$1,142,943.30		

Table 4. Financial impact of adopting the proposed Guam Food Code based on the cost analyses of implementing the four significant requirements that would likely have the greatest economic impact to the industry and the training workshops that the Department of Public Health and Social Services will be providing to the industry on the new requirements. *The higher end of the cost range was utilized for the calculation. **One-time cost impact to RFFs and DPHSS.

Financial Impact: Guam Food Code vs. North Carolina Food Code

For comparative purposes, the survey results were measured against the fiscal impact evaluation conducted by the State of North Carolina in their adoption of the 2009 FDA Food Code⁶. Although there were several changes made to the 2005 FDA Food Code (that the Guam Food Code was mirrored after) in the development of the 2009 version, which North Carolina adopted, these changes were mostly enhancements to improve the language and the code's designation system. Thus, the changes were not overly significant and the two versions are quite similar, including the four provisions of the Guam Food Code that were surveyed by DPHSS.

North Carolina also examined the economic impact the consumer advisory, reduced cold-holding temperature, managerial certification, and the prohibition of bare hands would have on its food industry. The state also conducted an industry survey similar to DPHSS but through an online service. Of the 1,642 operators identified for the survey, North Carolina was able to get a completed response from 277, which represented 0.9% of the total ~31,000 food establishments in the state. DPHSS' survey response was much higher with 6.0% of the total RFFs.

In their findings, North Carolina concluded that total cost to the industry for requiring their managers to become certified would be \$4,496,000 (Guam = \$181,830). This figure was

applicable to all the persons-in-charge of their RFFs at an average cost of \$125 per person. This came out to be about \$145 per establishment (\$4,496,000/31,000). For Guam, the cost would be less at \$110 per RFF.

For preventing the contamination of ready-to-eat meals by hands (aka, No Bare-hands Contact), North Carolina identified the monetary impact to the industry as “unquantifiable” since the requirement can be readily addressed through the use of “*deli tissue, spatulas, tongs, single-use gloves, or dispensing equipment,*” but they acknowledged that the use of gloves may be the only associated cost. In the state’s industry survey, 78% of their respondents did not allow the use of bare-hands, which was nearly identical to Guam’s survey results (79%). Guam’s survey was able to elicit the estimated impact cost to implement this provision from the responders.

In North Carolina’s economic impact report, the reduction of the cold-holding temperature from 45 °F to 41 °F was originally believed to cause a notable economic burden on the food service industry as many would need to purchase new equipment since older refrigeration units would be unable to meet the new requirement. However, their research had proven that only on rare circumstances will the purchase of new refrigeration be necessary. The state’s report noted that according to the National Sanitation Foundation (NSF), “*most refrigerated storage units have been designed to achieve a 40 °F holding temperature since 1966.*” Furthermore, in response to the development of the Model Food Code, NSF revised its standard in 1997 to conform to the code, thus any refrigeration equipment replaced since 1999 should meet the 41 °F standard. The report further concluded that an average life expectancy of reach-in units is 10-12 years while the larger walk-in chillers had a longer life expectancy. In determining the one-time expected cost to the industry, North Carolina made an assumption that 1% of their establishments (310) will be required to replace 1 unit for the total cost \$855,600.

In the DPHSS’ industry survey, 16% of the respondents indicated that they would need to replace their refrigeration unit(s). The large difference between North Carolina’s assumption (1%) and Guam’s survey results (16%) may suggest that many RFFs on island may possess refrigeration units that are: older, improperly working, inadequately sized, or a combination of the three. Furthermore, Guam’s tropical climate may be adversely affecting the units’ ability maintain the lower temperature. If the total economic burden resulting from this requirement was to be evenly distributed to its respective RFF population in North Carolina, each of the state’s establishments would endure a financial impact of \$28 ($\$855,600 \div 31,000$), while each RFF on Guam would sustain an impact of \$435 ($\$719,051.50 \div 1,653$). The substantial difference of over \$400 per each Guam RFF may further suggest that the respondents over-estimated the cost impact in Guam’s survey, and thus, the economic impact of lowering the cold holding temperature may actually be considerably less.

North Carolina deemed the economic impact in applying the consumer advisory provision to their food industry as “unquantifiable.” Guam expects this provision will have a direct economic impact to the local RFFs through the printing of the advisories.

The approximate cost determined by North Carolina for training the industry on their Food Code was \$471,400. Their analysis was based on the estimated time and cost incurred by their State’s

food establishment supervisors for the extra one-hour spent with a compliance officer in a “one-on-one training” during the establishment’s initial compliance inspections after the code’s adoption. Guam’s analysis was based on the eight hours spent by each food establishment supervisor attending the training workshop. While North Carolina estimated the cost impact to its state and local governments for the enforcement of their code, DPHSS did not calculate such cost as the training and the implementation of the Guam Food Code are deemed part of DEH’s regular duties and responsibilities in training the community on food safety.

North Carolina had conducted additional cost analyses, which included other provisions of their code. Nearly all were found to be either at “no cost”, “little to no cost”, or “unquantifiable cost” to the industry.

Economic Burden of Foodborne Diseases

In the U.S., the annual economic burden of food-borne diseases is calculated to be \$77.7 billion based on the U.S. CDC estimates of 48 million food-borne illnesses occurring every year in America⁷. This equates to \$1,618.75 per case. A case of Norovirus has been calculated to be \$673 per case and \$3.7 billion in total cost per year. *Vibrio vulnificus* had the highest per case cost at \$1.28 million, while *Salmonella* (nontyphoidal) had the greatest total cost at a staggering \$11 million a year. This study used economic estimates to include “*pain, suffering, and functional disability measure based on monetized quality-adjusted life year estimates.*” However, it did not include costs of local, state, and county health departments’ response to food-borne outbreak response, thus, the actual economic cost amount is actually greater. If Scharff’s annual estimate was applied to Guam using the island’s 2010 census, Guam’s share of the economic cost for food-borne illnesses would be approximately \$41.3 million a year.

A single case of listeriosis, an infection caused by the *Listeria monocytogenes* bacteria, which can cause miscarriage, premature delivery, serious infection of the newborn, or even stillbirth, has an estimated economic burden of \$1.2 million a case. To retard the growth of *Listeria*, the proposed Guam Food Code will require that cold holding temperature be reduced to 41 °F.

Norovirus, the leading cause of food-borne illness in the U.S., has an economic burden that is significantly less than listeriosis per each case. However, the total burden of norovirus to the economy is more than twice than that of *Listeria*. The no bare-hands provision of the Guam Food Code will tackle the problem of norovirus by minimizing the potential contamination of food that can occur from using bare hands, the primary vehicle of the transmission.

As previously noted, from the period of 2002-2011, there were 1,584 diseases reported in Guam that were of types associated with the consumption of contaminated food or water. While it’s uncertain what percentage of this total is attributed directly to foods, or even foods that originated from food facilities, it would not be unreasonable to assume that half of those which were true foodborne illness outbreaks were linked to commercial establishments. According to the Centers for Disease Control and Prevention, half of all foodborne illness outbreaks occurring in the United States are associated with restaurants⁶. These outbreaks, involving multiple

individuals per event, were cases that were documented as result of medical treatments they had received; it did not include cases which were not seen by local clinic or hospital and thus never reported. It is not uncommon for food-borne illnesses to have gone unreported if the symptoms were not severe enough for the afflicted individuals to seek medical treatment. Therefore, the data provided above for Guam is very likely to be significantly less than the actual number of food-borne diseases that occurred.

In 2006, over 100 elementary school students became ill at a local elementary school. The investigation alone cost DEH several hundred man-hours of work and the loss of 1-2 instructional days for over 200 students. The school cafeteria, regulated by DEH, which served lunch at the school, was implicated as the source of the outbreak. Five years later, on May 12, 2011, Guam experienced the largest food-borne illness outbreak recorded on Guam in the last twenty years; it involved 370 students, faculty, and staff from five public schools who became ill after consuming egg salad sandwiches contaminated with *Staphylococcus aureus* enterotoxin that were prepared and served by a vendor contracted by the local school department. The outbreak resulted in the activation of the emergency operation center by the Guam Office of Homeland Security with the involvement of several government agencies. The investigation took the Division of Environmental Health over a month to complete.

Using Scharff's study, which noted the average cost of \$695 per case for *Staphylococcus aureus*, the financial burden of the outbreak that occurred at the five local schools alone in 2011 could have been \$257,150 from just the health impact alone. The total amount would be much higher if government personnel, equipment, and other expended resources were included in the calculation.

Guam averages over 1,000 reported gastroenteritis cases a year, and if 20% of the infections are caused by the norovirus, as reported by CDC, then it may be assumed that 200 of the island's reported incidents are due to the virus. Furthermore, the number of actual food-borne illnesses linked to this estimated 200 annual gastroenteritis infections may be considerable since norovirus infections account for nearly 60% of all known foodborne illnesses in the U.S. The implementation of the no bare-hands contact provision may reduce the number of gastroenteritis occurring on Guam.

Also, if the Guam Food Code can prevent even a single case of *Listeria* through the lowering of the cold holding temperature, Guam can prevent the anticipated economic burden of \$1,282,069 to treat the case. Thus, theoretically, the implementation of the Guam Food Code could essentially offset the total financial impact the Code will have on the industry if the island can prevent even a single case of *Listeria* infection that can arise from food.

The implementation of the Guam Food Code will not assure that all food-borne diseases will be prevented on Guam. However, it will reduce the potential of these illnesses from occurring, and thus, also reducing the estimated \$41.3 million annual economic burden to the island.

III. Potential Increase or Decrease to Cost of Living or Price of good or service

The direct economic impact to the industry from the adoption of the Guam Food Code is estimated to be \$1,882,914.80 (excluding the \$6,000 financial impact to DPHSS) in the first year, which equals to \$1,139.09 per each retail food facility, or \$94.92 per month, and therefore, about \$3.06 a day. The following years, the total annual impact to the industry will be reduced to \$1,142,943.30, or \$691.44 per facility for \$57.62/mo. (\$1.86/day).

It is unlikely the increased cost from implementing the Guam Food Code will be passed down to the employees or customers when the expected cost will be less than \$2.00 per day after the first year. Larger businesses may be able to readily absorb the increased cost without hardship. Even the smaller businesses should be able to handle the nominal cost increase since their actual expenses resulting from the adoption of the code would be proportional to the size of their operation. The greatest cost impact of implementing the Guam Food Code derives from the need to replace the businesses' refrigeration unit. As noted earlier, the actual cost may be much less based on the observation of DEH inspectors and the findings of North Carolina's own economic impact study. Those retail food facilities in need of replacing their unit(s) would probably have to do so even without the adoption of the law since their existing unit(s) may not be properly functioning and/or insufficient to handle the current operation of the establishments.

A reduction in the cost of living that may result from the adoption of the Guam Food Code could be attributed to the decrease in the incidence of food-borne illness, or other diseases, caused by improved compliance inspections of regulated facilities. However, the confirmation of such consideration may require more thorough analysis.

IV. Direct or Indirect Impact of Employment

Adverse impact to employment is not expected from the adoption of the Guam Food Code. The direct impact may occur from businesses needing to hire additional managers to ensure their establishments have a certified supervisor or manager at all time during its operation. Indirect impact to employment could result from existing certified managers required to work longer or additional hours to comply with the Guam Food Code.

V. Increase or decrease in cost of business

The retail food facilities will be the primary entities that will experience increased cost of doing business from the adoption of the Guam Food Code. The additional expenses they will bear will derive from the procurement of supplies, such as gloves, utensils, labels, and other materials to meet the consumer advisory and no bare-hand contact provisions of the Code; replacement or retrofitting of their refrigeration unit(s) to meet the new cold holding temperature; and the training and certification of their supervisors or managers in food safety knowledge and its application in the workplace. The expenses the retail food facilities will incur will decrease after the first year of the Code's implementation.

Other businesses, whether dealing with food or other goods, are not expected to experience any direct increase in cost of business if the Guam Food Code is adopted.

VI. Adverse or beneficial economic impact

The adoption and implementation of the Guam Food Code will certainly have a financial impact on the industry as retail food facilities will be required to implement new practices in their operation and possibly replace one or more pieces of their equipment. While these additional costs may be deemed as an adverse impact to the affected businesses, the overall impact will be beneficial to the economy and the health of the population from the anticipated reduction in the number of foodborne illness incidents on the island and its associated economic burden.

Based on existing national figures and studies, the cost of treating food-borne illnesses can be enormous, and preventing just a fraction of the diseases, or even a single costly infection, can offset the costs the industry may incur as a whole. For example, preventing even one case of listeriosis through the implementation of the lowered cold-holding temperature, as required in the code, could reduce the financial burden that exceeds one million dollars per case. Guam has been fortunate that no listeriosis case been reported in the past decade, and the adoption of the Guam Food Code is one preventive measure that the island can readily put in practice.

The implementation of the no bare-hand contact provision of the Guam Food Code should also have beneficial economic impact to the island. As CDC has indicated, norovirus is now the leading cause of severe gastroenteritis in U.S. children, with 1 in 278 children being hospitalized by the illness by the time they turn 5 years of age. The nearly 1 million pediatric medical care visits in 2009-2010 in the U.S. amounted to hundreds of million dollars in treatment costs each year. Thus, with the Code's adoption it can be expected that the incidence of norovirus and its economic burden can be reduced in Guam's vulnerable population.

Studies have shown that the presence of a certified manager in a food facility reduces the number of critical violations, and restaurants with such managers will less likely be involved in foodborne disease outbreaks than were restaurants without managers certified in food safety^{7,8}. According to the CDC, "*This finding is important because it suggests that restaurant manager food safety certification may provide a protective effect against foodborne illness.*" Consequently, a reduction in the number of food-borne illnesses translates to reduced economic burden to the population.

The anticipated reduction of foodborne illnesses on Guam, which is expected to occur from the implementation of the proposed Guam Food Code, should consequently reduce the economic burden these diseases have on the island and its people. These cost benefits should outweigh the actual and imagined costs that the industry may experience from the adoption of the Code.

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GUAM FOOD CODE - ECONOMIC IMPACT SURVEY

(Name of Facility)

(Print - Person completing survey)

Part I: Consumer Advisory

The proposed Guam Food Code (Section 3-603.11) contains a provision which requires retail food establishments to inform their customers of the increased risk from pathogens if the establishment serves or sell raw or undercooked beef, egg, pork, fish, lamb, milk, poultry, or shellfish in a ready-to-eat form or as an ingredient to a ready-to-eat form. Such notification must be in writing through brochures, label statements, menu advisory, placards, or other effective written manner.

Example: A restaurant offering eggs "sunny-side up" or "over-easy" will be required to provide a written notice on the menu, a placard on the dining table, or any other means that will effectively inform the customer of the risk of consuming such partially raw food.

1. Does your establishment serve or sell ready-to-eat undercooked meat, seafood, and poultry products?

YES _____ NO _____

If you answered "NO," you do not need to complete the rest of Part I. Please go on to Part II. If "YES," please continue below.

2. If "YES" and the Guam Food Code is adopted, how do you plan to advise your customers?
(Please mark all that apply.)

MENU _____ PLACARD _____ LABEL _____ BROCHURE _____ OTHER _____

3. What is the anticipated cost your business will incur in developing and providing the written advisory to your customers? (Please mark one only.)

\$0 - \$499 _____ \$500 - \$999 _____ \$1,000 - \$1,499 _____ \$1,500 and above _____

Part II: Manager's Certificate

The proposed Guam Food Code (Section 2-102.11) contains provisions which require that a person-in-charge be present during all hours of operation, and that the person-in-charge is a "certified food protection manager" who has passed a food protection manager certification program.

1. What are your hours of operation at this location?
(Please indicate time for each.)

Monday: _____ to _____
Tuesday: _____ to _____
Wednesday: _____ to _____
Thursday: _____ to _____
Friday: _____ to _____
Saturday: _____ to _____
Sunday: _____ to _____

2. How many shifts do you have during these hours?
 (Please mark number for each.)

Monday: 1 ___ 2 ___ 3 ___ 4 ___
 Tuesday: 1 ___ 2 ___ 3 ___ 4 ___
 Wednesday: 1 ___ 2 ___ 3 ___ 4 ___
 Thursday: 1 ___ 2 ___ 3 ___ 4 ___
 Friday: 1 ___ 2 ___ 3 ___ 4 ___
 Saturday: 1 ___ 2 ___ 3 ___ 4 ___
 Sunday: 1 ___ 2 ___ 3 ___ 4 ___

3. How many of your shift supervisors have a current Manager's Certificate? _____
 (ex: ServSafe Certificate from GCC)

Part III: Cold Holding

Current rules and regulations governing retail food facilities require chilled food to be kept at 45 °F or lower. The proposed Guam Food Code (Section 3-501) will require the temperature to be kept at 41 °F or lower to safeguard against the pathogenic bacteria, *Listeria monocytogenes*, which can grow at a temperature of 45 °F.

1. Does your facility have existing refrigeration equipment that is capable of maintaining food at 41 °F or less?

YES _____ (If "Yes," go to Part IV. Bare-hand Contact) NO _____

2. If "No," how many refrigeration units will you need to purchase to be sufficient in number and capacity for your operation? (Please mark one.)

1 ___ 2 ___ 3 ___ 4 ___ 5 ___

3. What is the total cost your business will likely incur to purchase new refrigeration equipment that is capable of maintaining food at 41 °F? (Please mark one.)

\$1 - \$499 _____ \$500 - \$999 _____ \$1,000 - \$1,499 _____
 \$1,500 - \$1,999 _____ \$2,000 - \$2,999 _____ \$3,000 - \$4,999 _____
 \$5,000 and above _____

Part IV: No Bare-Hand Contact

Current rules and regulations governing retail food facilities require food-handlers to wash their hands to prevent contamination of food, and the wearing of (disposable) gloves is optional. The proposed Guam Food Code (Section 3-301.11) will prohibit the bare-hand touching of ready-to-eat (RTE) foods. As a result, gloves and/or utensils must be utilized when handling RTE foods. Ready-to-eat foods are those food items that are already in a condition for immediate consumption.

Examples of RTE foods:

- Properly cooked meat and poultry products ready for consumption
- Salads and desserts prepared for serving
- Raw fruits and vegetables that have been washed
- Bakery goods not requiring further cooking
- Hot or cold held foods ready for consumption
- Rice and other ingredients for sushi
- Raw fish to be prepared and served as is (i.e., sashimi)

1. Do your employees use their bare hands when handling ready-to-eat foods?

YES _____ (If "YES," go to #3.) NO _____ (Please continue.)

2. If "NO," do your employees use:

(Check all that apply.)

Single-use gloves _____ Slash-resistant gloves _____ Utensils _____

3. What is the total monthly cost your business has incurred, or will likely incur, to implement the "no-bare hands" provision, including anticipated expenses to purchase items checked in #2 above and any other associated costs:

(Please mark one.)

\$1 - \$49 _____ \$50 - \$99 _____ \$100 - \$199 _____
 \$200 - \$399 _____ \$400 - \$599 _____ \$600 and above _____

4. Is the anticipated cost marked above in #3 only for purchases of the articles in #2?

YES _____ NO _____

If "NO," please explain:

METHODOLOGY IN THE CALCULATION OF THE APPROPRIATE SAMPLING SIZE FOR THE ECONOMIC IMPACT STUDY IN THE ADOPTION OF THE PROPOSED GUAM FOOD CODE

Permits Issued by Category/Subcategory

Category	Subcat	Permits
Eating and Drinking Establishment (E&D)	Bar	185
	Cafeteria	40
	Caterer	48
	Coffee Shop	37
	Drink Stand	4
	IPEE	14
	Lunch Room	2
	Mobile FSE	69
	Restaurant	460
	Sandwich Stand	2
	School Cafeteria	18
	Short Order	24
	Soda Fountain	18
	Stall Stand	114
	Tavern	34
Temp FSE (long term)	23	
Food Establishment (FE)	Bakery	53
	Deli	4
	Retail	504

Total E&D	1,092
Total FE	561
Total estab	1,653 N (our "population" size)

For the Economic Impact Statement survey:

If we would like a 95% confidence level, and a 3% level of precision for our results, and 50% variability then our sample size will need to be:

$$n_0 = [1.96^2 (.5) (.5)] \div (.03)^2 = 1,067$$

using the adjustment for a small population:

$$n = 1067 \div \{1 + [(1067-1) \div 1654]\}$$

$$n = 649$$

With a 95% confidence level, a 5% level of precision, and 50% variability, our sample size will be:

$$n_0 = [1.962 (.5) (.5)] \div (.05)^2 = 384$$

with the adjustment for small population:

$$n = 384 \div \{1 + [(384-1) \div 1,654]\}$$

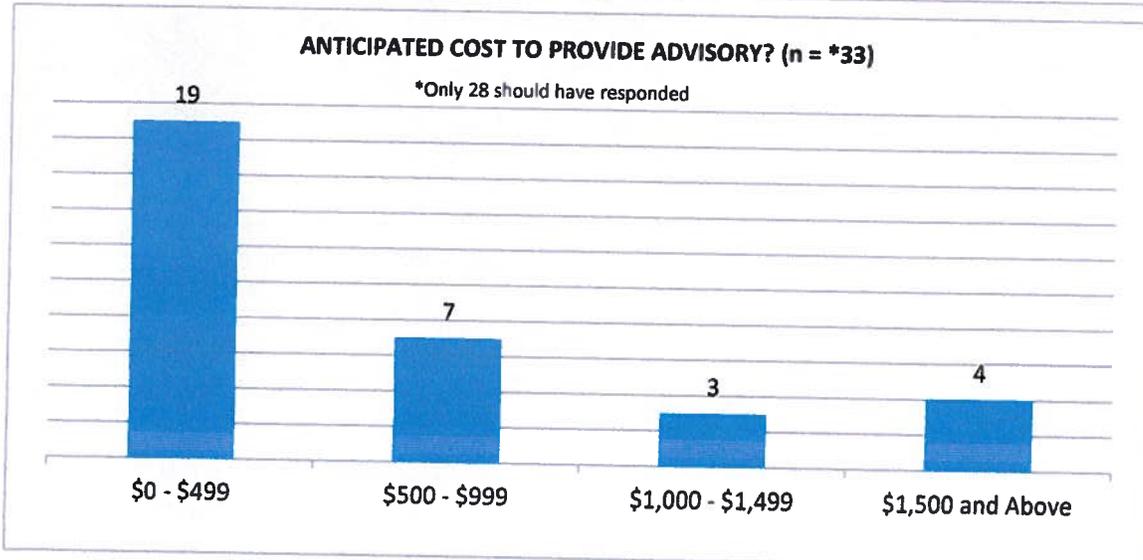
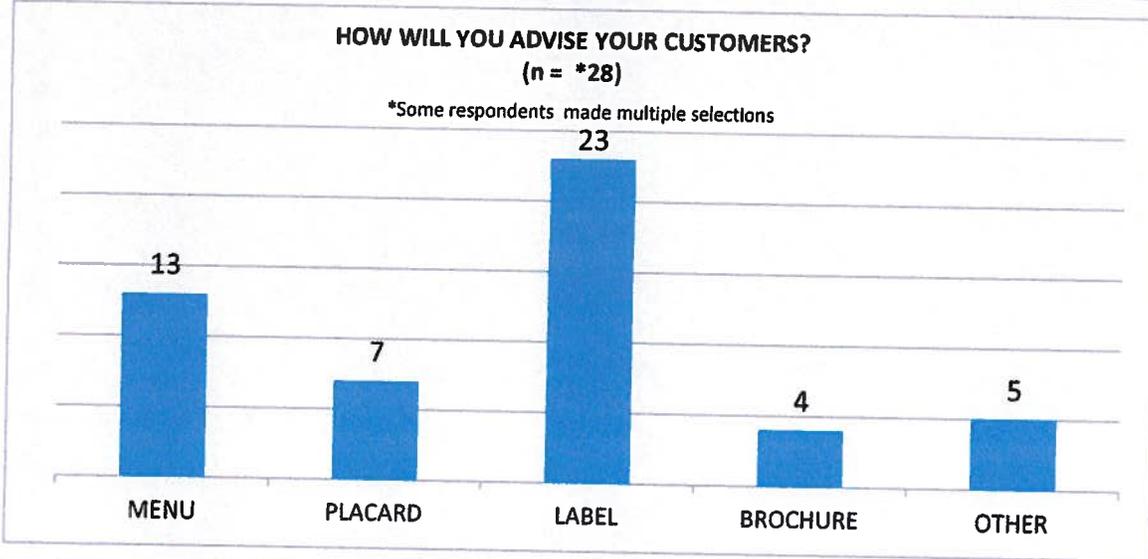
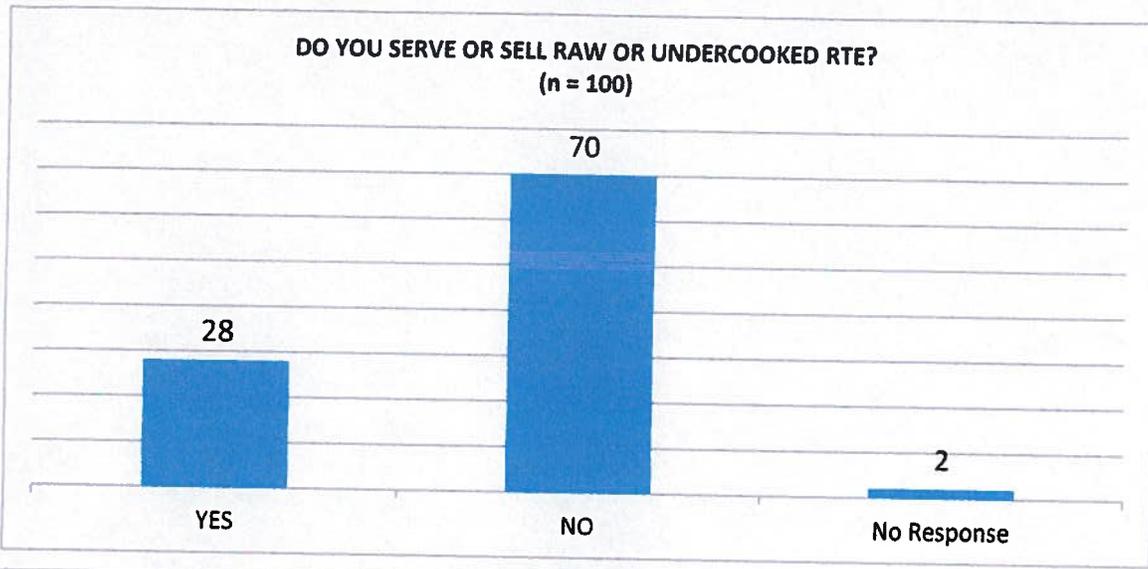
$$n = 312 \quad \text{Sampling size for survey}$$

Level of precision: Also known as sampling error, is the range in which the true value of the population is estimated to be. This range is often expressed in percentage points ($\pm 5\%$). So, if we find that 25% of HRE are affected by the adoption of the Guam Food Code with a precision rate of $\pm 5\%$, we can conclude that between 20% and 30% of HRE in the population will be affected.

Confidence level: Basically, our confidence that we chose a sample that is representative of the population we are surveying. Statistically: when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value, and the sample values are normally distributed around the true value (some higher, some lower).

Degree of variability: The distribution of the attribute in the population. Since we do not know the proportion of HREs that will be affected by the adoption of the GFC, we assume the highest degree of variability, 50%.

PART I: CONSUMER ADVISORY



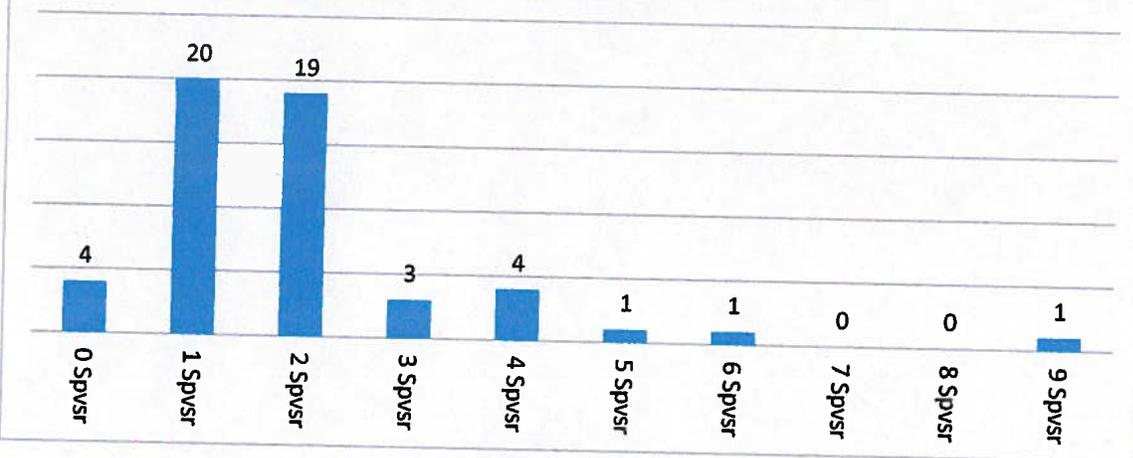
PART II: MANAGER'S CERTIFICATION

NUMBER OF HOURS OF OPERATION? (n = *96)

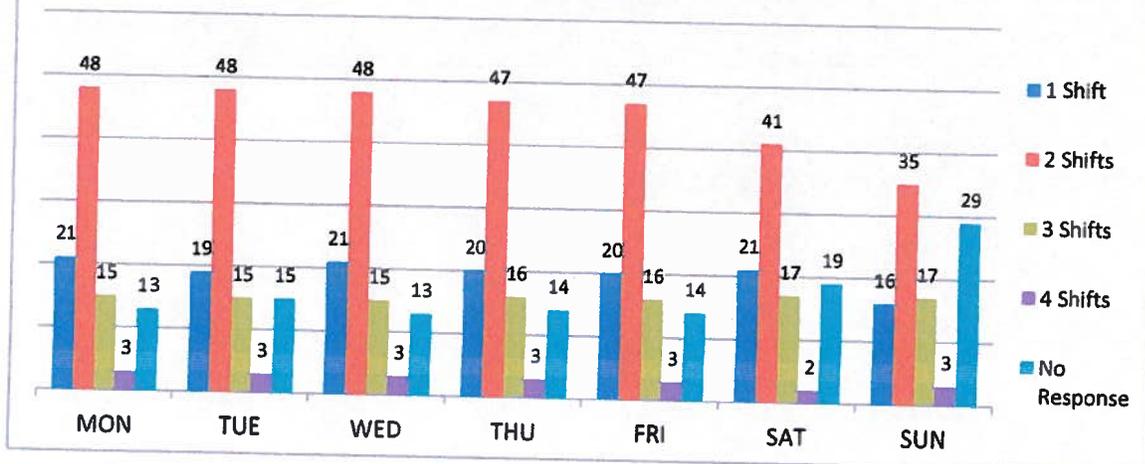
*Four did not respond

	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Sun.
Range =	3 - 24 hours						
Arithmetic Mean =	13.1	13.2	13.1	13.2	13.3	13.3	13.6
Geometric Mean =	12.2	12.5	12.2	12.4	12.5	12.6	12.8

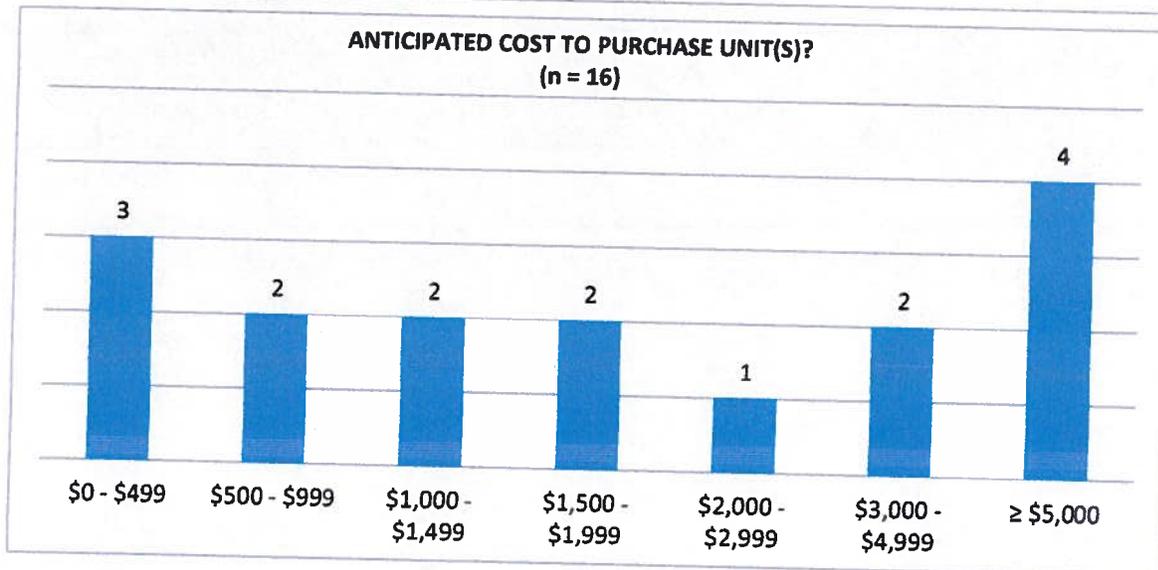
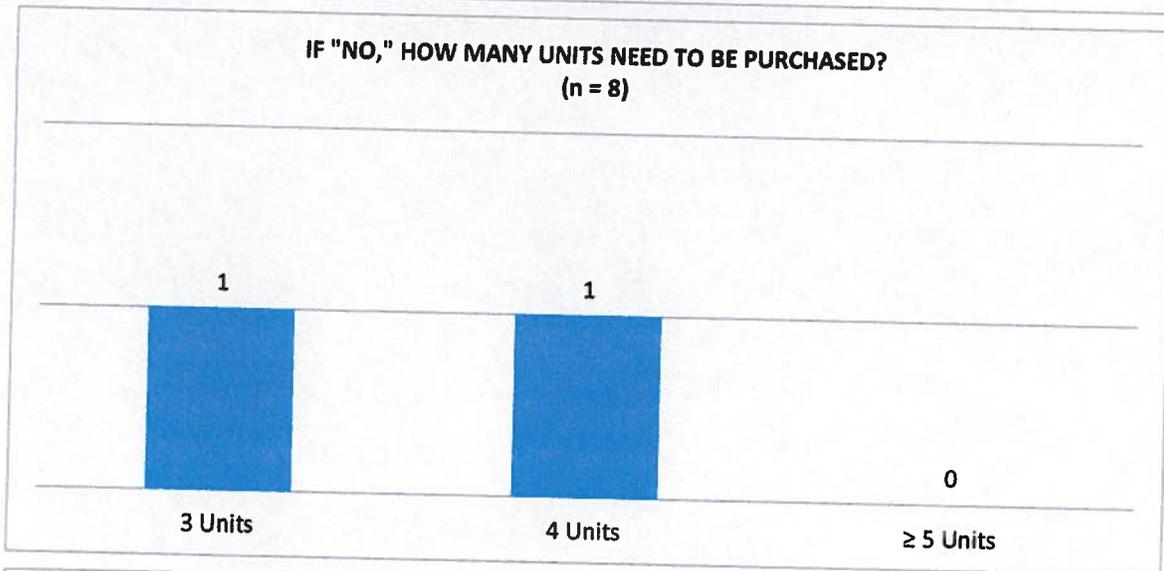
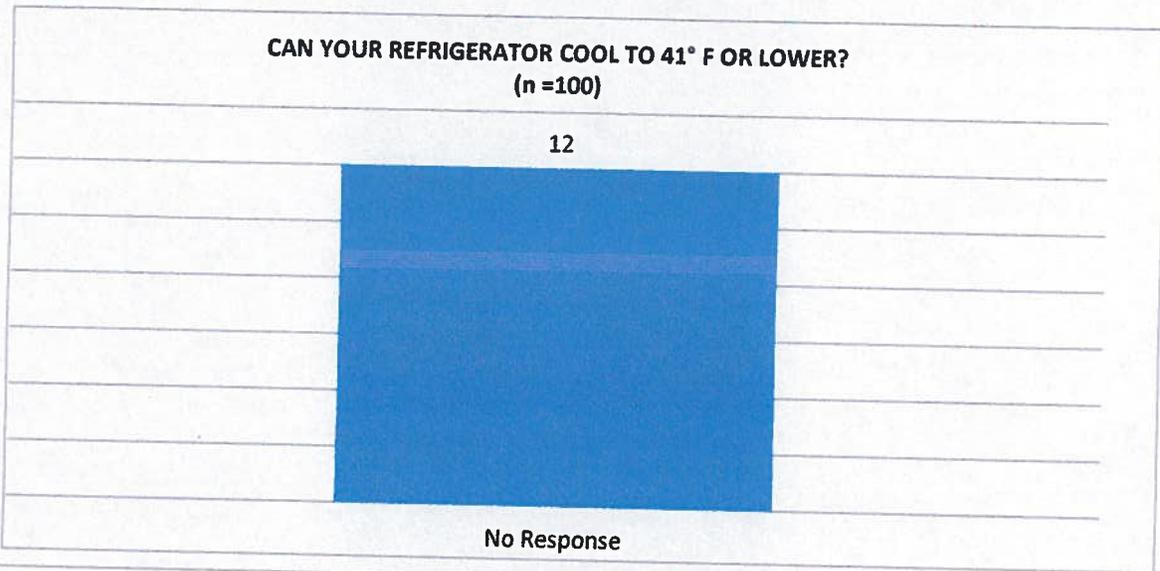
**NUMBER OF SHIFT SUPERVISORS WITH MANAGER'S CERTIFICATE?
(n = 53)**



**HOW MANY SHIFTS DO YOU HAVE?
(n = 100)**

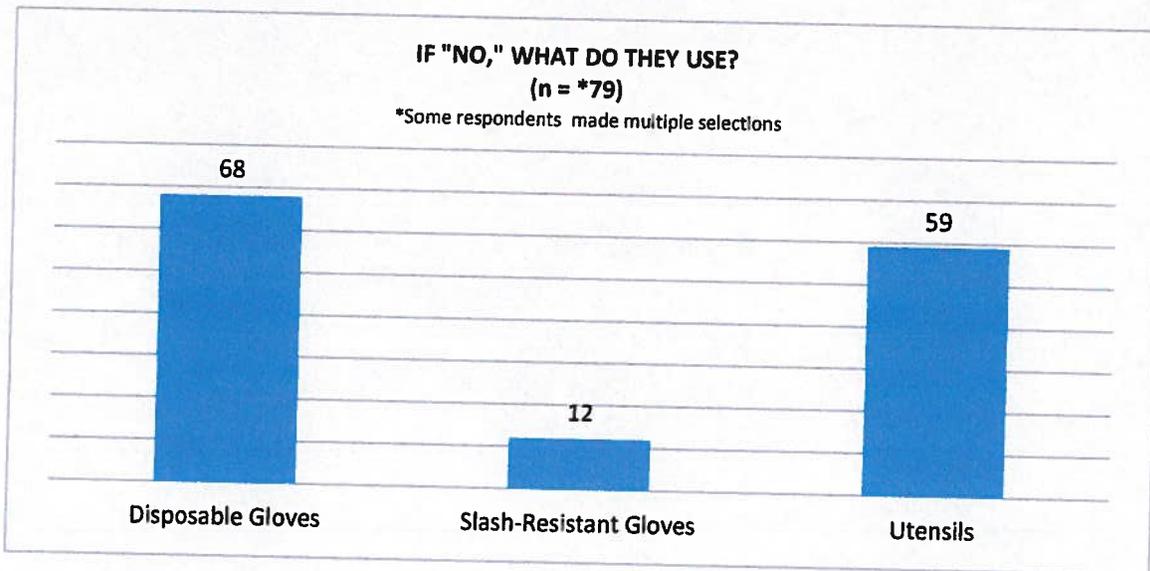
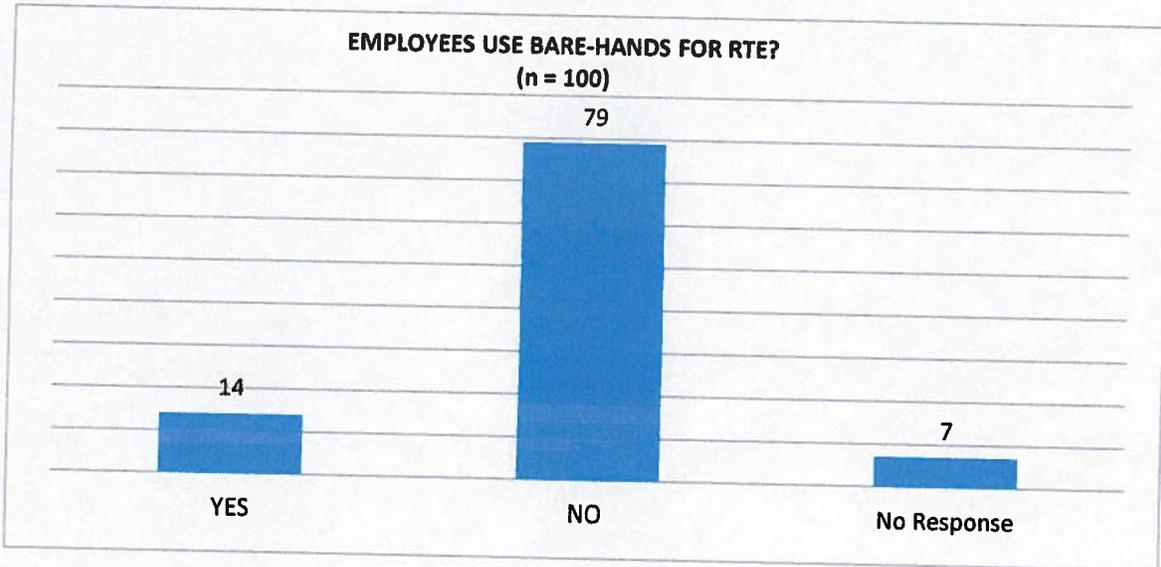


PART III: COLD HOLDING



PART IV: NO BARE-HANDS CONTACT

1 of 2



PART IV: NO BARE-HANDS CONTACT

2 of 2

