FINAL REPORT FARM-TO-TABLE PRACTICUM

Janet Buffer

Nov 22, 2010

INTRODUCTION:

The motivation to attend the Farm-to-Table practicum was prompted by the interests in food safety, global markets and global health related to food and nutrition. Course work at The Ohio State University exposed me to the production systems in the U.S., zoonotic disease, and food safety, but Uruguay provided an opportunity to observe food production and food safely. An abundance of information was gained including a few surprises; one being the U.S. imports 15% of it beef, from Uruguay and anther being *E. coli* O157:H7 is not a public health concern in Uruguay like it is in the U.S..

Fortunately, there were no unexpected surprises regarding the execution of the practicum. Travel to the Montevideo, Uruguay was easy, although long, and the arrangements for transportation from the airport to the hotel uneventful. The program was planned as the title suggests. Food production was observed from the farm to the table. Systems for livestock management of beef and dairy cattle were observed. An abattoir, cheese production dairy, a milk production plant and a fishery were all toured. Three diagnostic laboratories were visited all of which had a special niche for providing services to the public and or government addressing food safety.

The farms, production plants and diagnostic labs were not all found in the city of Montevideo. Every day involved a bus trip to new sites. Montevideo was the “home” site so to

speak, and every other day the group found itself back in the home city after traveling to and from Punta del Este and/or Colonia del Sacramento.

The bus rides to and from the largest city in Uruguay, Montevideo, was not wasted time but accommodated multiple opportune moments to network with various people from other countries. There were 21 participants, hailing from Costa Rica, Paraguay, Brazil, Uruguay and the United States. My original objectives were to observe, compare and contrast the livestock production systems of Uruguay to the United States, however, the networking and information exchange that took place on the bus rides cultivated personal ideas about future collaborations for food safety research and a desire to investigate policy development for food production and safety.

GLOBAL HEALTH APPLICATION:

Between 1998-2002 the Center for Disease Control reported 6,647 outbreaks of foodborne diseases, bacterial pathogens were the cause for 55% of the outbreaks (Lynch, 2006). *Escherichia coli* O157:H7 a zoonotic disease, was noted as prominent in the list of outbreaks, however later it was the source for the 2006 spinach outbreak (CDC, 2006) and most recently has been indicted as the pathogen responsible for the cheese foodborne outbreak (CDC, 2010). Bacterial contamination, including *E. coli* O157:H7 are continually plaguing the U.S. cattle industry and causing concern among consumers as there are often recalls of meat posted on the USDA's Food Safety and Inspection Services (FSIS) website. *E. coli* O157:H7 is the most detrimental of all the bacterium due to the potential for Hemolytic Uremic Syndrome (HUS) which can be fatal, but there are other *E. coli* serotypes emerging that have the potential

to be as devastating to humans as O157:H7 (Boerlin, 1999). According to the USDA economic Research Services the U.S. exported $1.868 to $2.828 billion worth of beef in 2009. These exports go all over the world therefore *E .coli* contamination for consumers is a global concern with the potential for a large economic impact. Uruguay, does not have a problem with *E. coli* due to the current livestock management practice of grass feeding or forage feeding their animals (Calloway, 2003). Research has shown that cattle stop shedding E-coli when fed forage, grass or hay several days before slaughter (Calloway, 2003).

Prevention of pathogen contamination is not the only positive seen when changing beef from concentrated feeding sources to grass. The fatty acid make up of the beef is altered when cattle forage on grass. Realini et al. (2004) analyzed and compared the fatty acid matrix between Uruguayan and U.S. beef. Linoleic (ω-6), Linolenic (ω-3) and conjugated linoleic acid (CLA) were found to be greater in grass fed beef. A diet rich in the ω-3 fatty acids has been shown to be protective against heart disease and diabetes. (von Schacky, 2007) and a diet rich in CLA has been protective against truck fat accumulation which contributes to both heart disease and diabetes (Belury, 2003). These two named diseases tend to be seen in wealthier countries, but with the changes occurring in the economic global markets, the prevalence of these two chronic conditions is becoming prevalent (WHO, 2010).

The importance of the fatty acids has been influential enough that persons will spend thousands of dollars a year purchasing supplements to improve their health. High consumer demand has decimated wild Atlantic salmon stock. This promoted the development and now pending approval of a genetically modified salmon. The modified salmon will produce more

meat per fish (FDA, 2010). Rather than relying solely on fish for rich sources of healthy oils, it would benefit many if another rich source was available, grass-fed beef.

Uruguayans eat about 55Kg of grass-fed beef per person per year, whereas in the US 30.4 kg of beef are consumed each year (Elert,2007). According to the WHO's Mortality Country Fact Sheets, residents of the US live about 4 years longer than the Uruguay and are less likely to die of Cardiovascular disease, 7% for the U.S. vs 12% for Uruguay. However, further research about this fact is needed as death may be prevented due to the life saving technology available in the U.S. compared to Uruguay. This conclusion is assessed as the number of ischemic events is higher in the US (21%) than Uruguay (13%) (WHO, 2006[a,] WHO, 2006[b]), suggesting that cardiovascular events are greater in the U.S. but possibly fatality is averted due to advanced technology and possibly differences in healthcare. The above facts are not conclusive about the health benefits of forage fed beef, but do warrant investigative research from the aspect of public health, economic feasibility and the application to global health markets.

Cardiovascular disease and diabetes are two conditions typically found in wealthier countries and globally the economic market is changing and developing countries are experiencing positive economic growth along with increases in chronic diseases. China and India are both very large countries becoming wealthier, both countries are experiencing increases in cardiovascular disease and diabetes, and both countries have seen an increase in beef consumption (WHO, 2010). Therefore both countries are very susceptible to *E.coli*

O157:H7 from beef fed concentrated feed and both countries could benefit from healthy fats produced by grass-fed beef.

RESPONSIBILIATES:

There were no day-to-day tasks required personally of any of the participants in the program. Educational opportunities were presented and it was the responsibility of every participant to glean the most from the program.

There was one task given that required all the participants complete. Four topics were identified by the directors of the program. The topics categorically addressed animal welfare, animal health, and public health. Four participants were assigned to one topic and it was the responsibility of the group to work together to develop a PowerPoint presentation about the assigned topic complete with references. The project was a challenge from the aspect of time and internet accessibility. Despite the limitations the participants were provided interesting and informative presentations. *E. coli* was my subject assignment along with another OSU, VPH-MPH student, a professor from Brazil, and a veterinarian from Uruguay who worked in the Ministry of Health, Lorena. Lorena provided the information that only 1 person in Uruguay, a child, had been diagnosed with *E.coli* O157:H7 and it was not certain that the pathogen originated from beef. This conclusion was a bit of a surprise; however Uruguay has an incredible traceback system, for their livestock. The system monitors the animal from the farm to the table. Therefore, if beef were suspected the ability for the Ministry of Health to trace the source is feasible.

Having the opportunity to network with people in various parts of the Americas who all have similar interests was exceptional and frankly it was the responsibility of the participant was to participate! As mentioned earlier, this was not just a collaboration between Ohio and Uruguay; students, professors, veterinarians, dentists and dietitians were all together introducing their diverse points-of-view and developing a broader and comprehensive scope of understanding about the global livestock food market, specifically the cattle industry.

POSITIVIE AND NEGATIVE EXPERIENCE

A negative experience is difficult to define as all experiences are valuable even if they make a person uncomfortable. There were no uncomfortable experiences during the course of the visit. There wasn't time for uncomfortable experiences there was too much to absorb.

The most positive outcome was the interaction with all the participants along with the variety of food production contacts had with various industry managers. An example of such an opportunity was the manager of the dairy farm owned by Uruguay. The manager explained how the fields were fertilized to promote optimum grown and nutrition in the forage and the fields were then segmented and the cattle rotated through the fields depending up the age of the animal. The outcome was an increase in milk production to the point of needing a larger bulk tank to hold the milk and later production was lucrative enough to build a new, updated milking parlor. The most memorable experience was observing the flow of food in the beef slaughter plant. The cattle were calm and humanly treated as they moved to the point of immobilization. Inside the plant each worker had a station and efficiently conducted their job.

Other than the noise of the line it was relatively quiet with very little talking. Each person knew exactly what was expected, as the employment retention in the plant was long. It wasn't uncommon to have employees work for 10-25 years in the plants. The other memorable experience from the slaughter plant was watching the cuts of beef being packaged and hearing the explanation of how Uruguay exports to 200 different countries. Such a market means having to comply with various food and safety requirements, various packaging requests and having an excellent tracking system for the product. If there was a foodborne outbreak as a result of exported beef, tracking the beef from the country affected to plant/animal of origin is a logistical challenge, but one being accomplished effectively in Uruguay.

CONCLUSION

The Uruguay Farm-to-Table experience was a well executed educational program providing a wealth of opportunity for the participants to generate ideas, networks, and resources for current or future endeavors in the global health arena. My understanding is that the goal of the program administrators is to grow and develop the program to one of international recognition. This outcome would not only be beneficial to all who participate, but the application of resources and knowledge gained from the program and applied to the global population for the betterment of health can only be viewed as invaluable.

REFERENCES:

Belury, M.A., Mahon, A., Banni, S. (2003) The conjugated linoleic acid (CLA) Isomer, t10c12-CLA, is inversely associated with changes in body weight and serum leptin in subject with type 2 diabetes mellitus. *J of Nutr,* 133;257S-260S.

Boerlin, P., McEwen, S.A., Boerlin-Petzold, F., Wilson J.B., Johnson, R.P., Gyles. C.L.(1999) Associations between virulence factors from Shiga Toxin-Producing Escherichia coli and disease in Humans. J Clin Mircro,37(3);497-503.

Calloway, T. E. (2003). Forage Feeding to Reduce Preharvest Escherichia coli. *J. Dairy Sci.* , (86);852-860.

Center for Disease Control, (October 6, 2006) *Update on Multi-State Outbreak of E. coli O157:H7 Infections From Fresh Spinach,* Retrieved from http://www.lib.wsc.ma.edu/webapa.htm

Center for Disease Control (Nov 16, 2010) *Investigation Update: Multistate Outbreak of* E. coli *O157:H7 Infections Associated with Cheese* Retrieved from http://www.cdc.gov/ecoli/2010/cheese0157/index.html

Elert, G. (2007), *Mass of US Beef Consumption*. Retrieved from http://hpyertextbook.com/facts/2007/MarcelofBernal.shtml

Lynch, M. P. (2006, November 10). Surveillance for Foodborne-Disease Outbreaks --- United States, 1998--2002. *MMWR* , p. 44.

Realini, C.E., Duckett, S.K., Brito, G.W., Dalla Rizza, M., De Mattos, D. (2004) Effect of pature vs concentrate feeding with or without antioxidants on carcass characteristics, fatty acid composition, and quality of Uruguayan beef. *Meat Science*, 66;567-577.

US Food and Drug Administration (Nov 4, 2010) *Public health meetings on genetically engineered salmon.* Retrieved from http://www.fda.gov/newsevents/publichealthfocus/ucm224089.htm

USDA Economic Research Services (July 10, 2010), *U.S. Beef and Cattle Industry: Background Statistics and Information*. Retrieved from http://www.ers.usda.gov/news/BSECoverage.htm

von Schacky, C. H. (2007). Cardiovascular benefits of omega-3 fatty acids. *Cardiovascular Research* , 73; 310–315.

World Health Organization (2006)[a] Mortality Fact Sheet, United States of America Retrieved from http://www.who.int/whosis/mort/profiles/mort_amro_usa_unitedstatesofamerica.pdf

World Health Organization (2010) Global Strategy on Diet, Physical Activity and Health, *Obesity and Overweight* Retrieved from http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/