

Master of Public Health
Applied Practice Experience

***LEARNING ABOUT KANSAS DEPARTMENT OF
AGRICULTURE'S LABORATORY***

by

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submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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Chapter 1 - Portfolio Products

My Applied Practical Experience was completed at the Kansas Department of Agriculture Laboratory (KDAL) in Manhattan, KS under the supervision of Dr. Sally Flowers, the Laboratory Director. During my time, I worked towards obtaining a better understanding of how a public health laboratory operates and became more familiar with basic microbiological and chemical techniques used for food safety and quality. The activities performed included: performing sample extractions for mycotoxin testing in animal feeds; assisting with method verification to stand up a new food microbiology testing platform in the Biosafety Level-2 (BSL-2) lab; and learning about the applications of the quality management system, ISO/IEC 17025-2017. Through these activities, I was able to deliver four portfolio products. The four products are data collection and report, SOP (Standard operating procedure) revision and application, safety training and method verification, all of which are summarized in Table 1.1. The MPH Foundational Competencies addressed in each product is found in Table 1.2.

Table 1.1 Summary of Portfolio Products

Portfolio Product		Description
1	Data Collection and Report	Collected various data from microbiological and chemical analyses for interpretation and reporting
2	SOP Revision and Application	Edited, studied, and performed analyses based on instructions in KDAL SOPs
3	Safety Training	Complied with ISO 17025 protocols regarding laboratory safety
4	Method Verification	Verified a new detection method using 3M™ MDS for <i>Salmonella</i> spp. and <i>Listeria monocytogenes</i>

Table 1.2 Portfolio Products and Competency Addressed

Portfolio Product		Number and Competency Addressed	
1	Data Collection and Report	2,3,4	2) Select quantitative and qualitative data collection methods appropriate for a given public health context 3) Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4) Interpret results of data analysis for public health research, policy, or practice
2	SOP Revision and Application	21	Perform effectively on interprofessional teams
3	Safety Training	12	Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence
4	Method Verification	2,3,4,11	2) Select quantitative and qualitative data collection methods appropriate for a give public health context 3) Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4) Interpret results of data analysis for public health research, policy, or practice 11) Select methods to evaluate public health programs

Chapter 2 - Competencies

Table 2.1 Summary of MPH Foundational Competencies

Number and Competency		Description
2	Select quantitative and qualitative data collection methods appropriate for a given public health context	Depending on the testing performed, the appropriate data collection methods were selected. For example, during determination of mycotoxins in animal feeds, data was collected using liquid chromatography in tandem with mass spectrometry (LC-MS/MS).
3	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Computer software was used for analysis of almost every test performed. The software programs were designed to use analytical methods such as biostatistics and informatics. Detection of foodborne pathogens was performed using 3M™ MDS; MassLynx™ software was used for LC-MS/MS testing.
4	Interpret results of data analysis for public health research, policy, or practice	Results from all data analyses were interpreted and reported to their respective programs for necessary action related to public safety and/or consumer protection.
11	Select methods to evaluate public health programs	Verifying a new detection method for <i>Salmonella</i> spp. and <i>Listeria monocytogenes</i> in food products
12	Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence	Safety training rooted in procedures developed by the ISO 17025 quality management system
21	Perform effectively on interprofessional teams	Working alongside other analysts while revising and implementing the same SOPs

Competency 2 – Quantitative and qualitative data collection methods were selected based on the appropriateness for a given public health context. The selection process was dependent on which analysis was being performed. During the detection of mycotoxins in animal feed, data were collected using LC-MS/MS to produce results for the analyst to interpret. When assisting with the method verification for detection of *Salmonella* spp. and *Listeria monocytogenes* using 3M™ MDS, this method of data collection was selected because of its efficiency and affordability.

Competency 3 – After the data were collected, analyses were performed using software programs that incorporated informatics, as well as biostatistics. While determining the levels of mycotoxins in animal feed by LC-MS/MS, MassLynx™ software provided the analysis of the

data collected from the feed samples. The method for detecting *Salmonella* spp. and *Listeria monocytogenes* used the 3M™ MDS program, whereas the old detection method utilized Hygiena's BAX System Q7.

Competency 4 – This competency was achieved by interpreting and reporting the analysis results to the other programs at KDA that requested the sample testing. After the results were reported, that program would take action when necessary to ensure consumer protection and public safety.

Competency 11 – Prior to purchasing a new PCR machine, KDAL used Hygiena's BAX System Q7. They discovered replacing their old method with a detection method for foodborne pathogens from 3M™ would offer more efficiency and affordability, so I assisted with verifying the 3M™ MDS method during my APE. Selecting this new method allowed KDAL to better serve the other public health programs at KDA.

Competency 12 – The ISO 17025 quality management system provided me with safety training necessary for each laboratory skill. Studying ISO 17025 allowed me the opportunity to practice safe laboratory techniques in order to promote accurate and credible test results.

Competency 21 – I was able to perform effectively on interprofessional teams in the day-to-day work environment at KDAL. More specifically, multiple analysts would contribute to revising SOPs, as well as reference the SOP during testing, and I was successful at adhering to the same instructions while working alongside other analysts to obtain the same test results.