

POLICY RESPONSES TO REDUCE THE OPPORTUNITY FOR HORSEMEAT
ADULTERATION FRAUD: THE CASE OF THE EUROPEAN UNION

by

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Abstract

Food production is changing in response to an expanding global population. The ability to distribute and process ingredients amongst many individuals and countries has brought economic benefits while also creating new problems. By increasing the complexity of the supply chain, the food industry has birthed new dynamics, thus creating new opportunities for contamination, fraud, and other threats. One threat dynamic is the varying levels of food safety and quality control at different nodes along a supply chain. Contaminations pinpoint weaknesses of a supply chain, and such weaknesses could be exploited for harm. One way foods are intentionally contaminated is through food fraud. Food fraud involves substitution, mislabeling, dilution, and other means of criminal deception. Routine testing by an independent science-based group led to the discovery of one the largest scales of substitution and mislabeling in history—the 2013 adulteration of beef products with horsemeat. Commonly referred to as the horsemeat scandal of 2013, this important event in the history of the global food system affected several regions, hundreds of products, and thousands of retailers and consumers. To date, this scandal was one of the largest incidents of food fraud. Mostly based in the European Union, the horsemeat scandal prompted the European Commission to take regulatory action. The European Union’s policy response included the creation of a five-point plan that addresses the different facets associated with the scandal. The five-point plan sought to strengthen food fraud prevention; testing programs; horse passports; official control, implementation, penalties; and origin labelling. The five-point plan is intended to decrease the fraud opportunity for the adulteration of beef with horsemeat. According to the crime triangle, a concept frequently cited in the field of criminology, fraud opportunity has three main elements: the victims, the fraudsters, and the guardian and hurdle gaps. When any of these elements change, the opportunity for a fraudster to commit a crime also changes. The research question of this thesis explores the policy responses of the European Commission. The Commission’s five-point plan targets the three elements of fraud opportunity; therefore, future fraud opportunity for the adulteration of beef products with horsemeat will theoretically decrease.

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List of Abbreviations

ABP	Anglo-Irish Beef Processors
CDC	Centers for Disease Control and Prevention
DEFRA	Department for Environment Food & Rural Affairs
DNA	Deoxyribonucleic acid
EFSA	European Food Safety Authority
EPICS	Electronic Product Code Information Services
EU	European Union
FDA	Food and Drug Administration
FFN	Food Fraud Network
FI-PPP	Future Internet Public-Private Partnership
FSA	Food Standards Agency (UK)
FSAI	Food Safety Authority of Ireland
GAO	Government Accountability Office
MIP	Meat Information on Provenance
NSAID	Nonsteroidal Anti-inflammatory
PCA	Peanut Corporation of America
PCR	Polymerase Chain Reaction
RASFF	Rapid Alert System for Food and Feed
SEDEX	Supplier Ethical Data Exchange
UK	United Kingdom

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Chapter 1 - Introduction

Introduction

Food production is changing in response to a growing global population. To meet the increasing needs of consumers, the supply chain of food production has globalized.

Globalization of the supply chain has created more opportunities for risks concerning security and safety of food.

Food fraud is the term coined for the deceptive intentional adulteration or mislabeling of food. Intentional adulteration includes substitution, addition, or misrepresentation of food or its ingredients.¹ Food fraud is both a security and safety risk. Food fraud exposes weaknesses in supply chains and can pose a safety risk because typically adulterants are not expected or not normally tested for. This allows criminals to evade detection from normal quality and safety controls.² Thus, many food fraud incidents remain undetected for months, sometimes years.

In 2012, the Food Safety Authority of Ireland (FSAI) lead a meat authenticity study. This study investigated the DNA composition of low-end meat products, such as ready-to-eat meals. From this investigation, the FSAI discovered the presence of porcine and equine DNA in some products. On the label of these products, beef was listed as the only meat source. In 2013, the FSAI released a statement expressing concern about the amount of equine and porcine DNA found in lower end beef products.³

Further investigation in the United Kingdom led to the discovery of additional beef products adulterated with horsemeat. Thus, the European Union (EU) launched a pan-European investigation into the composition of frozen, ready-to-eat products. EU-wide testing discovered

¹John Spink and Douglas C. Moyer, "Defining the Public Health Threat of Food Fraud," *Journal of Food Science* 76, no. 9 (2011).

²Karen Everstine, John Spink, and Shaun Kennedy, "Economically Motivated Adulteration (EMA) of Food: Common Characteristics of EMA Incidents," *Journal of Food Protection* 76, no. 4 (2013).

³"FSAI Survey Finds Horse DNA in Some Beef Burger Products," January 15 2013.

less than 5 percent of products that tested positive for equine DNA. The amount of equine DNA per product varied from trace amounts to over 60 percent.⁴

Mostly based in the European Union, the discovery of horsemeat in beef products prompted the European Commission to take regulatory action.⁵ The Commission's response was the creation of a five-point plan addressing different issues of the scandal.⁶ These five issues of the plan will include enhancing the following:

1. Food fraud prevention programs
2. Testing programs
3. Horse passports
4. Official control, implementation, and penalties
5. Origin labelling

Each point addresses reasons for adapting new regulations and tools, or the revision of existing regulations. The intention of the five-point plan was to assess the current situation of the horsemeat scandal and decrease fraud opportunity for the adulteration of beef with horsemeat in the future. This thesis serves as preliminary research regarding food fraud prevention in processed beef products. There are at least three reasons why preliminary research is necessary:

1. Food fraud is a new concept to individuals not in the food industry⁷;
2. Government programs, like the European Commission's five-point plan, take time to prove their effectiveness; and
3. There is a lack of policy analysis regarding the horsemeat scandal.

To better understand the fraud opportunity of the horsemeat scandal, the elements of the five-point plan will be compared to a common crime prevention tool and theory: the crime

⁴ "Results of Tests of Meat," The European Commission
http://ec.europa.eu/food/food/horsemeat/tests_results_en.print.htm.

⁵ The European Commission is the European Union's executive branch. The Commission represents the interests of Europeans. More at: http://ec.europa.eu/about/index_en.htm

⁶ "What Has the EU Done So Far to Address the Horsemeat Scandal?," The European Commission,
http://ec.europa.eu/food/food/horsemeat/timeline_en.htm.

⁷ Food fraud has been around since antiquity; therefore, to individuals in the food industry it is not a new occurrence. However, to individuals associated with solving food fraud cases, the notion of food fraud is new.

triangle.⁸ The crime triangle contains the three aspects of fraud opportunity—that is, the victims, the fraudsters, and the guardian and hurdle gaps. If any of these aspects are changed, the fraud opportunity is changed as well.⁹

This thesis will investigate how the Commission's five-point plan aims to decrease fraud opportunity of beef adulteration with horsemeat. In regards to the horsemeat scandal, each component of the crime triangle will be compared to the Commission's five-point plan.

Globalization

The food supply chain has morphed into a complex system to meet the needs and desires of its consumers. Globalization in the food system is a method used to make items cheaper by depending on different countries for ingredients and processes, increases steps along the supply chain. A supply chain utilizes different countries for ingredients and processes, causing items to shift from party to party. Consequently, by increasing the length and complexity of the global food supply chain, there is an increase in associated risks regarding economic and security factors of food.^{10,11}

One of the associated risks with globalization is the interplay of various countries to produce one product. Across the globe, countries have varying concerns regarding the topic of food. In some countries where ingredients and products are sourced, food security is more of a pressing issue. Food security is the lack availability, access, and use of food.¹² Today,

⁸ The crime triangle was developed by Lawrence Cohen and Marcus Felson. It is also referred to as the problem analysis triangle and comes from the routine activity theory.

⁹ John Spink, "Chapter 9: Defining Food Fraud and the Chemistry of the Crime," in *Improving Import Food Safety*, ed. W. Ellefson, L. Zach, and D. Sullivan, *Institute of Food Technologists Series* (Wiley-Blackwell, 2013).

¹⁰ Shaun Kennedy, "Emerging Global Food System Risks and Potential Solutions," *ibid.* P. 3

¹¹ "Pathway to Global Product Safety and Quality," ed. Office of Global Regulatory Operations and Policy (2011). P. 2

¹² World Health Organization, "Food Security," <http://www.who.int/trade/glossary/story028/en/>. According to the WHO, food security is built on three pillars: food availability, access, and use. Food availability is the steady availability to an ample amount of food. Food access is having the ability to obtain a nutritious diet. Food use is the proper use of education regarding food and care, along with an adequate water and waste system. Food security is multifaceted, and depends on aspects such as economics, physical health, environment, and trade.

approximately one in every eight people go hungry.¹³ With the world population expected to exceed 9 billion by 2050, the global food industry will experience increased pressure to produce safe and cheap foods to feed the world.¹⁴ Where food security is a pressing issue, food defense (later discussed in detail) takes lower precedence.¹⁵

Contamination events, both intentional and unintentional, expose vulnerabilities in the food supply chain. Consequently, these vulnerabilities face exploitation for intentional contamination, such as acts of bioterrorism. Intentional contamination for profit gain, or economically motivated food adulteration, combines both economic and security factors.¹⁶ In the US, the annual estimated price tag of adulteration and counterfeited foods to industry is approximately \$10 billion to \$15 billion.¹⁷ While the economic impact of adulterated foods is high, the fact that there are individuals wishing to deceive others with access to the food supply chain is disturbing.

Although globalization provides more opportunity for contamination, the real issue lies within the individual willing to carry out a crime. A fraudster is someone who wishes to deceive others.¹⁸ Food adulteration can occur in two forms, accidental or intentional. Typically, accidental food adulteration occurs when countries do not meet the same requirement for packaging, listing ingredients, or other aspects that are purely accidental without ulterior motive.

¹³ World Food Programme, "Hunger," <http://www.wfp.org/hunger>. According to WFP, deaths from hunger kill more than the sum of the deaths from AIDS, malaria, and TB.

¹⁴ United State Census Bureau, "International Data Base World Population: 1950-2050," <http://www.census.gov/population/international/data/idb/worldpopgraph.php>.

¹⁵ John T. Hoffman, Shaun Kennedy, "International Cooperation to Defend the Food Supply Chain: Nations Are Talking; Next Step—Action," *Vanderbilt Journal of Transnational Law* 40, no. 2 (2012). P 1172.

¹⁶ Economically motivated food adulteration is commonly assigned the acronym "EMA." From a personal interview with Dr. John Spink, the Director of the Food Fraud Initiative at Michigan State University, the author was informed to refrain from using the acronym because "EMA" is the acronym used for the European Medicines Agency, which is used later in this thesis. For the purposes of this thesis, EMA will refer to the European Medicines Agency.

¹⁷ "Consumer Product Fraud: Deterrence and Detection," (Good Manufacturers Association and A.T. Kearney 2010).

¹⁸ B. Wilson, *Swindled: The Dark History of Food Fraud, from Poisoned Candy to Counterfeit Coffee* (Princeton University Press, 2008). p. 322. The motive behind some forms of adulteration is greed. Strong motives, coupled with opportunity, present fraudsters with the perfect time to adulterate a product.

Intentional adulteration has additional motives that are typically economically or criminally driven. In short, all individuals in the food supply chain are responsible for providing safe and true products for consumers. From farm-to-fork or boat-to-plate, and every step along the way, there are security risks that need assessment and regulations in need of implementation. Harmonizing food safety comes from all parties and levels involved exercising the same stringent goals for a safe product.¹⁹

Food quality, safety, fraud, and defense

The classification of food risks depends on the action, economic threat, and public health risk. Typically, these risks generally fall into one of the four following food risk classifications: food quality, safety, defense, or fraud. The food fraud matrix, developed by Dr. John Spink, helps differentiate food quality, safety, defense, and fraud. The columns are the action of the contamination, unintentional or intentional. The rows represent what the action will affect, the economy or public health.

Table 1. Food fraud matrix

	Action	
	Unintentional	Intentional
Economic threat	Food Quality	Food Fraud
Public Health threat	Food Safety	Food Defense

Source: Adapted from Spink, John and Douglas C. Moyer. 2011. "Defining the Public Health Threat of Food Fraud." *Journal of Food Science* 76(9): R157-162.

Food quality is the comparison of a product against a set of standards. The purpose of a comparison against a set of standards ensures that products of the same type are identical. Food quality includes the testing of large and molecular aspects of food against a set of standards. The

¹⁹ The harmonization of food safety is the term used to coin that the safety of food should be carried out by all individuals involved in the food system and be held to the same importance at each level, thus increasing confidence regarding food safety. The Global Harmonization Initiative (GHI) is currently working on this issue. The GHI was founded by Institute of Food Technologists (IFT) International Division and the European Federation of Food Science and Technology (EFFoST), giving it a truly global standpoint. One of the non-profit's objectives is to harmonize food safety. (<http://www.globalharmonization.net/background>).

standards may require a product to have the same ingredients, properties, and organoleptic traits.²⁰ These aspects of food can be affected by transportation, processing, and storage.²¹ In 2012, Gerber voluntarily withdrew a batch of Gerber Good Start Infant Formula because of quality reasons. The recall on the FDA website stated, “The product poses no health or safety risk. However, this product might have an off-odor noticeable to some consumers.”²² This is an example of food quality because the unintended instance (i.e. the off odor) yielded an economic impact to Gerber when they recalled a batch of infant formula.

Food safety concerns are unintentional and pose a threat to public health. Examples of food safety concerns include bacterial, physical, or chemical contaminations. Food safety encompasses proper handling, preparation, and storage of food to decrease foodborne illness. In 1993, one of the most publicized outbreaks of *E.coli* O157:H7 was linked to undercooked hamburgers at Jack in the Box. This outbreak resulted in 623 illness and 4 deaths in the US.²³ *E.coli* O157:H7 is a natural inhabitant of the gastrointestinal tract of cattle, which may accidentally come into contact with meat during processing. To ensure a safe product an end minimum cooking internal temperature of 160°F for non-intact beef products is essential.²⁴ This is an example of food safety because the product unintentionally had bacterial contamination and this led to a public health threat.²⁵

²⁰ "Organoleptic." *Merriam-Webster.com*. Merriam-Webster, n.d. Web. 21 Jan. 2014. <<http://www.merriam-webster.com/dictionary/organoleptic>>. The definition of organoleptic properties applicable to this document is defined by Merriam-Webster as, “being, affecting, or relating to qualities (as taste, color, odor, and feel) of a substance (as a food or drug) that stimulate the sense organs.”

²¹ R. E. Hester and R. M. Harrison, "Food Safety and Food Quality," (Royal Society of Chemistry).

²² Food and Drug Administration, "Gerber Voluntarily Withdraws a Specific Batch of Gerber® Good Start® Infant Formula and Offers Replacement Product to Consumers," (2012).

²³ Andy Frame, "Policy Changes in the Wake of the Jack in the Box *E. Coli* Outbreak," <http://www.foodsafetynews.com/2013/02/policy-changes-since-the-jack-in-the-box-e-coli-outbreak/#.U7L1yZRdWSo>.

²⁴ "Ground Beef and Food Safety," ed. Food Safety and Inspection Service (2013).

²⁵ The author was an intern for the U.S. Department of Agriculture-National Institute of Food and Agriculture (USDA-NIFA) Coordinated Agricultural Project (CAP) grant, titled Shiga-toxigenic *Escherichia coli* (STEC) in the Beef Chain: Assessing and Mitigating the Risk by Translational Science, Education and Outreach, seeks to significantly advance evidence- and action-based beef food safety knowledge to protect public health. The author's project was, “Recovery of Shiga Toxin-producing *Escherichia coli* in Tenderized Veal Cordon Bleu Following

Food defense refers to deliberate acts on food to cause harm toward individuals. These deliberate acts include, but are not limited to, food bioterrorist attacks, which could include the addition of harmful bacterial, physical, or chemical agents. A classic example of a food defense instance is the 1984 Rajneeshee and *Salmonella typhimurium* incident. The Rajneeshee, a religious commune, in The Dalles, Oregon, were found guilty for the purposeful contamination of produce, coffee creamers, restaurant salad bars and blue cheese dressing. Hoping that enough voters would be too ill to vote against them, the Rajneeshee sought to gain control of their local government.²⁶ This classic case of deliberate contamination with intent to harm others resulted in 751 cases with 45 individuals needing medical attention.²⁷

Intentional contamination is typically economically or terror driven. Food fraud is the holistic term assigned to fraud that has an economically driven motive. Cases of food fraud expose weakness in food production, which may result in repeated adulterations if not caught. In 2013, Oceana, an international advocacy group for the world's oceans, published results from a US seafood fraud investigation. They discovered the amount of seafood fraud, the mislabeling and substitution of seafood, across the US to be staggering. From 2010-2012, Oceana collected 1,247 seafood samples and genetically analyzed 1,215 samples. This analysis revealed that 401 (33 percent) out of the 1,215 samples were mislabeled. The samples were collected from three different retail locations: sushi venues, grocery stores, and restaurants. Of the three locations, sushi venues had the highest rate of mislabeling estimated at 74 percent. Mislabeling results were determined by comparing the items label to the *The Seafood List*, while substitution results were obtained through DNA analysis. The FDA created *The Seafood List* to serve as a guideline for seafood labelling. The list shows the acceptable market names, the common names, and

Cooking on an Electric Skillet.” Here, she validated cooking times and temperatures for veal cordon bleu and can attest to the recommendation of following government guidelines for ensuring a safe product.

²⁶ J.J. Kastner, *Food and Agriculture Security: An Historical, Multidisciplinary Approach: An Historical, Multidisciplinary Approach* (ABC-CLIO, 2010). The author's major advisor, Dr. Justin Kastner, published this book. Chapters from this book were utilized in one of the author's classes, DMP 888 *Food and Agriculture Security: An Historical, Multidisciplinary Approach: An Historical, Multidisciplinary Approach*. The class instructed by Dr. Kastner, opened the author's eyes to the complex realm of food safety. Thus, inspiring the author to write a thesis about food safety and supply chain complexity and complete an internship in food safety.

²⁷ Dan Flynn, "Salmonella Bioterrorism: 25 Years Later," Retrieved from: <http://www.foodsafetynews.com/2009/10/for-the-first-12/#.UtcAT9JDuSo>.

scientific names of fish commonly consumed in the US. This report highlighted that seafood mislabeling and substitutions have economically driven motives. Consequently, mislabeled and substituted seafood are a threat to the welfare of marine life, health of consumers, and the seafood industry.²⁸

Food fraud

Food fraud is a term used to encompass any deceptive intentional adulteration and/or mislabeling for economic gain.²⁹ The term food fraud encompasses many forms of adulteration, and can be defined as:

“...the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packing; or false or misleading statements made about a product, for economic gain.”³⁰

Economically motivated food adulteration falls under the umbrella of food fraud. While economically motivated food adulteration is economically driven, its effects have affected public health. Economically motivated food fraud effects are interesting because unlike common forms of adulteration, this form of intentional contamination utilizes unexpected adulterants. The use of adulterants are sometimes not fully understood by fraudsters; therefore, along with fraud they may cause harm to others. To gain better insight into these incidents, Dr. John Spink applied the crime triangle to food fraud.³¹ The crime triangle is a tool used to breakdown the facets of food fraud, and examines food fraud opportunity.

²⁸ Walker Timme Kimberly Warner, Lowell Beth, Hirshfield Michael, "Oceana Study Reveals Seafood Fraud Nationwide," (Oceana, 2013).

²⁹ Food fraud a better term for explaining adulteration that is economically driven because it is more holistic than economically motivated food adulteration.

³⁰ John Spink, "Defining Food Fraud and the Chemistry of the Crime," in *Improving Import Food Safety*, ed. Lorna Zach Wayne Ellefson, and Darryl Sullivan (John Wiley & Sons, Inc. and the Institute of Food Technologies, 2013). P. 196

³¹ The crime triangle, also known as the routine activity theory by criminologists, demonstrates that fraudsters will strike when the target becomes an attractive target.

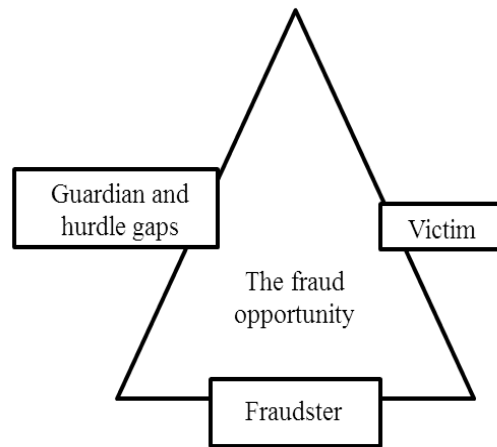


Figure 1. Crime triangle

Adapted from Spink, John and Douglas C. Moyer. 2011.

“Defining the Public Health Threat of Food Fraud.” *Journal of Food Science* 76(9): R157-162.

The crime triangle depicts the components of food fraud: the victim, the fraudster, the guardian and hurdle gaps all which surround the fraud opportunity of crime. The fraudster, an individual or group who wishes to deceive others, identifies the guardian and hurdle gaps in the system. Companies in the food system that have poor employee retention, low security, low wages, and adulterants on site are higher targets for intentional adulteration by fraudsters because of their low barriers and protection measures. High guardian and hurdle gaps are aspects that reduce the opportunity for crime. Guardians are individuals, while hurdles are things that prevent a crime from happening. Crime prevention tools, such as regulations and testing routines help, however gaps are ever evolving with the increasingly globalized food supply chain. The fraud opportunity is where the fraudster sees weakness in the supply chain and acts upon the opportunity for crime. The victim, such as consumers, producers, and governments are the ones affected by the crime.

Together, all components of the food fraud crime triangle effect the fraud opportunity. If one component of the crime triangle is changed, all of the components change, thus affecting the fraud opportunity. Any change in a component that affects the outcome is explained by Dr. John Spink. Spink compares the concept of the triangle to that of a chemical equation:

“The overall concept is referred to as the chemistry of the crime since a change (or removal) in one of the factors changes the overall risk of the model. In a chemical equation, a change in pressure or temperature changes the outcome of the reaction; in the chemistry of crime, a change (or removal) in criminal, victim, or guardian and hurdle gap changes the overall risk.”³²

As cases of intentional adulteration for economic gain are multi-faceted. Thus, collaboration between industry and government is necessary to create and implement improved guardians and hurdles to deter fraudsters. Fraudsters financially seek to make the same amount of profit off of a lesser product. If fraudsters’ choose to adulterate or misrepresent an item, there is a possibility for potential health effects (both short and long term). Historically, not all economically motivated adulterations result in public health implications. However, some cases have had severe public health implications.

Supply chain complexity

The figure below depicts the basic supply chain for food production.³³ Each arrow in this figure could represent a point of either transportation or storage. At each point during transportation or storage, security risks increase; more transfers, storage facilities, and handlers equal more risks. Steps along the path of production, transportation, suppliers, and storage today generally involve many countries. The increasing global complexity of a product, thus it becomes harder to trace product ingredients. More importantly, tracing the source of an intentional or unintentional contamination increases in difficulty.³⁴

³² Spink, "Defining Food Fraud and the Chemistry of the Crime." P. 206

³³ Keep in mind each sector and commodity has different supply chains; this is a very basic figure.

³⁴ T. Lang, D. Barling, and M. Caraher, *Food Policy: Integrating Health, Environment & Society* (Oxford University Press, Incorporated, 2009). Ch 5.

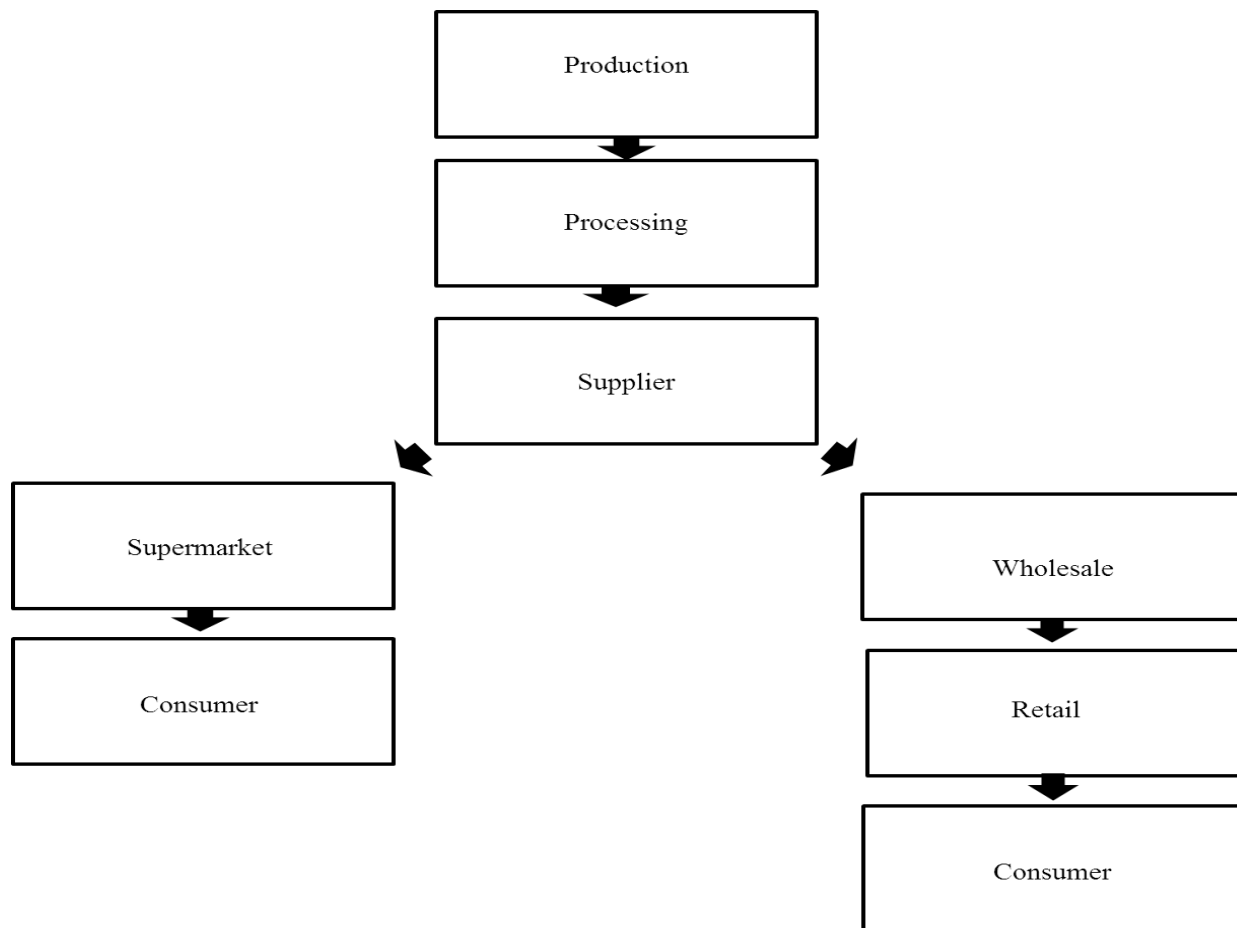


Figure 2. Basic supply chain

To ensure the same product is transferred between each step of production, some companies have turned to third party testing for product verification. While additional testing may increase product prices, verifying ingredients is increasing in popularity amongst producers and suppliers. However, one report by the Government Accountability Office (GAO) stated that some adulterations, such as the halting of a product from market entrance due to adulteration, are not shared within industry or government. Such adulterations are “kept under wraps” to prevent economic loss for companies. The impact of not sharing such information, even anonymously, with government authorities slows legislation development because the government does not know the full of extent of possible food adulterations.³⁵

³⁵ "Better Coordination Could Enhance Efforts to Address Economic Adulteration and Protect the Public Health," ed. Government Accountability Office (2011). This report suggests creating an anonymous database where companies could share instances of adulterated products that do not make it into the supply chain. Such a database could potentially aid in policymaking for economically motivated adulterated foods.

In addition to third party testing, random testing by advocacy groups and government entities help ensure products are free from fraud. In 2013, two incidents demonstrated the vulnerabilities and complexities of global food production. The first being the previously mentioned Oceana report that investigated seafood fraud in the US.³⁶ The second incident resulted from newly implemented routine species verification in processed beef products in the European Union (EU).³⁷ Both instances of food fraud had authorities that tested products that already entered commerce and discovered adulteration. Policy makers should be alarmed that current quality control practices in industry failed to catch such adulterations.

Both historical and recent events demonstrate how complex supply chains complicate investigations of both intentional and unintentional contaminations. A historical example of supply chain complexity involving intentional adulteration is the horsemeat incident of 1981. From 1976 to 1981, two Australian meat companies allegedly purchased meat intended for pet food and sold it into the human food supply chain. To keep their illegal operation covert the companies went as far as creating fake shell companies, paying off inspectors, and hiding accounting paperwork.³⁸ The lengthy, complex supply chain of bogus entities created a “rabbit trail” for officials to follow. Almost 30 years later, a similar incident involving horsemeat emerged in the EU.

Historically significant food fraud events

In 1981, individuals in Spain fell ill due to the ingestion of olive oil; therefore, this incident was named toxic oil syndrome. Imported into Spain, rapeseed had to be denatured with 2 percent aniline to avoid it from being sold as cooking oil. Fraudsters discovered a way to refine rapeseed oil, and then sold it to consumers labelled as olive oil. The consumption of this oil adulterated with aniline resulted in approximately 20,000 illnesses and 1,200 deaths.³⁹

³⁶ Kimberly Warner, "Oceana Study Reveals Seafood Fraud Nationwide."

³⁷ Food and the Marine Department of Agriculture, "Equine DNA & Mislabelling of Processed Beef Investigation," (2013).

³⁸ Sir Albert Edward Woodward and Royal Commission into Australian Meat Industry, "Report of the Royal Commission into Australian Meat Industry, September 1982," (Australian Government Publishing Service, 1982). This incident is a fascinating read, interesting to see how history repeats itself.

³⁹ These numbers may not be exact due to the monetary award given to those who claimed illness or death because of toxic oil. While the exact etiology of the toxin remains unsolved, it is thought that the vehicle was unlabeled

Not knowing the source of contamination is frightening, sometimes knowing the source is worse. From 2008-2009, an outbreak of *Salmonella* Typhimurium was linked to King Nut peanut butter. Since 2007, contaminated King Nut peanut butter was used in large quantities in industry and as an ingredient in many products. The Peanut Corporation of America (PCA) produced King Nut peanut butter in its plants and shipped contaminated products to companies and consumers. The contaminated products were shipped before the results of microbiological tests were complete. PCA failed to recall or alert consumers about contaminated items when the test results were received. PCA voluntarily recalled possibly contaminated products after the Centers for Disease Control and Prevention (CDC) became involved with the contamination. This outbreak was the cause of 714 illnesses and 9 deaths. The recall involved over 3,900 products from 200 companies affecting 2 percent of the nation's peanuts.^{40, 41} PCA officials involved with this incident faced indictment in 2013.⁴²

The year of 2008 proved to be an important year for economically motivated food adulteration. In addition to the PCA incident, one of the largest instances affecting public health via food fraud occurred. Melamine, a nitrogenous-rich compound, was added to milk at collection stations in China to give the illusion that milk, infant formula, and other milk products contained enough protein.⁴³ At collection stations, farmers brought their milk for holding until it could be later collected by large companies. Collection stations were owned and operated by multiple unregulated operators. Melamine was added at such collection stations to increase the

adulterated olive oil. Peter Macinnis, *Poisons: From Hemlock to Botox and the Killer Bean of Calabar* (Arcade Publishing, 2005). Manuel Posada de la Paz, Rossanne M Philen, and Abaitua Borda Ignacio, "Toxic Oil Syndrome: The Perspective after 20 Years," *Epidemiologic Reviews* 23, no. 2 (2001).

⁴⁰ "Investigation Update: Outbreak of *Salmonella* Typhimurium," Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov/salmonella/typhimurium/update.html>.

⁴¹ Kelsey Wittenburger and Erik Dohlman, "Peanut Outlook: Impacts of the 2008-09 Foodborne Illness Outbreak Linked to "Salmonella" in Peanuts," (Economic Research Service, 2010).

⁴² Gretchen Goetz, "Peanut Corporation of America from Inception to Indictment: A Timeline," Food Safety News, <http://www.foodsafetynews.com/2013/02/peanut-corporation-of-america-from-inception-to-indictment-a-timeline/#.Uxdv3j9dWSq>.

⁴³ World Health Organization, "Questions and Answers on Melamine," <http://www.who.int/csr/media/faq/QAmelamine/en/>.

protein content to ensure a decent payment would be received. This incident resulted in a \$10 billion loss and approximately affected 290,000 individuals, including 50,000 hospitalizations.⁴⁴

In particular, these three cases of economically motivated adulteration stand out amongst the others due to their public health and economic impact. To this day, the 1981 olive oil incident remains unsolved. The toxic agent has yet to be determined, proving that the substitution of quality products with cheaper and unknown can be detrimental. The PCA incident shows how even those involved with food safety could be more interested in moving products to ensure their payments. The melamine incident shows that without proper regulation and quality tests, dangerous substances can reach the market. These three historical events demonstrate the extent to which a fraudster is willing to go to make more money off a product. This disregard for others has cost some their health, while others their lives. Economically motivated food adulteration incidents, both historical and contemporary, weaken trust between consumers and producers.

Economically motivated food fraud

Legislation for managing economically motivated food adulteration is not a new idea. Historically, legislation as early as classical antiquity times, and legislation today have sought to decrease accounts of international adulteration without much prevail. In the Greco-Roman Empires, laws were created to deter the addition of flavor and colors into wine.⁴⁵ Thereafter, in Europe, the *Law of Bread and Beer Assizes* established in 1267 regulated bread loaves by size, weight, purity, and quality.⁴⁶ For brewers this regulated ingredients of beer to contain malt, water, and yeast. The *Law of Bread and Beer Assizes* used standards to set prices for bread and beer, instituted a licensing system, and developed a system to reprimand those who broke this law.⁴⁷ This regulation was one of the first laws to regulate food production.

⁴⁴ Grocery Manufacturers Association and A.T. Kearney, "Consumer Product Fraud: Deterrence and Detection," (Good Manufacturers Association and A.T. Kearney 2010).

⁴⁵ H. Ismail S. Sumar, "Adulteration of Foods – Past and Present," *Nutrition & Food Science* 5, no. 4 (1995).

⁴⁶ In Latin, referred to as *Assiza Panis et Cervicie*

⁴⁷ I.S. Hornsey and Royal Society of Chemistry, *A History of Beer and Brewing* (Royal Society of Chemistry, 2003). p. 292-294.

Historically, consumer interest in intentionally adulterated foods grew through the works of authors, two being Friedrich Christian Accum and Reay Tannahill. In the early 1800s, Accum (1769-1838) published a book examining adulteration in various commodities. In this book, Accum discussed his mistrust for those who sold adulterated products. He believed those who earned money for an adulterated product should be treated like thieves because they are defrauding others.⁴⁸ In his book, Accum states his observations about economically motivated food adulteration:

“The eager and insatiable thirst for gain, which seems to be a leading characteristic of the times, calls into action every human faculty, and gives an irresistible impulse to the power of invention; and where lucre becomes the reigning principle, the possible sacrifice of even a fellow creature's life is a secondary consideration.”⁴⁹

In 1989 author Reay Tannahill stated, “The simplest way was to bulk out genuine article with a cheap additive, which might, or might not, be harmful.”⁵⁰ Although a term (such as food fraud) did not exist, Accum and Tannahill captured the dilemma of food fraud. Both authors

⁴⁸ *Atheneum, or, Spirit of the English Magazines*, (Munroe and Francis, 1820). The author finds great enjoy in reading such historical works. This joy of appreciating history in relation to current topics came from the author’s participation in the *Frontier* program. The *Frontier* program—an interdisciplinary program for the historical studies of border security, food security, and trade policy (<http://frontier.k-state.edu>) has expanded the author’s views about the food industry through experiential learning opportunities. Through this program, the author has traveled to Lincoln, NE; Boston, MA; Huntington Beach, CA; Washington D.C.; and Kanas City, MO. These trips have broadened her scholarly breadth through visiting various companies, historical sights, and interacting with other scholars from various universities.

⁴⁹ Friedrich Christian Accum, *A Treatise on Adulterations of Food and Culinary Poisons: Exhibiting the Fraudulent Sophistications of Bread, Beer, Wine, Spirituous Liquors, Tea, Coffee, Cream, Confectionery, Vinegar, Mustard, Pepper, Cheese, Olive Oil, Pickles and Other Articles Employed in Domestic Economy ; and Methods of Detecting Them* (London: J. Mallett, 1820)., p. 30. It is interesting to note, that centuries later we are still facing the same dilemma. In addition, Accum states, “In reference to the deterioration of almost all the necessaries and comforts of existence, it may be justly observed, in a civil as well as religious sense, that “*in the midst of life we are in death.*” p. 30. This quote portrays the extent to which adulterated foods affect its victims. We, as a society, are failing if we cannot ensure the safety of products to consumers.

⁵⁰ Reay Tannahill, *Food in History* (Crown Publishers, 1989). P. 293

started an interest of wanting to see increased transparency and verification of food ingredients by sharing their thoughts to consumers.

The dilemma of meeting the needs of consumers by increasing the complexity of the food supply chain is apparent. This increase in complexity is not free from risk. Economically motivated food adulteration is not a new concern of food production, although it has gained more attention as opportunity for intentional adulteration increases. The FDA has elaborated the following working definition of economically motivated food adulteration:

“...fraudulent, intentional substitution or addition of a substance in a product for the purpose of increasing the apparent value of the product or reducing the cost of its production, i.e., for economic gain. EMA includes dilution of products with increased quantities of an already-present substance (e.g., increasing inactive ingredients of a drug with a resulting reduction in strength of the finished product, or watering down of juice) to the extent that such dilution poses a known or possible health risk to consumers, as well as the addition or substitution of substances in order to mask dilution.”⁵¹

While all foods are potential targets for adulteration, when compared to others, some are more probable targets. Processing, such as grinding beef or mincing fish meat, can increase an item’s risk. In addition, the act of diluting products with water or replacement of the ingredients happens to certain items more than others. Foods that are costly or difficult to produce, such as cooking oils and honey, are commonly adulterated. Whole foods, such as unprocessed fruit or whole fish, are harder to adulterate since the consumer can see what exactly they are purchasing. The following list includes commonly adulterated foods:

⁵¹ Randall W. Lutter, "Economically Motivated Adulteration; Public Meeting; Request for Comment," ed. Department of Health and Human Services (2009).

Table 2. Commonly adulterated foods

Commonly adulterated foods
Honey
Seafood
Meat
Pet food
Cooking oil
Fruit juice
Dairy products
Wine
Spices
Dietary supplements

Horsemeat scandal

The Food Safety Authority of Ireland (FSAI) is an independent science-based group that ensures food safety practices are properly implemented. In 2012, FSAI conducted a meat authenticity survey. Due to increasing prices of food and ingredients, coupled with a growing supply chain, authorities began to question the purity of products. The meat authenticity survey served as a way to test the ingredients of the meat using molecular biology techniques.⁵² FSAI tested low-market meat products because they are susceptible to substitution.

⁵² The presence of Deoxyribonucleic acid (DNA), the molecule that encodes genetic information, is often determined by a polymerase chain reaction (PCR). DNA is a double stranded molecule, with A PCR amplifies the amount of DNA in a sample Amplification is achieved by the cyclic heating and cooling of a sample, to allow for the two strands of DNA to separate and bond with a new complimentary strand. The FSAI first completed qualitative PCR analysis, this reaction yields with the detection of specific DNA. If equine DNA was detected, next the sample was subjected to a quantitative PCR, which detects specific DNA and determines its amount within a sample. Then, FSAI had samples sequenced and matched against international genetic databases to confirm equine DNA was found. The author has experience with PCR from graduate research experience with Dr. Sanjeev Narayanan and Sailesh Menon. This experience taught the author a lot about molecular biotechnology techniques and enhanced a set of skills only gained through many projects.

On January 15, 2013, an FSAI press release announced the confirmation of the presence of equine and porcine DNA in low-market meat products. This led to the Government of Ireland's Department of Agriculture, Food and the Marine to join forces with FSAI to find the source of contamination. Together, they investigated producers, processors, and transporters involved with processed beef production. The complexity of this supply chain prevented accurate traceability to the point of the adulteration. Even months after the discovery, discrepancies continued to arise concerning who was involved and where the adulteration occurred.⁵³

Regarding equine DNA, laboratory testing revealed 10 out of 27 beef burgers tested positive. Of these 10 burgers, one contained up to 29 percent equine DNA, hinting at intentional incorporation not accidental contamination. In addition to Ireland, 16 EU member states were affected. The United Kingdom (UK) began testing products, and discovered horsemeat adulteration in similar products. The Food Standards Agency (FSA) of the UK reported that one company, Findus, had confirmed products contained up to 60 percent horsemeat.⁵⁴

Horsemeat was substituted for beef in ready-to-eat products.⁵⁵ Additional investigations in other countries discovered high-profile beef products, such as burgers and frozen meals, were adulterated with horsemeat. While horsemeat is generally safe for human consumption, unanticipated risks still exist. For instance, if horses are not raised for meat they could have been administered drugs that are unsafe for human consumption. This discovery of beef adulteration with horsemeat highlighted the vulnerabilities that can arise with increased supply chain complexity, and the lack of traceability and transparency within food production.⁵⁶

Historical cases of food fraud involving horsemeat

Before the 2013 scandal, testing for horsemeat in beef products was not widely exercised. Although horsemeat was not thought to be an typical adulterant of beef, it appears in beef before the 2013 scandal. Once meat is processed, and then ground or minced, it becomes increasingly

⁵³ P.J. O'Mahony, "Finding Horse Meat in Beef Products—a Global Problem," *QJM* (2013).

⁵⁴ Food Standards Agency, "Findus Beef Lasagne Products Found with Horse Meat," Accessed from: <http://www.food.gov.uk/news/updates/news/2013/feb/findus#.UxDr1-NdWSo>.

⁵⁵ Commonly affected items: frozen meat and pasta dishes, hamburgers, meatballs,

⁵⁶ Department of Agriculture, "Equine DNA & Mislabelling of Processed Beef Investigation."

difficult to identify which species is present in the product. Knowing this, fraudsters have historically added horsemeat to processed beef products.

In 1981, a meat inspector in San Diego observed visual differences among frozen boneless beef products imported from Australia. The meat inspector said that some of the products looked “dark and stringy” compared to others. Tests revealed these products were horsemeat, not beef.⁵⁷ From 1976 to 1981, two Australian meat companies allegedly purchased meat intended for pet food and sold it into the human food supply chain. Pet food meat is not subjected to the same safety rules as meat intended for human consumption; therefore, it could be unfit for human consumption. Australian tests discovered that boneless beef products were adulterated with horse, donkey, and kangaroo meat. In addition, different species are allowed within each supply chain. Horse, donkey, and kangaroo meat are not widely consumed in the US, making this instance a headliner in the American media. The creation of fake names, involvement of many intermediaries, and lack of records made traceability difficult, leaving the Royal Commission without enough evidence to prove either company entirely guilty.⁵⁸

In 2000, a species based study completed a detected equine DNA in hamburger and Mexican sausage (known as “chorizo”). This team of scientists used immunodetection on agarose plates to detect species DNA within samples. This method is desirable because in comparison it is lower in cost. This study confirmed the presence of equine meat in 9 out of 23 hamburgers and 2 out of 17 Mexican sausages. The addition of an undeclared ingredient to a product is deceptive and a possible risk for consumers. However, horse-processing plants are less regulated in comparison to those plants producing commonly consumed meats (e.g., beef, pork, and lamb).⁵⁹

In 2003, a pilot study by the FSA revealed that three of twenty-four samples contained undeclared horsemeat. This led to the sampling of 158 salami and salami-like products for donkey and horsemeat. Out of 31 chorizo samples, one contained traces of horsemeat at the maximum level of detection. Because equine DNA levels did not exceed the detection limit, it was assumed and confirmed by the FSA and the chorizo producer that it was an incident of cross

⁵⁷ Ian Warden, "Suspiciously Dark and Stringy 'Beef'," (Out of the Cabinet: National Archives of Australia 2011).

⁵⁸ Woodward and Industry, "Report of the Royal Commission into Australian Meat Industry, September 1982."

⁵⁹ M. E. Flores-Munguia, M. C. Bermudez-Almada, and L. VÁZquez-Moreno, "A Research Note: Detection of Adulteration in Processed Traditional Meat Products," *Journal of Muscle Foods* 11, no. 4 (2000).

contamination. Results from this survey state, "...there is no evidence of a problem with undeclared horsemeat or donkey meat in salami-type products."⁶⁰

These three cases show the adulteration of meat products with horsemeat was not a novel phenomenon. In the Australian scandal, the complexity of the supply chain and clever fraudsters created a twisted trail, making indictment close to impossible. In this article, it is apparent that products were falsely labeled. The UK salami survey showed how cross contamination can produce low levels of DNA detection, but in the 2013 scandal it was apparent that some of the contamination was intentional. From the earlier two cases, we see similarity within the scandal of 2013: a complex supply chain making accusations difficult.

Research question and methodological tool

The EU horsemeat incident of 2013 highlights the scale of complexity reached by global supply chains. This incident gave rise to new legislation and strong consumer feelings towards high-profile frozen beef products. Because this incident of food fraud affected many countries and EU member states, this thesis will focus its efforts towards looking specifically at the EU member states Ireland and UK.⁶¹ With this in mind, this thesis poses the following research question:

Bearing in mind the three-sided nature of the "crime triangle," and in light of the European Commission's regulatory response to the 2013 horsemeat scandal, has the fraud opportunity for beef adulteration with horsemeat decreased?

This is an important question because the seafood-type scandals (previously discussed) are comparable to the horsemeat scandal.⁶² While the paths from boat-to-plate and farm-to-fork vary, weaknesses in both supply chains leave consumers open to fraud. Both incidents had staggering forms of food fraud, most notably mislabeling and substitution. By looking at the

⁶⁰ Food Standards Agency, "Survey of Undeclared Horsemeat or Donkeymeat in Salami and Salami-Type Products (46/03)," (2003).

⁶¹ All regions affected by the incident are the UK, France, Sweden, Germany, Switzerland, the Netherlands, Norway, Denmark, Austria, Bulgaria, Finland, Belgium, Spain, Italy, and Portugal. The EU consists of 28 member states which created a strong trading community for exporting and importing.

⁶² Alister Doyle, "Interpol Targets Illegal Fishing, Seafood Fraud," Reuters, <http://www.reuters.com/article/2013/02/25/us-fish-idUSBRE91O1B020130225>.

similarities between the seafood and horsemeat fraud instances, it is apparent food fraud, such as mislabeling and substitution, can occur anywhere in any supply chain. Due to increasing globalization, mislabeled and substituted foods are a threat towards the global food supply chain. Globalization, along with this exploitation of weakness in supply chains for economic gain, could also leave the global supply chain open to a bioterrorist attack. Therefore, to combat food fraud, fraud opportunity must be decreased. To understand and decrease the fraud opportunity, food fraud incidents can be analyzed with the crime triangle.

This thesis will delve into the three key elements of the horsemeat scandal utilizing the crime triangle. The crime triangle is the tool of choice because it involves the vital elements of food fraud—namely, the victims, the fraudsters, and the guardian and hurdle gaps. Such elements combine to create the fraud opportunity exploited by fraudsters. The thesis will then investigate how the European Commission’s five-point action plan addresses food fraud opportunity by taking into account each element of the crime triangle.

Chapter 2 investigates the victims of the horsemeat scandal. Victims can include the consumers, governments, and companies. Each type of victim experienced deception from the fraudster. Consumers believed the ingredient label on the packaging on items, and unknowingly consumed beef products that contained horsemeat. Governments believed that current food regulations were providing enough oversight to prevent food fraud. Companies believed the products they purchased from suppliers were wholesome and true. These victims experienced a loss in trust in those associated with food production.

Chapter 3 will discuss the guardian and hurdle gaps created by the EU to address the horsemeat incident. Guardians are individuals who wish to keep a product safe. Guardians utilize hurdle gaps, such as testing, to deter adulteration. The guardian and hurdle gaps include the creation of new legislation following the five-point action plan created by the Commission. This chapter will explain equine passports and methods created to decrease the chance of horsemeat purposefully appearing again in the food supply chain.

Chapter 4 will investigate the fraudsters of this event. This chapter will explain the two main paths of adulteration and the two individuals held responsible for the scandal. It will paint a picture of the path the meat traveled, and reveal the complex nature of meat production. This chapter will compare previous indictments from food fraud, and explore the similarities between the fraudsters of food fraud.

Chapter 5 will refer back to the research question and examine how the five-point plan addresses the victims, the guardian and hurdle gaps, and the fraudsters. It will reveal how this event of food fraud was opportunistic by nature—that the decision to commit fraud is based on the existence of fraud opportunity. That is, when the elements of the crime triangle are optimal for committing fraud without being caught, fraudsters will act.

Chapter 2 - Victims

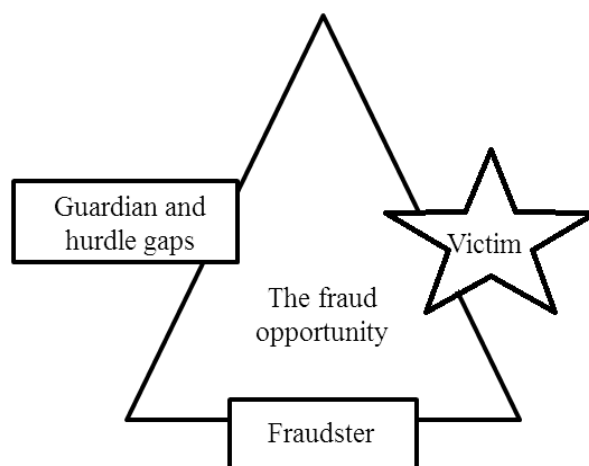


Figure 3. Crime triangle

Adapted from Spink, John and Douglas C. Moyer. 2011.
"Defining the Public Health Threat of Food Fraud."
Journal of Food Science 76(9): R157-162.

Victims of food fraud are those who were deceived by fraudsters. In this instance of fraud, the victims are the consumers, governments, and companies. The consumers believed they were buying what the ingredients stated were in the product. The companies and suppliers involved with the production of the contaminated products believed they were purchasing wholesome product. The government believed current food quality controls caught a majority of adulterated products. This chapter will explain how the three types of victims experienced fraud and provide pictures of adulterated products.

Consumers

Two customer surveys, one completed by the FSAI and the other completed by the FSA, discovered the impact of the horsemeat scandal felt by customers. While each survey asked different questions, the results mirror each other; consumer habits changed in response to the scandal. Most importantly, consumers experienced feelings of distrust toward their current food safety systems. They believe if the transparency of food supply chains can be increased, that food fraud will be reduced.

According to a survey completed by the FSAI, consumers have changed their purchasing habits since the horsemeat scandal. It was observed that more than half (51 percent) of consumers who previously purchased frozen burgers from the supermarket are now buying less of those products because of the incident. Interestingly, there was less of an impact regarding burger purchases from local butchers. It is thought that consumers believe local butchers have more traceability in products when compared to supermarkets. Processed foods that contain meat experienced a 42 percent loss in sales. Approximately 4 in every 10 consumers expressed concern for unknowingly having consumed horsemeat. Of the concerned consumers, 88 percent were concerned with what else might be in meat products with 86 percent concerned with chemical and antibiotic contaminants. In addition, about 76 percent of the concerned group were concerned that eating horsemeat may be a health risk. This survey also discovered that more than half of the meat-eaters surveyed are now more concerned with food ingredients, the country of origin, and food safety issues. From this study, it is observable that the horsemeat incident influenced consumers. These impacts vary from buying habits to food safety concerns.⁶³

The FSA held a series of Citizens Forums between February and June 2013 regarding the horsemeat scandal. The Citizens Forums took place over three waves, with each wave focused on different aspects of the incident. The first forum focused on “Consumer attitudes to towards the horse meat contamination issue.” The results showed that half (49 percent) of the participants bought less red meat and processed meat products. Of those participants less inclined to purchase red meat and processed products, 67 percent said it is due to the breach of trust brought out by the incident.⁶⁴ The second wave focused on “Changing consumer attitudes following the horse meat contamination issue.” These results showed that of the 49 percent in wave one that said they were inclined to buy less meat, only 33 percent followed through. Half (51 percent), also stated that it was not the issue of horsemeat itself, but the notion of mislabeling was concerning.⁶⁵

⁶³ Elaine Sloan and David McCarthy, "FSAI the Aftermath of the Horse Incident," (Food Safety Authority of Ireland, 2013).

⁶⁴ "FSA – Consumer Attitudes to Towards the Horse Meat Contamination Issue," (The Food Standards Agency, 2013).

⁶⁵ "FSA – Horse Meat Wave 2 Changing Consumer Attitudes Following the Horse Meat Contamination Issue ", (The Food Standards Agency, 2013).

The final wave third wave utilized some participants from the prior waves and participants from government and industry. This wave addressed consumer opinions about trace DNA in processed meats.⁶⁶ Many were unaware how trace DNA occurs in products and thought it was related to food safety. This wave concluded that consumers want increased transparency about food safety issues and increased regulations for testing.⁶⁷

From both surveys completed by the FSA and FSAI, it is observable that consumers want the same thing—a more transparent food industry. This incident of food fraud negatively affected consumers by decreasing their trust in the food industry. Thus, pressure falls onto the Commission to find a way to restore consumer confidence by addressing their concerns.

Governments

Governments are also a form of victim because they experienced a loss in trust from consumers due to fraudsters. Consumers rely on government regulations to ensure safe products are on the market. Studies completed after the horsemeat incident show that consumers did lose faith in their governments. From the study completed by the FSAI, only one in 5 were “totally confident” in food safety practices and regulations. Those who were not “totally confident”, said they were either “not sure” or “not very confident”.⁶⁸ From the study completed by the FSA, some subjects believed that the responsibility lies within the FSA, EU, and the UK government.⁶⁹ A study completed by Mintel found that 38 percent of British consumers believe that food safety depends on the government and 39 percent believe it depends on food companies.⁷⁰

While these numbers do not demonstrate that the majority of consumers lost confidence in the government’s responsibility for food safety, they do reflect concern from consumers.

⁶⁶ The author believes this was a very important part of the Citizens Forums because many individuals do not have knowledge of meat and meat production. Therefore, they lack the understanding of what “trace” means, and believe any percent of horsemeat is too much.

⁶⁷ TNS BMRB, "Trace DNA in Processed Meat, Consumer Views About Acceptability," (TNS BMRB, 2013).

⁶⁸ Elaine Sloan and McCarthy, "FSAI the Aftermath of the Horse Incident."

⁶⁹ "FSA – Consumer Attitudes to Towards the Horse Meat Contamination Issue."

⁷⁰ "Just Half of Brits Trust the Food Industry to Provide Safe Food to Eat," Mintel, <http://www.mintel.com/press-centre/food-and-drink/food-safety-after-horse-meat-scandal>. Just 9% of Britons interviewed believed that the problem has been solved.

These results show that consumers place a certain amount of trust in the government to prevent food fraud. When this trust was broken, there was a loss in confidence of the government's ability to regulate the food industry. Governments have worked to regain consumer confidence by reviewing and enhancing current food quality assurance, auditing, and species verification practices.

Companies

Companies are victims of food fraud because they had trusted their contractors and suppliers to provide a wholesome and true product. These breaches of trust lead to financial loss from companies for having to recall products and drop suppliers. Across the UK and the EU, more than 20 companies recalled products for possible beef adulteration with horsemeat. The online list also included reasons for why certain products were withdrawn. In this section, the author will explore which products were recalled from certain companies. Affected companies were:

Table 3. Companies affected by 2012 horsemeat scandal⁷¹

Companies
Aldi
Asda
Birds Eye
Burger King
Compass
The Co-operative Group
Findus
Hungarian Food Ltd.
Iceland
Ikea
King Fry

⁷¹ This list includes companies that withdrew products in the UK and Europe. The author could not clearly see the same of one company, and apologizes for leaving one company out. It should be noted that this list may not be fully comprehensive, but it does include the most readily known and affected companies.

Lidl
Makro
Morrisons
Nestle
Real
Sainsbury's
Sodexo
Taco Bell
Tesco
Waitrose
White Bread

Adapted from "Horsemeat Scandal: Withdrawn Products and Test Results," British Broadcast Corporation, <http://www.bbc.com/news/world-21412590>.

It is observable from the list that the range of companies affected varied from small to large. For the purposes of space, this thesis will focus on the widely recognized companies of Aldi, Tesco, Ikea, Findus, and Taco Bell. Many big name brands created ways to communicate risks to consumers. To disseminate their information to consumers, companies posted signs in areas where their products were sold, while others turned to posting ads in newspapers.

Aldi, a Germany-based international discount grocery chain, withdrew two items from its shelves. These items were Today's Special Frozen Beef Lasagna and Today's Special Frozen Spaghetti Bolognese. After independent testing, some of these products contained anywhere from 30 to 100 percent horsemeat.⁷² Aldi expressed the importance of their recall by posting signage indicating which products were recalled.

⁷² "Horsemeat Scandal: Withdrawn Products and Test Results," British Broadcast Corporation, <http://www.bbc.com/news/world-21412590>.



Figure 4. Notice of product recall by Aldi⁷³



Figure 5. Beef lasagne and spaghetti bolognese recalled by Aldi⁷⁴

⁷³ Image from:

<http://s1.reutersmedia.net/resources/r/?m=02&d=20130209&t=2&i=702443083&w=&fh=&fw=&ll=580&pl=378&r=CBRE9181J3Y00>

⁷⁴ Image from: <http://iheartaldi.blogspot.com/>

Possibly contaminated products were withdrawn and Aldi encouraged customers to return any products that could have been contaminated. A spokesperson for Aldi said,

“This is completely unacceptable and like other affected companies, we feel angry and let down by our supplier. If the label says beef, our customers expect it to be beef...”⁷⁵

This statement explains the trust that exists between suppliers, companies, and customers. Once the trust is breached, every level of the supply chain distrusts one another.⁷⁶ Months following the scandal, tests completed by the FSA found no horsemeat in 179 samples tested from Aldi. This suggests that Aldi successfully recalled and obtained a majority of the contaminated products.

Tesco PLC, a British multinational grocery store chain, experienced one of the largest recalls for products. From the 2013 testing scheme carried out by the FSAI, Tesco’s Everyday Value Beef Burgers contained 29 percent equine DNA.⁷⁷ Tesco responded by pulling potentially contaminated products from shelves in grocery stores and printing ads apologizing for the adulteration.⁷⁸ In addition, from independent testing, Tesco confirmed the presence of horsemeat in Tesco Frozen Beef Quarter Pounders and Flamehouse Frozen Chargrilled Quarter Pounders. Tesco withdrew approximately 10million burger products from the shelves.⁷⁹ This account of widespread product withdrawals affected the company’s sales. Tesco’s sales for frozen foods fell 1 percent after the horsemeat scandal.⁸⁰

⁷⁵ "Horsemeat Scandal: Aldi Ready Meal Range Contains 'up to 100% Horsemeat', Supermarket Confirms," http://www.huffingtonpost.co.uk/2013/02/09/horsemeat-scandal-aldi-ready-meal-supermarket_n_2650876.html.

⁷⁶ It is interesting to see the interconnection between the different levels of the supply chain. While testing exists at each level to confirm a product, so does trust.

⁷⁷ "FSAI Survey Finds Horse DNA in Some Beef Burger Products." The 29% positive presence of horse DNA came from one sample of a Tesco Everyday Value Beef Burger.

⁷⁸Tim Smith, "Tesco Comments on FSAI Beef Survey," (New Release: Tesco, 2013).

⁷⁹ "Horsemeat Scandal: Tesco Drops Supplier over Horsemeat in Value Burgers," (British Broadcast Corporation, 2013).

⁸⁰ "Tesco Sales Fall 1% as Horsemeat Effect Hits Frozen Food," <http://www.thegrocer.co.uk/channels/supermarkets/tesco/tesco-sales-fall-1-as-horsemeat-effect-hits-frozen-food/343906.article?redirCanon=1>.



Figure 6. Everyday value burgers recalled by Tesco⁸¹



Figure 7. Beef quarter pounders recalled by Tesco⁸²

⁸¹ Image from: <http://www.mirror.co.uk/news/uk-news/horse-meat-found-tesco-burgers-1536247>

⁸² Image from: <http://i2.cdn.turner.com/cnn/dam/assets/130116164613-pkg-boulden-uk-horse-in-your-beef-00000426-story-top.jpg>



Figure 8. Apology from Tesco⁸³

Ikea, a Swedish company that sells furniture, home décor, and food products became a victim to the horsemeat scandal. First noted in the Czech Republic, the recall then spread to 14 other countries. The same batch of adulterated meatballs were shipped to Slovakia, Hungary, France, the UK, Portugal, the Netherlands, Belgium, Spain, Italy, Greece, Cyprus and the Republic of Ireland. From independent testing, Ikea discovered 1,675 pounds of their meatballs contained horsemeat.⁸⁴



Figure 9. Meatballs recalled by Ikea⁸⁵

⁸³ Image from: <http://www.lovefood.com/images/content/body/tescoapology.jpg>

⁸⁴ Sorcha Pollak, "Horsemeat Scandal Spreads to Ikea Swedish Meatballs," TIME, Europe, <http://world.time.com/2013/02/26/horsemeat-scandal-spreads-to-ikea-swedish-meatballs/>.

⁸⁵ Image from: <http://www.ikea.com/au/en/catalog/products/70028680/>

Findus, a well-known brand of frozen foods, recalled items when they discovered some items contained horsemeat. Findus found 11 out of 18 beef lasagna samples contained more than 60 percent horsemeat. Findus recalled beef lasagna, shepherd's pie, and moussaka.⁸⁶



Figure 10. Beef lasagne recalled by Findus⁸⁷



Figure 11. Beef moussaka recalled by Findus⁸⁸

⁸⁶ Susannah Cullinane, "What's Behind the Horsemeat Contamination Scandal?," CNN World, <http://www.cnn.com/2013/02/12/world/europe/horsemeat-contamination-qanda/>.

⁸⁷ Image from: <http://static.guim.co.uk/sys-images/Guardian/Pix/pictures/2013/2/8/1360331997695/Findus-beef-lasagne-010.jpg>

⁸⁸ Image from: <http://www.ipolitics.ca/wp-content/uploads/2013/02/03972893.jpg>

A MESSAGE TO OUR CUSTOMERS FROM FINDUS UK

14th February 2013

Update 'bute'(phenylbutazone)

Findus UK can now confirm that 'bute' (phenylbutazone) was not found in the Beef Lasagne (withdrawn from sale on the 4th February) which we sent to accredited and certified scientific laboratories for testing.

We wanted to share this latest news with you and we remain truly sorry that horsemeat was found in our beef lasagne at all. This should not have happened and we are taking actions to make sure this will never happen again.

DNA tests have been carried out on all other Findus UK products and they are not affected.

Figure 12. Apology from Findus⁸⁹

While most of the scandal struck already-made products sold at major grocery stores, the fast food industry was affected by adulterated meat. Two widely known fast food restaurants, Burger King and Taco Bell, had beef that contained horsemeat. Early in the scandal, Burger King used the same beef supplier that supplied Tesco. In turn, the company stopped using the supplier and apologized to its customers. The discovery of horsemeat in Taco Bell's ground beef occurred later in the timeline. On the FSA's third round of testing, they found horsemeat DNA in ground beef and immediately stopped the use of the possibly contaminated product.⁹⁰

Contamination spanned from grocers to fast food companies. Products that were possibly contaminated were withdrawn from shelves from a precautionary standpoint. Recalling items might have prevented some consumers from buying adulterated products. However, the full scope of the adulteration remains unknown to both grocers and fast food companies. Companies that are victims of this incident of food fraud lost the trust of their customers therefore experienced a loss in sales. Consumers lost confidence in the food system.⁹¹

⁸⁹ Image from: http://media.treehugger.com/assets/images/2013/02/findus-apology.jpg.650x0_q85_crop-smart.jpg

⁹⁰ "Tests Find Horsemeat in Taco Bell UK Ground Beef," Reuters, <http://www.reuters.com/article/2013/03/01/us-horsemeat-idUSBRE9200N020130301>.

⁹¹ "Just Half of Brits Trust the Food Industry to Provide Safe Food to Eat". Mintel, a market research company, completed a research project six months after the horsemeat scandal. The results of this project discovered that only half of the consumers interviewed believed that the food industry provides safe food. In addition, less than half of the consumers believed that the food industry could successfully respond to major crisis, like the horsemeat scandal. This research proves that consumers have little faith in the food industry.

Victims

The French finance ministry estimates that horsemeat scandal affected over 4.5 million processed beef products, equaling about 1,000 tons of food.⁹² While each victim (consumers, governments, and companies) experienced a different affect from the fraudster, all three victims were intertwined. Consumers relied on both companies and governments for safe foods, and companies rely on consumers to purchase foods. Each type of victim will require different remedies from the Commission's five-point action plan to remedy the effects from the fraudsters.

Ironically, one group of food producers, local butchers, benefited from this widespread instance of food fraud. The Q Guild, a guild comprised of over 100 butchers in the UK reported an increase in trade by 20 cents and an increase in meatball and burger sales by 30 cents. Consumers turned toward local butchers believing that local butchers may have better traceability of their products.⁹³

⁹² Rudy Ruitenber, "Horse-Meat Suspect Spanghero Denies Beef Scam Responsibility," (2013), <http://www.bloomberg.com/news/2013-02-15/horse-meat-suspect-spanghero-denies-scam-admits-some-negligence.html>.

⁹³ Mike Connon, "Consumers Head for High Street Butchers Following Horse Meat Scare," <http://www.qguild.co.uk/2013/02/consumers-head-for-high-street-butchers-following-horse-meat-scare/>. The Q Guild founded in 1986 stands as a seal of excellence amongst butchers and meat retailers of the UK.

Chapter 3 - Guardian and hurdle gaps

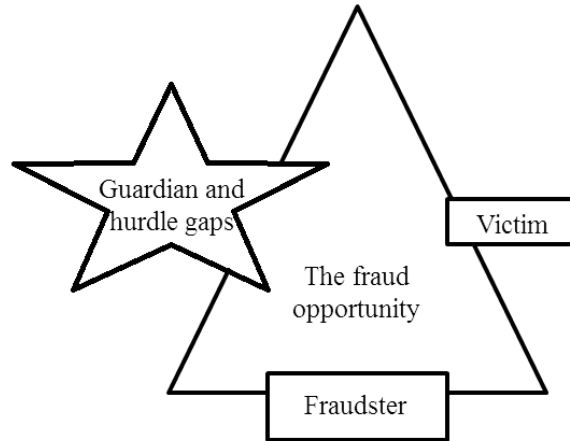


Figure 13. Crime triangle

Adapted from Spink, John and Douglas C. Moyer. 2011.

“Defining the Public Health Threat of Food Fraud.”

Journal of Food Science 76(9): R157-162.

Guardians are those who try to keep food products safe. They seek to safeguard products using tools to increase methods of deterrence, such as investigations and testing routines. Investigations and testing routines are types of hurdles; hurdles are tactics used by guardians to catch fraudsters.⁹⁴ Fraudsters perceive a better or worse fraud opportunity when guardian and hurdle gaps are changed. Changes immediately after the horsemeat scandal regarding authorities and regulations increased fraudster deterrence. This continuation of implementing changes with authorities and regulations will lead to greater deterrence of food fraud. The five-point plan created by the Commission seeks to strengthen product safety and prevent fraudsters from adulterating beef products with horsemeat. This chapter will discuss the guardian and hurdle gaps immediately following the scandal.

⁹⁴ J. and Moyer Spink, DC. , "Understanding and Combating Food Fraud " *Food Technology magazine* 67, no. 1 (2013). This articles notes that a minor change in standard operating procedures can influence hurdle gaps. A small change may cause a fraudster to change targets for the fear of what could have potentially changed as well as the hurdle.

Testing

The implementation of a three-part testing scheme by the Commission occurred immediately after the adulteration was caught by the FSAI. The purposes of these tests were to examine the scope and unanticipated public health implications from beef adulterated with horsemeat. This three-part testing scheme consisted of the following parts⁹⁵:

1. Test products for the presence of equine DNA
2. Test products for the presence of phenylbutazone
3. Public health risk assessment of phenylbutazone

One of the biggest public health concerns was the potential presence of phenylbutazone in adulterated beef products. Phenylbutazone, commonly referred to as bute, is a non-steroidal anti-inflammatory drug (NSAID) administered to horses for fever and pain management.⁹⁶ Bute can have adverse health effects in humans; therefore, it is prohibited in animals intended for human consumption.⁹⁷ The EU created a passport system to prevent bute from entering the food supply chain via horses. If a horse is labeled as possibly entering the food chain, all medications administered have to be listed on the horse's passport. It is worth noting that the Committee for Veterinary Medical Products could not identify maximum residue limits, making the product unsafe for human consumption.⁹⁸

The immediate DNA testing program required member states to send 10-150 samples, varying by state.⁹⁹ Authorities administered these tests, but additional tests were completed by

⁹⁵ "What Has the EU Done So Far to Address the Horsemeat Scandal?".

⁹⁶ The author, having an equine background, can recall countless times she has administered bute to her horses for pain management. Bute is the "advil" of the equine realm, and it is frequently administered. In the US, no record keeping system exists for medication administration to horses.

⁹⁷ These adverse health effects are highlighted in the EFSA and EMA joint statement article (sourced below) as blood dyscrasias, genotoxicity, carcinogenic, reproductive toxicity and sub-chronic and chronic toxicity. Because of the possible adverse effects, only a few member states use it as last resort treatment for chronic inflammation in humans.

⁹⁸ European Food Safety Authority and European Medicines Agency, "Joint Statement of EFSA and EMA on the Presence of Residues of Phenylbutazone in Horse Meat," *EFSA Journal* 11, no. 4 (2013). This in-depth article states the possible health implications from bute ingestion, risk of exposure, and recommendations for action.

⁹⁹ Sampling requirements can be seen at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.095.01.0064.01.ENG

individuals within industry occurred. From the tests administered by authorities, the results stated that out of 7,259 samples collected from 27 Member States 4,144 tested positive for horsemeat and 3,115 samples tested positive for bute. Of the samples, 193 were positive for equine DNA and 16 positive for bute. From the tested administered by individuals within the industry, 7,951 samples were tested, with 110 sampled containing equine DNA, and an even lower number for the presence of bute.¹⁰⁰

The European Food Safety Authority (EFSA) and European Medicines Agency (EMA) prepared a risk assessment regarding the possible presence of bute in the adulterated items. Since the risk assessment data showed low numbers regarding the presence of bute, the EFSA and EMA statement regarding exposure via adulterated beef products was low. The EFSA and EMA determined that the exposure to bute was considered to be:

“Up to 144 and up to 36,800 individuals per 100 million could be potentially exposed across countries and age groups each day. On a given day, the probability of a consumer being both susceptible to developing aplastic anaemia and being exposed to phenylbutazone was estimated to range approximately from 2 in a trillion to 1 in 100 million.”¹⁰¹

After the FSAI report, the FSA began testing products in the UK. Over five thousand test results on products such as burgers, lasagna, and meatballs showed that beef adulterated with horsemeat affected limited items. In addition, per the Commission directive, the FSA sent 150 samples for horsemeat and bute detection. The results reported no items contained horsemeat over the reporting threshold.¹⁰²

Testing immediately following the scandal was necessary to see the scope of adulteration. Testing confirmed that some products, such as processed beef products, had a higher chance of adulteration. Of the products that contained horsemeat, not many contained bute. Thus, the risk

¹⁰⁰ "Results of Tests of Meat".

¹⁰¹ European Food Safety Authority and European Medicines Agency, "Joint Statement of EFSA and EMA on the Presence of Residues of Phenylbutazone in Horse Meat."

¹⁰² "Horse Meat: Answer to Your Questions," <http://www.food.gov.uk/enforcement/monitoring/horse-meat/horse-meat-faq/#.U6shSpRdWSo>. "Reporting threshold" refers to presence of equine DNA at or above 1%.

towards the health of the public from horsemeat was low. To gather and disseminate research about samples, Member States relied on current food safety tools and practices.

Traceability

Since 2000, the Commission has required all equines (horses, donkeys, zebras and hybrids) within the EU to have a passport.^{103, 104} Equine passports are tools to prevent the entrance of equines administered unsafe drugs from entering the food system and the misidentification of animals. The traceability of horses in and out of the food chain has increased by keeping track of drug administration, purchasing history, and movement of such animals. In 2009, a new section of regulation was added to equine passports. The new regulation requires all horses born in 2009 or those that do not have a passport by 2009 to obtain a microchip.¹⁰⁵

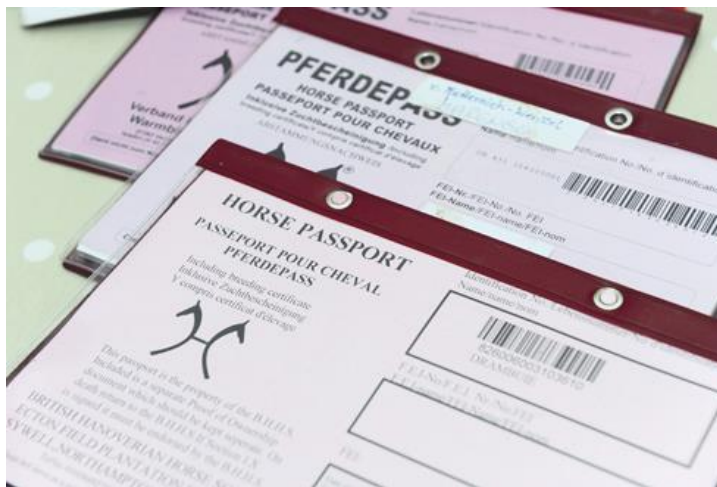


Figure 14. Example of a horse passport¹⁰⁶

Because the presence of bute was detected in some samples of products that contained horsemeat, clearly the passport system is lacking proper implementation in Member States. In 2013, a survey conducted by the Equine Sector Council for Health and Welfare discovered that

¹⁰³ "Identification of Equine Animals", http://ec.europa.eu/food/animal/identification/equine/index_en.htm.

¹⁰⁴ No such system for the traceability to identify or track drug administration of equines exists in the United States. A system like equine passports would be beneficial to help identify animals, along with ensuring animals sold for slaughter in countries that slaughter, are clean of medications that could harm humans.

¹⁰⁵ This is an interesting concept that is not widely adopted in the US. Today, some parts of the equine industry depend on individuals drawing and writing descriptions of our animals.

¹⁰⁶ Image from: <http://www.horseandhound.co.uk/features/horse-passports-who-should-keep-them/>.

80 percent of individuals in the equine industry believed the passport system lacks success. They believe the lack of success is due to a misunderstanding of the rules; lack of implementation and execution; and lack of a central database.¹⁰⁷

Tools

Results from the early 2013 tests were exchanged through the EU's Rapid Alert System for Food and Feed (RASFF). RASFF is a database utilized to share information regarding food safety risks amongst governing bodies, such as the Commission, EFSA, ESA, and EU member states.¹⁰⁸ This year, RASFF created a consumer portal so consumers could access information regarding food risks.¹⁰⁹ While RASFF proved beneficial to distribute information about the horsemeat scandal, the incident was not a food safety issue.¹¹⁰

Research is ongoing to develop more methods to exchange food information. One method for the exchange of information amongst consumers, supply chain partners, and authorities is the creation of SmartAgri-Food, and Future Internet Public-Private Partnership (FI-PPP) funded by the Commission. One trial of this project is the Meat Information on Provenance (MIP), which targets transparency within the meat supply chain. To achieve such transparency, all of partners in the supply chain exchange information about products through clear and concise communication. This tool would make the Electronic Product Code

¹⁰⁷ "Calls for Simpler Horse Passport System as Survey Results Highlight Poor Understanding and Compliance," <http://www.worldhorsewelfare.org/Article/Calls-for-Simpler-Horse-Passport-System-as-Survey-Results-Highlight-Poor-Understanding-and-Compliance>. World Horse Welfare is an international equine welfare group based in the UK. Scarily enough, this article states that some abattoirs were unclear of the passports objectives. Keeping bute of the food supply by checking equine passports before slaughter is one of the main reasons of the passports.

¹⁰⁸ In addition to the 28 member states, RASFF is utilized by Norway, Liechtenstein, Iceland, and Switzerland.

¹⁰⁹ "Rasff - Food and Feed Safety Alerts," http://ec.europa.eu/food/safety/rasff/index_en.htm. The author encourages readers to check out the consumer portal, as it lays out food safety information and alerts clearly.

¹¹⁰ As noted in Chapter 1 of this thesis, food fraud and food safety are different sectors of food. While RASFF was useful for communicating information regarding the horsemeat scandal, using such an interface might have created confusion. Confusion created by the differences between food safety and food fraud led individuals to believe the horsemeat scandal was an incident of food safety. Individuals continued to believe this well after the EFSA and EMA stated the risk of exposure to bute was minimal.

Information Services (EPICS) available to consumers, governments, and businesses.¹¹¹ The availability of such information would increase transparency amongst those within production and purchasing of meat products.

Findus, one of the companies involved, joined a non-profit platform that allows communication among those involved with production. The Supplier Ethical Data Exchange (SEDEX) has an online database that allows members of a supply chain to share information on labor standards, health and safety, environment, and business ethics.¹¹² This program increases transparency of the supply chain, while keeping information limited to only those of the supply chain. This could be a very useful tool to combat food safety and fraud instances in the future.

Guardian and hurdle gaps

The Commission became a guardian when they began testing products for the presence of equine DNA and bute in high risk products. Their testing scheme became a hurdle because it served as a means to determine the scope of food fraud in the processed beef sector. Horse passports were a tool used to prevent horses that were administered drugs unsafe for human consumption from entering the human food chain. However, the lack of proper implementation of equine passports lead to the entrance of bute into the food supply chain. While the use of existing tools aided communication, the scandal lead to the creation of new technologies to combat food fraud. Although these new technologies have been created, they lack current implementation. The horsemeat scandal has encouraged those within the food industry to think outside of the box about food fraud.

¹¹¹ Huub Scholten et al., "Enabling Transparency in Meat Supply Chains: Tracking & Tracing for Supply Chain Partners, Consumers and Authorities" (paper presented at the GIL Jahrestagung, 2014). In addition, EPICIS would include information to ensure transparency such as birth, fattening, serial number for entire length of supply chain, etc. More information can be seen at: <http://www.fispace.eu/Documentations/Leaflets/meat-information-on--provenance-leaflet.pdf> . Germany utilizes a program created by GS1 Germany called "fTRACE" which gives consumers the opportunity to see an items origin, processing, manufacturing path and more (<http://www.ftrace.de/en/us>). The author was amazed such a program even existed, as there is no similar program in the US.

¹¹² "Sedex," <http://www.sedexglobal.com/>.

Chapter 4- Fraudsters

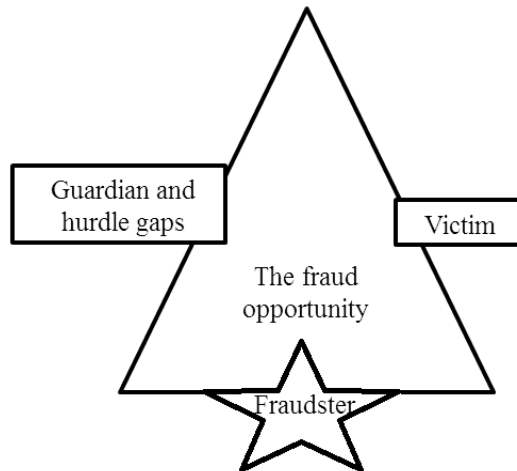


Figure 15. Crime triangle

Adapted from Spink, John and Douglas C. Moyer. 2011.

“Defining the Public Health Threat of Food Fraud.”

Journal of Food Science 76(9): R157-162.

Fraudsters are individuals who are defrauding others by cheating.¹¹³ This act of cheating can be, for instance, the act of substituting a cheaper product in place of a more expensive product, like horsemeat for beef. Discovering who the fraudsters were in this intricate supply chain was difficult. The supply chain caused meat (both beef and horse) and its products to shift between countries, individuals, and facilities creating a tangled web of companies. This supply chain created such a tangled web that pinpointing the source of adulteration was difficult.

As authorities tried to pinpoint the fraudsters, companies, and affected products, they realized the complexity of ready-to-eat meals. Finally two individuals, Willy Selten and Jan Fasen, were pinpointed as the main fraudsters associated with the horsemeat scandal. Selten’s and Fasen’s ties to the adulterated supply chains led to them being held responsible for the two main routes associated with the horsemeat scandal of 2013.

¹¹³ Spink, "Understanding and Combating Food Fraud ". This article points out a vital piece of wisdom, while arrests lead to some fraudsters being stopped, others may get away with defrauding consumers, companies, and governments for an infinite amount of time if not caught by guardian and hurdles.

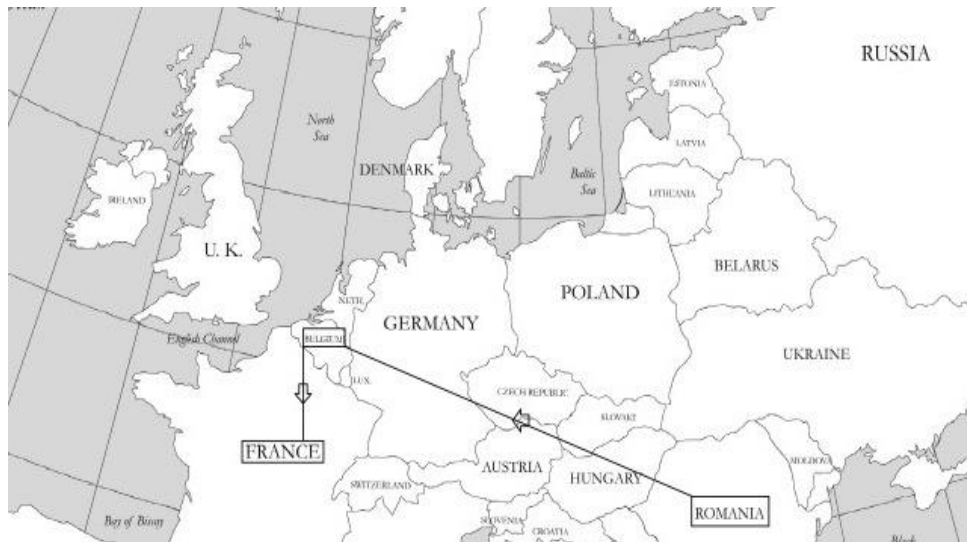


Figure 16. France route during the horsemeat scandal¹¹⁴

The first fraud route originated from two abattoirs in Romania. Both abattoirs, CarmOlip and Doly Com, processed horses and horsemeat for export. In addition, both abattoirs exported horsemeat to Belgium where meat was sub-contracted by Draap Trading Ltd. Owned by Jan Fasen, Draap was a meat trading company registered in Cyprus, although it operated out of Belgium.¹¹⁵ Draap purchased horsemeat from CarmOlip and Doly Com, but claimed all meat kept their appropriate labels.

Draap supplied meat to Spanghero, a French meat processing company. Spanghero supplied meat to Comigel, another French food processing company.¹¹⁶ Comigel manufactured lasagna and spaghetti dishes to be sold by Findus, Tesco, Aldi, and various retailers.¹¹⁷ Findus discovered their lasagna products contained more than 60 percent horsemeat after testing

¹¹⁴ Image created by author by editing a map found at

<http://alabamamaps.ua.edu/contemporarymaps/world/europe/europe2.jpg>

¹¹⁵ According to Google translate, “Draap” is Dutch for horse spelled backwards.

<https://translate.google.com/#en/nl/horse>

¹¹⁶ Neil Buckley, "Romanian Abattoir Defends Horsemeat Trade," <http://www.ft.com/cms/s/0/202ad07a-753e-11e2-b8ad-00144feabdc0.html#axzz35adDa400>.

¹¹⁷ Felicity Lawrence, "Horsemeat Scandal: The Essential Guide,"

<http://www.theguardian.com/uk/2013/feb/15/horsemeat-scandal-the-essential-guide>.

products when Comigel stated concern over the source of meat in the lasagnas.¹¹⁸ The French route of adulteration contains many individuals and companies along its supply chain. While everyone along the path of the chain pleaded innocent, a lawsuit found Fasen liable of fraud.

Table 4. Companies affected along the France route of the 2013 horsemeat scandal

Companies
Aldi
Asda
Findus
Tesco

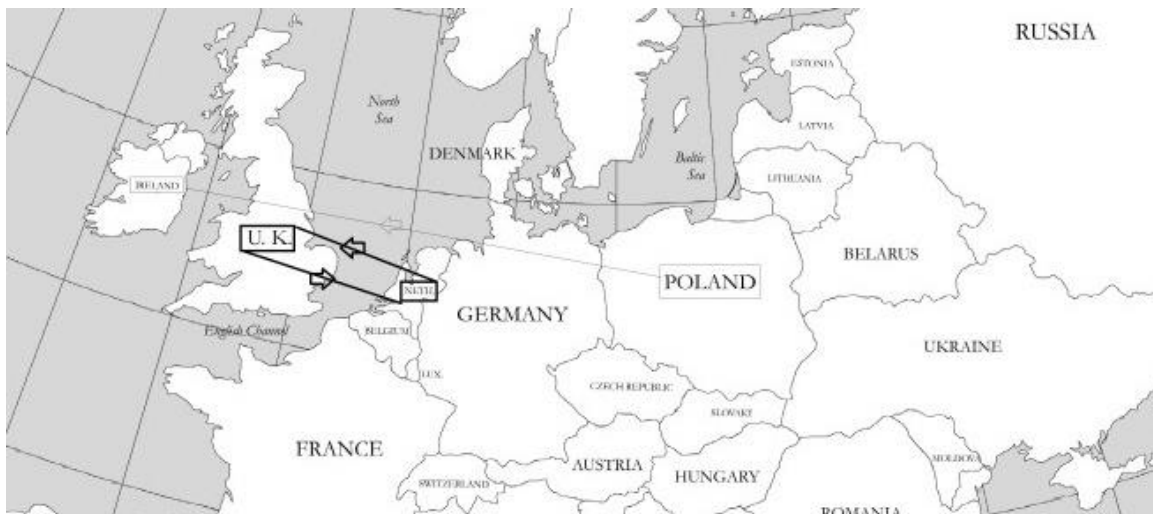


Figure 17. Other routes of adulteration during the horsemeat scandal¹¹⁹

The second route of fraud has two sources of adulteration. One of the largest beef exporters, Anglo-Irish Beef Processors (ABP), obtained beef from multiple suppliers, two of which were found to have ties with horsemeat. The two suppliers were Silvercrest and Norwest. ABP supplied meat many companies, such as Burger King, Tesco, Aldi, The Co-operative

¹¹⁸ "Findus Beef Lasagne Products Found with Horse Meat," <http://www.food.gov.uk/news-updates/news/2013/feb/findus#.U86BSONdWS0>. These beef lasagnas were believed to have been only distributed in the UK.

¹¹⁹ Image created by author by editing a map found at <http://alabamamaps.ua.edu/contemporarymaps/world/europe/europe2.jpg>

Group, Makro, Waitrose, Asda, and Greencore. Shortly after the discovery of horse DNA in ABP products, Tesco, the Co-operative Group, Aldi, and Burger King dropped ABP as a meat supplier.¹²⁰

The involvement of the first supplier, Silvercrest Foods in County Monaghan Ireland, is shown in the above figure with the thin line and arrow.¹²¹ Silvercrest obtained meat from Food Service, a supplier in Poland. While the slaughterhouse Food Service had EU accreditation, it is possible they were the source of adulteration. This suspicion comes from the type of product purchased by Silvercrest, which was frozen blocks of low-value beef. In the fall of 2013, ABP took Food Services to court to address the adulteration issue.¹²² Food Services claimed that they did not process any type of equine meat on their property.¹²³ Results from this trial remain inconclusive.¹²⁴

Involvement of second processing plant, Norwest Foods in the Cheshire county of England, is shown in the above figure with the bolded lines and arrows. Norwest obtained some of its product from Willy Selten. Evidence suggests that Selten obtained horsemeat from the Red Lion, an abattoir in the UK. Horsemeat was then shipped to Selten in the Netherlands where he made his own products that involved mixing horsemeat with other meats. While Selten admits to mixing horsemeat and beef, he claims that the product was meant for animal consumption.

¹²⁰ James Davey and Stephen Mangan, "Three Retailers Drop Irish Beef Baron's Firm over Horsemeat Row," <http://uk.mobile.reuters.com/article/topNews/idUKBRE90T0DT20130130>. Of the companies that dropped Silvercrest, their reason focused around that Silvercrest "breached the contract" between them. This breach came from the supplying of a product that was not in the contract.

¹²¹ While many sources also state Dalepak, of Leeming Bar (a subsidiary of ABP) guilty of producing products containing horsemeat tests completed by the FSA did not find horsemeat in samples taken from Dalepek items. <http://www.food.gov.uk/news-updates/news/2013/jan/horse-dna-third-update#.U8wf5ZRdWS0>

¹²² Jamie Smyth, "Horse Meat Source Identified in Poland," <http://www.ft.com/intl/cms/s/0/df8477fa-687d-11e2-ad8f-00144feab49a.html#axzz381XbUwkC>.

¹²³ Richard Ford, "Polish Supplier Hits Back at Abp Horsemeat Allegations," <http://www.thegrocer.co.uk/fmcg/fresh/polish-supplier-hits-back-at-abp-horsemeat-allegations/349541.article>.

¹²⁴ The author cannot find the results of the trials.

Norwest reached a financial settlement with ABP, stating that they may have, unknowingly, sold ABP beef adulterated with horse.¹²⁵

While these two incidents remain the most pertinent paths of adulteration, there are a few smaller companies worth mentioning. McAdam Foods, a meat trader, supplied meat to ABP and Rangeland meats. Tests at Rangeland confirmed the presence of horsemeat, along with tests completed at Freeza Meats, which was storing some of McAdams products.¹²⁶

QK Meats had a variety of meat stocks from Poland in cold storage. Tests proved that some of the samples tested positive for horse DNA. Thus, Birds Eye dropped QK meats as its supplier. Lastly, QK Meats supplied Oak Farm Foods, which lead to the discovery of equine DNA in school lunches and products.¹²⁷ The Ireland routes of contamination led to profit loss because companies dropped one of the largest beef producers. While the routes were more “clear cut” than the French route, the Ireland routes seem to have affected more companies because of ABP. Currently, only Selten has been brought to court over fraud.

Table 5. Companies affected during the 2013 horsemeat scandal

Companies
Aldi
Asda
Burger King
The Co-operative Group
Makro
Taco Bell
Tesco
Waitrose

¹²⁵ Felicity Lawrence, "UK Abattoir Linked to Dutch Distributor Investigated over Horsemeat Scandal," <http://www.theguardian.com/uk/2013/apr/22/uk-abattoir-dutch-distributor-horsemeat>.

¹²⁶ "I Didn't See or Handle Horsemeat' Says Monaghan Meat Broker," <http://www.bbc.com/news/uk-northern-ireland-21376297>.

¹²⁷ Department of Agriculture, "Equine DNA & Mislabelling of Processed Beef Investigation."

Indictment

The arrests of Fasen and Selten occurred because of investigations led by authorities. Both Selten and Fasen were arrested on counts of fraud, fabrication, and conspiracy to defraud. Naturally, both men denied purposefully selling adulterated beef.^{128, 129} All evidence suggests their trials are pending, and the investigations leading to prosecution are ongoing. In food fraud cases it not unusual for prosecutions to take considerable amount of time. The supply chain of food production is complex in nature, thus investigations are complicated.

As mentioned in Chapter 1, prosecution of fraudsters associated with the *Salmonella typhimurium* contamination in peanut butter and peanut butter products took almost five years. In 2013, a 76-count indictment was charged against those allegedly involved with the production and distribution of contaminated peanut butter and peanut butter products. A piece of the indictment addressed the fabrication of documents certifying products safe for consumption.¹³⁰

In China, certain drugs such as chloramphenicol, nitrofurans and/or fluoroquinolones are used to treat honeybees. In the US, however, the FDA has not approved the use of such substances in products for human consumption. Therefore, the US does not import honey from China.¹³¹ In 2011, arrests made regarding the sale of Chinese honey in the US mirrored the horsemeat scandal. Fraudsters improperly declared the imported honey from China to avoid more than \$180 million in anti-dumping duties.¹³²

These three incidents of food fraud occurred in different countries and involved different types of products. However, there is an observed similarity between the two: fraudsters found a way to evade guardian and hurdle gaps for financial gain. In the peanut butter and honey cases,

¹²⁸ "Dutch Meat Trader Charged in France over Horsemeat Scandal," <http://www.thegrocer.co.uk/people/dutch-meat-trader-charged-in-france-over-horsemeat-scandal/356971.article>.

¹²⁹ "Horsemeat: Dutch Trader Willy Selten Arrested," <http://www.thegrocer.co.uk/topics/food-safety/horsemeat/horsemeat-dutch-trader-willy-selten-arrested/343560.article>.

¹³⁰ "Former Officials and Broker of Peanut Corporation of America Indicted Related to Salmonella-Tainted Peanut Products," ed. Department of Justice (2013).

¹³¹ "Import Alert 36-04," ed. Food and Drug Administration (2014).

¹³² Helena Bottemiller, "'Honeygate' Sting Leads to Charges for Illegal Chinese Honey Importation," Food Safety News http://www.foodsafetynews.com/2013/02/honeygate-sting-leads-to-charges-for-illegal-chinese-honey-importation/#.U8_W5eNdWSo.

indictments took years; therefore, the judicial rulings for Selten and Fasen may take a considerable amount of time.

Fraudsters

The routes of contamination from the horsemeat scandal involved many abattoirs, processors, and suppliers. This chapter provided information to gain a better understanding of the fraudsters involved by depicting the paths of products. By comparing previous cases of food fraud to the horsemeat scandal, we can see that parallels exist between those who commit food fraud. These types of fraudsters are willing to deceive others for an economic gain regardless of possible public health implications.

Chapter 5- Conclusion and discussion

The Commission created a five-point plan in response to the concerning aspects generated from the horsemeat scandal. Each point is aimed at a specific target, with the ultimate goal to decrease future food fraud. The five points of the plan include the following:

1. Food fraud prevention programs
2. Testing programs
3. Horse passports
4. Official control, implementation, and penalties
5. Origin labelling

Bearing in mind the three sides of the crime triangle (i.e. the victims, the fraudsters, and the guardian and hurdle gaps) we can see how the Commission addressed each of the sides of the crime triangle. Thus, the Commission has, in theory, decreased future fraud opportunity for beef adulteration with horsemeat. The points aimed to address both short and long-term goals, with some of the longer goals not achieved yet.

Victims

The first side of the crime triangle displayed was the victims. For the purposes of this thesis, the victims were consumers, companies, and governments. If there was a change in the number of victims, the fraud opportunity would have been affected. Because of the complex supply chain and wide distribution of frozen ready-to-eat products, the amount of victims involved was innumerable. This number remains innumerable because no one can be certain of for how long beef was adulterated with horsemeat.

The Commission's point (official control, implementation, and penalties) addresses companies because Member States must participate in unannounced inspections and testing. Recalling how the scandal was discovered, through routine testing, increased testing has the opportunity to catch fraud before it becomes widespread. With more government testing, companies will likely increase their own testing to ensure compliance. This testing should yield a lesser economic impact for victims if adulterations are caught prior to market entry.

Consumers as victims are addressed in the Commission's points one and five. In point one (food fraud) the action calls to create a method for the rapid exchange of information and alerts about food fraud. Creating a database like RASFF that has a consumer portal for food fraud helps decrease the number of affected consumers. A portal like RASFF could also provide consumers with information to avoid affected products. In addition, the EU Food Fraud Network (FFN) was created. The purpose of this network is to serve as a cross-border cooperation tool between member and non-member states of the EU.¹³³ The FFN allows for communication between food fraud officials on possible cases of food fraud and legislation.

The Commission's fifth point (origin labelling) addresses consumers because it calls for more country of origin labelling on products. The goal is that the more information provided on a product means it could provide an easier way to recall products. Origin labelling already exists for many products, and after the horsemeat incident, it will be extended to more species, including horses. This fifth point poses an issue because the cost of a system to implement country of origin labelling increase production costs. To combat this rise in price, three options for country of origin labelling are under consideration. The first is to keep country of origin labelling voluntary, the second is to label products "EU, non-EU, and third country" and the third is to have the member state or third country acknowledged. This is an ongoing effort and a report will be published by the end 2014 to summarize its trials and success.

Lastly, by increasing guardian and hurdle gaps, the government's chance of becoming a victim is minimized. With more regulations and individuals checking product ingredients, the hurdles a fraudster will have to evade to surpass discovery will increase. Therefore, fraudsters will likely be less inclined to adulterate beef with horsemeat.

Guardian and hurdle gaps

Guardians are those who wish to safeguard a product, and hurdle gaps are the actions and policies in place to deter defrauding. If the amount of individuals and actions in place to deter food fraud are increased, the fraud opportunity becomes smaller. The Commission's point two, (testing programs) the Commission will continue testing for the presence of horsemeat and other adulterants in products.

¹³³ Including non-EU member states Iceland, Switzerland, and Norway.

The passport system of current Commission Regulation 504/2008 was created to address point three of the Commission's five-point plan.¹³⁴ The first way to strengthen the passport system is through the traceability of substances not approved for human consumption, such as bute, which is commonly administered to equines. This calls for Member States to report the process of reporting bute administration to equines on the passports. The second way to strengthen equine passports is to streamline and reduce points of error when assigning passports thereby limiting the amount of people involved with passport issuing. The Commission also calls for the creation of a central national database to allow for the transparency of passport information. Last, the Commission wishes to increase control of areas where noncompliance is high. As explained in Chapter 3, individuals feel the passports are not fulfilling their purpose. In the UK, Department for Environment Food & Rural Affairs (DEFRA) is collaborating with World Horse Welfare to strengthen the passport system in Britain.¹³⁵

The Commission will review Regulation 882/2004 to require Member States to have regular unannounced testing and inspections, and the Commission's can impose upon such testing if they wish.¹³⁶ In addition, the Commission will adopt rules for unprocessed meats and prevent the use of misleading information on country of origin labels. A report (estimated completion of Fall 2014) about country of origin labelling will offer more insight for the possibility to extend labelling to:

1. Processed meats not currently covered by regulation
2. Milk
3. Milk as an ingredient in dairy products
4. Single ingredient foods
5. Not processed foods

¹³⁴ "Commission Regulation (Ec) No 504/2008: Implementing Council Directives 90/426/Eec and 90/427/Eec as Regards Methods for the Identification of Equidae," ed. The European Commission (2008).

¹³⁵ "Better Laws for Horses in Britain," <http://www.worldhorsewelfare.org/Better-Laws-for-Horses-in-Britain>. Currently world horse welfare is focusing on: a more effective horse passport system, a central database for passport information, live export from the UK, restriction of an agreement that allows horses to travel without a certificate of health, and enhancing biosecurity regarding the equine industry.

¹³⁶ "Regulation (Ec) No 882/2004 of the European Parliament and of the Council: On Official Controls Performed to Ensure the Verification of Compliance with Feed and Food Law, Animal Health and Animal Welfare Rules," ed. European Commission European Parliament (2004).

6. Ingredients that are more than 50% of an item

Fraudsters

The Commission's fourth point addresses fraudsters through penalties. The financial penalty for food fraud would require a fine greater than the estimated financial gain from the fraud. By requiring a high monetary effect from fraud, the Commission is hoping to deter fraudsters, which decreases the fraud opportunity.

Research question revisited

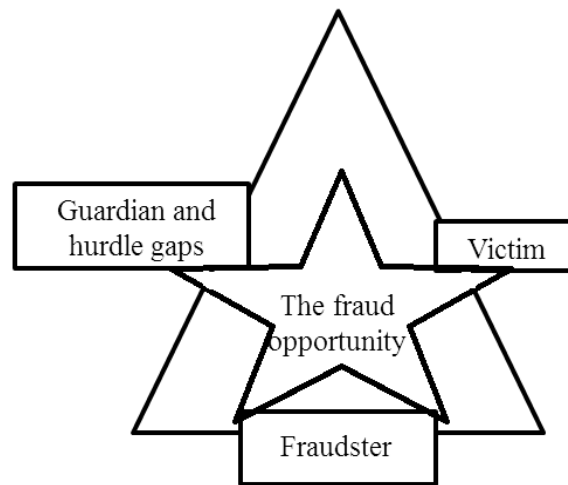


Figure 18. Crime triangle

Adapted from Spink, John and Douglas C. Moyer. 2011.
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In conclusion, the five-point action plan created by the Commission successfully addressed the issues highlighted by the horsemeat scandal. Incidentally, these issues were the same issues utilized by the crime triangle that influence fraud opportunity. Therefore, the policy response designed to prevent fraud opportunity focused its efforts towards the elements of the crime triangle. The European Commission's five-point plan takes into account the three elements of fraud opportunity; therefore, future fraud opportunity for the adulteration of beef products with horsemeat has theoretically decreased.

Additional perspective from criminology

There is a notion that organized crime rings played a part in the horsemeat scandal. While not credibly sourced, some believe that mafia members in Poland and Italy have been making a profit off of meat substitution for years.¹³⁷ This idea is likely because the amount of DNA present in samples suggests that not all samples contained trace amounts of horsemeat, but the presence of horsemeat was intentional. Many of the fraudsters involved, both at the abattoir and supplier level, claim numerous times only “one or a couple horses were slaughtered.” Considering the scope of companies, products, and percent equine DNA discovered, there might have been more than “a couple horses” slaughtered.

¹³⁷ Jamie Doward, "Horsemeat Scandal Blamed on International Fraud by Mafia Gangs," The Observer <http://www.theguardian.com/business/2013/feb/09/horsemeat-scandal-international-fraud>.

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