

## ***Food Fraud Initial Screening (FFIS) Model –***

### ***pre-filter support of a broader Food Fraud Vulnerability Assessment.<sup>i</sup>***

This primer provides an overview and details to implement a Food Fraud Initial Screening (FFIS) – part of a two-stage assessment that usually includes a deeper, detailed Food Fraud Vulnerability Assessment (FFVA). The FFIS is a model that can be used within the overall FFVA. The initial screening concept is based on the Sarbanes-Oxley Act requirements by COSO (the Committee of the Sponsoring Organizations of the Treadway Commission) as implemented in Enterprise Risk Management (ERM). The underlying concepts are based on general quality management (e.g., ISO 9000) and risk management (e.g., ISO 31000) methods. When the food industry requirements for addressing food fraud prevention were being developed, the FFSI and FFVA concepts were formalized in food safety management systems which are almost universally based on the Global Food Safety Initiative (GFSI). The FFIS model research was published in 2016 in Food Control Journal. This primer builds upon other more basic primer documents to provide a step-by-step approach to implementing the FFIS.

***This primer document covers food fraud prevention models or tools and not incident databases or monitoring systems. The Primer includes links to free or open Intellectual property tools and methods.***

**To review**, as of January 1, 2018, the Global Food Safety Initiative (GFSI) requires a documented Food Fraud Vulnerability Assessment. While the food fraud prevention focus has recently been on the GFSI activities, conducting an FFVA (or a review of hazards) has been implicitly a requirement since the Food Drug & Cosmetics Act of 1938 (FDCA). FDCA defines acts that are illegal regardless of whether there is a health hazard or not, which applies to "Adulterated Foods" and "Misbranded Foods." Also, the Sarbanes-Oxley Act of 2002 requires *Internal Controls/ Integrated* framework for managing risk to revenue and equity.<sup>ii</sup>



The Food Fraud Initial Screening Model (FFIS) was first published in Food Control Journal in 2016.<sup>iii</sup> The concept has been presented publically later, such as in Food Safety Magazine in 2017<sup>iv</sup> (Figure) as well as in numerous presentations, including the SQF International Conference in 2017.<sup>v</sup>

## General Risk Assessment Process Steps

From the Food Control Journal article, and based on COSO/ERM guidance,<sup>vi</sup> the ERM risk assessment process is outlined here:

1. **Identify risks.** These might impact the enterprise (external or internal).
2. **Develop assessment criteria.** Assessment criteria are often challenging to develop as it is complicated to compare and aggregate risk across the enterprise. Such criteria often focus on the relative likelihood of an enterprise experiencing a specific risk as well as the impacted financial and all other negative consequences that might occur.
3. **Assess risk.** This is accomplished in two stages that include: (1) a qualitative *initial screening* by categories of likelihood/impact to identify concerns that should be addressed by (2) a more *detailed quantitative assessment* of those risks that were deemed most consequential in the initial screening.
4. **Assess risk interactions.** This step focuses on understanding the enterprise risk portfolio in an integrated or holistic way by examining how identified risks positively or negatively influenced by specific changes/processes that might occur within the enterprise.
5. **Prioritize risks.** This step includes evaluating risks against "predetermined target risk levels and tolerance thresholds [later referred to as risk appetite]."



**Supplemental Resource:** for more on the GFSI requirements and expectations please see the GFSI Food Fraud Technical Document<sup>1</sup>: URL: <https://mygfsi.com/wp-content/uploads/2019/09/Food-Fraud-GFSI-Technical-Document.pdf>

## Developing General Assessment Scales and Prioritizing Risks to Address

The FFIS uses a qualitative, five-point scale of very high, high, medium, low, and very low. "Applied to the research question in this paper, an important aspect of developing assessment criteria is defining the ranking scales. [...] Scales should allow meaningful differentiation for ranking and prioritization purposes. Five-point scales yield better dispersion than three-point scales. A ten-point scale, for example, would imply precision typically unwarranted in qualitative analysis, and assessors may waste time trying to differentiate between a rating of six or seven when the difference is inconsequential and indefensible".<sup>vii</sup>

The estimates or values that differentiate the scale are determined by the risk assessment team and validated or agreed to by the enterprise risk manager, chief financial officer, or other authorized officer. From COSO, "In order to quantify risk, COSO describes some important concepts that should be evaluated: impact, likelihood, vulnerability, and onset."

The FFIS is efficient and effective as a first step since it enables a rapid screening of the entire fraud opportunity and focuses on the next, more detailed assessments. This pre-filter is especially important for situations where there are 100s or 1000s of products to evaluate – the time commitment to assess each product, would be inefficient. From a realistic perspective, starting the process by evaluating each and every individual product is impractical and nearly impossibly draining on resources. "COSO recommends a two-step process to prioritize risks. The first step allows all risks to be examined using qualitative approaches. This results in screening or filtering out

those risks that the enterprise deems as a lower priority and leads to the second step where the remaining high-risk priorities are addressed quantitatively."

### Evaluating the Findings: Using the Enterprise-Wide Corporate Risk Map

The assessment results are plotted on a corporate risk map (Figure) – e.g., a risk heat map – to help organize and visualize the most severe vulnerabilities. Of course, all food fraud incidents are bad and concerning, but to assist in resource-allocation decision-making, the food fraud vulnerabilities should be compared to all other enterprise-wide risks – e.g., *compare everything to everything*. To note, the likelihood and impact scales are calibrated to the entire enterprise, not just to food fraud incidents or vulnerabilities. ***It is critical to emphasize that there could be situations where ALL food fraud vulnerabilities are within the risk tolerance or may already have countermeasures or controls in place.***

		Likelihood				
		VH	H	M	L	VL
Impact Consequence	VH	A1	B3	C4	D5	A3
	H	A1	B3	C4	D5	A3
	M	B3	C4	D5	A3	A3
	L	C4	D5	A3	A3	A3
	VL	D5	A3	A3	A3	A3

Figure 6. Corporate Risk Map Plotting FFIS Risk Assessments (for Correlation to All Other Enterprise-Wide Risks)

### Implementing the Food Fraud Initial Screening (FFIS) Model

Developing the Food Fraud Initial Screening model (FFIS) is a strategically critical next step because, by design, it only reviews broad risks. As intended, the output would identify broad risks and not be a product-by-product assessment. The FFIS can then more efficiently be supplemented with a detailed FFVA (e.g., by individual product, etc.) that identifies specific risks, or at least provides more intelligence on suspicious activity. The FFIS fits into the risk assessment continuum. (Figure)

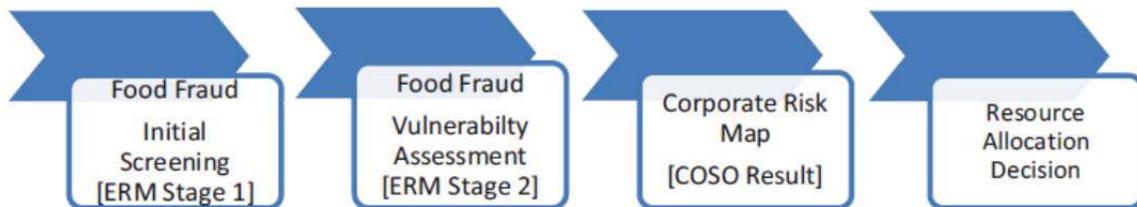


Fig. 17.3 The role of the Food Fraud Initial Screening (FFIS) in the Food Fraud Risk Continuum.

### FFIS Assessment Process Steps

The objective of the initial screening process is to produce a quick and straightforward food fraud risk assessment that integrates these risks into an ERM-type system. While this process was developed for Food Fraud, it applies across all food risks, all product risks, and across all enterprise-wide activities. This enables the full adoption of the ERM-type principles into operations and front-line decision-making.

The FFIS model has several specific process steps: (1) define the scope and basic terms, (2) review incidents, and suspicious activity, (3A) conduct the FFIS for health hazards, (3B) conduct the FFIS for enterprise-wide risks, and (4) plot the Food Fraud risks on the Corporate Risk Map.<sup>viii</sup>

- **Step 1 – Define the scope and basic terms:** There are a series of basic definitions and questions that must be addressed that help populates the model before actually conducting the initial screening assessment. Define the products to be assessed and the supply chain(s) such as "incoming/ingredients" or

"outgoing/finished goods." The incoming and outgoing types of products are so different that a separate assessment should be performed for each. The assessment team should consider the necessity of reviews is specific to each type of fraud, a region, or a type of fraud in a region. This establishes the assessment scope. Then, define the risk rank thresholds between very high, high, medium, low, and very low.

- Step 2 – Incident review:** In this step, incidents or suspicious activity are reviewed. There are many acceptable sources for the information, including subject matter expert insight. Using expert insight is a very efficient starting point that can quickly identify whether there is a lack of information or where the enterprise decision-makers will need more data. Currently, there are no explicit or detailed process steps for gathering and sorting data. Government regulation and industry standards refer to experts, or a qualified person, to assess hazards and assign risk ranks. Also, many key terms are not defined, such as the related U.S. food law concept of a "known or reasonably foreseeable hazard."

- Step 3 – Conduct the Food Fraud Initial Screening for health hazards and economic impact:** The x-axis identifies specific markets or regions. The y-axis identifies groups of products and can include specific products, but specificity is not critical for initial screening (Figure). Each column and row is identified with a letter or number (respectively) so that each cell can be referenced by an alphanumeric code (e.g., "A1" is the item in the first row and first column, etc.). (An example is prepopulated in the FFIS matrix figure). A column and row can be included for an overall global assessment or to include "all other" items.

- NOTE: At this point, the level of detail required for each cell is at the discretion of the enterprise decision-maker, risk assessor, or risk assessment team. An initial screening should be broad as it is indicative only of which enterprise-wide fraud risks may need to be more fully assessed. While an entire group or class of products can be assessed, in other instances, it may be more efficient to assess a specific product, stock-keeping unit, package style, or supplier.

- Step 3 – Introduction:** Develop a Matrix for Incoming Goods and another for Outgoing Goods (Figure)

- Step 3A – Health hazards:** A health hazard is also often the most critical and impactful type of incident because financial costs for the enterprise can be extremely severe. This step is a subroutine that contributes to the over-arching, financially-based ERM assessment of step 3B. In this step, the Food Fraud Initial Screening matrix is populated to record health hazard risk ranks using the terms defined in step 1.

HAZARD, Ingredients		Market or Region				
		Europe	North America	South America	Africa	All Other
Product/Group		A	B	C	D	E
Spices	1	H				
Meat	2	M				
Dairy	3		VL			
Grains	4			L		
All Other	5					

Figure 4. FFIS Review of Hazards for Ingredients by Geographic Region and Product Group

ECONOMIC, Ingredients		Market or Region				
		Europe	North America	South America	Africa	All Other
Product/Group		A	B	C	D	E
Entrées	1	VH				
Soups	2	M				
Raw Foods	3		H			
Spices, Dry	4			M		
All Other	5					

Figure 5. FFIS Review of Economic Impact of Finished Goods by Geographic Region and Product Group

- Step 3B – Financial impact:** This step is the same as step 3A above, but the focus is on all enterprise risks with respect to financial impact. The health hazard assessment in step 3A helps inform the economic impact in step 3B. There is not necessarily a direct correlation between health hazard and economic impact, though usually the economic impact of a health hazard is among the highest costs. Lacking direct input from the enterprise's final financial decision-makers, the risk assessment team (e.g., a food safety team) may make temporary educated guesses regarding risk rankings.

- **Step 4 – Corporate Risk Rank:** Once the enterprise-wide FFIS matrix is populated (step 3B above), each ranked risk is entered on the Corporate Risk Map using the alphanumeric cell references (Figure) from those matrices. The Corporate Risk Map includes "Likelihood" and "Impact" axes. The axes include risk rank ranges defined by the risk assessors into categories of very high (VH), high (H), medium (M), low (L), and very low (VL). The completed Corporate Risk Map creates a reference document for calibrating risk ranks within the ERM system.

**Supplemental resource:** For an example of the FFIS in action, please see the 2017 SQF International Conference presentation: URL: <https://www.youtube.com/watch?v=8TNk0y0G1os> and training summary at URL: <https://www.youtube.com/watch?v=MU7dQ-xUUNE>

## Application to a Food Fraud Prevention Strategy

The FFIS is a method to conduct a quick yet comprehensive assessment of food fraud vulnerabilities. The incident review, FFIS/ FFVA, and the corporate risk map are key starting points for developing and implementing the Food Fraud Prevention Strategy (FFPS). The FFPS defines the FFVA standard operating practices (SOPs), including the process for reviewing new incidents or suspicious behavior as well as the full annual review.

**Supplemental resource:** For more on developing and implementing an FFPS, please see:

- Primer: Food Fraud Prevention Method (FFPM)
- Primer: Food Fraud Vulnerability Assessment (FFVA)
- URL: <https://www.foodfraudpreventionthinktank.com/primers/>

Also, the Food Fraud MOOC series:

- Free online course: MOOC: Food Fraud Prevention VACCP Implementation MOOC (FFPV)
- URL: <https://www.foodfraudpreventionthinktank.com/food-fraud-prevention-academy/>

<sup>i</sup> Spink, John, Moyer, Douglas C, & Speier-Pero, Cheri (2016). Introducing the Food Fraud Initial Screening Model (FFIS), Food Control, Volume 69, November 2016, Pages 306-314. <https://www.sciencedirect.com/science/article/pii/S0956713516301219>

<sup>ii</sup> COSO, Committee of Sponsoring Organizations of the Treadway Commission., Home Page: <https://www.coso.org/Pages/default.aspx>

<sup>iii</sup> Ibid, FFIS, 2016

<sup>iv</sup> Spink, John & Moyer, Doug (2017), Food Fraud Vulnerability Assessment and Prefilter for FSMA, GFSI, and SOX requirements, Food Safety Magazine, February/ March, URL: <https://www.foodsafetymagazine.com/magazine-archive1/februarymarch-2017/food-fraud-vulnerability-assessment-and-prefilter-for-fsma-gfsi-and-sox-requirements/>

<sup>v</sup> Spink, John, (2017), Food Fraud Prevention Strategy and Vulnerability Assessment Methodology, 2017 SQF International Conference, URL: <https://www.youtube.com/watch?v=8TNk0y0G1os> and training summary at URL: <https://www.youtube.com/watch?v=MU7dQ-xUUNE>

<sup>vi</sup> COSO, Committee of Sponsoring Organizations of the Treadway Commission. (2012). Risk assessment in practice. Committee of Sponsoring Organizations of the Treadway Commission, COSO.

<sup>vii</sup> Ibid., COSO, 2012

<sup>viii</sup> Ibid., FFIS, 2016