



Essential Tools to Manage Grain and Flour Quality and Food Safety

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Technical Director**

**IAOM SE Asia Regional Conference and Exposition
Jakarta, October 7, 2019**





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Wheat Supply Chain

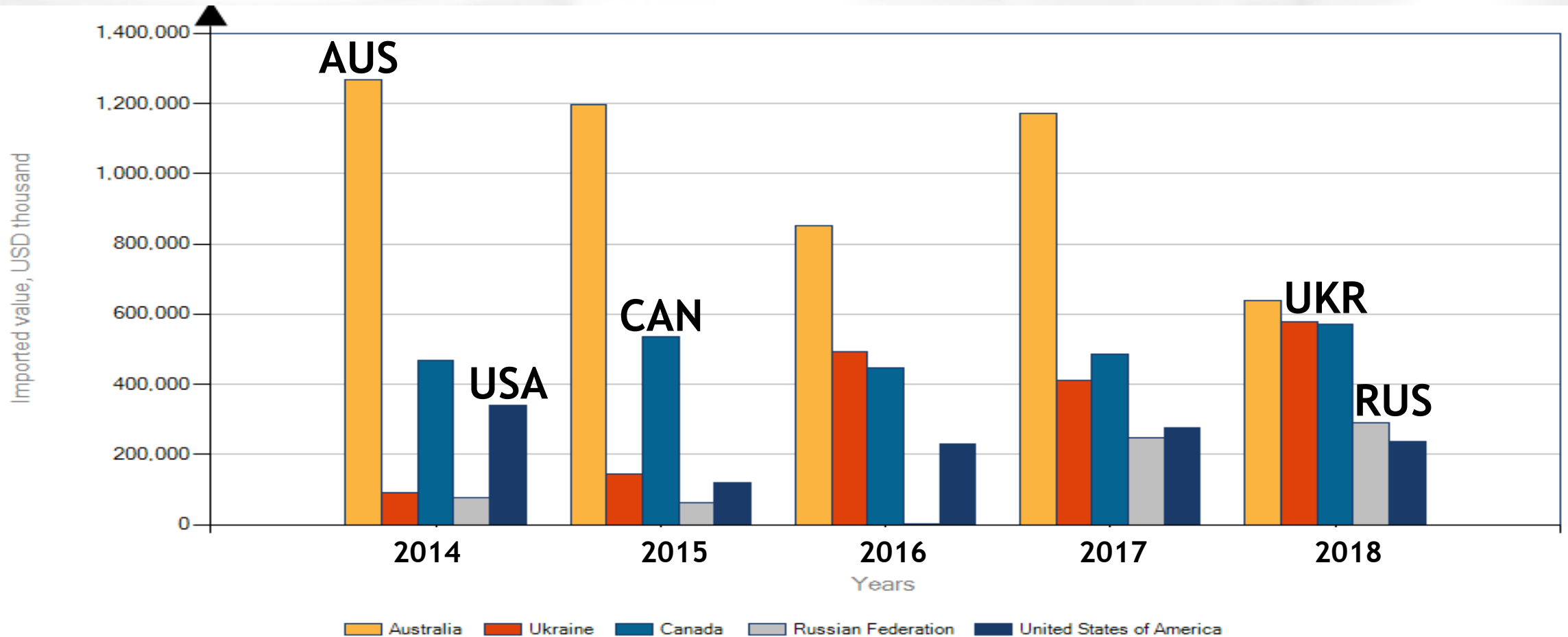
- **Grain and Flour Quality**
- **Tools to Manage - Standards**
- **Food Safety**

Wheat Imports in SE Asia



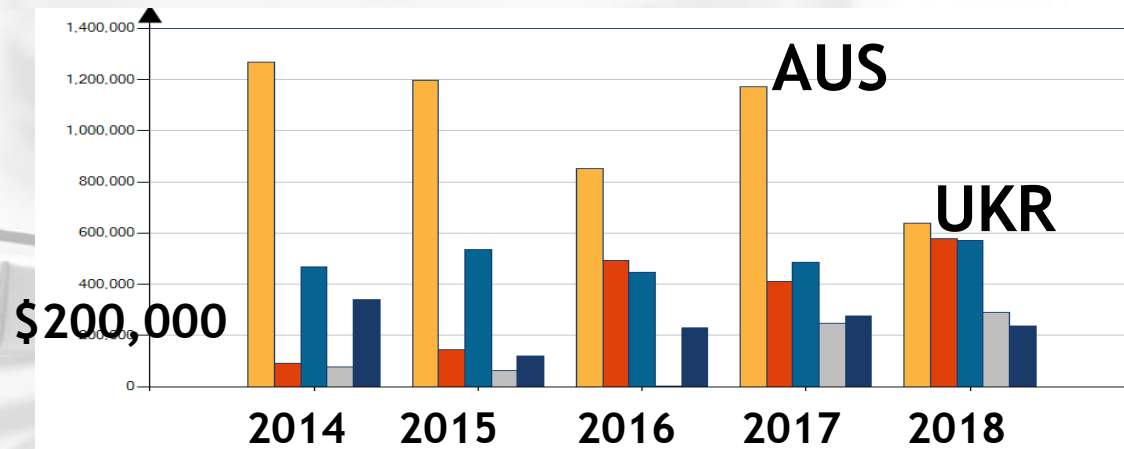
Image Source Rabobank

Wheat Imports in Indonesia - 6.1% Total Wheat

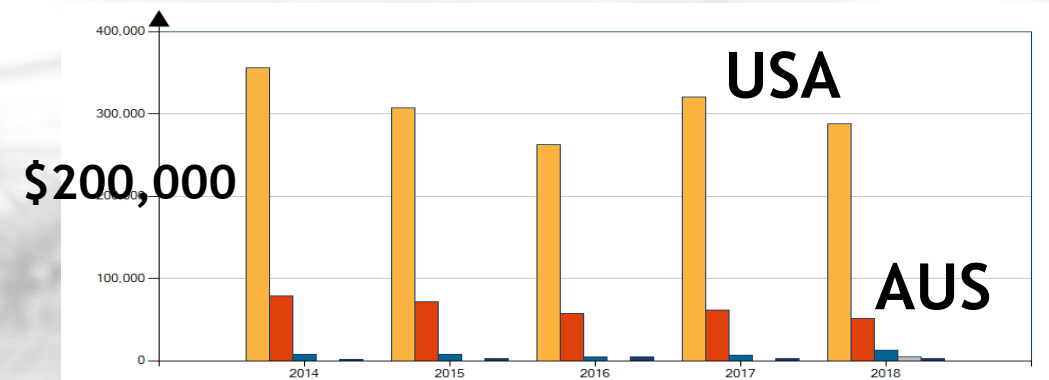


Wheat Imports in Asia

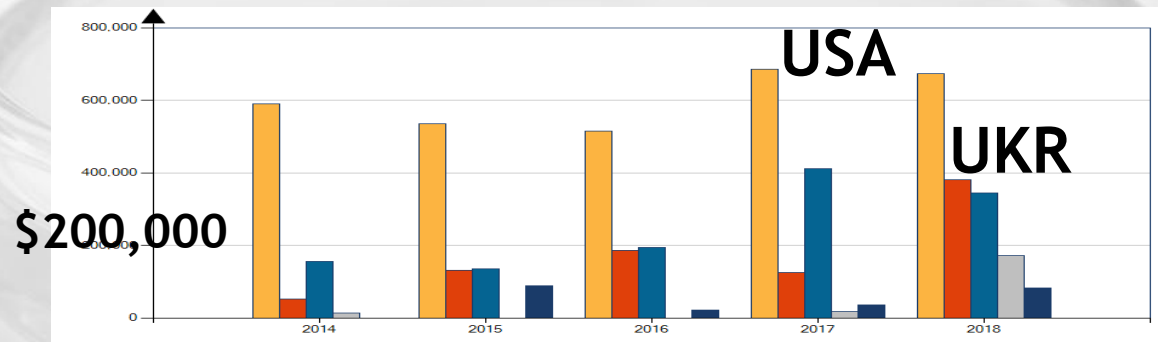
Indonesia



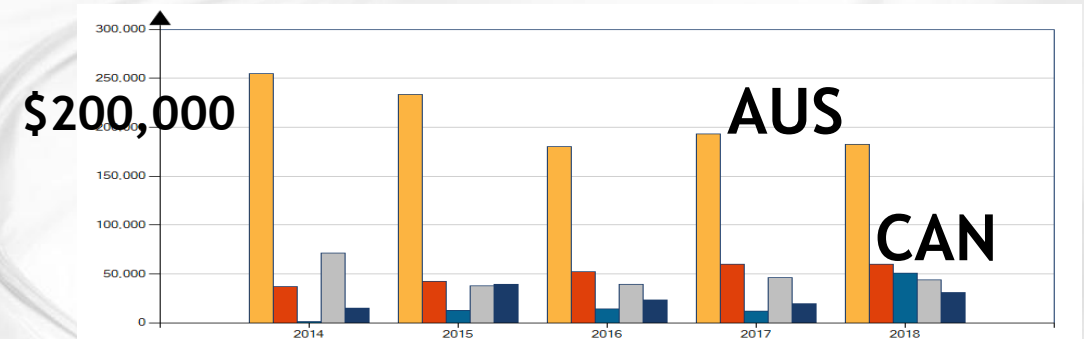
Malaysia



Philippines



Taiwan





- Specifications
- Food Quality
- Food Safety

➔ Standards



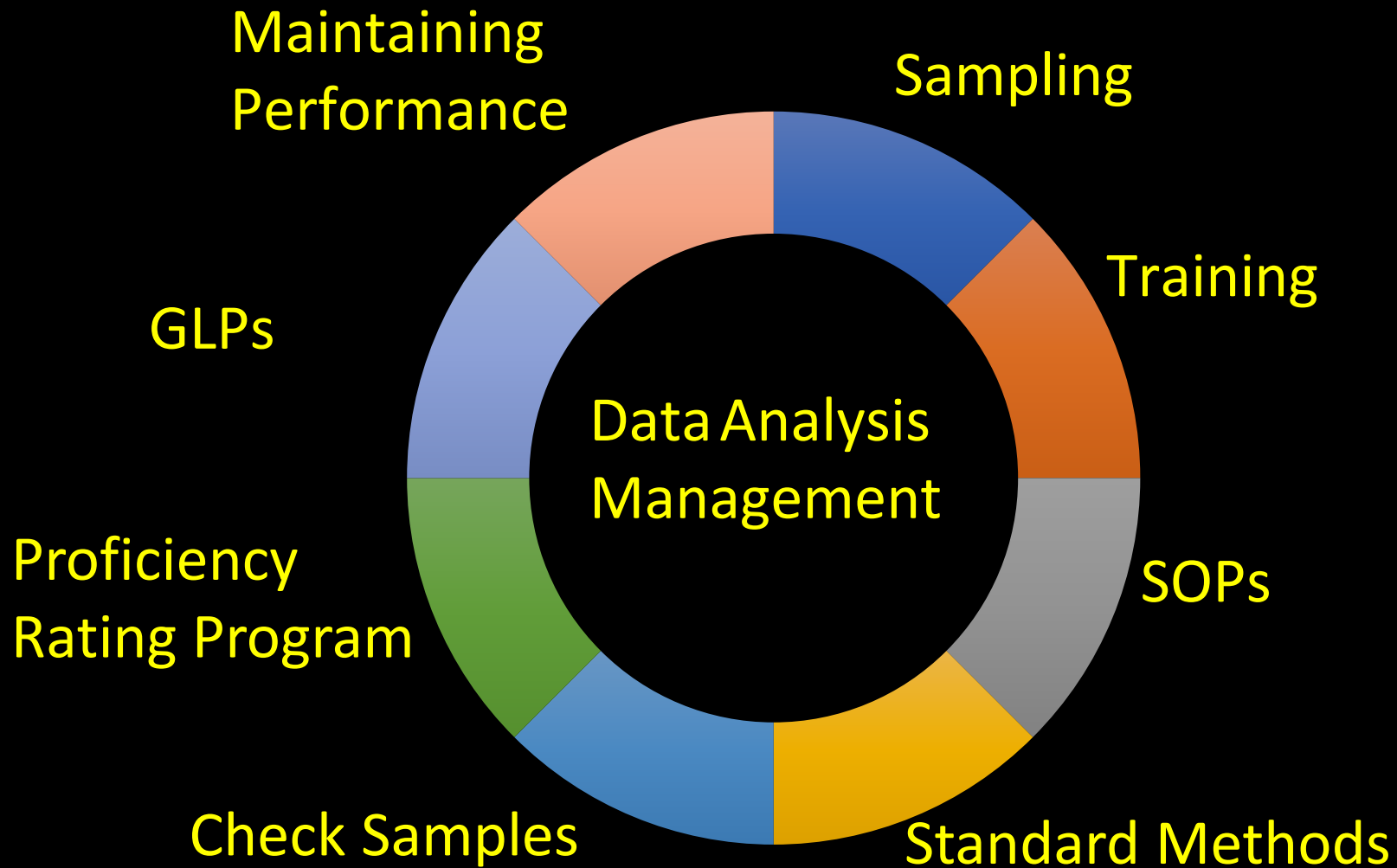
Wheat Supply Chain

- **Grain and Flour Quality**
- **Tools to Manage - Standards**
- **Food Safety**

What is Grain and Flour Quality?

Physical Grain	Flour	Dough Rheology
Moisture	Moisture	Moisture
Test Weight	Flour Extraction	Farinograph
Thousand Kernel Weight	Protein	Extensigraph
Grain Hardness	Diastatic Activity and/or Starch Damage	Alveograph
Protein	Flour Purity (Color grade and/or Ash)	Amylograph
Ash	Yellowness	RVA
Falling Number	Brightness	
Screenings	Flour Pasting	
LMA Laboratory Screening		

Elements of Quality Program - the Toolbox



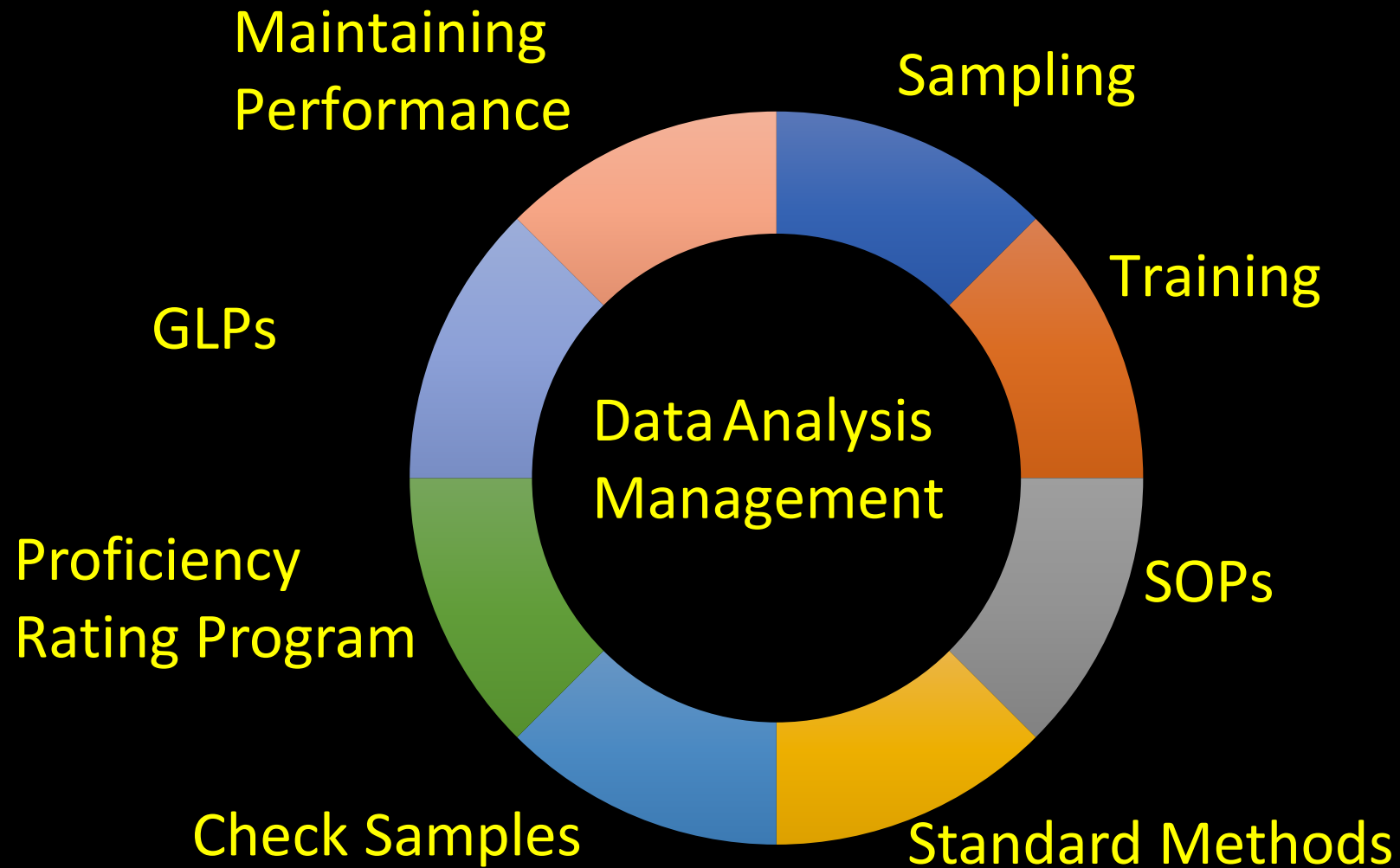
Inspecting the Sample

What is in the sample?



How much sample have you received?
Is it representative of the lot?

Elements of Quality Program - the Toolbox



What is a Standard?

A **published specification** that establishes a common language, and contains a technical specification or other precise criteria and is designed to be used consistently, as **a rule, a guideline, or a definition.**

International
standards

Creating
CONFIDENCE
globally



What is a Standard?

Standards can be set by

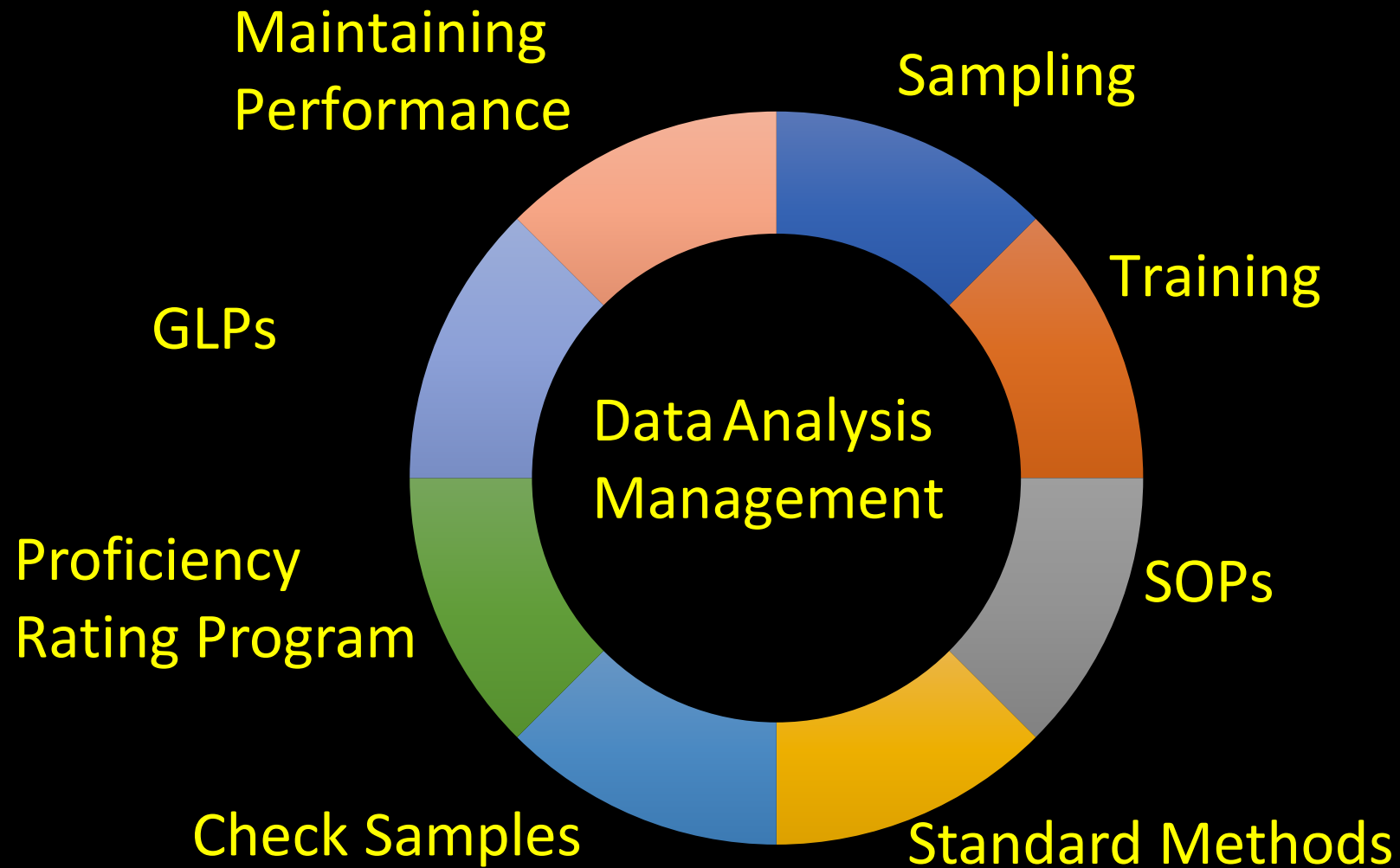
- governments
- regional and intergovernmental agencies
- standards development organizations
- trade organizations
- learned societies with input from industry and end-users

International
standards

Creating
CONFIDENCE
globally



Elements of Quality Program - the Toolbox



GLP: Good Laboratory Practice

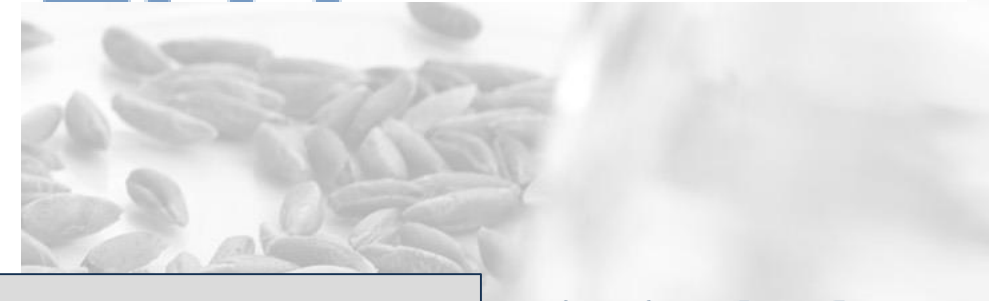
- GLP a set of principles that provide a framework within which laboratory analyses are planned performed, monitored, reported and archived.
- GLP is sometimes confused with the standards of laboratory safety like wearing safety goggles.



ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories

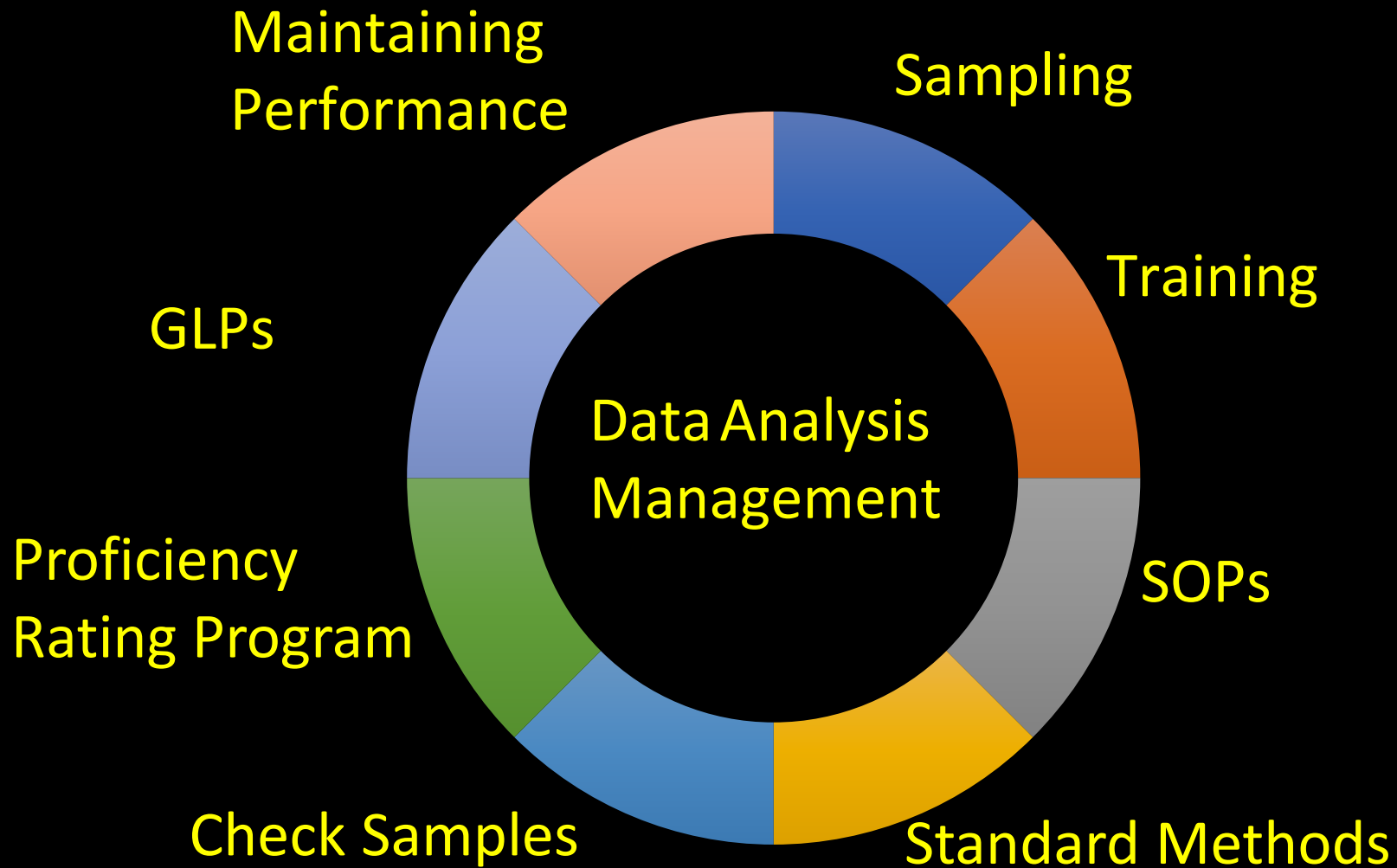
ISO/IEC 17025:2017

- Sampling included - designed to find and correct problems
- Risk assessment - results being wrong (to laboratory, customers etc.)
- Resourcing, Process (flow in laboratory), Laboratory and Management Quality Control
- Account for digital management - records, equipment operation
- Use latest version of Standard



ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories

Elements of Quality Program - the Toolbox



- [Methods Home](#)
- [All Methods](#)
- [Methods eXtras](#)
- [Propose a Method](#)
- [Cite a Method](#)
- [Technical Committees](#)
- [Archived Methods](#)
- [Standards Affiliations](#)
- [Suppliers Guide](#)
- [Laboratory Proficiency Program](#)
- [Harmonized Methods](#)

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What's New?

[Solvent Retention Capacity Profile - Automated Measurement](#)

[Gelatinization Temperature of Milled Rice Flour](#)

[Guidelines for Shelf-Life Testing of Food and Ingredients for Key Quality Attributes](#)

[Guidelines for Making Japanese Ramen Noodles](#)

[Measurement of Crumb Structure of Baked Products by C-Cell](#)

[Water-Holding Capacity of Pulse Flours and Protein Materials](#)

AACC Proficiency Rating Program

Focus on Grains / Grain-based Foods

- Subscribers - monthly, bimonthly, quarterly
- Homogenous Sample
- Fixed Analytes
- Regular Participation
- Training
- New Products - Reference Samples



**Food Quality for
Your Laboratory**



Examples of Flour Testing Methods

Moisture AACC 44-15.02, NIR;
Protein AACC 46-11.02, NIR;
Ash; Falling Number; Gluten Index

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methods.aaccnet.org



- **Flour Analysis - hard, soft, semolina - proximates etc**
- **Food and Feed Safety - microbiology, mycotoxins**
- **Food and Feed Labeling - sugars, fats, DF, GF, vitamins and minerals**
- **Physical Testing - Rheology**

- **Flour Analysis - hard, soft, semolina - proximates etc**
- **Food and Feed Safety - microbiology, mycotoxins**
- **Food and Feed Labeling - sugars, fats, DF, GF, vitamins and minerals**
- **Physical Testing - Rheology**

Nutrition Facts		Nutrition Facts	
1 serving per container		8 servings per container	
Serving size 1 cup (80g)		Serving size 1 cup (80g)	
Calories 370		Calories 370	
Amount per serving		Amount per serving	
Total Fat 10g 20%		Total Fat 10g 20%	
Saturated Fat 6g 12%		Saturated Fat 6g 12%	
Trans Fat 0g 0%		Cholesterol 0g 0%	
Cholesterol 0g 0%		Sodium 100mg 2%	
Total Crap 10g 20%		Total Crap 10g 20%	
Saturated Crap 6g 12%		Saturated Crap 6g 12%	
Trans Crap 0g 0%		Trans Crap 0g 0%	
Cholesterol 0g 0%		Cholesterol 0g 0%	
Total Sugar 10g 20%		Total Sugar 10g 20%	
Saturated Sugar 6g 12%		Saturated Sugar 6g 12%	
Trans Sugar 0g 0%		Trans Sugar 0g 0%	
Cholesterol 0g 0%		Cholesterol 0g 0%	
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Cholesterol 0g 0%		Cholesterol 0g 0%	

Food Labeling Series
GF, SUGAR, DF, VMP, BAKE, FEED

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Proficiency Program

aacnet.org/checksample

Check Samples and Proficiency Rating Program

201 AACCI Wheat Flour - HW1



Laboratory Test Result Summary

201 AACCI WH

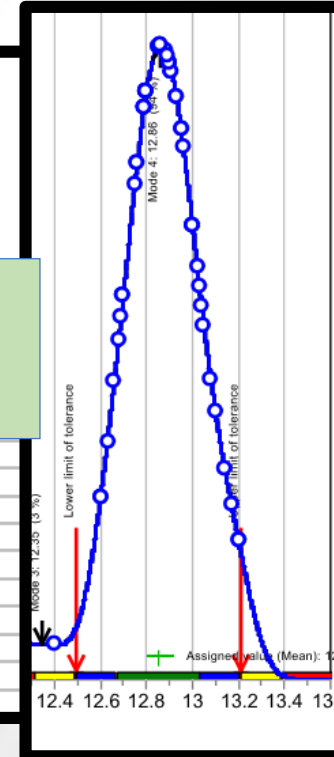
Analyst	Moisture % Method Codes	Protein (N X 5.7) % Method Codes
39	13.97 C7	12.79 C7
96	13.86 A1	12.70 B3
659	13.52 A2	12.91 B3
768	14.20 A2	13.04 B3
839	14.12 A1	12.93 B3
936	14.18 A1	12.86 B7
1131	13.92 A3	13.00 B7
1233	13.30 A1	12.95 B3

Summary of Z-Score 2018 201 AACCI Wheat Flour -

Moisture %	Protein (N X 5.7) %	Ash %	Falling Number sec
0.008	-0.365	-4.007	
-0.485	-0.868	-1.145	
-2.011	0.305	1.144	
1.040	1.030	-1.227	-0.438
0.681	0.416	0.327	1.039
0.950	0.025	0.694	-0.227
-0.216	0.807	-2.249	-1.352
-2.998	0.528	-0.736	-3.181
-0.620	0.249	0.081	0.828

ISO 13528:2015(en)

-3.181



- Results reviewed
- Comparison other labs
- Managed in test lab
- Problem resolution



Wheat Supply Chain

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Key Food Safety and Security Issues?

Foodborne illness most important food safety issue - caused by

Pathogens - *E coli*, salmonella, yeasts and molds

Mycotoxins - in cereals and grains, pulses, vegetables and oilseeds

Chemical Contamination

Heavy metals

Illegal use - v

Illegal use - p

Allergens - peanuts,

Food Adulteration -

Sugar water i

formula powd

Food Confusion - misinformation, chemicals, product labels

Need to understand

- Measure (quantify)
- Manage
- Communicate

ibles

ifant



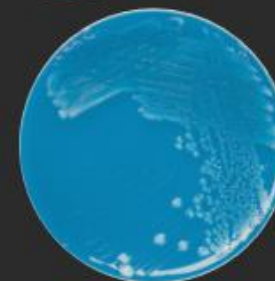
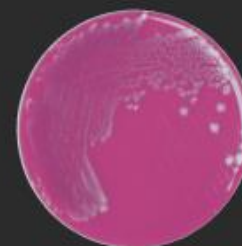
FDA posts expanded flour recall; no word on whether Aldi is mill's only customer

By Coral Beach on May 28, 2019

In an expanded recall notice for flour sold by Aldi, the grocery chain's supplier is reminding consumers that the baking staple is made from raw grain and therefore inherently dangerous.



**Food Quality for
Your Laboratory**



Food Safety Testing Series

MICRO1, MICRO2, MYCO, EXTRA

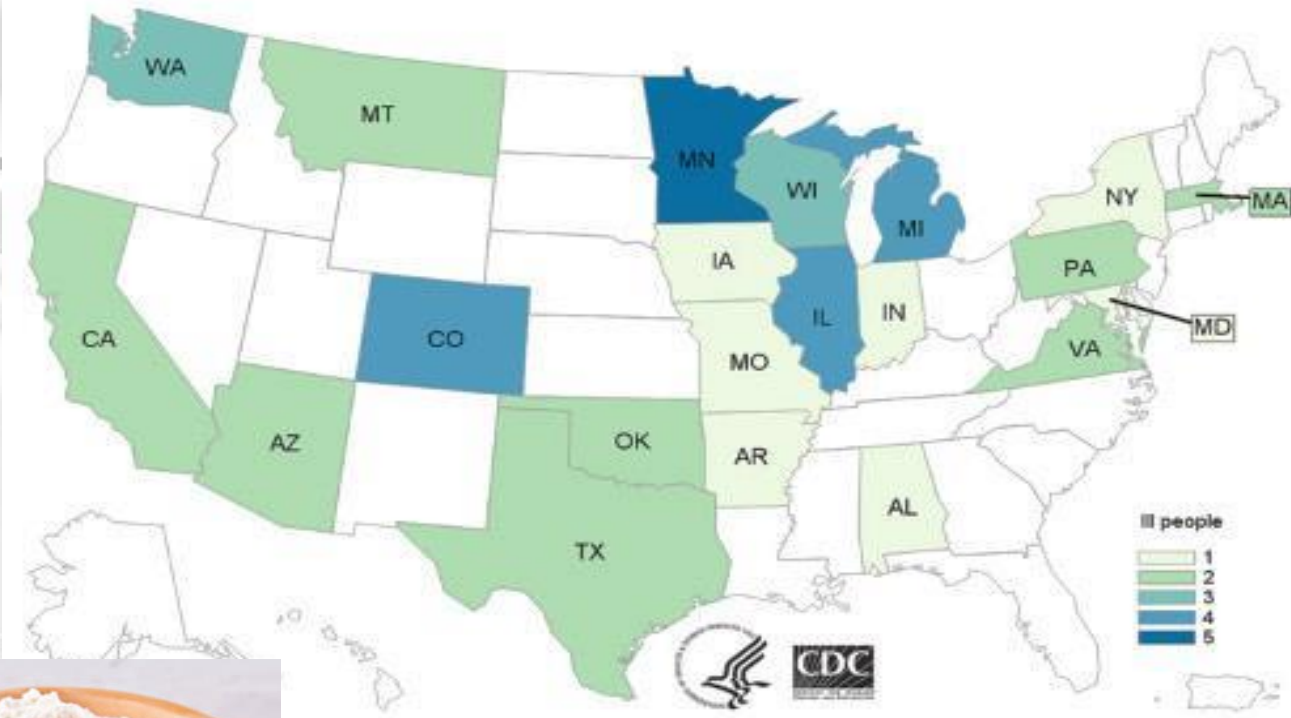
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USA - Food Safety Effects Everyone

People infected with the outbreak strains of *E. coli* O121 or O26, by state of residence, as of July 25, 2016 (n=46)



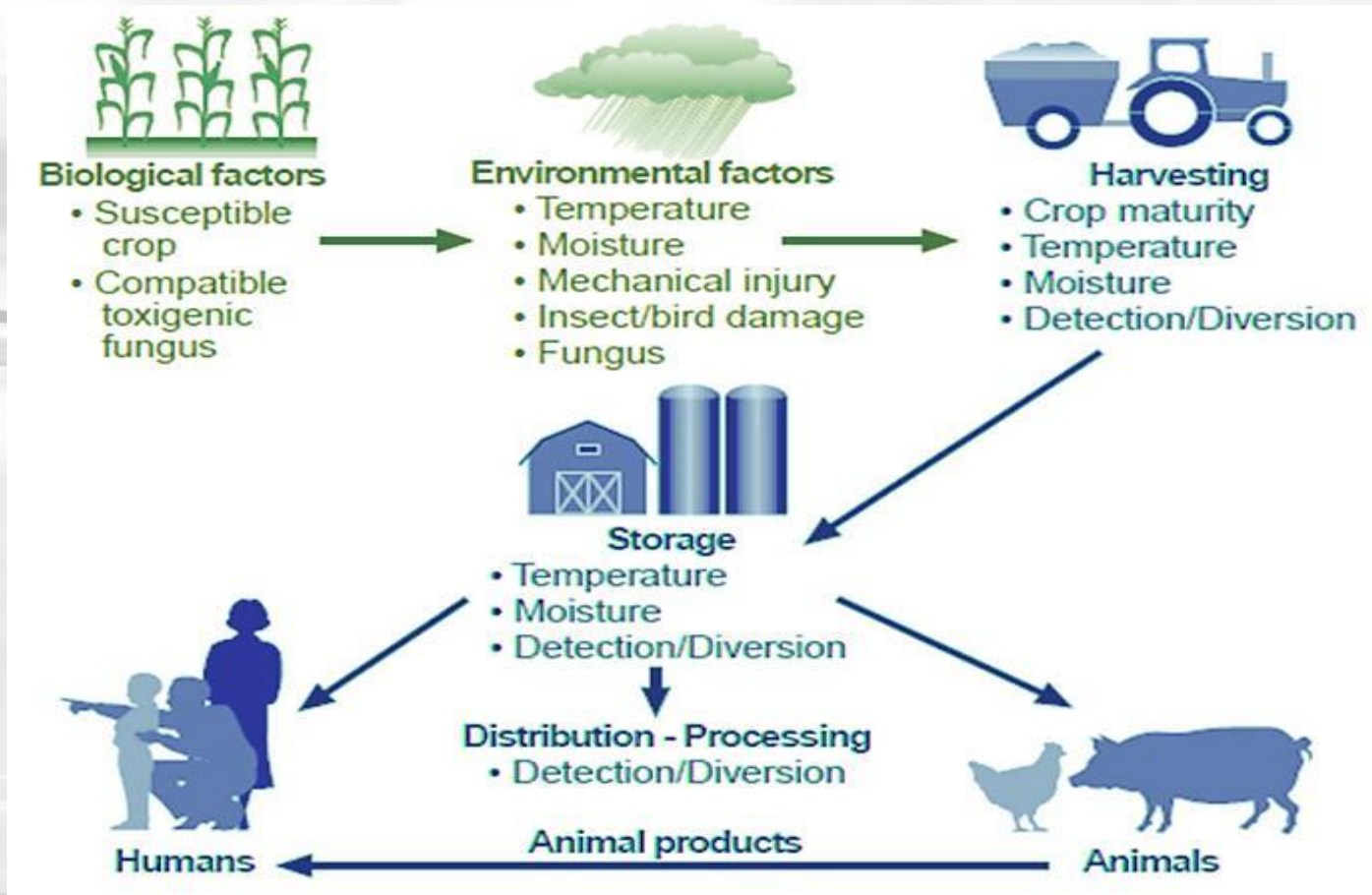
American food supply - one of safest in the world

Federal government estimates 48 million cases of foodborne illness each year

- 1 in 6 sick
- Approx. 128,000 hospitalizations
- 3,000 deaths

Raw flour consumed

USA - Food Safety Effects Everyone



Pestka, J. J. and W. Casale. 1989. Naturally occurring fungal toxins. In M. S. Simmons and J. Nriagu (Eds.) *Food Contamination from Environmental Sources*. John Wiley and Sons, Ltd.

DON Occurrence in Grains: A North American Perspective
<http://www.aaccnet.org/initiatives/Documents/CFW-60-1-0032-EP.pdf> (2015)



Questions?

Educational Opportunities - publications, journals
Annual Meeting, webinars, workshops, and more

Analytical Resources

- ❖ AACCC Approved Methods of Analysis - recognized international standards
- ❖ Moisture, protein, dietary fiber, gluten-free, shelf-life
- ❖ AACCC Check Samples and Proficiency Rating Programs
- ❖ Technical Committees
- ❖ Professional and Student memberships



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