ASSESSMENT OF THE KANSAS FOODBORNE ILLNESS COMPLAINT SYSTEM AND THE ASSOCIATED RESTAURANTS, 2009-2014

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MPH Field Experience

Kansas Department of Health and Environment

INTERNSHIP OVERVIEW

- Kansas Department of Health and Environment
  - Bureau of Epidemiology and Public Health Informatics
  - Assessment of foodborne illness in Kansas, the complaint system, and the restaurants that produce the complaints

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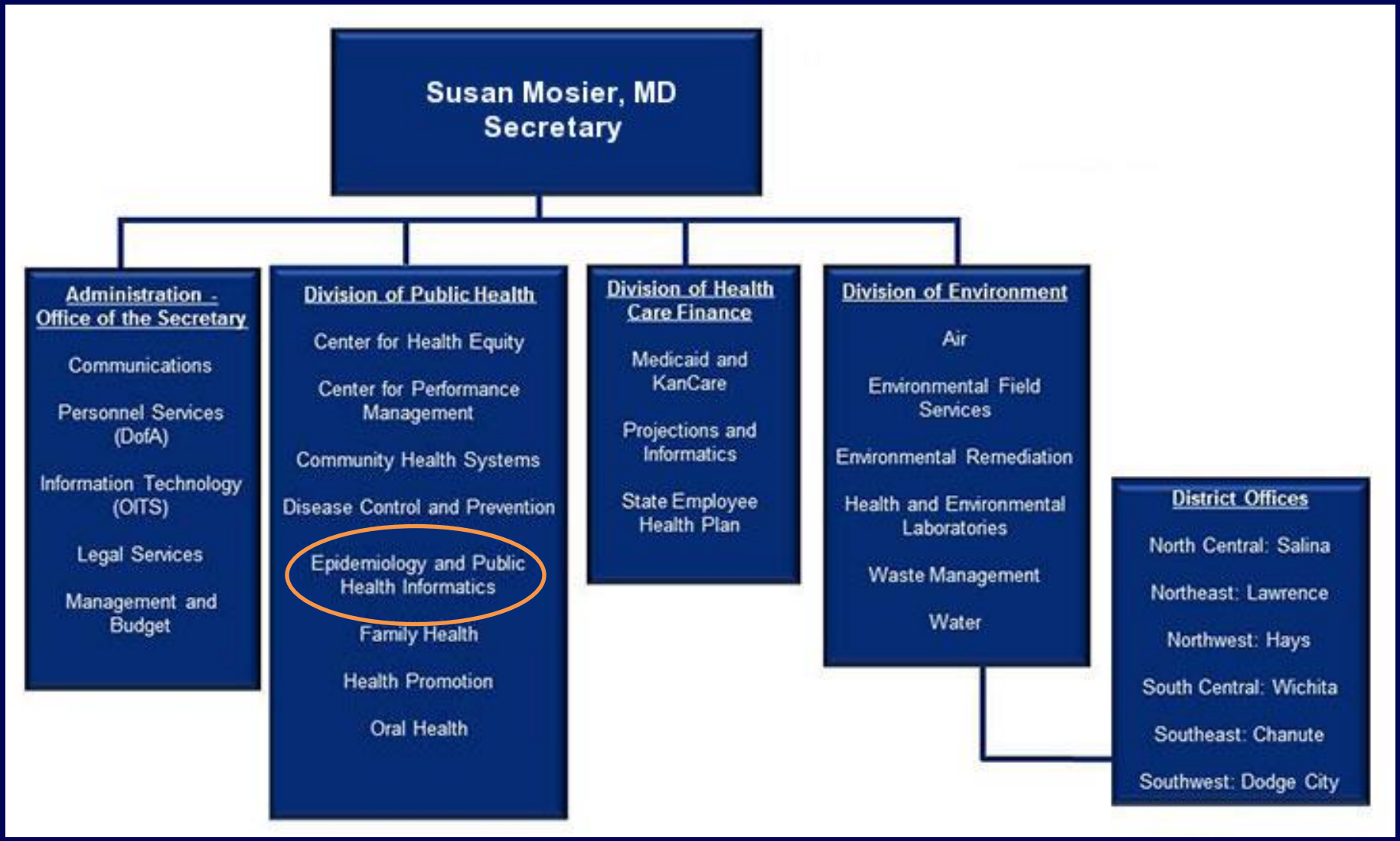
OVERVIEW: KDHE



DEFINITIONS

- KDHE: Kansas Department of Health and Environment
- KDA: Kansas Department of Agriculture
- KFE: Kansas Food Establishment
  - A location holding a food-service license with the KDA
- Investigation: A complaint meeting the investigation criteria as follows:
  - *"Two or more individuals from different households who experience a similar illness after eating a common food or different food from a common place."*

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INTERNSHIP ACTIVITIES

- Participated in daily updates on Kansas epidemiology and health issues
- Attended CDC phone lectures
- Attended KDHE teleconferences with local health departments
- Assisted with outbreak investigations and phone interviews
- Assisted the CDC in tick collection for testing

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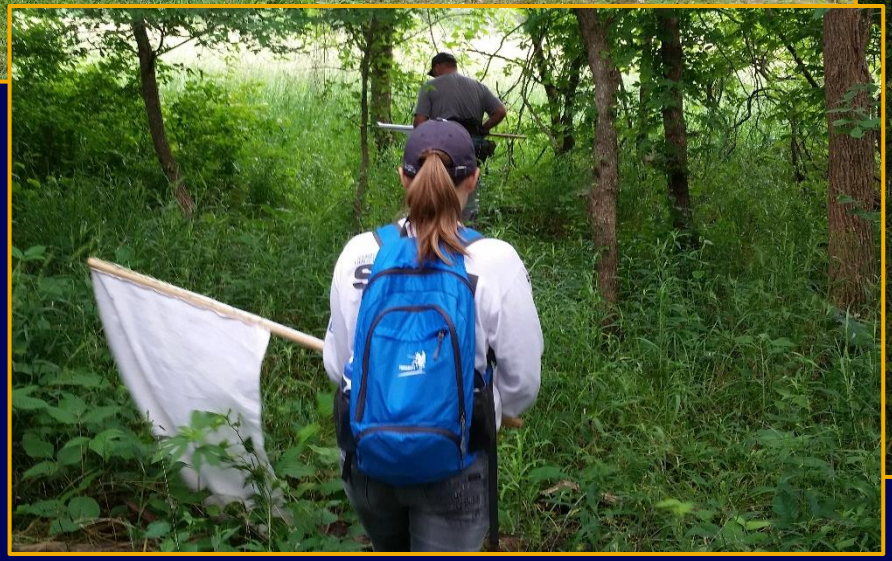
INTERNSHIP ACTIVITIES: Tick Hunting



MAIN PROJECT OVERVIEW

- Analysis of KDA's food establishment complaint system
- Compilation of databases from multiple sources
- Statistical analysis of data
- Provide a multi-disciplinary approach considering the needs of involved agencies

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BACKGROUND

- Yearly, approximately 1 in 6 Americans develops a foodborne illness
  - Costing the United States $365 million in medical costs annually
  - 128,000 will be hospitalized
    - 3,000 cases will be fatal[1]
  - Foodborne disease can be caused by viruses, bacteria, parasites, toxins, or chemical contamination[10]

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BACKGROUND *cont.*

Pathogen	Estimated number of illnesses (9)	% Food-Related Illness (9)
Norovirus	5,461,731	58
Salmonella, nontyphoidal	1,027,561	11
Clostridium perfringens	965,958	10
Campylobacter spp.	845,024	9
Staphylococcus aureus	241,148	3
Subtotal		91

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BACKGROUND *cont.*

- Most pathogen contamination occurs during food preparation[3]
- Over half of the reported foodborne disease outbreaks cannot be traced to an etiological agent
  - Most foodborne infections go undiagnosed and unreported
    - Either the ill person does not see a doctor or there is no specific diagnosis

BACKGROUND *cont.*

- Foodborne illness outbreaks are usually detected in one of three ways:[3]
  - Pathogen-Specific surveillance of reportable diseases
  - Reports of illness by healthcare providers or institutions
  - Consumer complaints of suspected foodborne illness
    - Organized by the KDA

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BACKGROUND *cont.*

- Complaint systems have many benefits
  - Do not require a diagnosis or lab results
  - All diseases are reported
  - Put constituents in direct contact with appropriate departments
  - Allows investigations to proceed much more rapidly

BACKGROUND *cont.*
Methods of Reporting

COMPLAINT INVESTIGATION REPORT

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
BUREAU OF CONSUMER HEALTH
FOOD SAFETY & CONSUMER PROTECTION

Establishment Name: _____ Est ID #: _____ Type: _____

Date Received: _____ Received By: _____ Occurrence Date: _____ Occurrence Time: _____

Complainant: s _____ Phone: (___) _____ Email: _____

Please check **one** major complaint type:

- ☐ 1 Alleged Foodborne Illness / Outbreak (see below)
- ☐ 2 Personal Health / Hygiene
- ☐ 3 Food Source (sound condition; spoilage; approved
- ☐ 4 Labeling / Expiration
- ☐ 5 Food Protection (temperatures)
- ☐ 6 Water / Plumbing Sewage
- ☐ 7 General Sanitation
- ☐ 8 Insect, Rodent, Animal
- ☐ 9 Other

COMPLAINANT'S CONCERN:

Alleged Foodborne Illness:

Symptoms (✔ All that Apply): ☐ Vomiting ☐ Diarrhea ☐ Nausea ☐ Abdominal Cramps ☐ Fever ☐ Other ___

Date of Illness Onset: _____ Time: _____ # Persons Ill: _____ # Persons Served: _____ # Household

Doctor Visited?: Hospitalizations?: Stool sample taken?: Food samples avai

Food/Beverage Eaten: _____

Any other commonalities/meals shared?: N If yes, which meal(s): _____

INSPECTOR COMMENTS:

Date Worked: _____ VALID: _____ INVALID: _____ UNDETERMINE

Date Complainant Notified: _____ Via: Letter/email (copy attached) ___ Phone ___

ORIGINAL INSPECTION REPORT & COMPLAINT REPORT FORMS TO TOPEKA O

Bureau of Consumer Health 1000 SW Jackson, Ste 330 Topeka, KS 66612 (785) 296
R

Home > Divisions & Programs > Food Safety and Lodging > Report a Complaint

Report a Complaint

You may make a complaint about a Kansas Food Establishment, Food Processor, or Lodging Facility by using our one of our online complaint forms below, sending an email to fsl@kda.ks.gov; or by calling us at (785) 564-6767.

File a Food Safety or Lodging Complaint
File a Food Safety Complaint involving Illness

Please note that, if you provide it, your name and contact information is subject to the Kansas Open Records Act. All complaints are processed according to program policy. Any information provided on the complaint form will be subject to release even if you request to remain anonymous.

Occasionally we have questions about the complaints we investigate, and if we are unable to contact you, it could slow or stop our investigation.

To file a confidential Food Safety Complaint involving illness, please call the Kansas Department of Health and Environment Infectious Disease Epidemiology and Response at (877) 427-7317 or email EpiHotline@kdheks.gov.

We work cooperatively with the Kansas Department of Health and Environment Infectious Disease Epidemiology and Response investigating foodborne illness outbreaks. They provide expertise and technical support to local health departments, the private health care community and the general public. You may contact them at (877) 427-7317 or at EpiHotline@kdheks.gov.

BACKGROUND *cont.*

- Current State Complaint System
  1. A Kansan suspects illness originating from a Kansas food establishment
  2. Complainant submits a formal complaint to KDA either through email, telephone, fax, or in person
  3. KDA forwards a copy of the complaint to KDHE
  4. KDHE assesses the complaint and determines if it meets criteria for an outbreak investigation
  5. Investigation is further assessed by KDHE and KDA

DEFINITIONS *cont.*

- Complainant: The person or entity submitting the complaint
- Franchise Status: For the purpose of this presentation, a “chain establishment” is defined as 3 or more establishments registered in Kansas.
- Anonymity: Anonymous denotes a complainant’s desire to remain anonymous and not provide identifying information on the complaint form.
- Ready-To-Eat Food: Food product that is prepared at the KFE or prepared by an associated location and delivered to be served or sold

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DEFINITIONS *cont.*

- RAC: A number 1-6 assigned to a KFE denoting the relative risk of foodborne illness with 1 being the lowest risk and 6 being the highest. (9)

RAC	Basic Description	Potentially Hazardous Foods (PHF's)	Cold/Hot Holding	Food Preparation	Cooking on Site	Ware Washing	Reheating /Cooling
#6	Advanced Prep	Yes	Cold and/or Hot	Extensive	Yes	Yes	Yes
#5	Cook and Serve	Yes	Cold and/or Hot	Simple	Yes	Yes	None
#4	Deli's, Satellite Food Service	Yes	Cold Only	Limited	None	Yes	None
#3	PHF's can be served-Satellite	Yes	Cold and/or Hot	None	None	Yes	None
#2	May have PHF's, but no prep on site	Yes	Cold Only	None	None	None	None
#1	Food in Original container	No	Neither	None	None	None	None

OBJECTIVES

- Merge and clean data sets from KDHE and KDA
- Descriptive analysis of foodborne complaints and foodborne outbreak data.
- Statistical significance tests on KFE and complaint variables
  - Identify relevant variables contributing to complaints, investigations, and foodborne disease outbreaks

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METHODS

- KFE license information and Complaint data from 2009-2014 was collected from KDA
- EDSS and EpiTrax investigation data was collected from KDHE
- All data was cleaned and compiled on a single Excel file
  - Complaints not involving ready-to-eat food or illness were excluded
  - KFEs not meeting ready-to-eat criteria were excluded
  - Outbreaks not involving food were excluded
  - Outbreaks not originating from complaints were excluded

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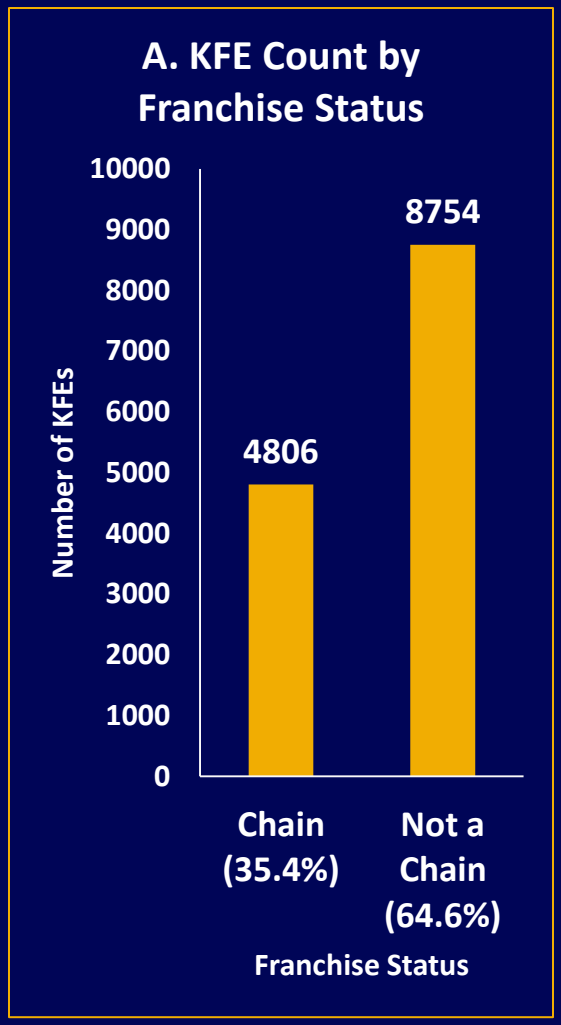
METHODS *cont.*

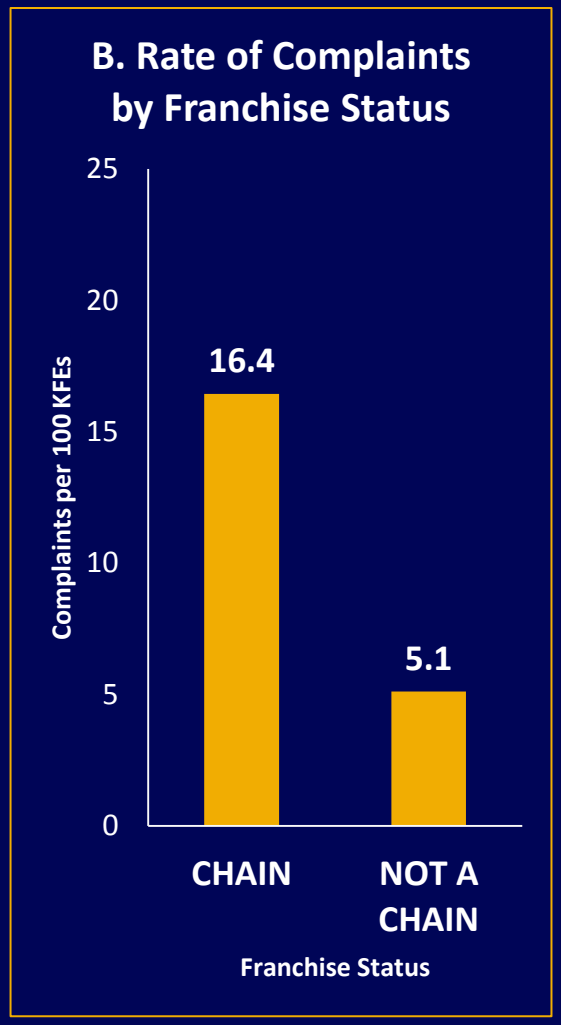
- Outbreak ID was added to the original complaint data
- Merged outbreaks with complaint files using Outbreak ID
- Complaint data linked to producing KFE using registered license
  - KFEs were classified by Principal Food Type, and Franchise Status

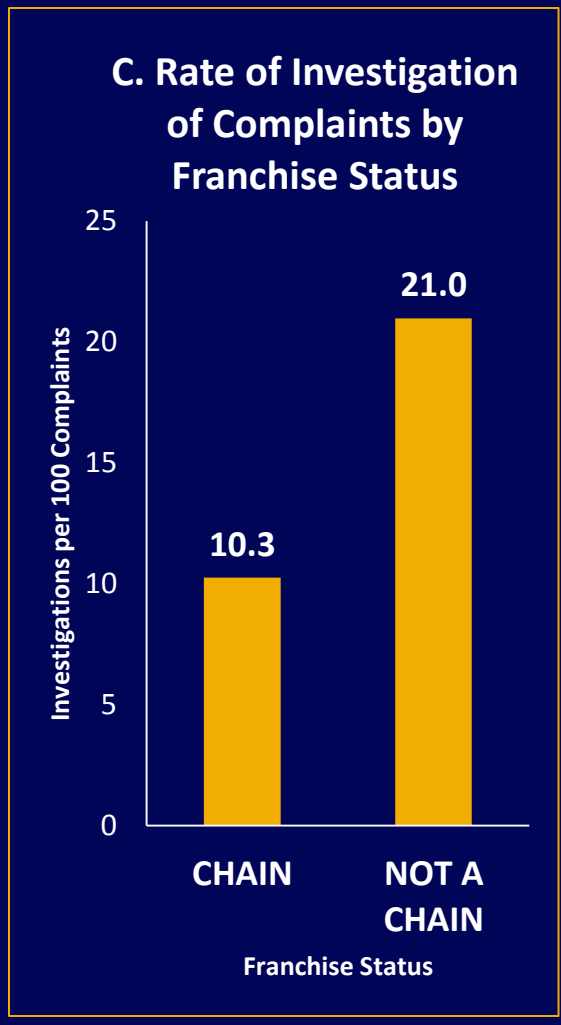
ANALYSIS

- Count data was assessed and compiled using Excel and SAS
- KFE variables were analyzed for contributing factors in complaint submission
- Complaint and KFE factors were analyzed for significant contribution to complaint investigation
- Relevant variables were assessed for contribution to confirmation of an outbreak from an investigation

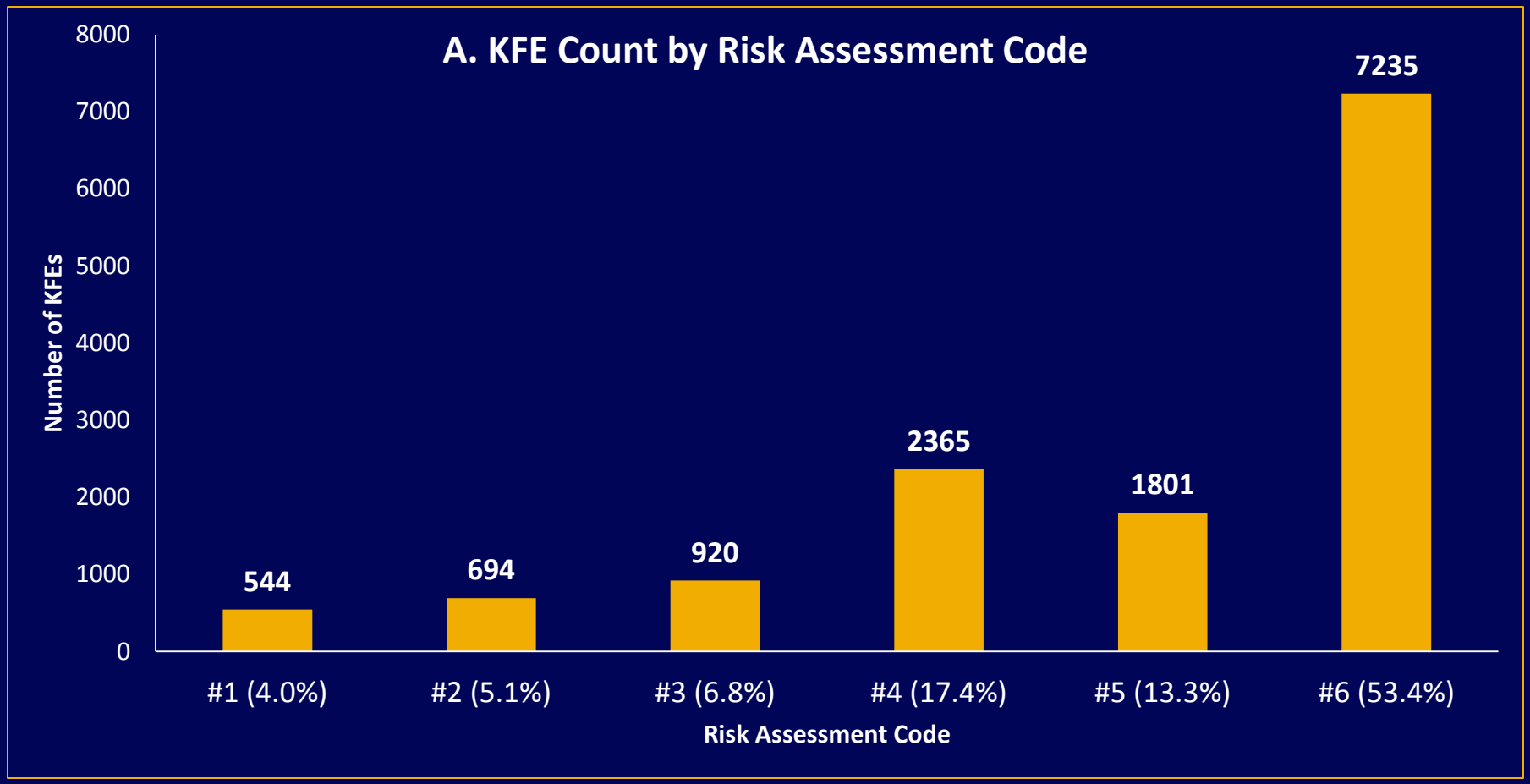
RESULTS- Franchise Status







RESULTS- Risk Assessment Code



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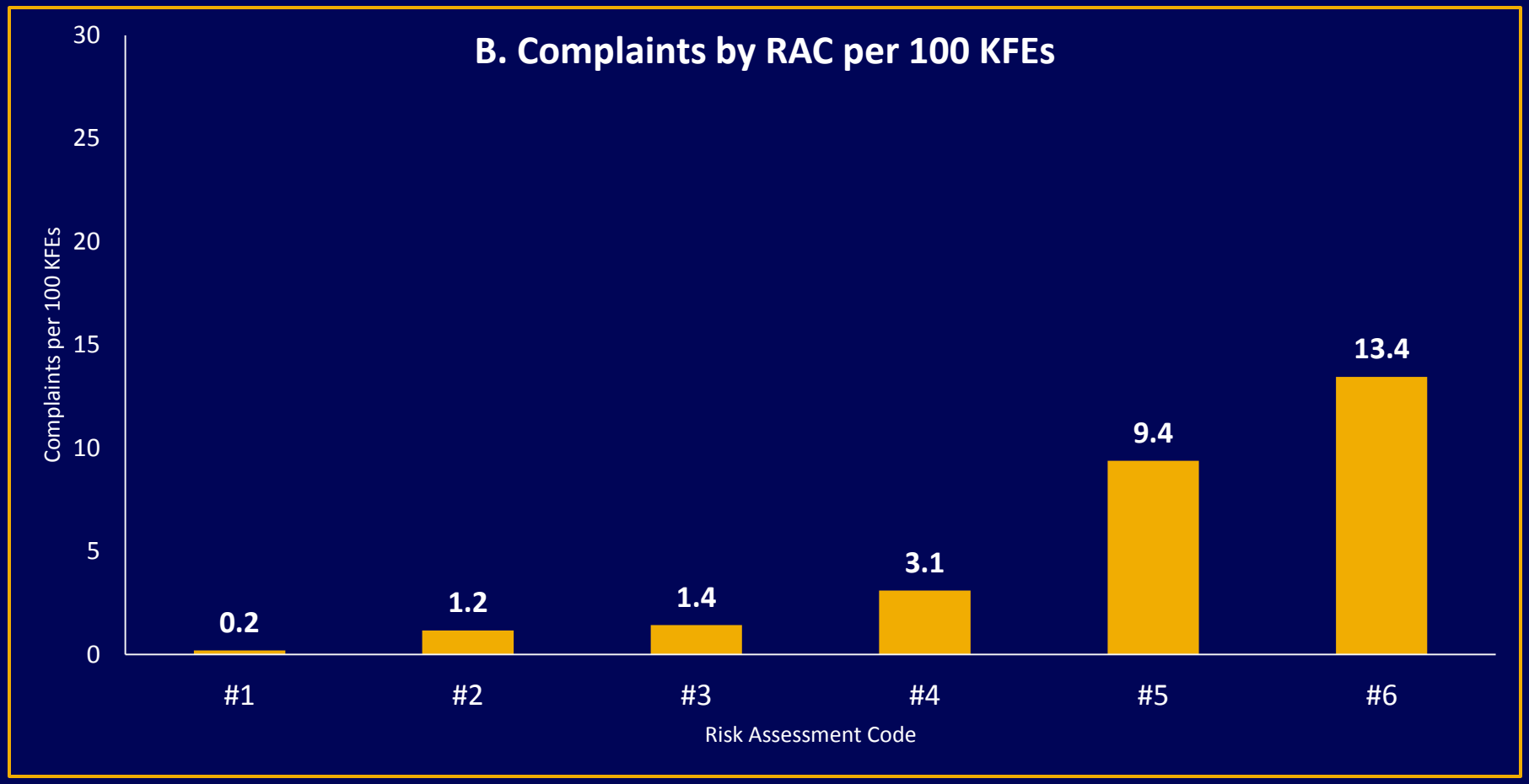
RESULTS- RAC *cont.*



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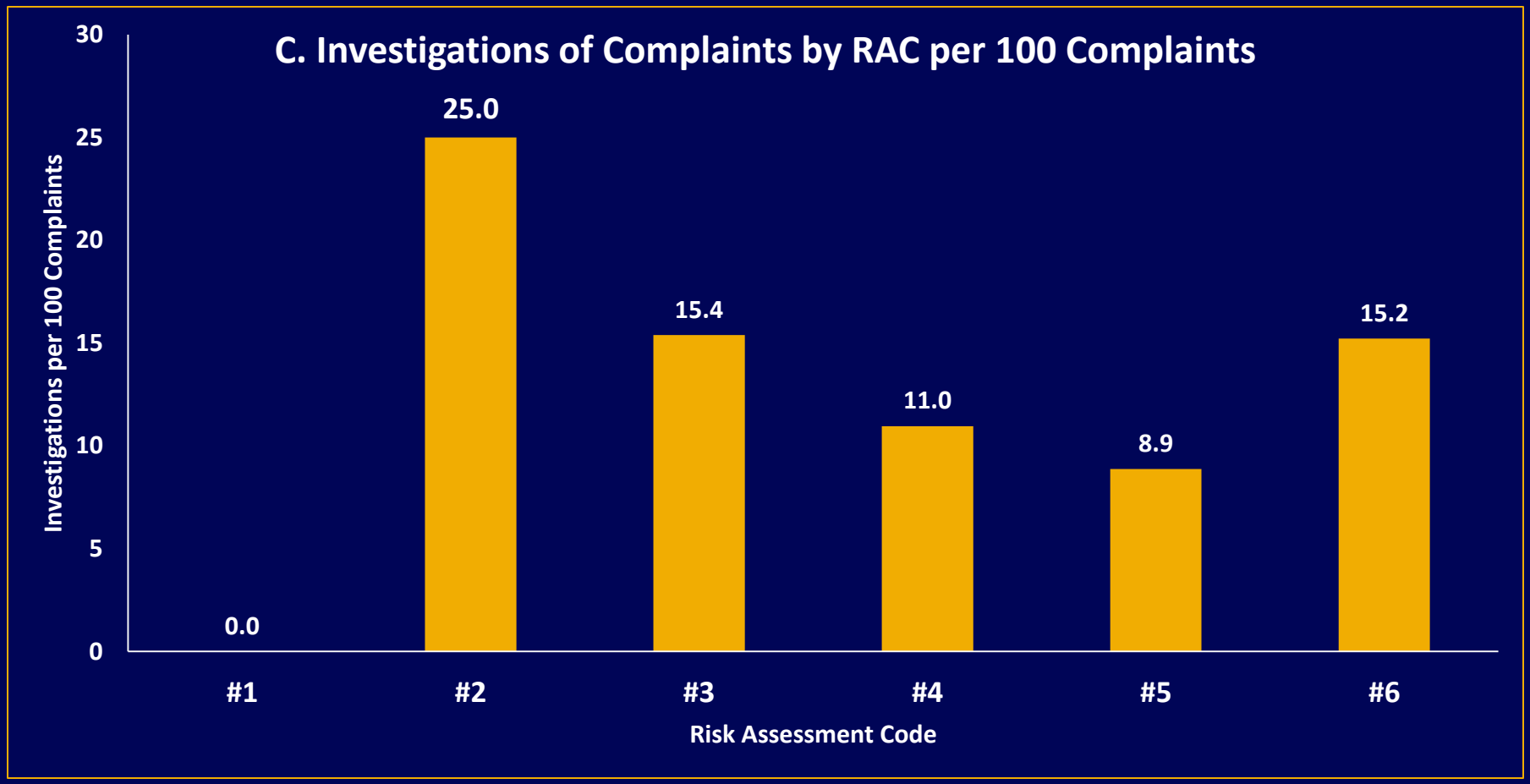
RESULTS- RAC *cont.*



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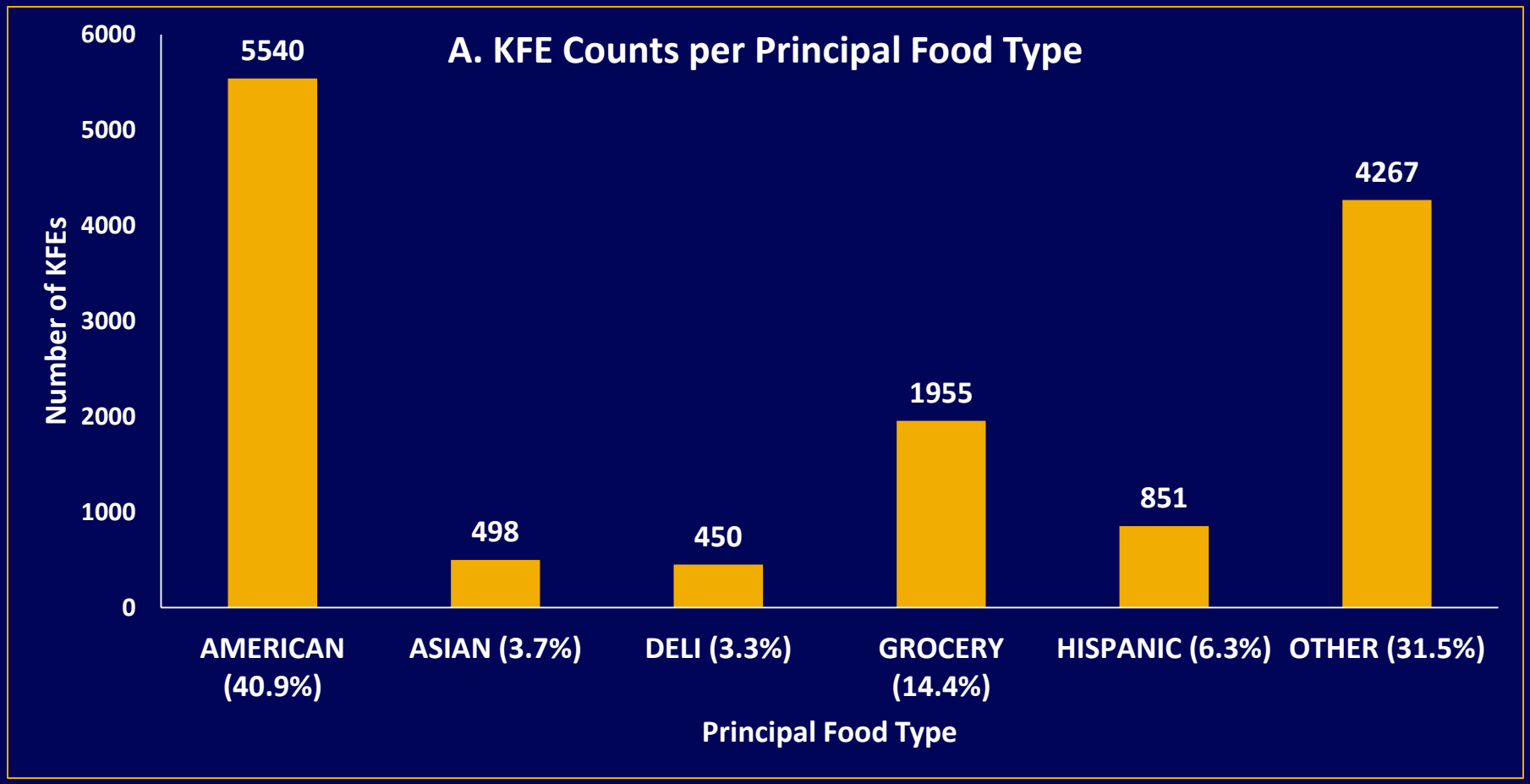
RESULTS- Principal Food Type



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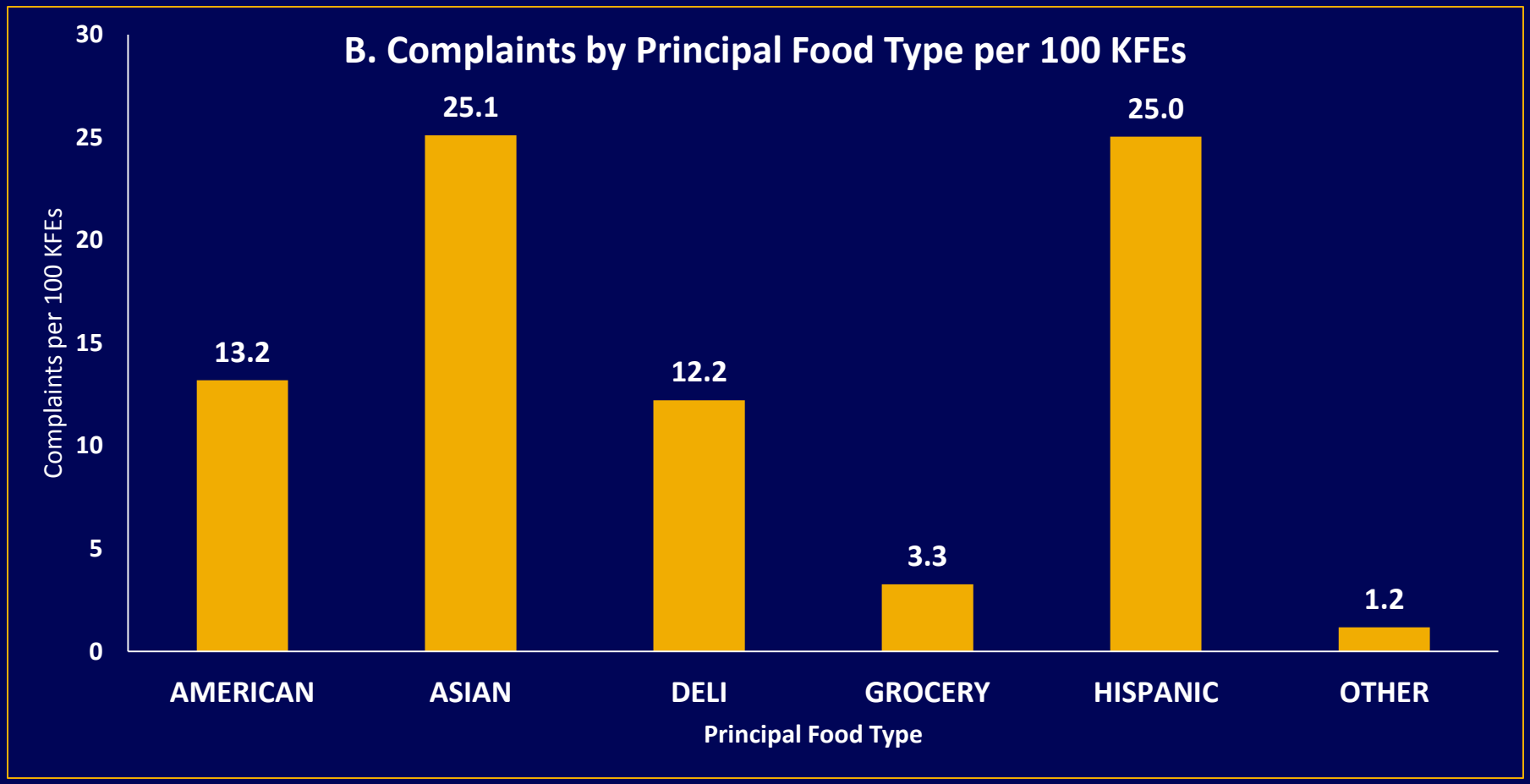
RESULTS- Principal Food Type *cont.*



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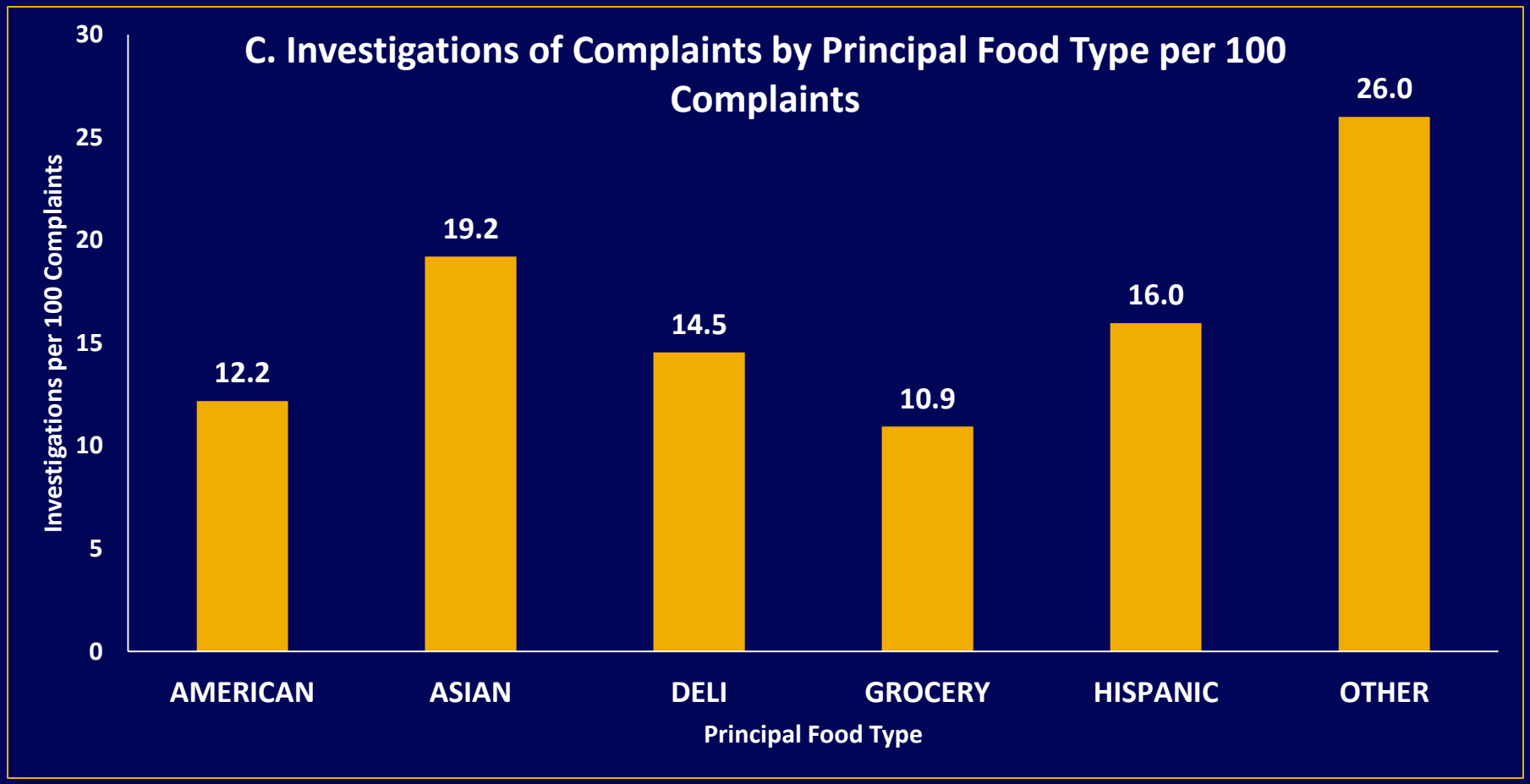
RESULTS- Principal Food Type *cont.*



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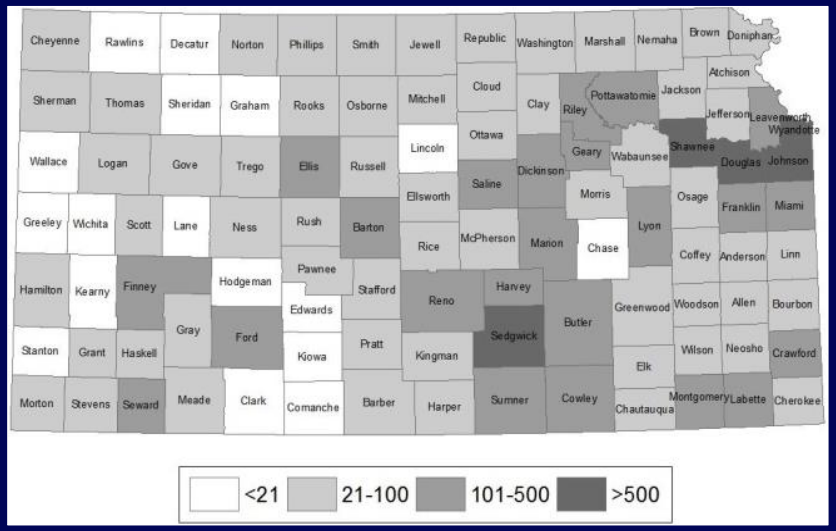
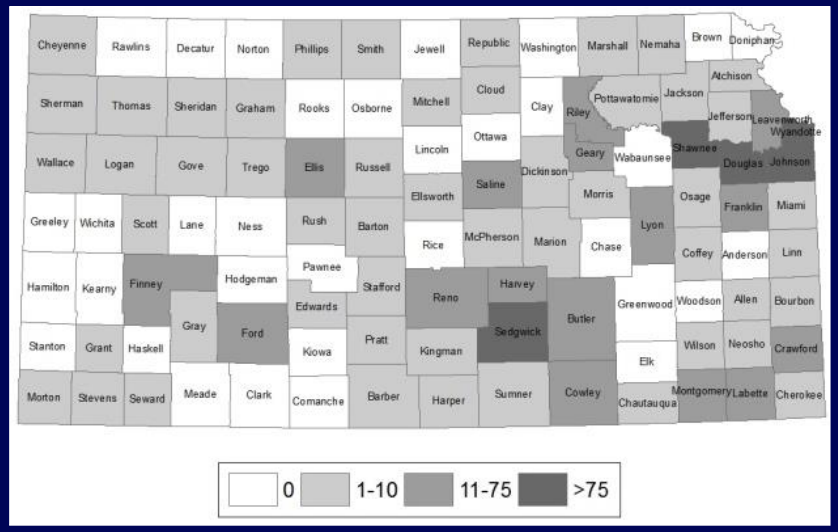
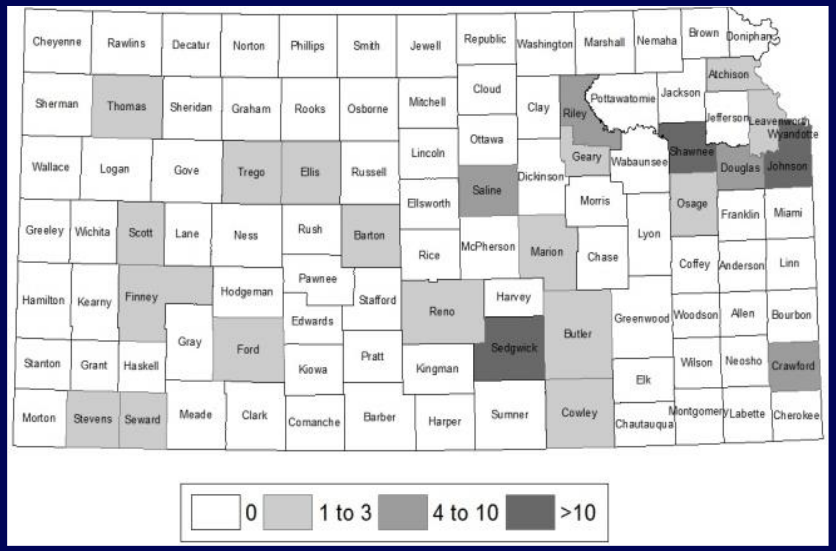
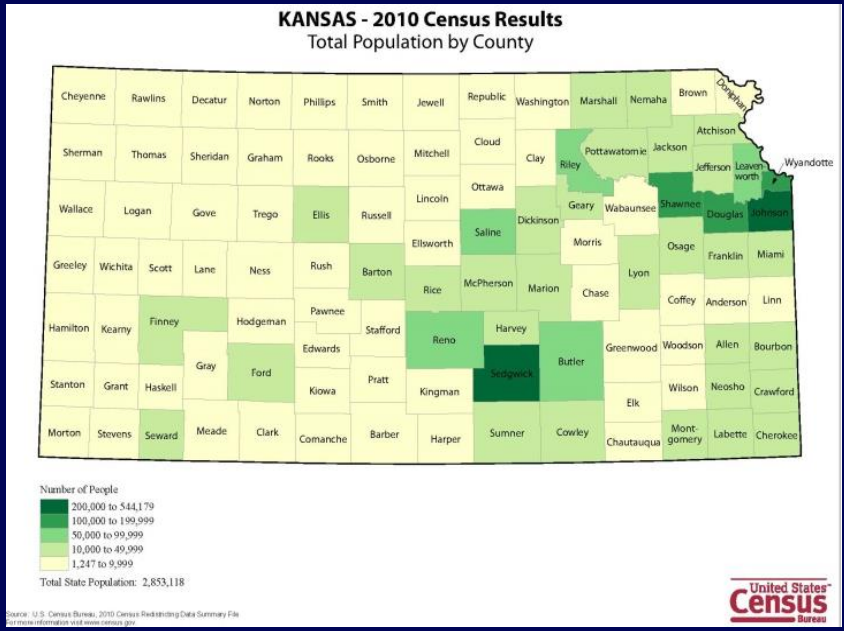
RESULTS- Per County

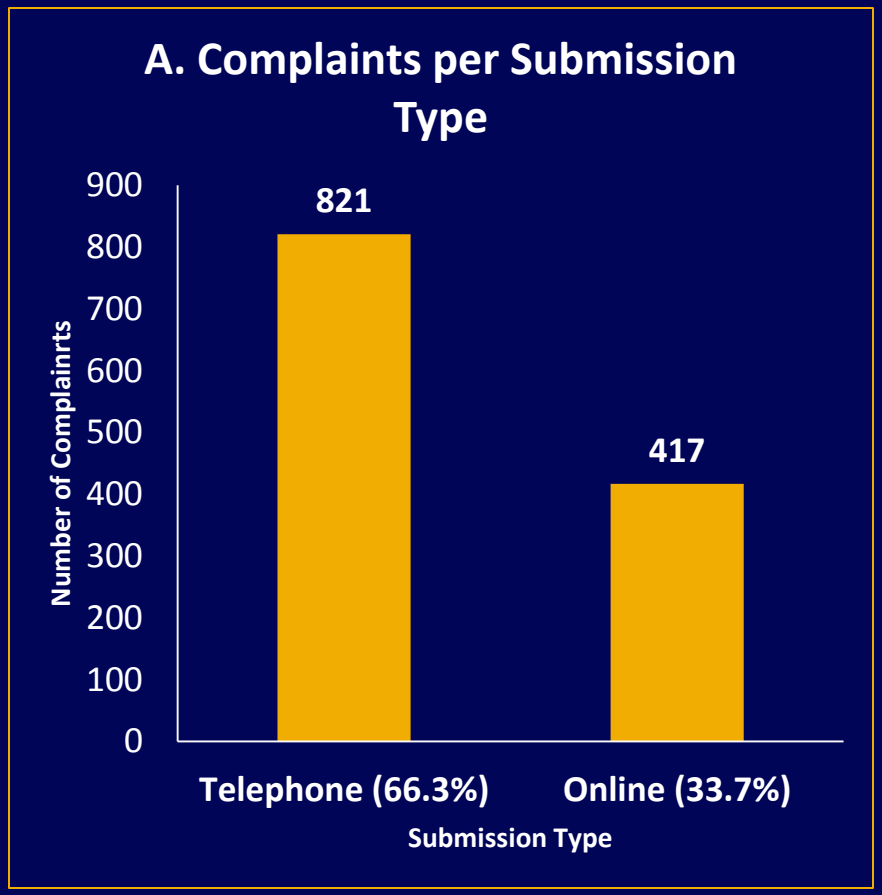


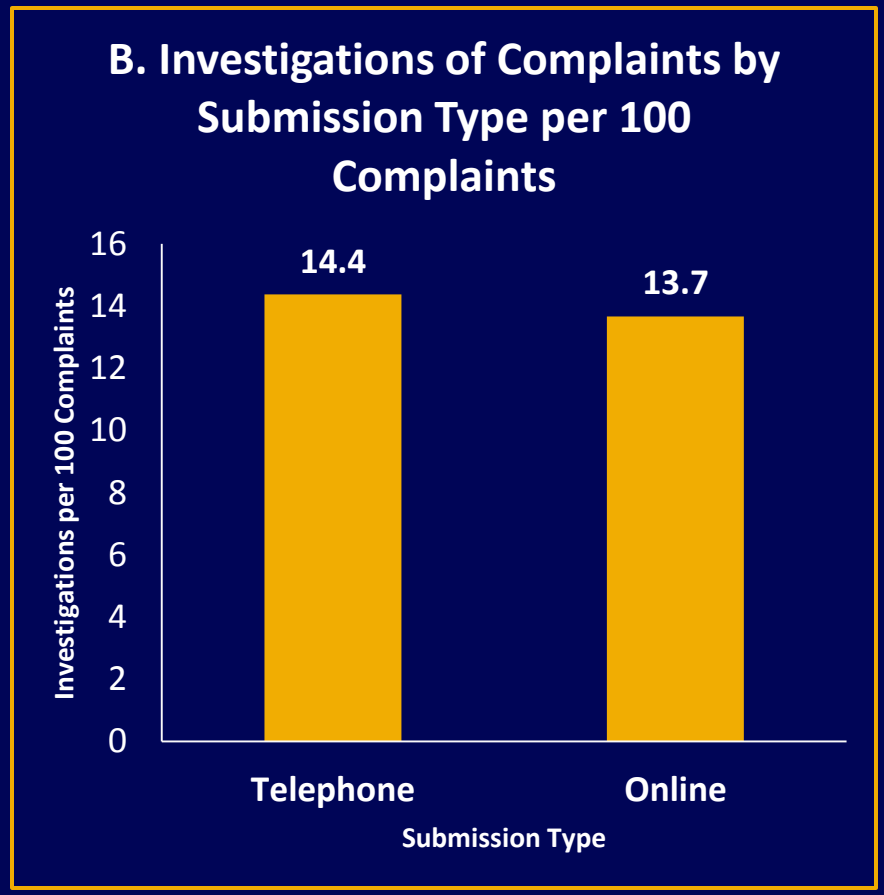






RESULTS- Submission Type





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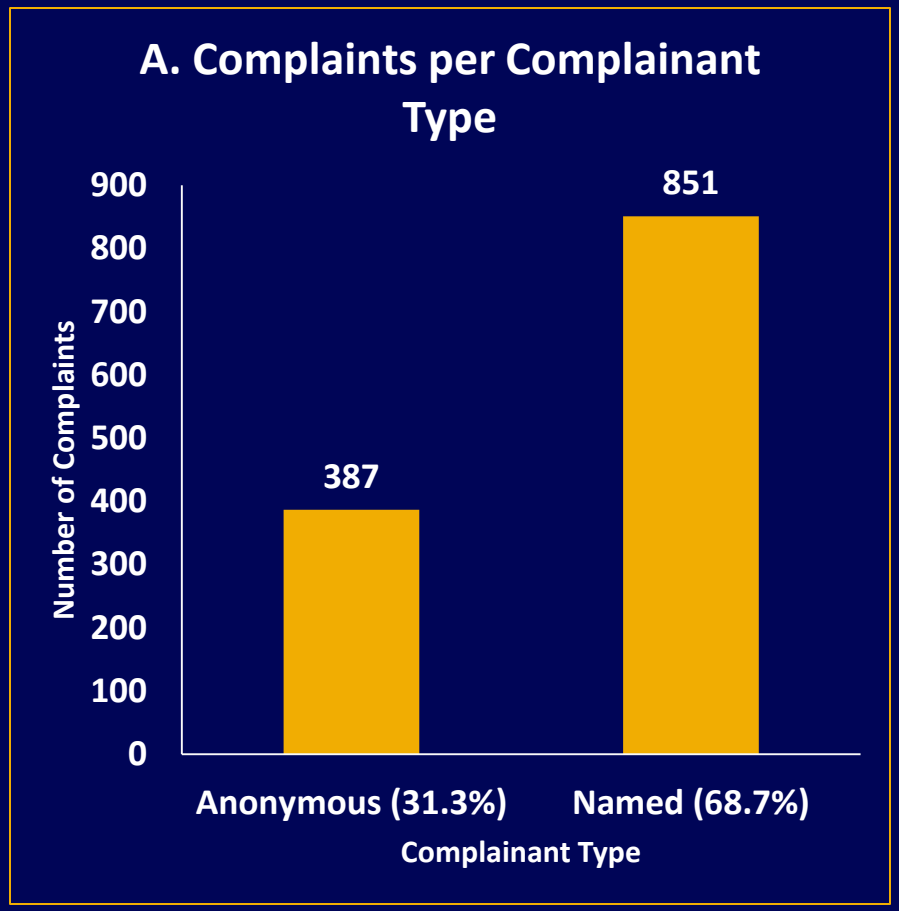
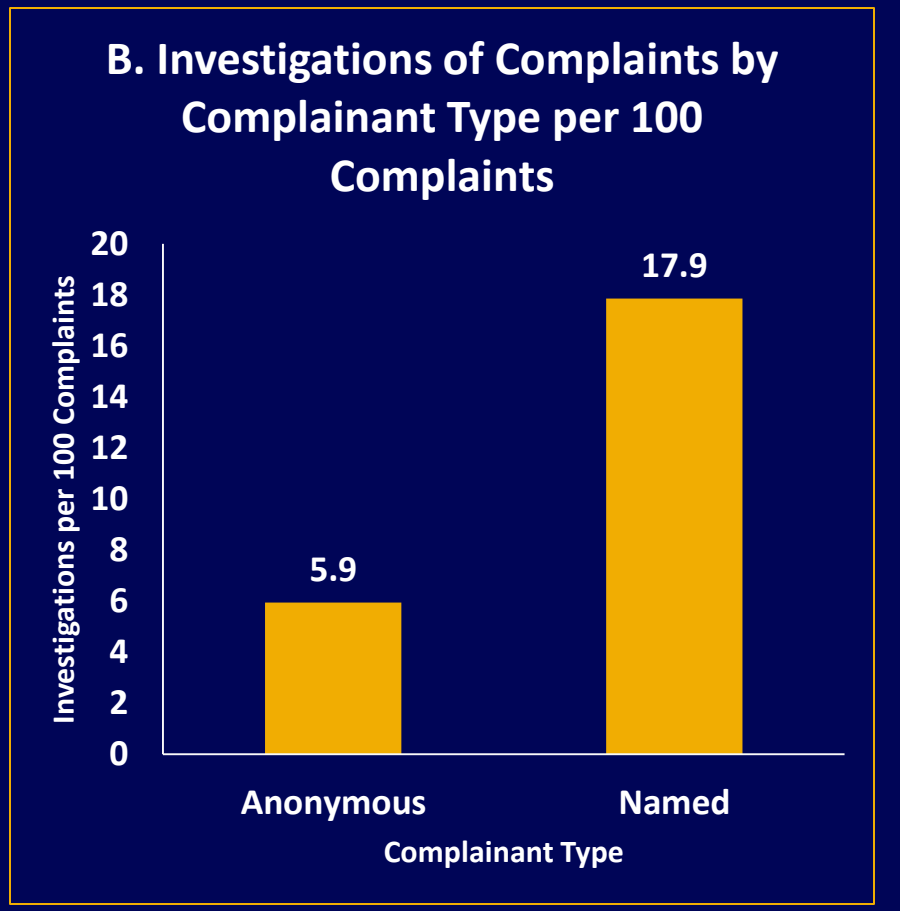
RESULTS- Anonymity





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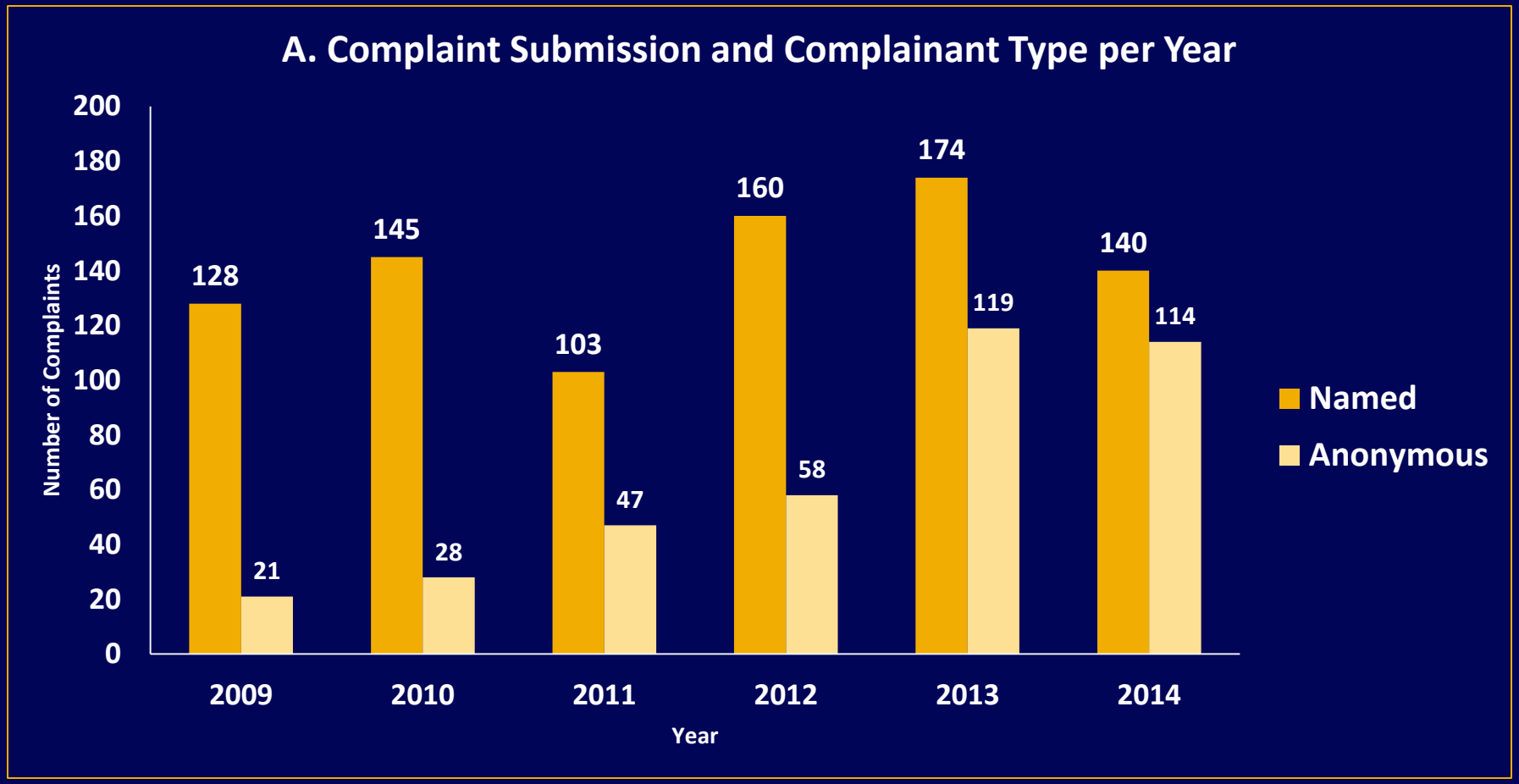
RESULTS- Anonymity by Year



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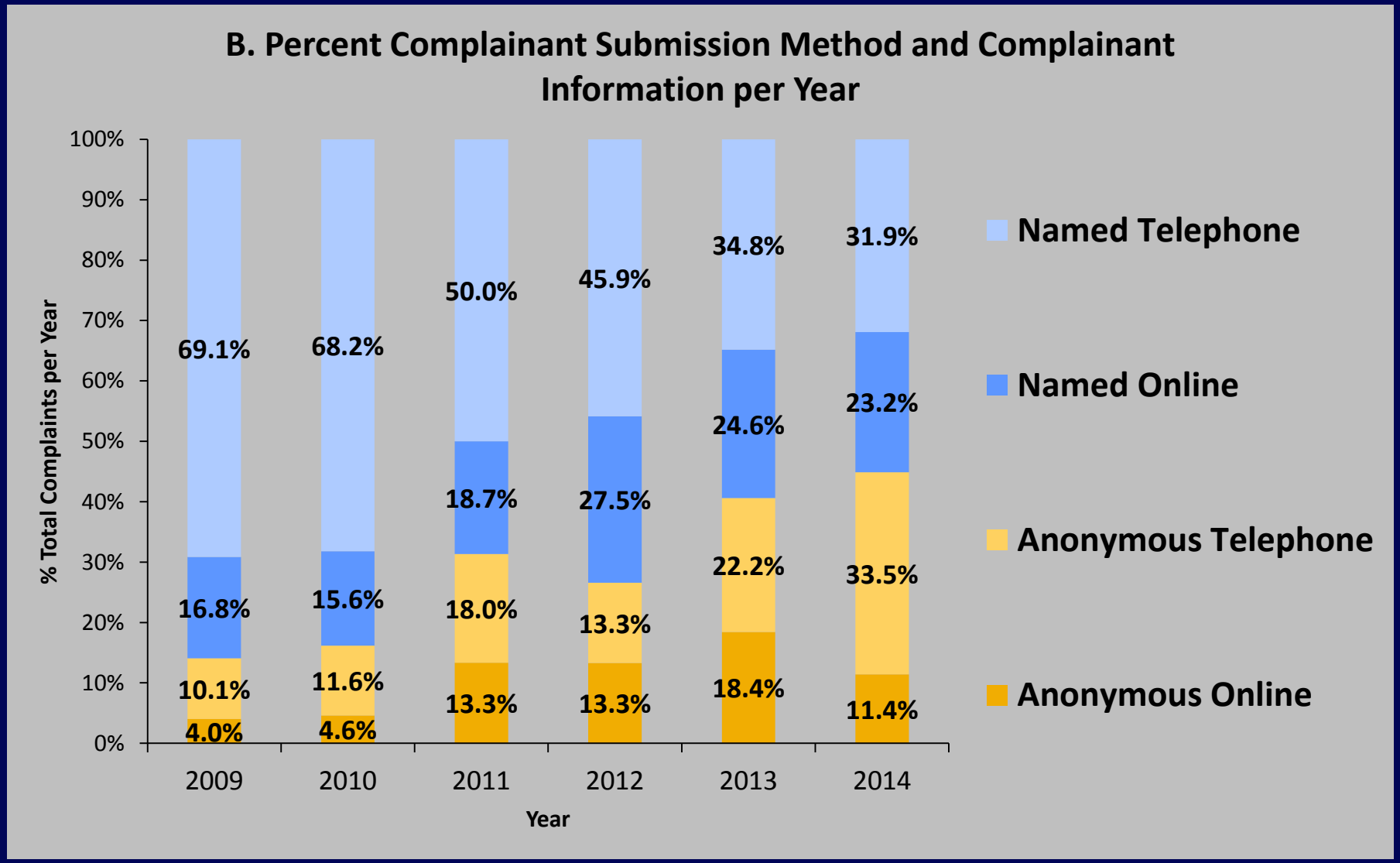
RESULTS- Anonymity by Year *cont.*



ANALYSIS: KFE Factors and Complaints

TABLE 1. KFE FACTORS PRODUCING A COMPLAINT			
RISK ASSESSMENT CODE	Odds Ratio	95% Confidence Limits	
RAC 1 vs. 4	0.058	0.003	0.262
RAC 2 vs. 4	0.366	0.162	0.718
RAC 3 vs. 4	0.450	0.237	0.788
RAC 5 vs. 4	3.251	2.464	4.332
RAC 6 vs. 4	4.884	3.861	6.276
FRANCHISE STATUS			
Chain vs. Non-Chain	3.647	3.230	4.122
PRINCIPAL FOOD TYPE			
Asian vs. American	2.205	1.769	2.731
Deli vs. American	0.916	0.677	1.217
Grocery vs. American	0.223	0.170	0.287
Hispanic vs. American	2.196	1.844	2.609
Other vs. American	0.078	0.058	0.103

ANALYSIS: KFE, Complaints, and Outbreak Investigations

TABLE 2. COMPLAINTS INVESTIGATED FOR OUTBREAKS AND NOT INVESTIGATED BY RESTAURANT VARIABLES, KANSAS, 2009-2014			
	Not Investigated (n=1063)	Investigated (n=174)	P-Value
	No. (%)	No. (%)	
RAC			
1	1 (<1)	0 (<1)	0.91
2	6 (1)	2 (1)	
3	11 (1)	2 (1)	
4	65 (6)	8 (5)	
5	154 (14)	15 (9)	
6	826 (78)	147 (84)	
PRINCIPAL FOOD TYPE			
American	642 (60)	88 (51)	0.31
Asian	101 (10)	24 (14)	
Deli	47 (4)	8 (5)	
Grocery	57 (5)	7 (4)	
Hispanic	179 (17)	34 (20)	
Other	37 (3)	13 (7)	
FRANCHISE STATUS			
Chain	709 (67)	80 (46)	<0.0001
Non-Chain	354 (33)	94 (54)	

ANALYSIS: KFE, Complaints, and Outbreak Investigations

TABLE 3. COMPLAINTS INVESTIGATED FOR OUTBREAKS AND NOT INVESTIGATED BY COMPLAINT SUBMISSION VARIABLES, KANSAS, 2009-2014					
	Not Investigated (n=1429)	Investigated (n=224)	Odds Ratio	95% Confidence Limit	
	No. (%)	No. (%)			
SUBMISSION METHOD					
Telephone	948 (66)	152 (68)	0.93	0.69	1.26
Online	481 (34)	72 (32)			
ANONYMITY					
Anonymous	468 (33)	28 (12)	3.41	2.26	5.14
Named	961 (67)	196 (88)			

ANALYSIS: Complaint Anonymity and KFE Franchise Status

TABLE 4. COMPLAINT ANONYMITY AND KFE FRANCHISE STATUS EFFECT ON COMPLAINT SUBMISSION OUTCOME, KANSAS, 2009-2014				
	OR	95% Confidence Limits		R^2
ANONYMITY				
Named Complaints Vs. Anonymous Complaints	3.44	2.26	5.14	0.03
FRANCHISE STATUS				
Non-Chain Vs. Chain	2.35	1.70	3.26	0.02

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ANALYSIS: Submission Method and Anonymity

TABLE 5. COMPLAINT METHOD'S EFFECT ON ANONYMITY			
	Odds Ratio	95% Confidence Limits	
Online vs. Telephone	1.430	1.148	1.779

TABLE 6. ANONYMITY'S EFFECT ON INVESTIGATION NOT LEADING TO AN OUTBREAK			
	Odds Ratio	95% Confidence Limits	
Outbreak Determined "Not an Outbreak" vs Confirmed Outbreaks	2.669	1.179	6.468

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DISCUSSION

- Anonymity and its effects on investigations
  - Online complaints have 1.4 times the odds of being submitted anonymously
    - OR= 1.4
  - Anonymous complaints that meet criteria for investigation are 2.7 times the likelihood to result in being declared “Not an Outbreak”
    - OR= 2.7

DISCUSSION *cont.*

- KFE Variable effects on Complaints
  - Risk Assessment Code
    - RAC is a good predictor of the odds of a complaint being submitted with RAC 6 standing significantly higher than all lower codes
  - Principal Food Type
    - Delis, groceries, and other types of food demonstrate lower odds of complaint production compared to American KFES with OR= 0.92, 0.22, and 0.08 respectively
    - Compared to American food, our two “Foreign” food establishment categories, Asian and Hispanic, showed an increased odds of producing a complaint of 2.2

DISCUSSION *cont.*

- KFE Variable Effects on Complaints Cont…
  - Franchise Status
    - OR= 3.7
      - Chain restaurants are 3.7 more likely to produce a complaint compared to non-chain restaurants

DISCUSSION *cont.*

- KFEs:
  - Excluding Franchise Status, KFE strata do not serve as significant predictors for the odds of investigations or outbreaks
  - However, KFE strata do all serve as a significant predictor for the odds of producing a complaint

DISCUSSION *cont.*

- Significant Variable effects on Investigation
  - Anonymity
    - OR= 3.4
      - Named complaints increase the odds of an investigation 3.4 fold
  - Franchise Status
    - OR= 2.3
      - Complaints regarding a non-chain restaurant are 2.3 times more likely to result in an investigation compared to their chain franchise counterparts

*No other KFE variables were shown to significantly contribute to the Investigation Status

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DISCUSSION *cont.*

- Anonymity
  - Positively affected by “Other”(Email) complaint methods
  - Negatively affects ability to investigate and confirm outbreaks
  - Seems to be increasing as complainants move towards email complaints
- An increased number of complaints does not necessarily mean to expect an increase in investigations or outbreaks

CONSIDERATIONS

- Well-structured complaint systems are an effective part of foodborne outbreak surveillance [3]
- Complaint systems have the potential for more rapid assessment of a complaint
- Complaint systems remove the barriers between the general population and health departments

CONSIDERATIONS *cont.*

- KFEs
  - Watch for bias in reporting of complaints
    - "Foreign Food" restaurants are much more likely to produce a complaint, but does not result in an investigation or outbreak
  - High complaint levels do not necessarily mean a greater odds of an outbreak
  - RAC serves as a good predictor for complaints but not for potential outbreaks

CONSIDERATIONS *cont.*

- Anonymous Complaints:
  - Assess ways to encourage complainants to submit a named complaint
  - Assess anonymity warnings in the complaint process
  - Encourage telephone complaints
- Potential Outcomes:
  - A decrease in “fruitless” investigations
  - An increase in confirmed outbreaks

LIMITATIONS

- Dependence on population to submit complaints
- Missing Information in Complaint Data
- Missing KFE Data
- “Not an Outbreak” could mean many things
- Data lost due to data sets originating from different agencies, departments, and systems

Future Study

- Analysis of other KFE variables (e.g. KFE size, Date of Licensure, etc.)
- Analysis of time between exposure to complaint
- Determine how best to inform Kansans regarding the foodborne illness complaint system
- Determine how best to encourage named complaints

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Core Competencies

- **Biostatistics**
  - Analysis of foodborne illness complaints and KFEs
  - Association between investigations and anonymity
- **Environmental Toxicology**
  - Review of foodborne illness from toxin contamination
  - Thorough application of Permethrin when hunting ticks
- **Epidemiology**
  - Analysis of complaints by KFE factors
  - Assistance with disease investigations
  - Daily updates on current projects at KDHE
- **Administration of Health Care Organizations**
  - Daily work in the BEPHI offices
  - Meetings with epidemiologists from varying disciplines
- **Social and Behavioral Basis of Public Health**
  - Barriers between ill persons and complaints
  - Assessment of current state of anonymous complaints

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ACKNOWLEDGEMENTS

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Dr. Abbey Nutsch

Dr. Wei-Wen Hsu

MPH Program

Dr. Michael Cates

Barta Stevenson

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Questions?

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