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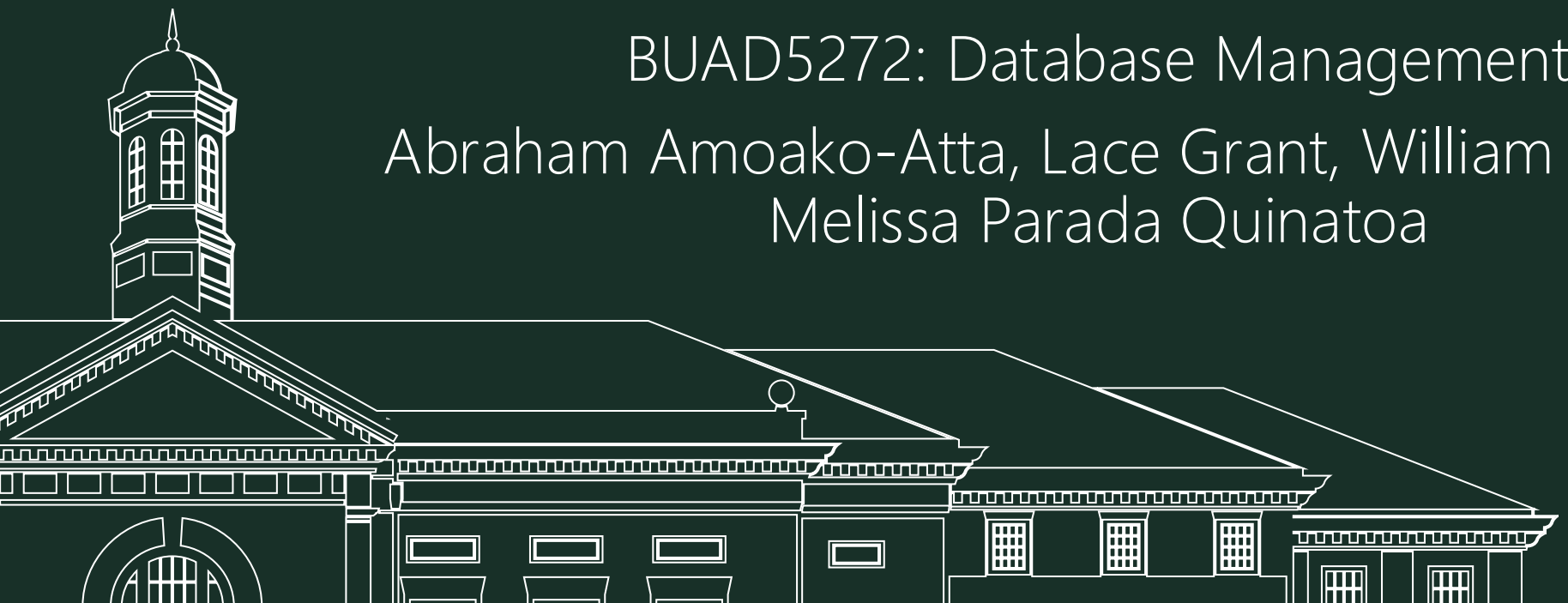
Medium Rare Chicken: Salmonella Outbreaks by Restaurant Type

BUAD5272: Database Management

Abraham Amoako-Atta, Lace Grant, William Olichney,
Melissa Parada Quinatoa



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Introduction

Why and how are we tracking salmonella outbreaks?

Stopping Salmonella

Salmonella is the most prevalent foodborne illness in the United States; how do we stop the spread?

- Health codes exist but some slip through the cracks
- Tracking food providers and types will let us identify breakouts and track companies

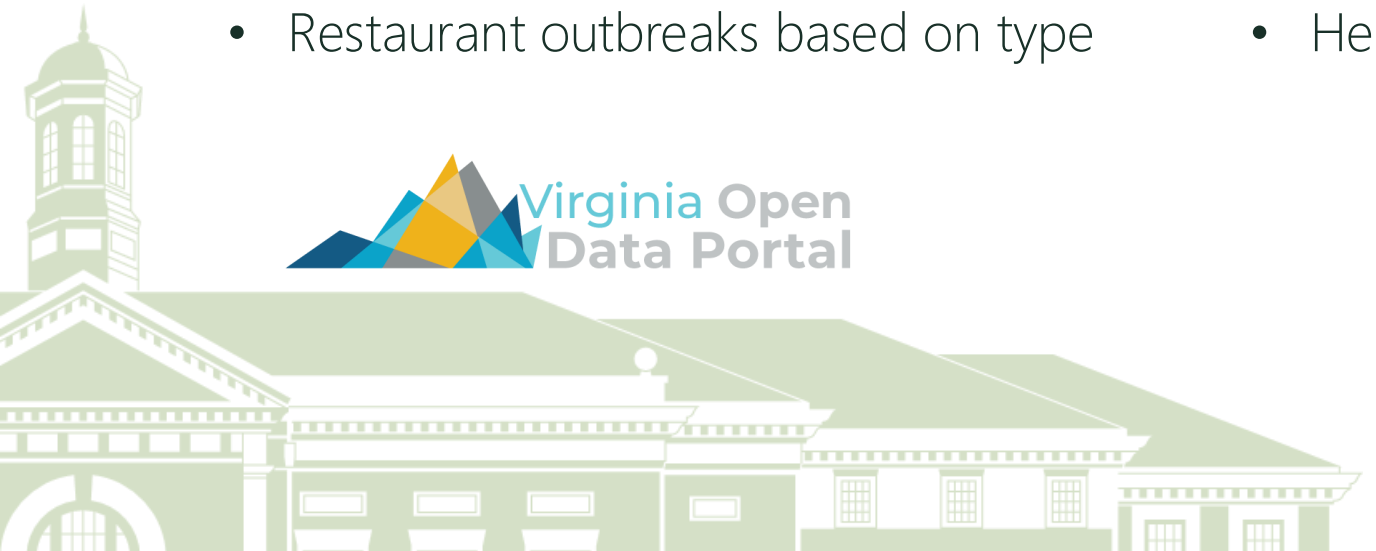
Data Sources & Contents

1. Virginia Open Data Portal

- Publicly accessible data from the Virginia government
- Contains foodborne pathogen outbreak data by food provider
- Does not provide scope of the issue nor impacted products
- Restaurant outbreaks based on type

2. CDC Outbreak Data

- Publicly accessible data from the CDC official website
- Contains number of salmonella diagnoses & food products causing it
- Does not contain information on providers or distributors
- Health data about outbreaks



Virginia Open Data Portal

CDC
U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

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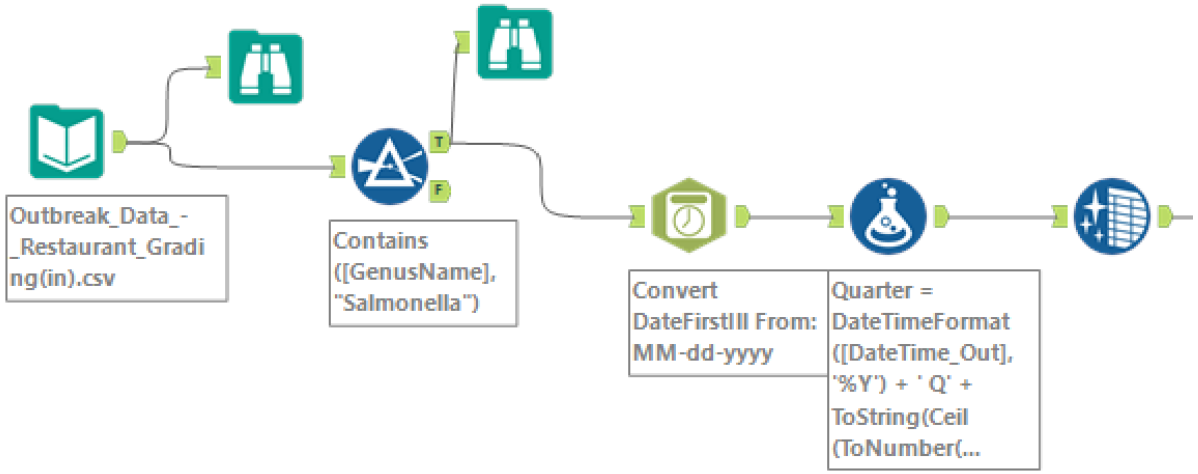
ETL Processes

Cleaning, Preparing & Joining our Data

ETL – Outbreak Data

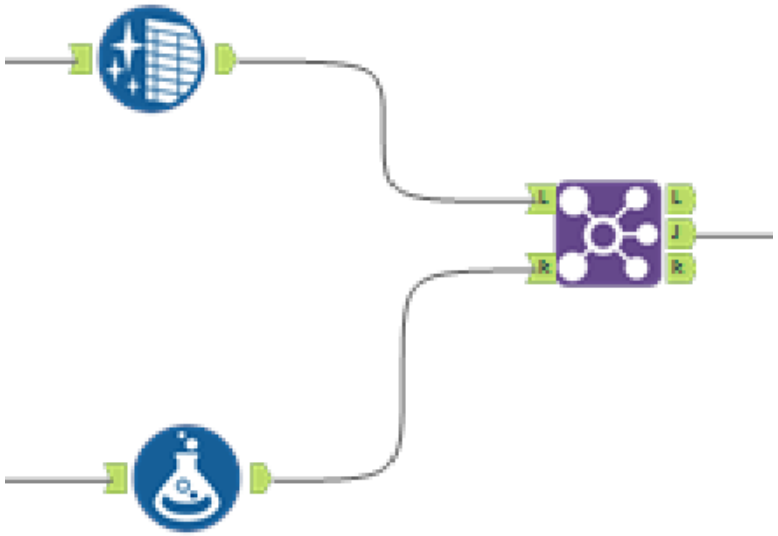


- Input file
- Filter data
- Data configuration
- Data Cleansing

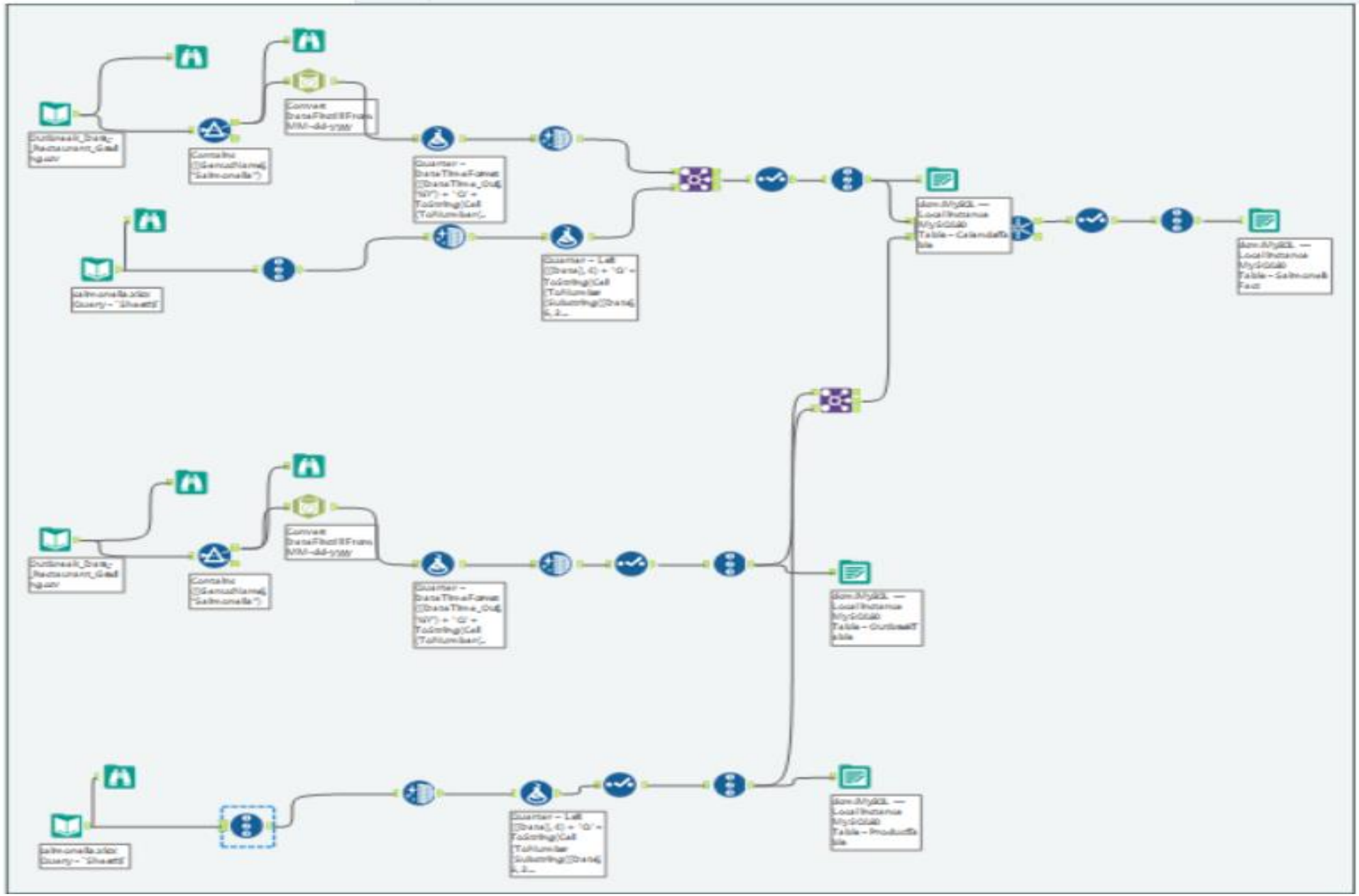
ETL – Salmonella Health Data

- Input file
- Filter data
- Data configuration
- Data Cleansing

ETL – Join Data



- Joined both files
- 17 Fields
- 15 Records



Advice to Consumers, Restaurants, and Retailers

- On November 27, 2018, Achdut Ltd. in Ari'el, Israel recalled tahini products because they might have been contaminated with *Salmonella*.
- Do not eat, sell, or serve recalled tahini or products made with recalled tahini, such as hummus.
  - Recalled tahini products sold under the following brands have expiration dates of April 7, 2020 to May 21, 2020:
    - Achva
    - Achdut
    - Soom
    - S&F
    - Pepperwood brand tahini
    - Soom brand Chocolate Sweet Tahini Halva Spread (lot code 071318CH)
  - Recalled Baron's brand tahini has an expiration date of May 5, 2021.
  - Recalled tahini products have lot codes ranging from 18-097 to 18-141. For a full list, visit the FDA website .
- Return any recalled tahini products to the store for a refund or throw

At A Glance

- Reported Cases: 8
- States: 4
- Hospitalizations: 0
- Deaths: 0
- Recall: Yes

H94

	A	B	C	D	E	F	G
1	UniqueID	WherePrepName	EtiologyKnown	GenusName	SpeciesName	SerotypeName	DateFirstIll
45	1382	Restaurant - Sit-dow	1	Salmonella	enterica	Typhimurium	3/26/2016
49	1956	Restaurant - "Fast-fo	1	Salmonella	enterica	Newport	6/5/2016
51	1648	Restaurant - Sit-dow	1	Salmonella	enterica	I 4,[5],12:i:-	6/17/2016
58	1120	Restaurant - other or	1	Salmonella	enterica	Enteritidis	5/6/2016
59	1639		1	Salmonella	enterica	Javiana	8/27/2016
69	1719	Restaurant - other or	1	Salmonella	enterica	Muenchen	9/5/2016
74	1956	Private home/reside	1	Salmonella	enterica	Stanley	10/11/2016
89	1337	Camp	1	Salmonella	enterica	Typhimurium	11/15/2016
92	1820	Office/indoor workpl	1	Salmonella	enterica	Enteritidis	12/12/2016
94	2065	Restaurant - Sit-dow	1	Salmonella	enterica	Javiana	6/28/2016
96	1475	Farm/dairy	1	Salmonella	enterica	Saintpaul	12/19/2016
102	2410	Restaurant - Sit-dow	1	Salmonella	enterica	Enteritidis	4/22/2016
104	1402	Restaurant - other or	1	Salmonella	enterica	Virchow	7/24/2016
107	1306, 1142	Fair, festival, other te	1	Salmonella	enterica	I 4,[5],12:i:-	7/5/2016
108	1306	Restaurant - Sit-dow	1	Salmonella	enterica	Enteritidis	9/12/2016
109	1306	Restaurant - Sit-dow	1	Salmonella	enterica	Thompson	6/19/2016
111	1306	Restaurant - Sit-dow	1	Salmonella	enterica	Braenderup	3/12/2016
127	1053	Private home/reside	1	Salmonella	enterica	Reading	11/21/2016
128	1306	Restaurant - Sit-dow	1	Salmonella	enterica	Paratyphi B	1/1/2016
141	1257	Long-term care/nursi	1	Salmonella	enterica	Enteritidis	2/11/2017
147	1449	Restaurant - Sit-dow	1	Salmonella	enterica	Typhimurium	11/27/2016
149	1382	Grocery store	1	Salmonella	enterica	Typhimurium	6/2/2016
150	2168	Unknown	1	Salmonella	enterica	Mississippi	5/2/2016
151	1283	Restaurant - Sit-dow	1	Salmonella	enterica	Enteritidis	2/17/2017
154	1120	Unknown	1	Salmonella	enterica	Thompson	4/29/2016
157	1956	Private home/reside	1	Salmonella	enterica	Javiana	3/9/2017
158	1644	Restaurant - Sit-dow	1	Salmonella	enterica	Enteritidis	2/3/2017
193	1475	Private home/reside	1	Salmonella; Sali	enterica; enterica	Typhimurium; Mo	6/4/2017
201	1598	Restaurant - Sit-dow	1	Salmonella	enterica	Braenderup	12/4/2016
206	1598	Caterer (food prepar	1	Salmonella	enterica	Lomalinda	7/10/2016

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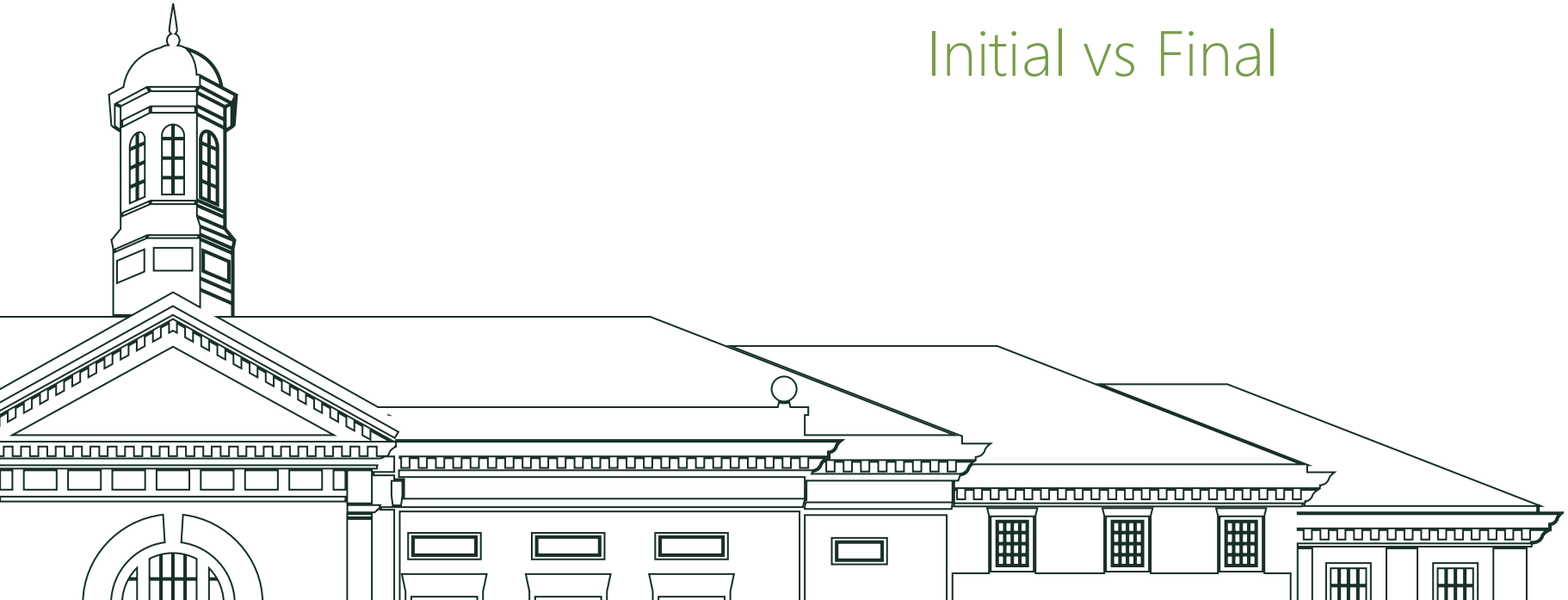
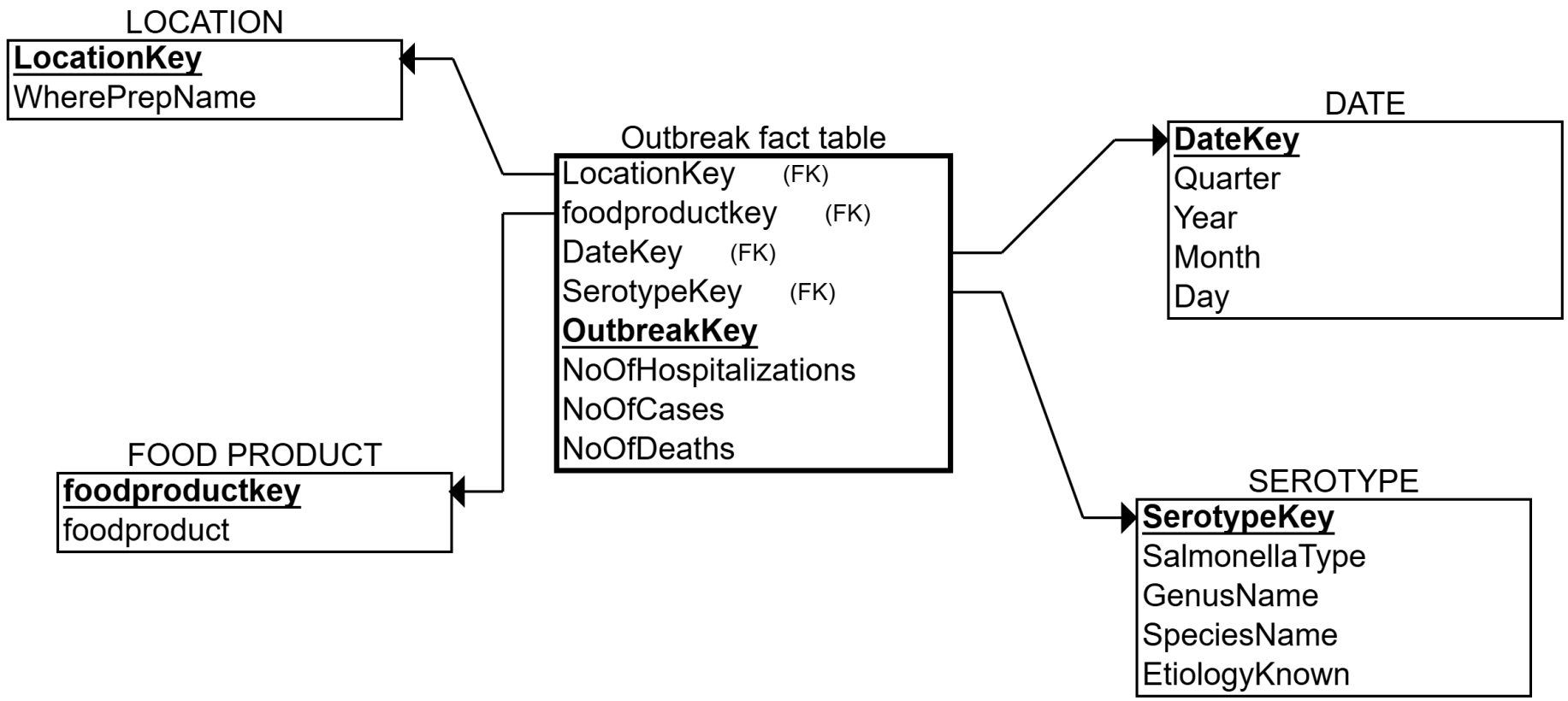
Dimensional Model Diagrams

Initial vs Final



Initial Star Schema



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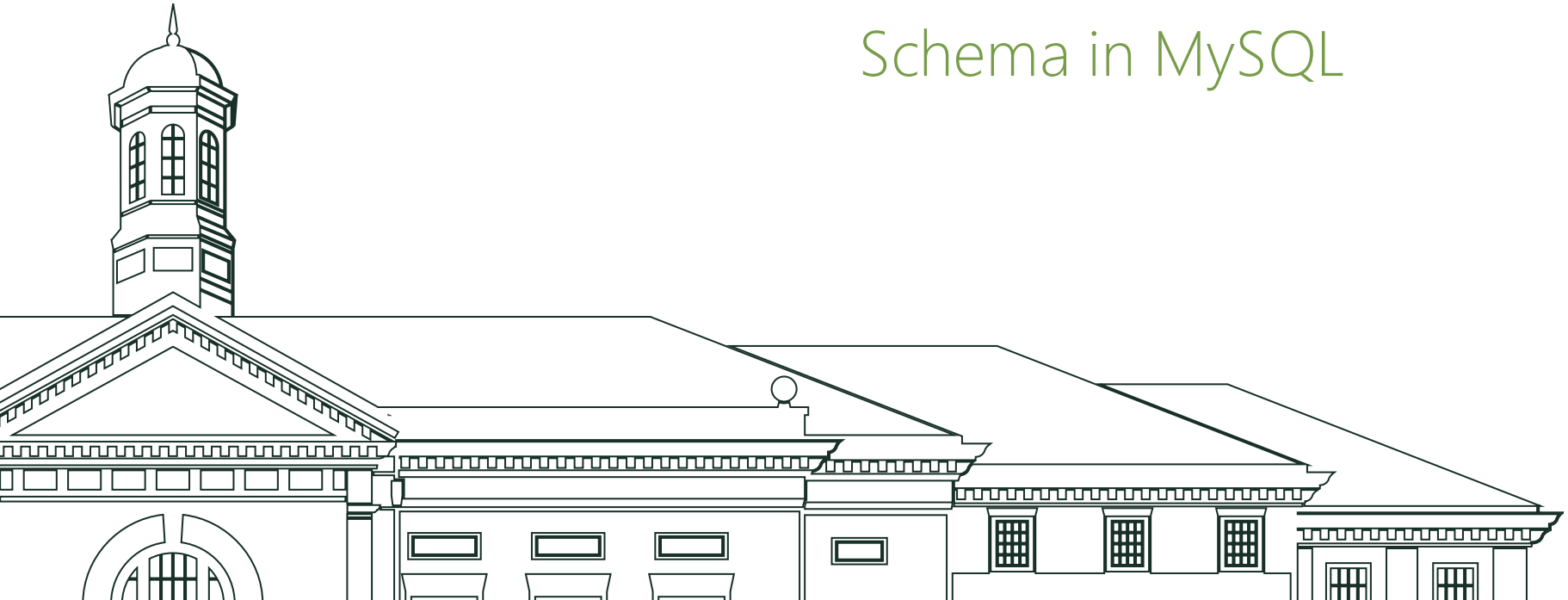
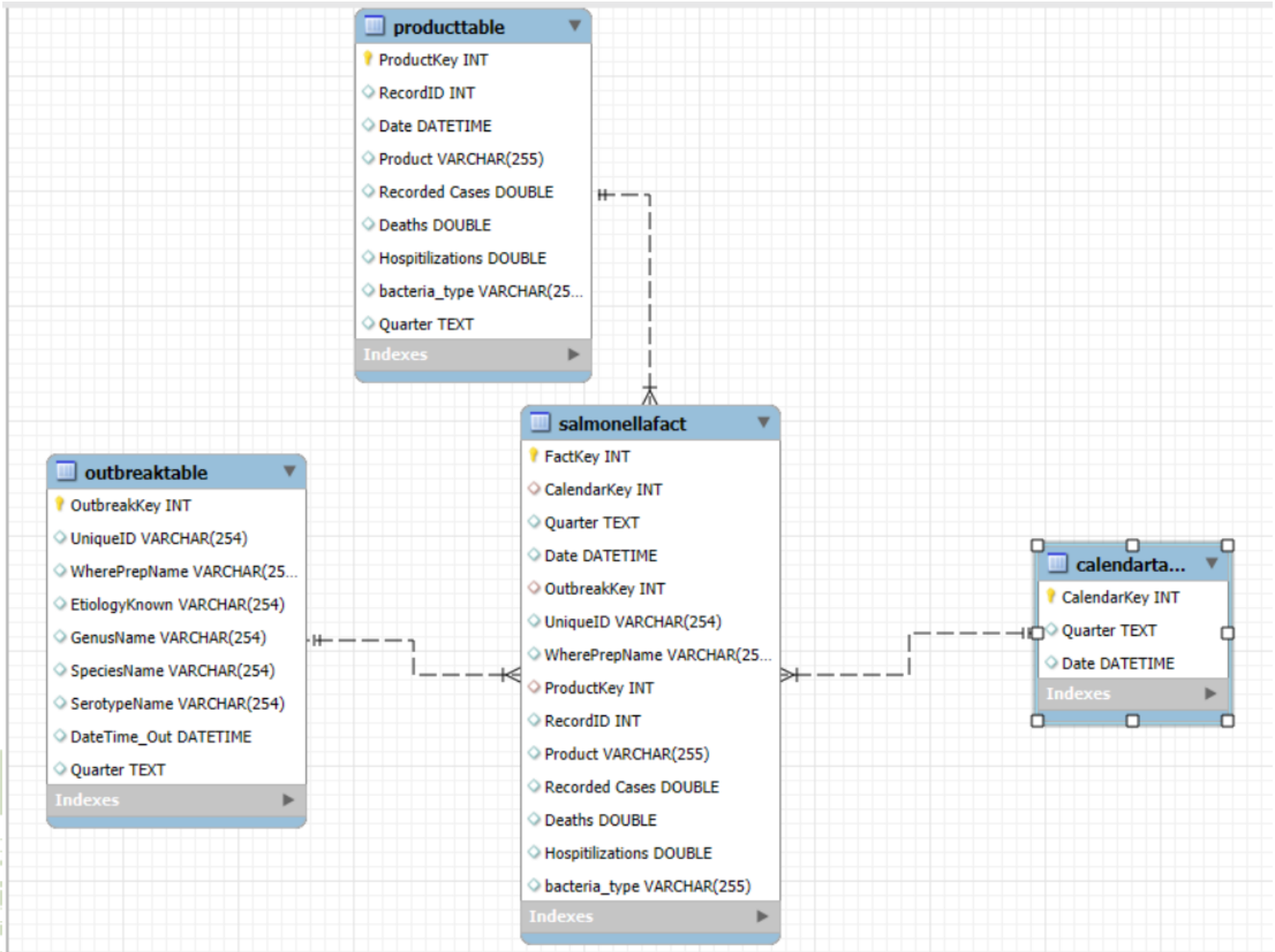
Final Schema

Schema in MySQL



Final Star Schema



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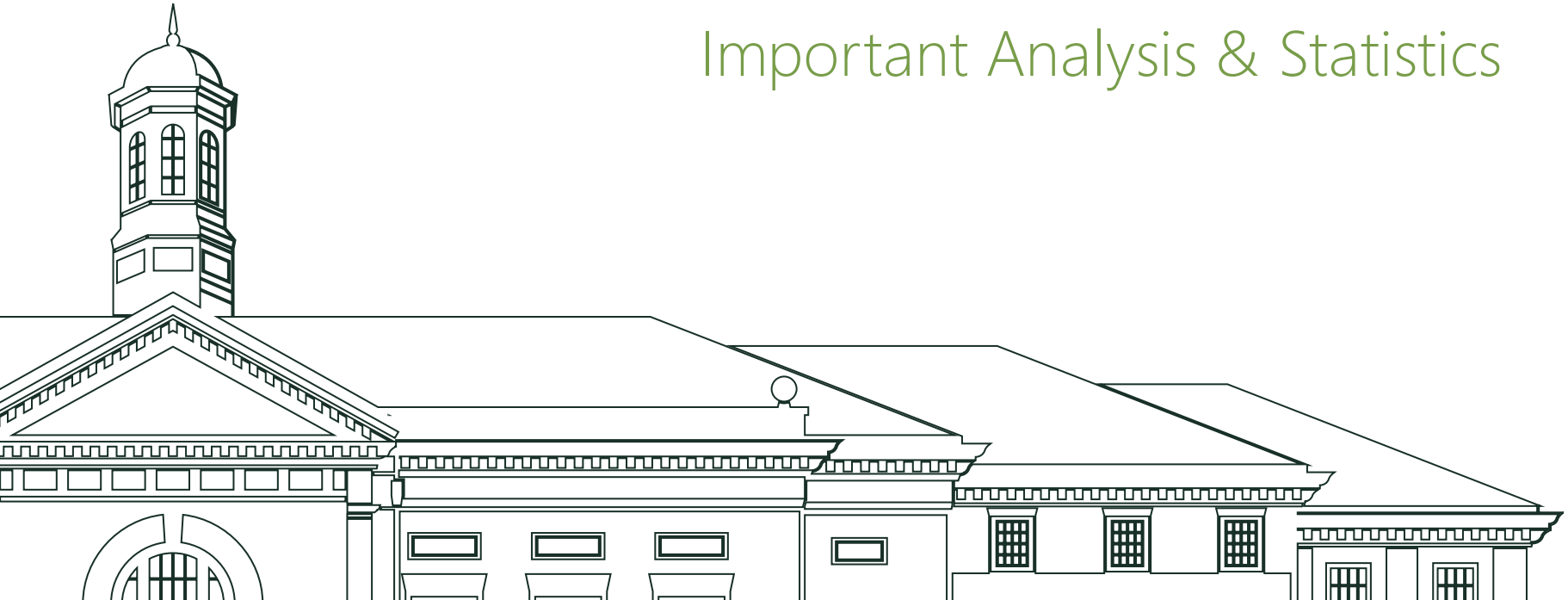
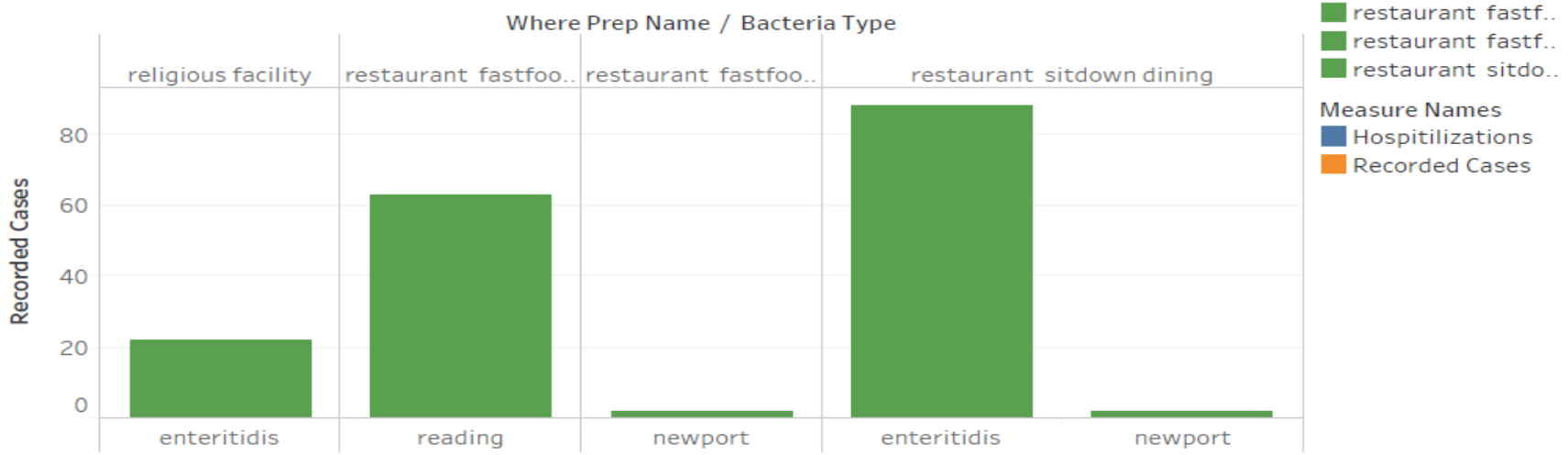
Analytics Dashboard

Important Analysis & Statistics

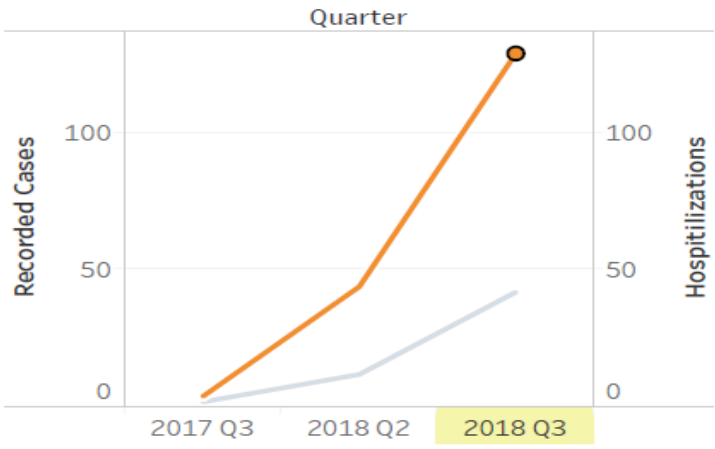


Recorded Cases by Exposure Site and Bacteria Site



Recorded cases by Bacteria

Salmonella Recorded Cases and Hospitalizations by Quarter



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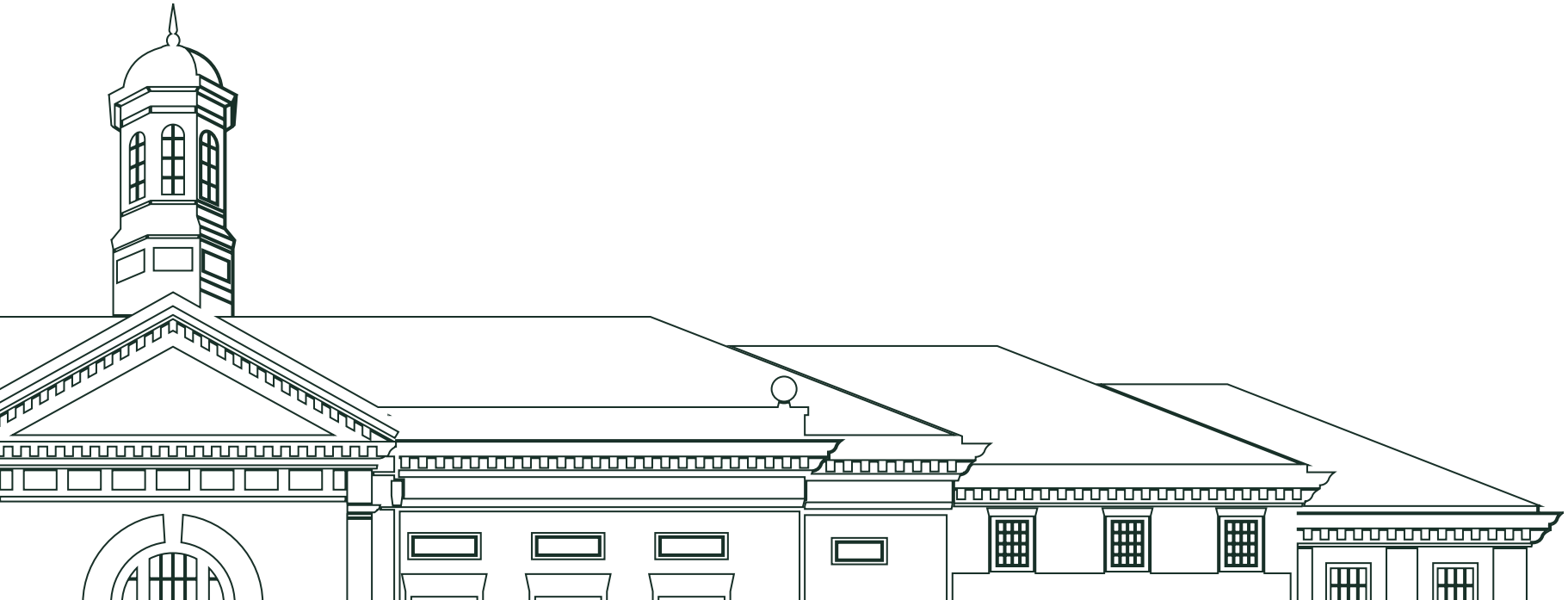
Conclusion

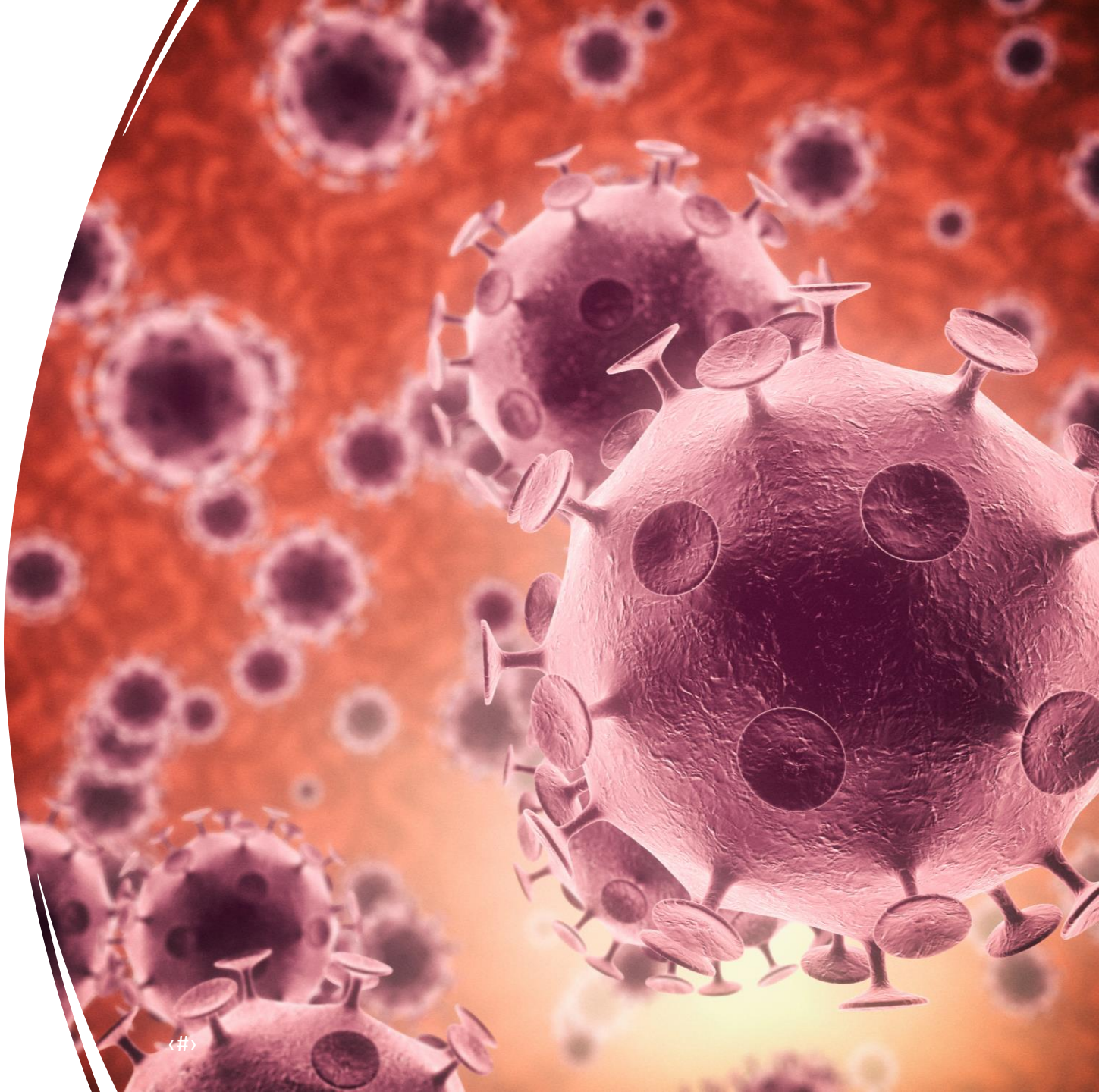


Our Experience & Struggles

1. Limited usable observations working with initial data
   - Initially had nine observations, changed our grouping model to create fifteen
2. Brainstorming improvements to our model
   - Existing public model was simple and had room for improvement
   - Adding additional items to track for better safety
3. ETL
   - Joining data without clear primary keys (utilizing date ranges, Salmonella type) to populate our data

Potential Improvements

- Easier tracking of salmonella outbreaks by both product and restaurant
    - What food products and restaurants?
    - Who is to fault per each outbreak?
- Faster recalls from FDA by pinpointing causes
    - Quickly communicating information between relevant bureaus
- Track cases and recovery



Final Thoughts

- Poultry:
  - Well cooked
- Eggs:
  - Cook, wash hands after touching eggshell
- Fruit:
  - Wash thoroughly
- Restaurant anonymity versus food safety:
  - Primary key identifier for restaurants in outbreak data?

Restaurant responsibility