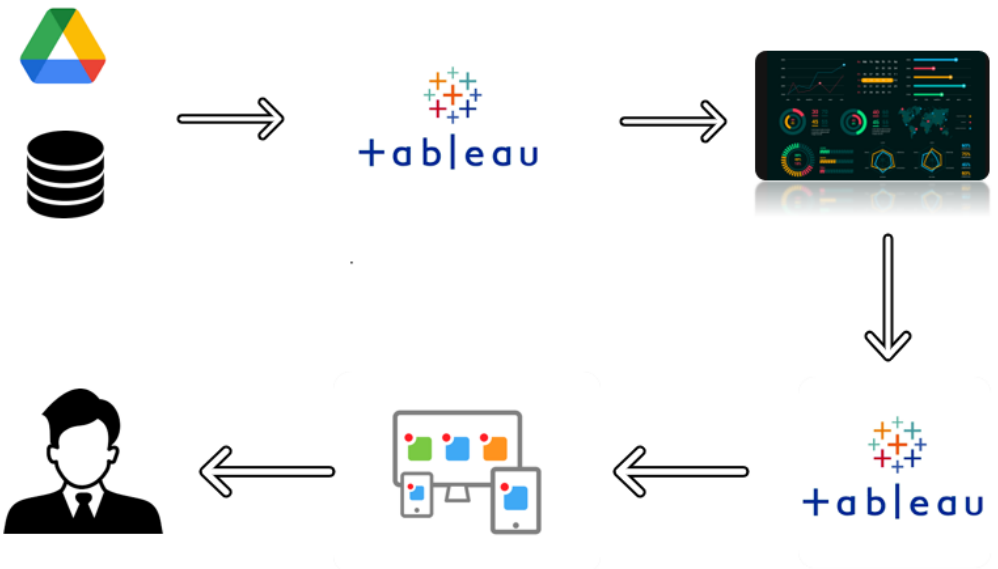
Pediatric Allergies Unveiled: A Tableau Exploration of Prevalence and Demographics

The "Pediatric Allergies Unveiled" project delves into an in-depth analysis of the prevalence and demographics surrounding pediatric allergies. With allergies significantly impacting children's well-being, understanding their prevalence and underlying demographic factors is crucial for effective intervention strategies. Employing the power of Tableau, a robust data visualization tool, this project aims to reveal key insights that shed light on the prevalence and demographic nuances of pediatric allergies. By harnessing data-driven visualizations, this exploration seeks to contribute to the broader understanding of pediatric allergies and their implications for healthcare and public awareness.

The project will provide valuable insights for medical professionals, policymakers, and parents to make informed decisions related to pediatric allergies.Utilize geospatial visualizations to depict the regional distribution of pediatric allergies. Identify hotspot regions with higher prevalence and investigate potential reasons for such concentrations.Tableau's visualization capabilities to showcase the prevalence of various types of pediatric allergies over time. Compare and contrast the prevalence rates among different age groups, regions, and genders.By presenting these insights in an engaging and interactive manner, the project seeks to enhance awareness, inform decision-making, and contribute to the well-being of children affected by allergies.

Technical Architecture:



Project Flow

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
    - Specify the business problem
    - Business requirements
    - Literature Survey
    - Social or Business Impact.
- Data Collection & Extraction from Database
    - Collect the dataset,
    - Storing Data in DB
    - Perform SQL Operations
    - Connect DB with Tableau
- Data Preparation
    - Prepare the Data for Visualization
- Data Visualizations
    - No of Unique Visualizations
- Dashboard
    - Responsive and Design of Dashboard
- Story
    - No of Scenes of Story
- Performance Testing
    - Amount of Data Rendered to DB ‘
    - Utilization of Data Filters
    - No of Calculation Fields
    - No of Visualizations/ Graphs
- Web Integration
    - Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
    - Record explanation Video for project end to end solution
    - Project Documentation-Step by step project development procedure

Milestone 1: Define Problem / Problem Understanding

Activity 1: Specify the business problem

The "Pediatric Allergies Unveiled" project addresses a pressing business problem in the healthcare sector – the need for a comprehensive understanding of the prevalence and demographics of pediatric allergies. Pediatric allergies have become a growing concern affecting children's health and quality of life. However, a lack of detailed insights into the prevalence rates, geographic patterns, and demographic associations hinders the development of targeted interventions and informed healthcare decisions. Through the utilization of Tableau's data visualization capabilities, this project aims to uncover actionable insights that can assist healthcare professionals, policymakers, and parents in making informed choices regarding the prevention, management, and awareness of pediatric allergies. By bridging the gap between data and decision-making, the project seeks to address this business problem with impactful solutions.

Activity 2: Business requirements

Comprehensive Data Collection: Gather and curate a diverse and representative dataset of pediatric allergy cases from reliable sources, including medical databases, health surveys, and research studies.

Data Cleaning and Preparation: Thoroughly clean, preprocess, and structure the collected data to ensure accuracy, consistency, and compatibility for analysis within the Tableau platform.

Prevalence Analysis: Develop visualizations that clearly depict the prevalence of different types of pediatric allergies over time. Highlight trends, fluctuations, and growth rates to provide a comprehensive understanding of the allergy landscape.

Demographic Insights: Create visual representations that showcase how demographic variables such as age, gender, ethnicity, and socioeconomic status correlate with pediatric allergies. Identify demographic groups with higher vulnerability to allergies.

Geospatial Mapping: Implement geospatial visualizations to display the regional distribution of pediatric allergies. Identify hotspots, regional variations, and potential environmental factors contributing to allergy prevalence.

Interactive Dashboard: Design an interactive Tableau dashboard that allows users to explore and interact with the data. Incorporate user-friendly filters and dynamic visual elements that facilitate personalized analysis.

Risk Factor Identification: Analyze potential risk factors associated with pediatric allergies, such as family history, environmental exposure, and dietary habits. Illustrate these factors through visualizations to aid in understanding their influence.

Comparative Analysis: Develop side-by-side comparisons of different allergy types, age groups, and demographics to facilitate data-driven decision-making and identify areas requiring targeted interventions.

Accessibility and User-Friendly Design: Ensure that the visualizations and dashboard are intuitive, accessible, and comprehensible for both healthcare professionals and the general public.

Activity 3: Literature Survey

The literature survey for the "Pediatric Allergies Unveiled" project involves a comprehensive review of existing research on pediatric allergies. This survey serves to understand current trends, demographic patterns, risk factors, and management strategies related to pediatric allergies. It informs the project's research questions, methodology, and data analysis techniques. The survey covers themes such as prevalence, demographics, risk factors, interventions, and data sources used in previous studies. Ultimately, the literature survey provides a foundation for the project's insights and ensures its relevance within the context of existing knowledge in the field of pediatric allergies.

Purpose of Literature Survey:

The literature survey serves several purposes within the project:

Understanding the Landscape: It provides a comprehensive understanding of the current state of knowledge regarding pediatric allergies, including the latest research trends and key findings.

Identifying Gaps: The survey helps identify gaps or areas where research is lacking, which can guide the project's focus and contribute to its novelty.

Informing Research Questions: The insights gained from the survey help in formulating specific research questions that the project aims to address.

Methodology and Framework: The survey informs the project's methodology, data collection, and analysis strategies by highlighting the methods used in previous studies.

Supporting Findings: The survey supports the project's findings and conclusions by placing them in the context of existing research.

Interventions and Management: Analyze research on effective interventions, treatments, and management strategies for pediatric allergies, including both medical and lifestyle approaches.

Visualization and Data Presentation: Explore literature on effective data visualization techniques, especially within the context of healthcare and medical research, to inform the project's visualizations.

Activity 4: Social or Business Impact.

Informed Decision-Making: The project will provide valuable insights for medical professionals, policymakers, and parents to make informed decisions related to pediatric allergies.

Improved Interventions: By understanding demographic patterns and risk factors, healthcare professionals can design better interventions and strategies to prevent and manage pediatric allergies.

Public Awareness: The project's visually appealing content can be used to educate the public about pediatric allergies, promoting understanding and empathy.

Future Research: The project's findings can serve as a foundation for future research in the field of pediatric allergies and related healthcare issues.

Milestone 2: Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Activity 1: Collect the dataset

Please use the link to download the dataset: Link

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files. we have provided 1 CSV files:

1.food-allergy-analysis-Zenodo

Column Description for food-allergy-analysis-Zenodo:

1.BIRTH_YEAR : Year of birth of the patient.

2.GENDER_FACTOR : Gender of the patient.

3.RACE_FACTOR : Race of the patient.

4.ETHNICITY_FACTOR : Ethnicity of the patient.

5.PAYER_FACTOR : Insurance coverage of the patient.

6.ATOPIC_MARCH_COHORT : Cohort of the patient.

7.AGE_START_YEARS : Age of the patient at the start of the study.

8.AGE_END_YEARS : Age of the patient at the end of the study.

9.SHELLFISH_ALG_START : Shellfish allergy status at the start of the study.

10.SHELLFISH_ALG_END : Shellfish allergy status at the end of the study.

11.MILK_ALG_START : Milk allergy status at the start of the study.

12.MILK_ALG_END : Milk allergy status at the end of the study.

13.SOY_ALG_START : Soy allergy status at the start of the study.

14.SOY_ALG_END : Soy allergy status at the end of the study.

15.EGG_ALG_START : Egg allergy status at the start of the study.

16.EGG_ALG_END : Egg allergy status at the end of the study.

17.WHEAT_ALG_START : Wheat allergy status at the start of the study.

18.WHEAT_ALG_END : Wheat allergy status at the end of the study.

19.PEANUT_ALG_START : Peanut allergy status at the start of the study.

20.PEANUT_ALG_END : Peanut allergy status at the end of the study.

21.SESAME_ALG_START : Sesame allergy status at the start of the study.

22.SESAME_ALG_END : Sesame allergy status at the end of the study.

23.TREENUT_ALG_START : Tree nut allergy status at the start of the study.

24.TREENUT_ALG_END : Tree nut allergy status at the end of the study.

25.WALNUT_ALG_START : Walnut allergy status at the start of the study.

26.WALNUT_ALG_END : Walnut allergy status at the end of the study.

27.PECAN_ALG_START : Pecan allergy status at the start of the study.

28.PECAN_ALG_END : Pecan allergy status at the end of the study.

29.PISTACH_ALG_START : Pistachio allergy status at the start of the study.

30.PISTACH_ALG_END : Pistachio allergy status at the end of the study.

31.ALMOND_ALG_START : Almond allergy status at the start of the study.

32.ALMOND_ALG_END : Almond allergy status at the end of the study.

33.BRAZIL_ALG_START : Brazil nut allergy status at the start of the study.

34.BRAZIL_ALG_END : Brazil nut allergy status at the end of the study.

35.HAZELNUT_ALG_START : Hazelnut allergy status at the start of the study.

36.HAZELNUT_ALG_END : Hazel

37.ATOPIC_DERM_START : Atopic dermatitis status at the start of the study.

38.ATOPIC_DERM_END : Atopic dermatitis status at the end of the study.

39.ALLERGIC_RHINITIS_START : Allergic rhinitis status at the start of the study.

40.ALLERGIC_RHINITIS_END : Allergic rhinitis status at the end of the study.

41.ASTHMA_START : Asthma status at the start of the study.

42.ASTHMA_END : Asthma status at the end of the study.

43.FIRST_ASTHMARX : First asthma medication prescribed.

44.LAST_ASTHMARX : Last asthma medication prescribed.

45.NUM_ASTHMARX: Number of asthma medications prescribed.

Activity 2: Storing Data in DB & Perform SQL Operations

Explanation video link:

https://drive.google.com/file/d/1yqwwF5jnUSQ6QWxrJquxXSvD_gJAaoE8/view?usp=sharing

Activity 3: Connect DB with Tableau

Explanation video link:

https://drive.google.com/file/d/1QI-Ikmg1J_ZeqRcEqnncd-8DGtoSqpkW/view?usp=sharing

Milestone 3: Data Preparation

Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

Explanation video link 1:

https://drive.google.com/file/d/11ixw3RtNgkfvd9m58tKjLKgPmtiGbgIF/view?usp=sharing

Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

Activity 1: No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the performance. This project aims to uncover actionable insights that can assist healthcare professionals, policymakers, and parents in making informed choices regarding the prevention, management, and awareness of pediatric allergies. By bridging the gap between data and decision-making, the project seeks to address this business problem with impactful solutions.

Activity 1.1: Allergy Prevalence Deltas Visualization by Gender

Explanation video link:

https://drive.google.com/file/d/11ixw3RtNgkfvd9m58tKjLKgPmtiGbgIF/view?usp=sharing

Activity 1.2: Comparison of Allergy Prevalence Changes with Asthma

Explanation video link:

https://drive.google.com/file/d/1eK5hi4N2W1PSIfMiEv39mJoZbtTOUbTm/view?usp=sharing

Activity 1.3: Delta Analysis: Number of Asthma Medications Prescribed

Explanation video link:

https://drive.google.com/file/d/1JYN2Rhm2daU7j4WmXyaY4cpn_Z50Nylj/view?usp=sharing

Activity 1.4: Delta Analysis: Allergic Rhinitis Study

Explanation video link:

https://drive.google.com/file/d/1Ovg-Pi55t0HN2maFmGoxOAZyo1UdVYFW/view?usp=sharing

Activity 1.5: Delta Analysis: Atopic Derm Study

Explanation video link:

https://drive.google.com/file/d/1lwtw7Uj8V5XZzwwD706A_NCCucdRMZVy/view?usp=sharing

Activity 1.6: Allergy Analysis: Milk And Wheat Sensitivity Patterns

Explanation video link:

https://drive.google.com/file/d/17aNQsEgID3YwfhetA7hT0Fh9a3y1Bsvx/view?usp=sharing

Activity 1.7: Comparative Study of Allergic Reactions to Egg, Fish, and Shellfish

Explanation video link:

https://drive.google.com/file/d/1qhq1rFYIsIceBcGH35PxZQCIlC0MnOiz/view?usp=sharing

Activity 1.8: Initial Allergy Status Analysis: Walnut, Tree Nuts, and Peanut Allergies

Explanation video link:

https://drive.google.com/file/d/17aNQsEgID3YwfhetA7hT0Fh9a3y1Bsvx/view?usp=sharing

Activity 1.9: Allergy Status Comparison: Almond, Cashew, Hazelnut, and Pistachio Allergies

Explanation video link:

https://drive.google.com/file/d/1IchAx4eVoCtyRdQlQgAjFAcar-d8lr4k/view?usp=sharing

Milestone 5: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Activity :1- Responsive and Design of Dashboard

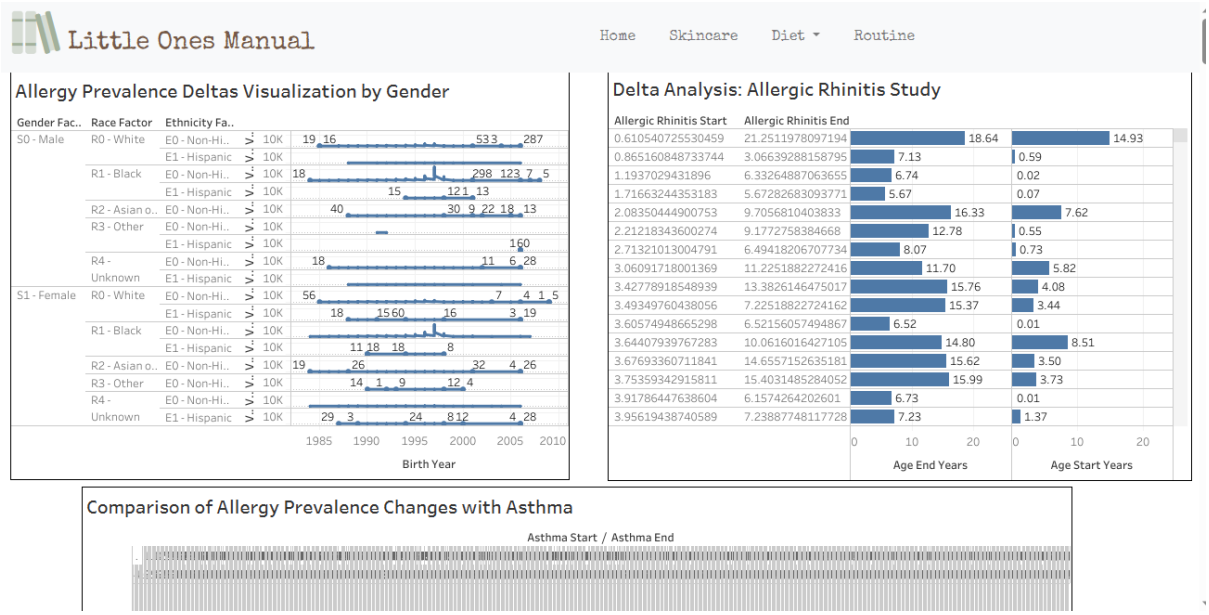
The responsiveness and design of a dashboard for analyzing the Pediatric Allergies Unveiled is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centered design, clear and concise information, interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a dashboard that is user-friendly, interactive, and data-driven, providing actionable insights to improve the performance and efficiency of Pediatric Allergies Unveiled.

Once you have created views on different sheets in Tableau, you can pull them into a dashboard.

Explanation video link:

https://drive.google.com/file/d/1BKFLUJEyh_9K3pcR-dcPQRP4RemYqYt6/view?usp=sharing

Childhood Allergies_Understand prevalance and Demographics | Tableau Public



Milestone 6: Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

Activity:1- No of Scenes of Story

The number of scenes in a storyboard for a data visualization analysis of the Pediatric Allergies Unveiled and will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

Explanation video link:

https://drive.google.com/file/d/1ZGD_Eviv1EMQKhgWg8BBaCuM7oTFg8bG/view?usp=sharing

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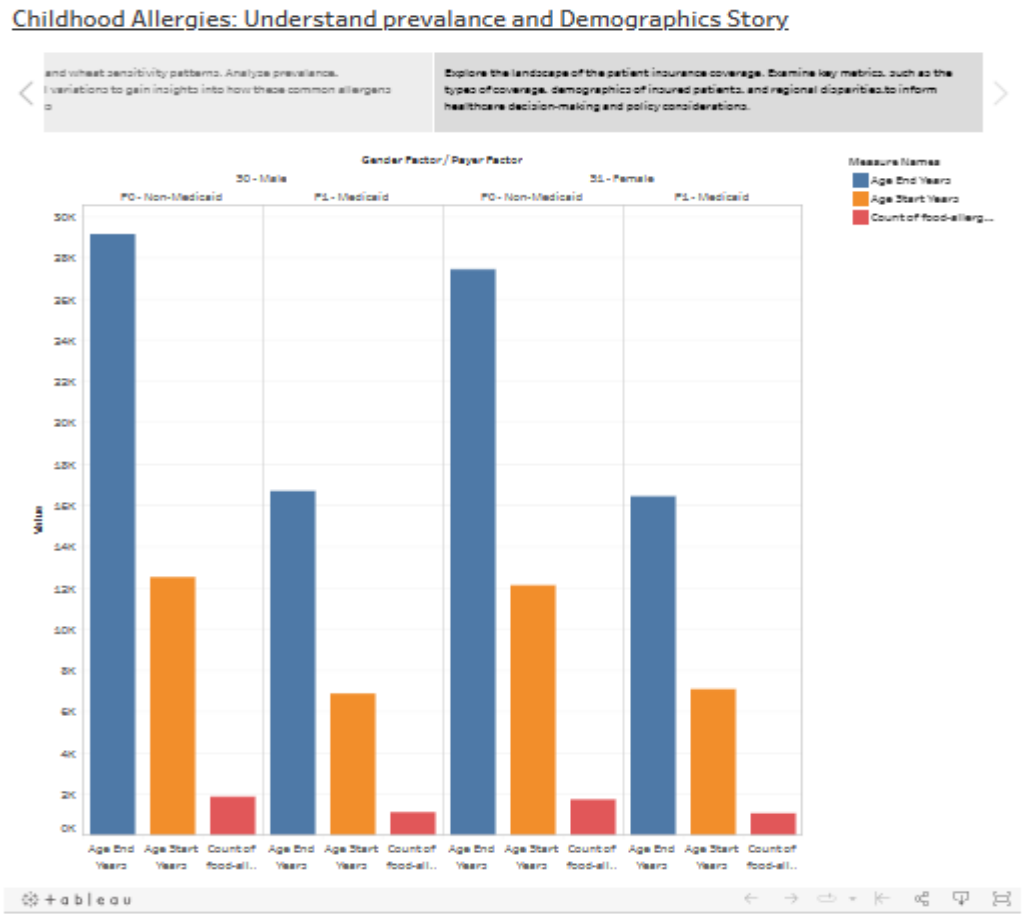
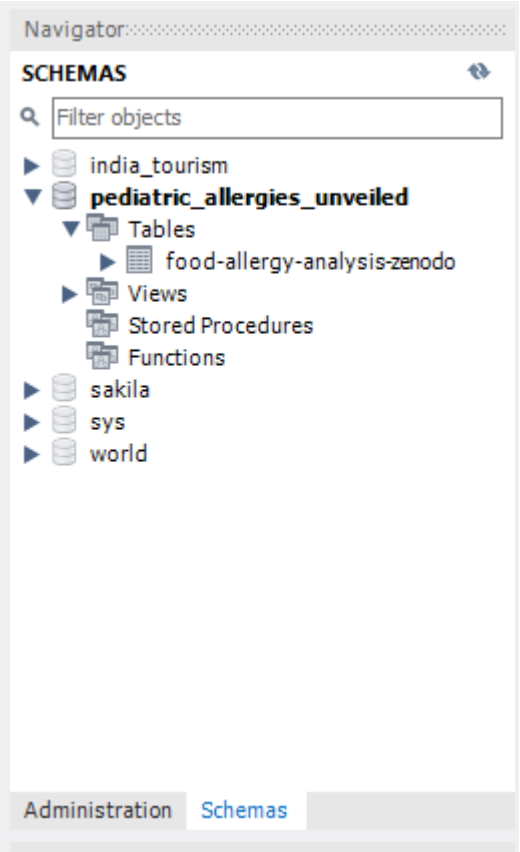


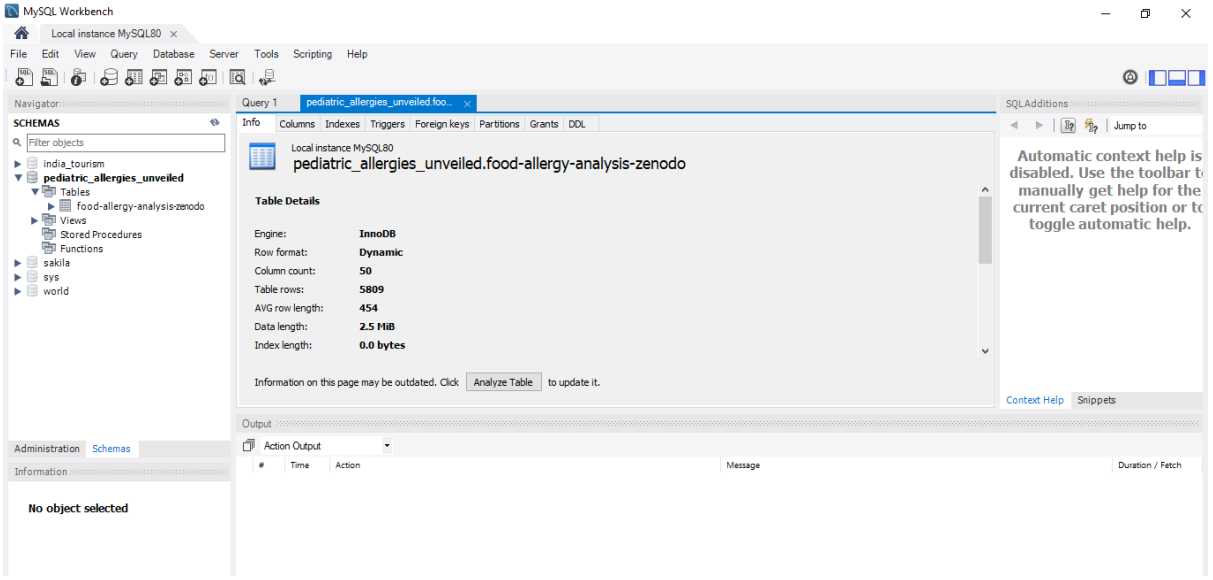
Milestone 7: Performance Testing

Activity 1: Amount of Data Rendered to DB

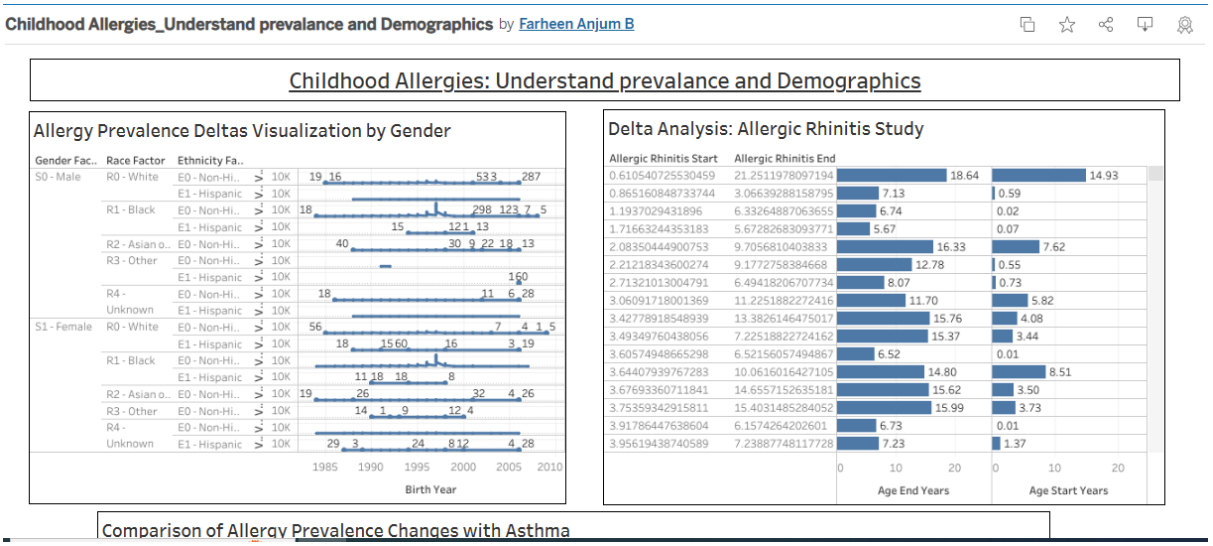
- The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.

- Open the MySQL Workbench, go to the database then click to expand the tables,select the table and click on (i) button to get the information related to table such as column count,table rows etc.





Activity 2: Utilization of Data Filters



Activity 3: No of Calculation Fields

Activity 4: No of Visualizations/ Graphs

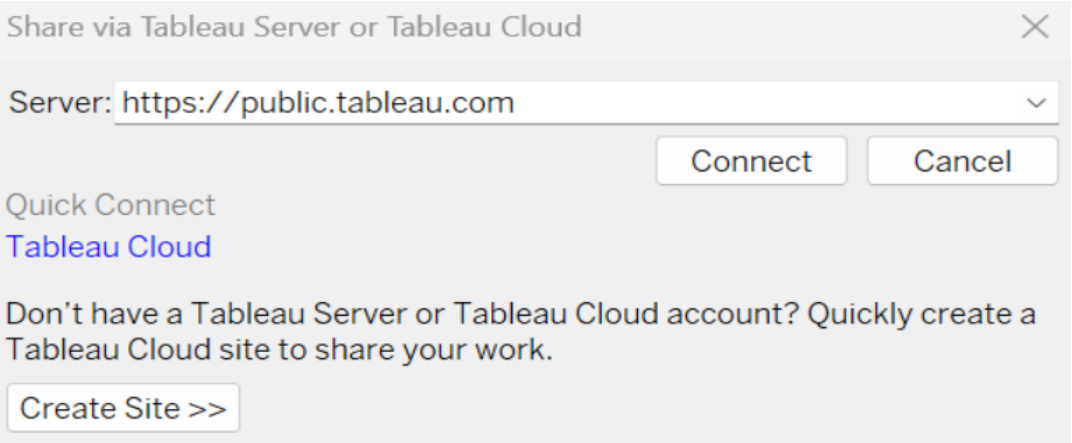
1. Allergy Prevalence Deltas Visualization by Gender.
2. Comparison of Allergy Prevalence Changes with Asthma.
3. Delta Analysis: Number of Asthma Medications Prescribed.
4. Delta Analysis: Allergic Rhinitis Study.
5. Delta Analysis: Atopic Derm Study.
6. Allergy Analysis: Milk And Wheat Sensitivity Patterns.
7. Comparative Study of Allergic Reactions to Egg, Fish, and Shellfish.
8. Initial Allergy Status Analysis: Walnut, Tree Nuts, and Peanut Allergies.
9. Allergy Status Comparison: Almond, Cashew, Hazelnut, and Pistachio Allergies.

Milestone 8: Web integration

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

Publishing dashboard and reports to tableau public

Step 1: Go to Dashboard/story, click on share button on the top ribbon



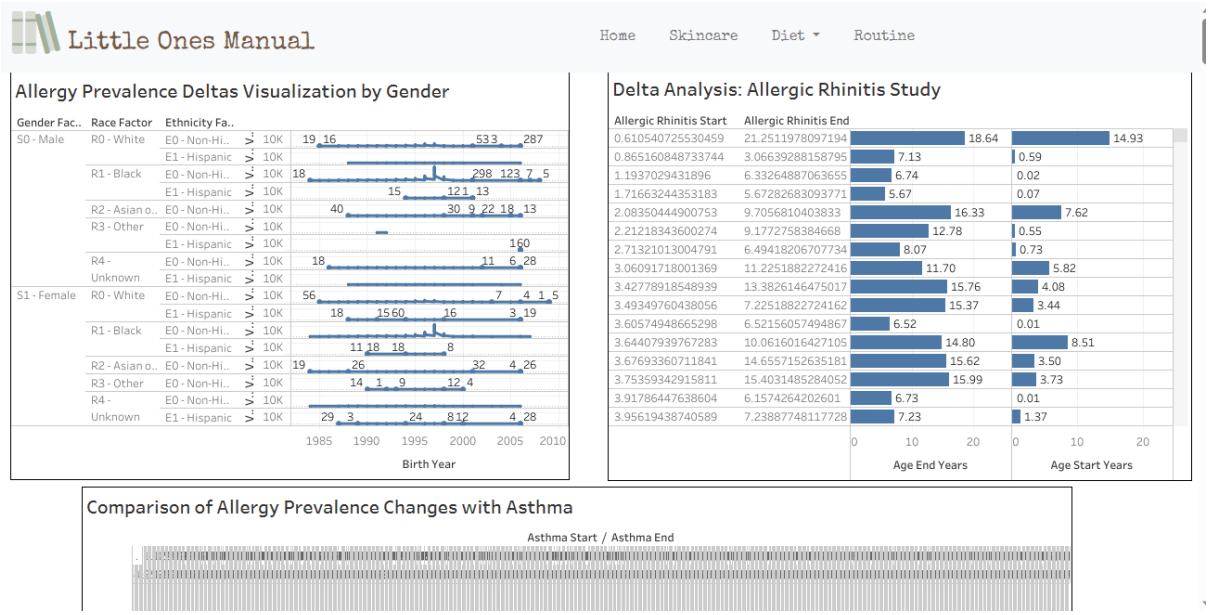
Give the server address of your tableau public account and click on connect.

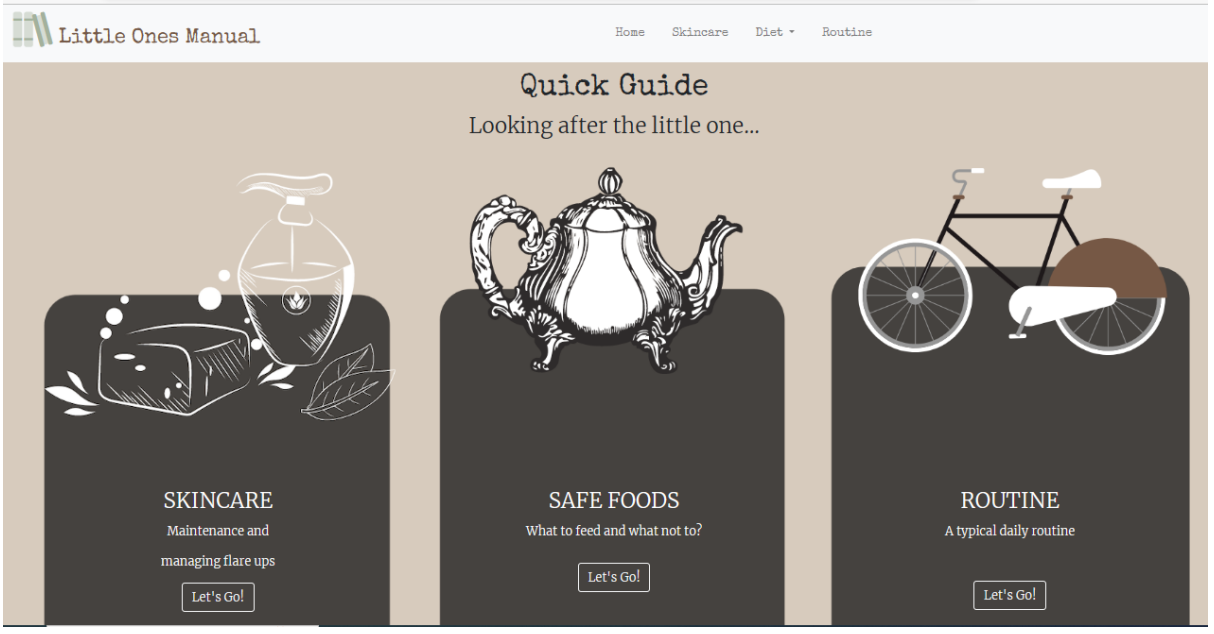
Step 2: Once you click on connect it will ask you for tableau public user name and password

Once you login into your tableau public using the credentials, the particular visualization will be published into tableau public

Note: While publishing the visualization to the public, the respective sheet will get published when you click on share option.

Activity 1: Dashboard and Story embed with UI With Flask





SAFE FOODS

VEGETABLES

- Asparagus
- Aubergine
- Beetroot
- Brocolli
- Brussel Sprouts
- Carrots
- Cauliflower
- Celery
- Cooked tomatoes
- Cucumber
- Green Beans

FRUITS

- Apples
- Banana
- Blackberries
- Blueberries
- Dried dates
- Pears
- Strawberries

SNACKS

- Organix – Oat & banana flapjacks (not more than 1 packet a day)
- Nairns Gluten free – Plain Oat biscuit (he likes with mashed banana & drop of honey)

MEAT/FISH

- Plain beef from the counter only (ask if allergy free)
- Fresh salmon from the counter only (ask if allergy free)
- Eggs (not more than 1 per week)

SUGARS/SWEETNERS

- Coconut sugar
- Honey
- Agave

OILS

- Sunflower oil (tiniest amount)

HERBS & SPICES

Childhood Allergies: Understand prevalance and Demographics Story

and wheat sensitivity patterns. Analyze prevalence.
l variations to gain insights into how these common allergens
o

Explore the landscape of the patient insurance coverage. Examine key metrics, such as the types of coverage, demographics of insured patients, and regional disparities,to inform healthcare decision-making and policy considerations.