DVI Group 40

HEALTH AND FAMILY WELFARE ANALYSIS REPORT

Problem Statement

HMIS (Health Management & Information System) report of All India for 2018-19 and 2019-20 provides exhaustive data regarding various indicators of HMIS across states/UT in India. It contains data on various parameters including Abortions, Immunisation, Adolescent, Bite, Sting, Disease, Diarrhoea, Hypertension, HIV, AIDS, Malaria, Neurological, Stroke, Fever, Respiratory, Infection, suicide, Trauma, Accident, Burn, Tuberculosis etc.

The Department of Health Research in India is particularly interested in understanding the situation of specific childhood diseases—namely pneumonia, diarrhoea, measles, and asthma—over these two years. The primary goal is to analyse the trends and prevalence of these diseases across different states and UTs in India to inform health policy and targeted interventions.

Key Objectives:

- Combine Data Across Years: Integrate the HMIS data from 2018-19 and 2019-20 to provide a comprehensive overview.
- Handle Missing Data: To replace any null values in the dataset with zero to ensure accuracy and completeness.
- Filter Relevant Data: Extract data specifically related to pneumonia, diarrhoea, measles, and asthma from the broader dataset.

Importance of the Analysis:

The analysis is crucial for the Department of Health Research to gain insights into the current state of childhood diseases in India. By identifying trends, regional disparities, and changes over time, the department can make informed decisions on where to allocate resources, which interventions to prioritize, and how to develop effective health policies. The goal is to reduce the incidence of these childhood diseases and improve the overall health outcomes for children in India.

In summary, this analysis will provide a detailed and data-driven understanding of the state-wise and year-wise prevalence of pneumonia, diarrhoea, measles, and asthma among children, helping the Deputy Secretary and other stakeholders in the Department of Health Research to make well-informed policy decisions.

1. Know Your Audience

a. Primary Audience

- Department of Health Research

b. **Single Person Focus**

- Deputy Secretary of the Department of Health Research

c. **Audience Concern**

- Health situation over the years
- Regional disparities in the incidence of the diseases
- Mortality rates

d. **Action to be taken**

- Take informed decisions on the health policies
- Allocation of funds appropriately
- Take Targeted health interventions

e. **Stake**

- Health is at stake.

f. **Benefits of Action –** Better health situation and improvement in quality of life for next generation

g. **Risks of Inaction –** Regional disparities in health, Increased Mortality, Poor quality of life, wastage of resources (Inappropriate allocation of resources)

2. What?

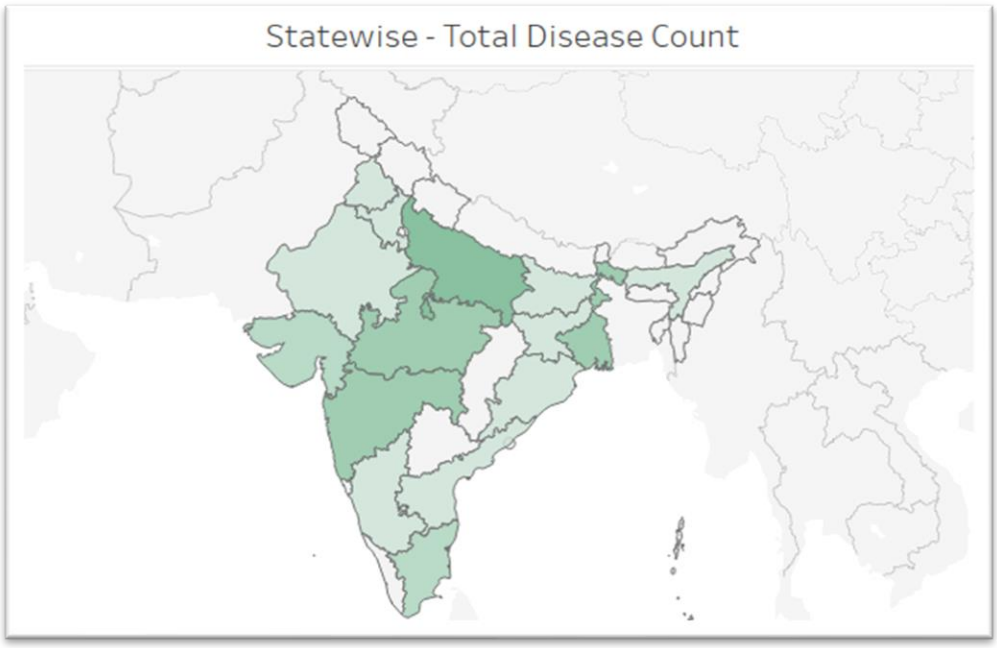
This Health and Family Welfare Analysis report is focused on diseases like pneumonia, diarrhoea, measles, and asthma among children all over India across years. The key points to communicate are effectively visualised to facilitate understanding and insights for the audience. Following questions will help in understanding the situation of all these 4 diseases among children in India, allowing stakeholders to identify trends, regional disparities, and the impact of socio-economic factors on disease prevalence.

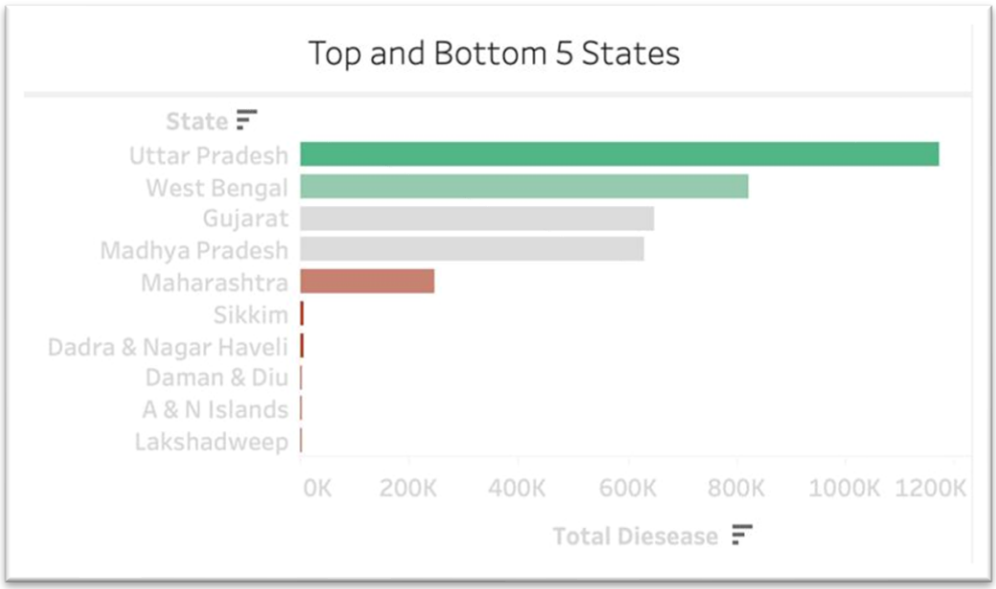
Data Preparation:

- Appended (Union) both the excel files to work on 2018-19 and 2019-20 data using Tableau Prep.
- Feature Engineering – Kept only selective and useful columns and removed unnecessary columns, using Tableau Prep
- The null values for the feature "Total - Total [(A+B) or (C+D)]" (for each month), were removed for both fiscal years by creating calculated measures that replaced the null values with zeros. This ensured the accuracy and completeness of the data for analysis.
- Filtered the parameters to only include Asthma, Measles, Diarrhoea and Pneumonia

1) **What is the regional disparity of these childhood diseases across different regions in India for the year 2018-20?**

2) **What are the most impacted States (needs immediate attention) and least impacted states (continue to maintain quality of Healthcare and Awareness)**

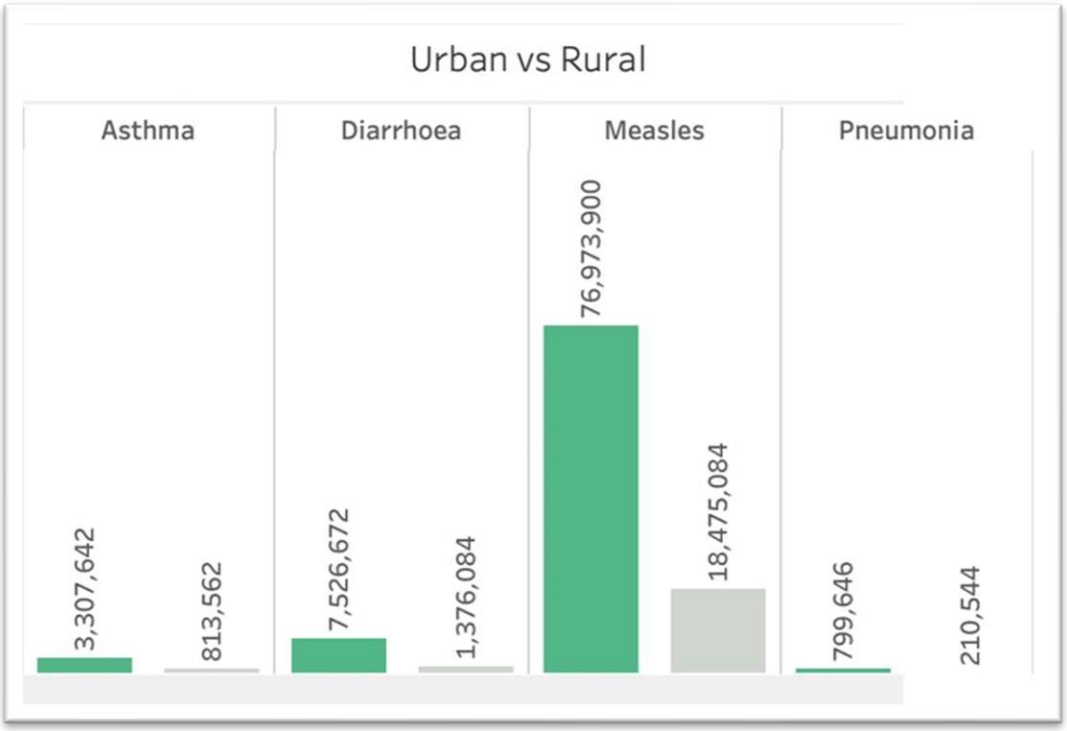




State wise count of childhood diseases in India for a certain period (likely 2018-2020). As per the analysis:

- **Northern Region**: Higher disease counts are typically observed in states like Uttar Pradesh and Bihar. Socio-economic factors and healthcare infrastructure challenges could be a contributing factor to this disparity
- **Eastern and Northeastern Region**: States like Assam and West Bengal have moderate to high count. Limited access to healthcare in remote areas could be influencing the data.
- **Southern Region**: States like Tamil Nadu, Karnataka, and Kerala often have lower disease counts, attributed to better public health programs and higher healthcare standards.
- **Western Region**: Maharashtra and Gujarat may show medium to high disease levels based on urban-rural divides in healthcare access.
- **Central India**: States like Madhya Pradesh shows higher disease count possibly due to lower healthcare accessibility and Chhattisgarh shows moderate disease count.

3) **What is the Total Urban-Rural divide in the incidence of these diseases among children for the fiscal years together?**



The bar chart displays the urban versus rural distribution for four childhood diseases in India, for the years 2018 - 2020

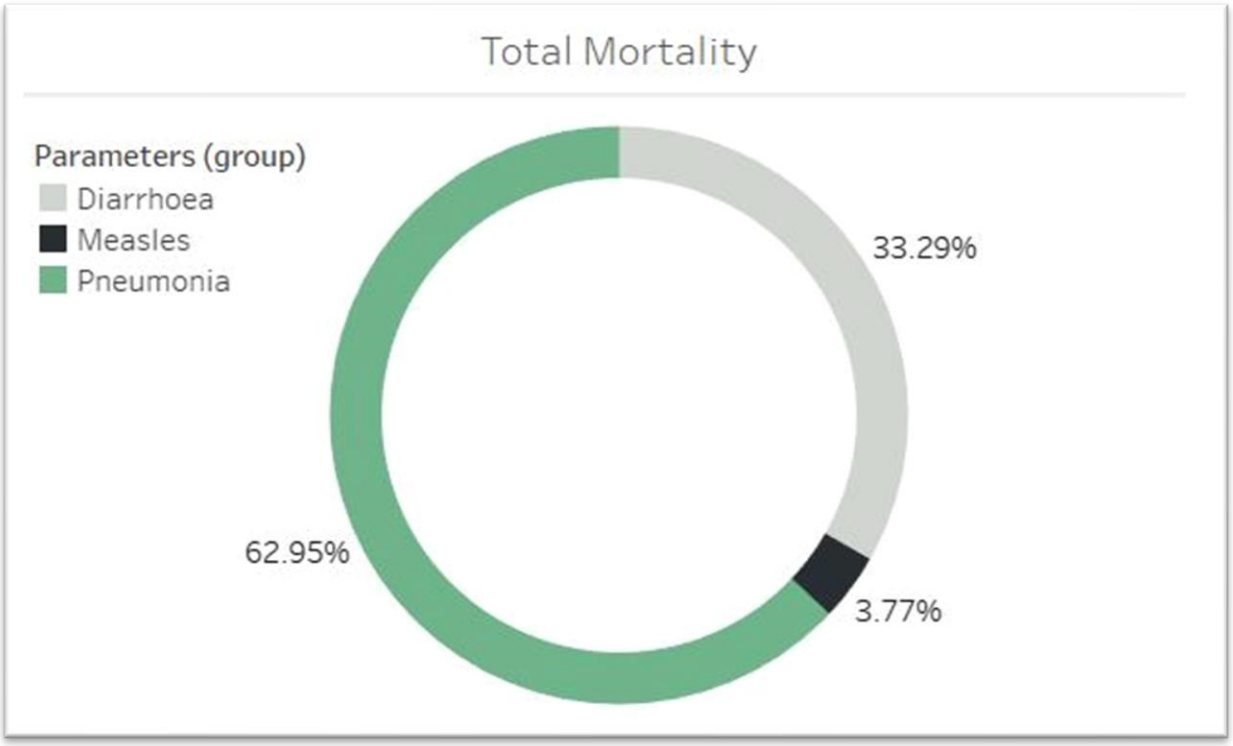
- **Asthma**: Higher prevalence in rural areas (3,307,642 cases) compared to urban areas (813,562 cases).
- **Diarrhea**: Significantly more cases in rural areas (7,526,672) than urban areas (1,376,084).
- **Measles**: Predominantly rural (76,973,900 cases) compared to urban (18,475,084 cases).

- **Pneumonia**: Higher rural incidence (799,646 cases) compared to urban (210,544 cases).

Summary

For all diseases shown, rural areas have substantially higher disease counts than urban areas, highlighting a significant disparity in healthcare access, sanitation, or preventive measures between rural and urban regions.

4) **What is distribution of causes of total Mortality, and which are should be prioritized to reduce childhood mortality?**



The **Total Mortality** chart shows the following breakdown of causes:

- **62.95%:** Pneumonia
- **33.29%:** Diarrhea
- **3.77%:** Measles
- **0%:** Asthma

Summary

Pneumonia accounts for the majority of mortality (62.95%), followed by diarrhea (33.29%), while measles contributes a much smaller share (3.77%). Addressing pneumonia and diarrhea should be prioritized for the most significant impact on reducing overall childhood mortality.

Big Idea

Analysing the trends and patterns in childhood diseases (Asthma, Pneumonia, Diarrhoea, Measles) will help in better understanding the health situation in India, using which targeted health policies can be devised and implemented across the country for the betterment of future generation.

3. How?

Chart 1: State-wise Disease Distribution (Map)

- **Type of Visualization**: Geographical Map
- **Reason for Selection**:
  The geographical map effectively represents the state-wise distribution of disease incidences across India. It allows users to quickly identify regions with varying disease burdens.
- **Gestalt Principles**:
  - **Law of Similarity**: Darker shades of green represent states with higher disease counts, while lighter shades indicate lower counts, enhancing comparison.
  - **Law of Proximity**: Geographically adjacent states naturally facilitate comparisons due to their spatial proximity.
  - **Law of Continuity**: The continuous layout of India's map ensures smooth visual flow, making it easier to interpret regional patterns.
- **Pre-attentive Attributes**:
  - **Colour**: Darker green shades highlight regions with higher disease incidence, guiding attention to the most affected areas.
  - **Position**: The geographical positioning of states helps maintain spatial context for easier interpretation of distribution patterns.

Chart 2: Urban vs. Rural Disease Incidence (Bar Chart)

- **Type of Visualization**: Side by Side Bar Chart
- **Reason for Selection**:
  A clustered bar chart is ideal for comparing urban and rural disease incidences. Grouping each disease into urban and rural categories provides clear visual analysis of the distribution.
- **Gestalt Principles**:
  - **Law of Similarity**: Bars representing urban data are coloured green, while rural data bars are grey, enabling quick distinction.
  - **Law of Proximity**: Bars for urban and rural incidence are placed adjacent to each other, allowing direct comparisons for each disease.

    - **Law of Figure-Ground**: The contrast between the bars and background ensures the data stands out.

- **Pre-attentive Attributes**:
    - **Colour**: Differentiates between urban (green) and rural (grey) regions.
    - **Length**: Represents the count of disease incidences, where longer bars indicate higher numbers.

Chart 3: Top and Bottom 5 States by Total Disease Count (Horizontal Bar Chart)

- **Type of Visualization**: Horizontal Bar Chart
- **Reason for Selection**:
  Horizontal bar charts are well-suited for ranking states by total disease count. Displaying the top and bottom five states offers a clear comparison of regions with the highest and lowest disease burdens.
- **Gestalt Principles**:
    - **Law of Similarity**: Bars are coloured in shades indicating disease count, aiding in quick visual comparison.
    - **Law of Proximity**: Grouped bars for the top 5 and bottom 5 states provide distinct visual separation.
    - **Law of Continuity**: Aligning the bars along a common axis creates a logical and continuous reading order.
- **Pre-attentive Attributes**:
    - **Length**: Bar length corresponds to total disease counts, emphasising magnitude differences.
    - **Colour**: Shades highlight variations in disease prevalence.

Chart 4: Total Mortality (Donut Chart)

- **Type of Visualization**: Donut Chart – Created Custom Visual in Tableau as Donut chart is not directly available for use in Tableau.
- **Reason for Selection**:
  A donut chart effectively represents the proportional contribution of each disease to total mortality while providing a clearer view by opening the centre, making it less visually cluttered than a full pie chart. It shows measles as the dominant cause, followed by diarrhoea and asthma.
- **Gestalt Principles**:
    - **Law of Figure-Ground**: The contrast between the donut chart and background enhances the focus on the mortality distribution.
    - **Law of Similarity**: Segments with similar colours represent related mortality categories.

- **Pre-attentive Attributes**:
    - **Angle and Colour**: Represent mortality shares, emphasising measles as the largest contributor to overall mortality.
    - **Circular Shape**: Guides attention to the proportional representation of mortality causes while keeping a clear layout.

Key Features of the Dashboard

- Users can switch between dark theme and light theme to view the dashboard keeping in mind, aesthetics, improve readability, user experience, preference and accessibility. Users viewing on a high-glare screen may prefer a dark section, while others prefer light backgrounds.
- Users can download the dashboard in pdf format for reporting and presentation as well as easy accessibility.
- Implemented Action Filter instead of Quick Filter, to improve dashboard performance. Moreso, we have also grouped the filter for ease of use.

Summary of Findings:

Disease Distribution Across States:

- Uttar Pradesh, West Bengal, Maharashtra, Madhya Pradesh, and Gujarat emerged as the top five states with the highest disease prevalence in the studied period.
- Regions like Lakshadweep, Dadra & Nagar Haveli, and Andaman & Nicobar Islands reported the least prevalence of diseases.

Urban vs Rural Analysis:

- Significant disparities were observed between urban and rural areas. For instance:
    - Pneumonia and diarrhoea have a higher prevalence in rural areas.
    - Measles showed a marked increase in urban regions compared to rural regions.

Group-Wise Disease Count:

- Measles had the highest count, with **65,25,36,353 cases**, indicating a severe outbreak or reporting over the years.
- Diarrhoea followed, with **89,02,756 cases**, reflecting a persistent challenge in public health.
- Asthma and pneumonia had significantly lower counts, with **41,21,204** and **10,10,190 cases**, respectively.

Total Mortality Breakdown:

- Total mortality accounted for 90 million cases, with **81.33% attributed to diseases other than the four under study**.
- **13.80% of deaths** were linked to the studied diseases, necessitating targeted interventions.

Conclusion:

The analysis provides valuable insights into the state-wise and disease-specific distribution of pneumonia, diarrhoea, measles, and asthma among children for the years 2018-19 and 2019-20. Key findings highlight Uttar Pradesh and West Bengal as the most affected regions, emphasising the need for focused health policies and resources in these states.

The urban vs rural comparison underscores the importance of targeted interventions based on location-specific needs, particularly addressing rural challenges in managing diarrhoea and pneumonia. The alarming prevalence of measles calls for enhanced immunisation drives and public health awareness campaigns.

By addressing these issues through informed health policies, resource allocation, and targeted interventions, the Department of Health Research can reduce childhood disease incidence and improve health outcomes for future generations.