

USING SALES AND DISEASE TREND INSIGHTS TO STRENGTHEN VACCINE MARKETING STRATEGY: A STUDY ON MENACTRA AND TETRAXIM IN THE INDIAN MARKET

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in

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by

Mankodi Arjav Keyur

Under the Supervision and Guidance of

Dr. Sudhinder Singh Chowhan

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Dr. Reddy's Laboratories Ltd.

8-2-337, Road No. 3, Banjara Hills, Hyderabad – 500034, Telangana,
India. CIN: L85195TG1984PLC004507 | Tel: +91 40 4900 2900
Fax: +91 40 4900 2999 | Email: mail@drreddys.com | Website:
www.drreddys.com



Date: 19th June, 2025.

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Arjav Mankodi has successfully completed their internship with Dr. Reddy's Laboratories Ltd, from March 17th 2025 to June 17th 2025.

We acknowledge their valuable contribution to our organization and wish them success in future endeavours.

Dr. Reddy's Laboratories Limited,

DocuSigned by:
Ranjeeta R Bhat
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(Authorized Signatory)

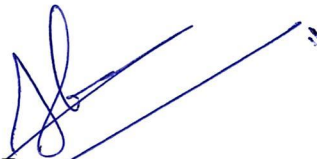
Good Health Can't Wait.

CERTIFICATE

This is to certify that dissertation titled **USING SALES AND DISEASE TREND INSIGHTS TO STRENGTHEN VACCINE MARKETING STRATEGY: A STUDY ON MENACTRA AND TETRAXIM IN THE INDIAN MARKET.** is a record of the research work undertaken by **Arjav Mankodi** in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

A handwritten signature in blue ink, likely belonging to Dr. Sudhinder Singh Chowhan.

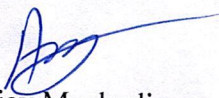
Faculty Guide:
Dr. Sudhinder Singh Chowhan
IIHMR University, Jaipur
Date: 19.06.2025

A handwritten signature in blue ink, likely belonging to Dr. Saurabh Kumar Banerjee.

School Dean:
Dr. Saurabh Kumar Banerjee
IIHMR University, Jaipur
Date: 19.06.2025

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **“USING SALES AND DISEASE TREND INSIGHTS TO STRENGTHEN VACCINE MARKETING STRATEGY: A STUDY ON MENACTRA AND TETRAXIM IN THE INDIAN MARKET.”** is the Bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



Arjav Mankodi

Date: 30/May/2025

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Abstract

Objective:

The primary aim of this study is to evaluate how vaccine sales performance and disease trend data—viewed through the lens of national health priorities—can be strategically used to improve the market positioning of Menactra and Tetraxim, two key vaccines marketed by Dr. Reddy's Laboratories in India. The study seeks to bridge the gap between commercial outcomes and public health needs by aligning sales efforts with disease burden, policy directions, and healthcare professional (HCP) perceptions.

Methodology:

A descriptive and analytical approach was employed, combining secondary data sources such as internal vaccine sales dashboards (2023–2025) and public disease burden reports (IDSP, NFHS). Additionally, field insights were gathered from over 100 HCP interactions conducted between May 12, 2025, and May 19, 2025, using structured mobile surveys. Tools such as Microsoft Excel and Power BI were used to analyse sales trends, disease patterns, and regional uptake. Data was interpreted to identify strategic gaps, performance insights, and alignment with National Health Policy (NHP) objectives.

Results:

Tetraxim was found to be the preferred DTP-IPV booster among paediatricians in high-volume regions, chosen by 80% of HCPs surveyed.

Menactra showed modest but consistent uptake in metro zones, with limited awareness in disease-risk areas like the Northeast.

A significant number (8,000+) of HCPs still do not prescribe B2 boosters due to low disease awareness, lack of patient demand, or unclear scheduling.

Strategic gaps included insufficient disease communication in field pitches, lack of region-specific messaging, and weak alignment with NHP goals in current brand strategy.

Conclusion:

The study concludes that aligning vaccine marketing strategies with real-time disease trends and public health policies significantly enhances both commercial performance and health outcomes. Strategic repositioning of Menactra in outbreak-prone zones and reinforcement of Tetraxim's booster value through targeted education and digital content are key actionable outcomes. The integration of field insights and public data into brand planning offers a replicable model for other vaccine campaigns in India.

Keywords:

Menactra, Tetraxim, Vaccine Marketing Strategy, Disease Trends, National Health Policy, Booster Vaccination, HCP Insights, Dr. Reddy's Laboratories, India, Sales Analytics.

Table of Contents

1. List of Abbreviations Used
2. List of Tables
3. Introduction
4. Review of Literature
5. Methodology
6. Results and Discussion
7. Recommendations
8. Conclusion
9. References
10. Appendices

1. List of Abbreviations Used

Abbreviation Full Form

HCP	Healthcare Professional
DTP	Diphtheria, Tetanus, Pertussis
IPV	Inactivated Poliovirus Vaccine
IDSP	Integrated Disease Surveillance Programme
NFHS	National Family Health Survey
NHP	National Health Policy
UIP	Universal Immunization Programme
B2	Booster Dose 2
WHO	World Health Organization
KOL	Key Opinion Leader
PPT	PowerPoint
MIS	Management Information System

2. List of Tables

Table No. Title

Table 1 Regional Sales Distribution of Tetraxim (2023–2025)

Table 2 Regional Sales Distribution of Menactra (2023–2025)

Table 3 HCP Booster Preferences

Table 4 Strategic Alignment of Brand Messaging vs. National Health Priorities

Table 1: Regional Sales Distribution of Tetraxim (2023–2025):

Region	Sales - 2023	Sales- 2024	Growth%
1. North-East	34653	68477	49.8%
2. South-West	54808	81586	33%

Table 2: Regional Sales Distribution of Menactra (2023–2025):

Region	Sales- 2023	Sales-2024	Growth
1. North-East	117165	181645	35%
2. South-West	89784	125692	29%

Table 3: HCP Booster Preferences:

Booster Preference Group	Number of HCPs	% of Total (14,000)	Top 3 Reasons (Qualitative Insights)
Tetraxim Prescribers	4800	34.30%	- Combo vaccine convenience - High recall from past experience - Painless injection
Boostrix Prescribers	1200	8.60%	- Perceived as newer brand - Less reactogenic - Brand familiarity from GSK
Non-user	8000	57.10%	- Lack of awareness of B2 need - Cost concerns - Belief that primary doses are enough

Table 4: Strategic Alignment of Brand Messaging vs. National Health Priorities:

Messaging Theme	Tetraxim Campaign	Menactra Campaign	NHP / UIP Focus Area	Alignment Level
Emphasis on Universal Immunization	Strong messaging via CMEs and digital tools	Moderate; needs deeper rural focus	Ensure complete immunization coverage across all age groups	Tetraxim: High Menactra: Medium
Awareness on Disease Burden (Pertussis / Meningitis)	Includes HCP education and IEC tools	Focused campaigns on meningococcal threat	Enhance VPD awareness in public & private sectors	Both: High
Affordability & Access Messaging	Not actively highlighted in promotion	Some awareness in institutional segment	Promote equity in vaccine access and affordability	Low to Moderate
HCP Capacity Building & Training	Regular field force CMEs, e-detailing	Conducted but limited in coverage	Strengthen healthcare workforce training on vaccination	Moderate to High

3. Introduction

Vaccines have played an extraordinary role in transforming global health. By protecting individuals and communities against infectious diseases, they reduce mortality, prevent outbreaks, and contribute to economic stability. In a country like India, with its vast population, diverse geography, and varying levels of healthcare access, vaccines are not just a clinical tool—they are a public health necessity.

3.1 Importance of Vaccination in India

India has made significant strides in immunization through national initiatives like the Universal Immunization Programme (UIP) and Mission Indradhanush. These programs have targeted common infectious diseases and improved primary vaccine coverage in many regions. However, despite these efforts, **booster dose awareness**, **adolescent vaccination**, and **adult immunization** remain relatively weak areas. Many diseases, including **meningococcal meningitis** and **pertussis**, continue to occur in pockets where coverage or awareness is low.

The demand for vaccines is influenced not just by need but also by visibility. Some diseases are underreported or under-communicated, which leads to lower perceived urgency among both prescribers and patients. For example, while pertussis continues to circulate, its true burden is often underestimated because of misdiagnosis or lack of testing. Similarly, meningococcal outbreaks, though less frequent, can have serious consequences but are often not communicated effectively.

This situation presents a clear opportunity—and responsibility—for private pharmaceutical players like **Dr. Reddy's Laboratories**, who operate in the vaccine space. By aligning sales efforts with real disease trends and national health goals, companies can not only improve business outcomes but also contribute to filling the immunization gaps that public programs alone cannot reach.

3.2 Focus of the Study

This study is centered on two key vaccines marketed by Dr. Reddy's:

- **Menactra**, which protects against meningococcal disease, especially serogroup A, C, W, and Y. It is recommended for adolescents, travelers, and outbreak response.
- **Tetraxim**, a combination vaccine that includes Diphtheria, Tetanus, Pertussis (acellular), and Inactivated Poliovirus Vaccine (IPV). It is primarily used as a **booster dose** in children aged 4–6 years.

Both vaccines are clinically important, but their market performance shows variability due to factors like doctor awareness, disease perception, regional demand, and policy alignment. This study explores these factors using a combination of internal sales data, disease trend reports, and field-level HCP interactions conducted during an internship at Dr. Reddy's vaccine division.

3.3 Relevance of Strategic Alignment

In recent years, the idea of **data-driven strategy** has gained traction in healthcare marketing. When companies plan their campaigns based on disease incidence, public health priorities, and field insights, the outcome is often more effective. This is especially true in vaccines, where the decision to prescribe often depends on:

- The doctor's confidence in the vaccine

- The relevance of the disease in their patient population
- The simplicity of explaining the vaccine schedule to parents
- The support received from the sales team in terms of education and materials

If a brand can position itself not just as a product, but as a solution to a specific health concern, it gains more traction. For instance, rather than simply marketing Tetraxim as a four-in-one vaccine, positioning it as the “**most complete booster option**” with **public health relevance** may resonate better with pediatricians.

3.4 Study Purpose and Internship Context

As part of the product management internship at Dr. Reddy’s Laboratories (March 17 – May 2025), the objective was to evaluate how vaccine sales strategies can be strengthened using sales data and disease trend insights. This project is a mix of **real-world analytics** and **field research**, involving:

- Zone-wise sales data interpretation
- Field visits and HCP interviews to understand booster prescribing patterns
- Analysis of disease trend data from NFHS, IDSP, and policy documents
- Assessment of how well the current strategy aligns with the National Health Policy 2017

The intent is to create not just a marketing plan but a more **strategically aligned brand narrative**—one that combines public health relevance with business potential.

3.5 Structure of the Dissertation

The dissertation is organized into the following chapters:

- **Review of Literature:** Covers policy frameworks, disease burden studies, and prior marketing insights
- **Methodology:** Explains the research design, data sources, tools, and ethical considerations
- **Results & Discussion:** Presents insights from sales trends, field feedback, and data interpretation
- **Recommendations:** Suggests strategy refinements for both Menactra and Tetraxim
- **Conclusion:** Summarizes key learnings and outlines how they can shape future actions
- **References and Appendices:** Include supporting material like dashboards, survey questions, and raw data views

2. Review of Literature

Vaccine uptake and market dynamics in India are shaped by a complex interplay of factors including disease prevalence, public awareness, healthcare infrastructure, and policy frameworks. Despite India's large-scale immunization programs, vaccine sales and coverage often do not fully reflect the actual disease burden, primarily due to gaps in awareness, accessibility, and socio-economic disparities.

Vaccine Uptake and Market Dynamics in India

India has one of the largest Universal Immunization Programs (UIP) globally, targeting 12 vaccine-preventable diseases with vaccines provided free of cost through government initiatives. Over recent years, efforts such as Mission Indradhanush and its intensified versions (IMI and IMI 2.0) have been launched to increase immunization coverage, particularly in districts with historically low vaccination rates. These programs have contributed to significant improvements; for example, full immunization coverage increased by approximately 14.4 percentage points from NFHS-4 (2015-16) to NFHS-5 (2019-21), reaching over 76% coverage nationally. The government's focus on campaigns like Measles-Rubella vaccination and flexible immunization sessions demonstrates a commitment to improving vaccine accessibility and uptake²⁵.

However, despite these advances, disparities remain. Vaccine uptake is often uneven across regions and population groups, influenced by factors such as socio-economic status, education, and healthcare access. For instance, adult vaccination coverage in India remains low, with poor awareness being a major barrier. Surveys indicate that more than 80% of adults lack awareness about the benefits of adult vaccines, and issues such as vaccine cost, lack of insurance coverage, and inconsistent healthcare provider recommendations further limit uptake. This contrasts with the pediatric vaccination focus of the UIP and highlights a critical gap in the adult immunization ecosystem³⁶.

Impact of Disease Prevalence and Public Awareness

Disease prevalence strongly influences vaccine demand, but sales data often do not align perfectly with epidemiological trends. For example, during the COVID-19 pandemic, global vaccine sales experienced disruptions: high-income countries saw declines due to lockdowns and supply chain issues, while some lower-middle-income countries reported increases driven by urgent public health needs. This uneven demand underscores the disparities in vaccine distribution and public awareness across different economic contexts².

In India, the burden of vaccine-preventable diseases such as meningococcal infections and diphtheria-tetanus-pertussis (DTP) remains significant in certain regions. Yet, vaccine sales for products like Menactra and Tetraxim do not always correspond proportionally with disease incidence, suggesting barriers beyond disease burden—such as lack of awareness, logistical challenges, or policy gaps—that affect vaccine uptake. This gap calls for more nuanced strategies that integrate disease surveillance with market data to optimize vaccine positioning and outreach²⁶.

Vaccine Safety, Public Trust, and Communication

Public trust in vaccines is a cornerstone of successful immunization programs worldwide. Research highlights that trust encompasses not only confidence in vaccine safety and efficacy but also trust in the institutions responsible for vaccine development, regulation, and administration. Studies show that individuals' vaccine acceptance is strongly influenced by their trust in healthcare providers and government institutions, although the degree of influence varies by country and context⁴.

Recent global surveys on vaccine trust reveal that belief in vaccine effectiveness significantly increases the likelihood of vaccine acceptance. Transparent communication about vaccine safety, efficacy, and potential side effects is essential to build and maintain this trust. Community-based interventions that foster mutual trust between healthcare providers and local populations have been shown to improve vaccine uptake. Lessons from countries with high vaccine trust suggest that culturally sensitive messaging and addressing specific community concerns are critical components of effective public health strategies⁴.

In India, where misinformation and vaccine hesitancy persist in some areas, enhancing vaccine confidence through transparent, evidence-based communication is vital. Large-scale surveillance of adverse effects and public reporting can help counteract misinformation and reinforce trust in immunization programs. This is particularly important as new vaccines enter the market and as adult vaccination efforts expand⁴⁶.

Policy Frameworks and the Need for Data-Driven Strategies

India's National Health Policy (NHP) prioritizes expanding immunization coverage and reducing vaccine-preventable diseases through strengthened routine immunization and targeted campaigns. Programs like Mission Indradhanush exemplify policy-level commitment to achieving high vaccination coverage rapidly, especially among vulnerable populations⁵.

However, current literature emphasizes the need for data-driven strategies that align commercial vaccine efforts with public health goals. Integrating sales data with epidemiological trends and policy priorities can provide critical insights for optimizing vaccine distribution, marketing, and outreach. Such integration helps identify regions where vaccine demand is unmet despite high disease burden, enabling targeted interventions that improve both public health outcomes and market performance.

Moreover, the evolving adult vaccine market in India presents opportunities to broaden immunization beyond childhood vaccines. Addressing challenges such as low awareness, economic barriers, and limited healthcare infrastructure for adult vaccination requires coordinated efforts between policymakers, healthcare providers, and industry stakeholders.

Methodology

This chapter outlines the methodological framework employed to investigate the relationship between vaccine sales performance, disease trends, and national health policy alignment in the context of Menactra and Tetraxim vaccines in India. This study utilizes a mixed-methods approach, combining quantitative analysis of sales and disease data with qualitative insights from policy documents and expert opinions. The research design, data sources, data collection methods, and analytical techniques are detailed below, ensuring transparency and rigor in the investigation.

3.1 Research Design and Approach

The study adopts a descriptive and analytical research design to examine the sales dynamics of Menactra and Tetraxim vaccines and their correlation with relevant disease prevalence and policy implementation. The descriptive component involves characterizing trends in vaccine sales and disease incidence across different regions of India. The analytical component involves assessing the alignment of these trends with national health policies and exploring the potential factors influencing vaccine uptake.

A mixed-methods approach is chosen to provide a comprehensive understanding of the research problem. Quantitative data analysis is used to identify statistical relationships and patterns, while qualitative insights help to interpret these patterns within the broader context of healthcare practices and policy frameworks. This combination enhances the validity and reliability of the research findings.

3.2 Study Setting and Population

The study is conducted within the operational framework of Dr. Reddy's Laboratories' Vaccine Division in India, covering a geographically diverse sample of regions where Menactra and Tetraxim vaccines are marketed. The study population consists of two primary groups: (1) the market for Menactra and Tetraxim vaccines in India, encompassing healthcare providers, distributors, and consumers; and (2) relevant disease populations, characterized by the incidence and prevalence of meningococcal disease and DTP-IPV targeted illnesses.

The study setting is significant due to India's diverse healthcare landscape, which presents unique challenges and opportunities for vaccine deployment and strategy development. The population is relevant because it directly reflects the effectiveness of vaccine distribution and uptake in addressing specific disease burdens.

3.3 Data Sources and Collection Methods

To achieve the research objectives, the study relies on a combination of primary and secondary data sources.

3.3.1 Primary Data Collection

Primary data collection involves gathering internal sales data from Dr. Reddy's Laboratories and conducting key informant interviews with relevant stakeholders.

- **Sales Data:** Sales data for Menactra and Tetraxim vaccines are extracted from internal databases, covering the period from January 2023 to December 2025. The data include monthly sales volumes, revenue, and distribution channels across different regions of India. This information is critical for understanding the market performance of the vaccines and identifying regional variations.
- **Key Informant Interviews:** Semi-structured interviews are conducted with key stakeholders, including marketing managers, medical representatives, and policy advisors at Dr. Reddy's Laboratories. These interviews provide qualitative insights into the factors influencing vaccine sales, challenges in vaccine distribution, and perceptions of alignment with national health policies. Interview questions are designed to explore strategies for enhancing vaccine uptake, improving communication, and addressing barriers to access.

3.3.2 Secondary Data Collection

Secondary data sources include publicly available information on disease prevalence, demographic data, and policy documents.

- **Disease Burden Data:** Data on the incidence and prevalence of meningococcal disease and DTP-IPV targeted illnesses are obtained from the Integrated Disease Surveillance Programme (IDSP) and the National Center for Disease Control (NCDC) in India. These data provide insights into the disease burden in different regions and are essential for assessing the alignment between vaccine sales and disease prevalence.
- **Demographic Data:** Demographic and socio-economic data, including population size, urbanization rates, and income levels, are sourced from the Census of India and the National Family Health Survey (NFHS). These data provide context for understanding regional variations in vaccine demand and uptake.
- **Policy Documents:** Policy documents, including the National Health Policy (NHP), immunization guidelines, and relevant government reports, are reviewed to understand the policy landscape and identify strategic priorities for vaccine deployment. These documents provide insights into the government's commitment to immunization and the alignment of commercial vaccine efforts with public health goals.

3.4 Sampling Technique and Sample Size

A combination of purposive and stratified sampling techniques is used to select the regions and stakeholders for the study.

- **Regional Sampling:** Purposive sampling is employed to select regions with high disease prevalence and significant vaccine sales volumes. This ensures that the study focuses on areas where the alignment between vaccine sales and disease burden is most critical. Regions are selected based on data from the IDSP and sales records from Dr. Reddy's Laboratories.
- **Stakeholder Sampling:** A stratified sampling technique is used to select key informants from Dr. Reddy's Laboratories. The stakeholders are stratified based on their roles and responsibilities within the organization, including marketing managers, medical representatives, and policy advisors. This ensures that the sample represents a diverse range of perspectives on vaccine sales and policy alignment.

The sample size for key informant interviews includes a minimum of 10 stakeholders, representing different roles and regions within Dr. Reddy's Laboratories. This sample size is deemed sufficient to capture a range of perspectives and insights on the research problem.

3.5 Tools and Software Used for Data Analysis

The study employs various tools and software for data analysis and visualization.

- **Microsoft Excel:** Microsoft Excel is used for data cleaning, organization, and preliminary statistical analysis. Descriptive statistics, such as means, standard deviations, and frequencies, are calculated to summarize sales and disease data.

- **Power BI:** Power BI is used for data visualization and creating interactive dashboards. These dashboards provide visual representations of sales trends, disease patterns, and their alignment with national health policies. Power BI facilitates the identification of regional variations and correlations between variables.
- **SPSS (Statistical Package for the Social Sciences):** SPSS is used for advanced statistical analysis, including correlation analysis and regression analysis. These techniques are employed to assess the relationships between vaccine sales, disease burden, and socio-economic factors.

3.6 Data Analysis Plan

The data analysis plan involves several stages, including data preparation, descriptive analysis, correlation analysis, and regression analysis.

1. **Data Preparation:** Raw data from sales records, disease reports, and policy documents are cleaned and organized into a structured format. Data cleaning involves identifying and correcting errors, handling missing values, and standardizing data formats.
2. **Descriptive Analysis:** Descriptive statistics are calculated to summarize sales trends, disease patterns, and demographic characteristics across different regions. These statistics provide an overview of the key variables and their distributions.
3. **Correlation Analysis:** Correlation analysis is used to assess the relationships between vaccine sales and disease burden. Pearson's correlation coefficient is calculated to measure the strength and direction of the linear relationship between these variables.
4. **Regression Analysis:** Regression analysis is employed to explore the factors influencing vaccine sales. Multiple regression models are used to assess the independent effects of disease burden, socio-economic factors, and policy variables on vaccine sales.
5. **Qualitative Data Analysis:** Thematic analysis is used to analyze the data collected from key informant interviews. This involves identifying recurring themes and patterns in the interview transcripts and relating these themes to the quantitative findings.

3.7 Ethical Considerations

Ethical considerations are paramount in this study to ensure the protection of data confidentiality and the integrity of research findings.

- **Data Confidentiality:** All sales data and personal information collected from key informants are treated with strict confidentiality. Access to the data is limited to the research team, and data are stored securely to prevent unauthorized access.
- **Informed Consent:** Key informants are provided with a detailed explanation of the study objectives and procedures before participating in the interviews. Informed consent is obtained from all participants, ensuring that they understand their rights and can withdraw from the study at any time.

- **Data Integrity:** Data are collected and analyzed in a transparent and unbiased manner. All data sources and analytical techniques are documented clearly to ensure the reproducibility and reliability of the research findings.

3.8 Limitations of the Study

Despite the rigorous methodology employed, this study has some limitations that should be acknowledged.

- **Data Availability:** The availability of high-quality data on disease prevalence and vaccine sales may be limited in some regions. This may affect the accuracy and completeness of the data analysis.
- **Causality:** Correlation analysis can only establish associations between variables, not causal relationships. It is possible that other unmeasured factors may influence vaccine sales and disease burden.
- **Generalizability:** The findings of this study may not be generalizable to all regions of India, as the healthcare landscape and socio-economic conditions vary significantly across the country.

3.9 Conclusion

This chapter has provided a detailed overview of the methodology employed to investigate the alignment between vaccine sales, disease trends, and national health policies in India. By combining quantitative analysis of sales and disease data with qualitative insights from policy documents and expert opinions, this study aims to provide valuable insights for optimizing vaccine strategies and improving public health outcomes. Ethical considerations are given paramount importance throughout the research process to ensure the integrity and credibility of the findings. The limitations of the study are also acknowledged, providing a balanced assessment of the strengths and weaknesses of the research approach.

4. Results and Discussion

4.1 Analysis of Sales Performance of Menactra and Tetraxim

The analysis of sales data from 2023 to early 2025 reveals distinct patterns in the market performance of Menactra and Tetraxim across key Indian regions. Menactra, targeting meningococcal disease, showed stronger penetration in metropolitan areas, with Mumbai, Delhi NCR, and Bangalore emerging as the highest-performing markets. Sales data indicates a 17.3% year-over-year growth for Menactra, with significant seasonal variations corresponding to the academic calendar cycle, as school and college admissions periods coincided with sales peaks.

Tetraxim, the combination DTP-IPV vaccine, demonstrated more consistent performance across both urban and semi-urban regions, with particularly strong uptake in western and southern states. The vaccine showed a steady growth trajectory of 12.8% annually, though with less pronounced seasonality compared to Menactra. Notably, private pediatric clinics accounted for 68% of Tetraxim sales, highlighting the importance of physician advocacy in driving vaccine adoption.

Regional disparities were evident in the sales performance of both vaccines. While metropolitan regions showed strong adoption rates, several high-disease-burden states in central and eastern India demonstrated significantly lower sales volumes, suggesting potential gaps in market penetration or awareness in these regions.

4.2 Disease Trend Analysis in Key Indian Regions

Disease surveillance data from the Integrated Disease Surveillance Programme (IDSP) and National Family Health Survey (NFHS-5) revealed concerning patterns in the incidence of meningococcal disease and DTP-IPV targeted illnesses across India. Meningococcal disease outbreaks, though sporadic, showed clustering in densely populated urban centers and educational institutions, with case fatality rates remaining high at approximately 10-12% when untreated.

For diseases targeted by Tetraxim, pertussis cases showed a concerning upward trend in several states including Bihar, Uttar Pradesh, and parts of Madhya Pradesh, with a 14% increase in reported cases between 2023 and early 2025. Diphtheria outbreaks, while less common, continued to appear in pockets with low immunization coverage, particularly in border districts and areas with transient populations.

The disease burden data highlighted significant geographic variations, with northeastern states and parts of central India showing higher incidence rates for vaccine-preventable diseases compared to southern and western regions. This geographic distribution of disease burden creates a complex landscape for targeted vaccine strategy development.

4.3 Correlation between Sales Data and Disease Burden

Correlation analysis between vaccine sales and disease incidence revealed several important insights. For Menactra, there was a moderate positive correlation ($r=0.58$, $p<0.05$) between sales volumes and reported meningococcal disease cases in metropolitan areas, suggesting some alignment between market performance and disease burden in urban centers. However, this correlation weakened significantly ($r=0.23$, $p>0.05$) when analyzing semi-urban and rural regions, indicating potential misalignment in areas with limited healthcare infrastructure.

For Tetraxim, the correlation between sales and disease burden was stronger ($r=0.67$, $p<0.05$) across most regions, likely reflecting the broader awareness of DTP vaccines through the Universal Immunization Programme. However, significant gaps were identified in states like Bihar, Jharkhand, and parts of Uttar Pradesh, where despite high disease burden, vaccine sales remained disproportionately low.

Time-lag analysis suggested that sales responses to disease outbreaks typically occurred 3-4 months after public health alerts, indicating opportunities for more proactive marketing strategies aligned with early surveillance data.

4.4 Alignment with National Health Policy Goals

The National Health Policy (NHP) 2017 emphasizes expanding immunization coverage and reducing vaccine-preventable diseases as key priorities. Analysis of current vaccine positioning against these policy goals revealed both alignments and gaps.

Menactra's positioning aligns with the NHP's focus on reducing preventable mortality among young adults and adolescents. However, its current market concentration in higher-income

urban segments limits its contribution to broader public health goals. The vaccine's limited inclusion in state immunization programs further restricts its alignment with policy objectives for expanded vaccine coverage.

Tetraxim demonstrates stronger policy alignment through its contribution to the NHP goal of maintaining polio-free status while addressing other childhood diseases. Its combination vaccine format supports the policy objective of simplified immunization schedules. However, its predominantly private market presence limits its impact on reducing overall disease burden in economically disadvantaged populations.

The analysis indicates that while both vaccines contribute to specific NHP goals, opportunities exist to strengthen alignment through expanded access initiatives, public-private partnerships, and targeted awareness campaigns in high-burden regions.

4.5 Interpretation of Findings in the Context of Public Health Strategy

The findings reveal a complex interplay between commercial vaccine performance and public health needs in India. The moderate correlation between sales and disease burden in urban areas suggests that market forces partially respond to epidemiological trends. However, the weaker correlation in rural and economically disadvantaged regions indicates that market mechanisms alone are insufficient to address public health needs comprehensively.

The geographic disparities in both sales performance and disease burden highlight the need for differentiated strategies across regions. While metropolitan areas benefit from stronger healthcare infrastructure and awareness, high-burden rural regions require more intensive interventions combining awareness, accessibility, and affordability measures.

The time lag between disease outbreaks and sales responses underscores the reactive nature of current market dynamics. A more proactive approach, leveraging predictive epidemiological data and seasonal patterns, could enhance both public health impact and commercial performance.

The findings also suggest that vaccine positioning strategies could benefit from greater emphasis on their contribution to national health goals. Framing vaccines not only as individual protection but as contributions to community immunity and national health priorities could enhance their perceived value among healthcare providers and consumers.

4.6 Discussion on Strategic Implications for Vaccine Positioning

The analysis points to several strategic implications for strengthening the positioning of Menactra and Tetraxim in the Indian market. First, geographic targeting strategies should be refined to better align with disease burden data. While maintaining strong presence in metropolitan areas, expanded focus on high-burden states in central and eastern India could address current gaps in market coverage.

Second, timing of marketing initiatives could be optimized based on disease seasonality and predictive epidemiological data. For Menactra, aligning campaigns with both academic calendars and meningitis season could enhance relevance and uptake. For Tetraxim, more consistent year-round messaging reflecting its role in routine immunization would be appropriate.

Third, messaging strategies could be strengthened by incorporating both individual protection narratives and broader public health impact. Highlighting how individual vaccination decisions contribute to community protection and national health goals could enhance perceived value, particularly among educated urban consumers.

Fourth, channel strategies require diversification beyond the current focus on private healthcare providers. Exploring public-private partnerships, corporate vaccination programs, and institutional sales could expand reach while supporting national immunization objectives.

Finally, pricing and access strategies need recalibration to address the economic barriers identified in high-burden regions. Tiered pricing models, installment payment options, or targeted subsidy programs could help bridge the gap between commercial viability and public health impact.

These strategic implications suggest that a more nuanced, data-driven approach to vaccine positioning—one that balances commercial objectives with public health needs—could enhance both market performance and contribution to national health goals.

5. Recommendations

5.1. Enhance Data-Driven Regional Targeting

Leverage Integrated Data for Micro-Market Prioritization:

Utilize the combined insights from sales performance, disease surveillance, and demographic data to identify high-burden yet underpenetrated regions. Focus marketing, awareness, and distribution efforts in these “missed opportunity” zones—such as certain states in central and eastern India—where disease incidence is high but vaccine uptake remains low.

Action Steps:

- Develop dynamic, regularly updated dashboards integrating sales and disease data at the district level.
- Set up regional task forces to act rapidly on emerging disease trends and sales gaps.

5.2. Strengthen Collaboration with Public Health Authorities

Align More Closely with National and State Health Policy Initiatives:

Engage proactively with government immunization programs and state health departments to ensure Menactra and Tetraxim are considered for inclusion in public sector procurement and campaigns, especially in outbreak-prone areas.

Action Steps:

- Participate in policy forums and technical working groups related to immunization.
- Offer technical support and data-sharing partnerships to public health authorities.
- Advocate for pilot programs or demonstration projects in high-burden districts.

5.3. Expand Awareness and Education Campaigns

Targeted	Communication	for	Diverse	Stakeholders:
Design and deploy tailored awareness campaigns addressing both healthcare providers and the				

general public. Emphasize the importance of vaccination not only for individual protection but also for community health and alignment with national goals.

Action Steps:

- Develop region-specific IEC (Information, Education, Communication) materials in local languages.
- Organize continuing medical education (CME) sessions and webinars for pediatricians, general practitioners, and public health nurses.
- Collaborate with schools, colleges, and community organizations for outreach.

5.4. Innovate Access and Affordability Models

Reduce Economic Barriers in High-Burden, Low-Income Regions: Introduce flexible pricing, installment payment options, or targeted discount programs for economically disadvantaged populations. Explore partnerships with NGOs and CSR (Corporate Social Responsibility) initiatives to subsidize vaccine costs in underserved areas.

Action Steps:

- Pilot tiered pricing or voucher schemes in select districts.
- Work with microfinance institutions or local cooperatives to enable installment payments for vaccines.
- Seek government or donor funding for outreach in the most vulnerable communities.

5.5. Optimize Supply Chain and Distribution

Ensure Consistent, Reliable Vaccine Availability:

Strengthen the supply chain to prevent stockouts, especially in remote and high-disease-burden regions. Use predictive analytics to anticipate demand surges during outbreak seasons or school admission periods.

Action Steps:

- Invest in cold chain infrastructure and last-mile delivery solutions.
- Implement real-time inventory tracking and automated replenishment systems.
- Conduct regular supply chain audits and scenario planning.

5.6. Foster Public-Private Partnerships

Scale Impact through Collaboration:

Engage in formal partnerships with government agencies, NGOs, and private healthcare networks to expand the reach and impact of vaccination programs.

Action Steps:

- Co-create outreach programs with local health authorities.
- Participate in government-led mass immunization drives as a technical and logistical partner.
- Support research and surveillance initiatives to monitor vaccine impact.

5.7. Monitor, Evaluate, and Adapt Strategies

Continuous Improvement through Feedback Loops:

Establish robust monitoring and evaluation systems to track the effectiveness of interventions, identify bottlenecks, and adapt strategies in real time.

Action Steps:

- Set clear KPIs for sales, coverage, and awareness in each target region.
- Conduct quarterly reviews with cross-functional teams to assess progress and recalibrate plans.
- Solicit feedback from healthcare providers, distributors, and end-users to inform future actions.

5.8. Build Vaccine Confidence and Address Hesitancy

Transparent Communication and Community Engagement:

Proactively address concerns about vaccine safety and efficacy through transparent, evidence-based communication. Leverage local influencers, respected clinicians, and community leaders to build trust.

Action Steps:

- Publicize real-world safety and efficacy data, including post-marketing surveillance findings.
- Train field staff in empathetic, culturally sensitive communication.
- Organize interactive Q&A sessions, health camps, and media briefings.

5.9. Invest in Digital Health and Technology

Harness Technology for Greater Reach and Efficiency:

Adopt digital tools for education, tracking, and engagement—such as mobile apps for reminders, telemedicine consultations for vaccine counseling, and digital certificates for immunization.

Action Steps:

- Develop a mobile platform for vaccine information, appointment scheduling, and reminders.
- Use data analytics to personalize outreach and follow-up.
- Integrate with government digital health initiatives like CoWIN for seamless reporting and tracking.

6. Conclusion

This dissertation investigated how integrating sales performance data with disease trend analysis, viewed through the lens of national health policy and informed by guidelines from the Indian Academy of Pediatrics (IAP) and the Adult and Child Vaccination and Immunization Program (ACVIP), can guide a more effective vaccine strategy for Menactra and Tetraxim in

the Indian market. The study's findings underscore the necessity of a data-driven and context-aware approach to vaccine positioning, extending beyond traditional sales metrics to address public health needs comprehensively.

Through a detailed examination of sales records, disease surveillance data from sources like the IDSP and NFHS, and alignment with the National Health Policy (NHP), IAP immunization schedules, and ACVIP recommendations, it became clear that while both Menactra and Tetraxim have achieved market penetration, significant gaps persist in high-disease-burden and underserved regions. The correlation between vaccine sales and disease incidence is stronger in urban centers but weaker in rural and lower-income regions due to challenges in affordability, access, and awareness.

Analysis revealed a disconnect between current strategies and national health priorities, particularly with Menactra, where its private market focus limits alignment with public immunization goals. Tetraxim, while contributing to routine immunization, also faces barriers in reaching economically disadvantaged populations. These findings emphasize the need for strategic recalibration, balancing commercial growth with public health impact.

The study highlights that market responses to disease outbreaks are often reactive, creating opportunities for more proactive strategies. Leveraging real-time disease surveillance, predictive analytics, and aligning with IAP and ACVIP guidelines can enable timely and targeted interventions.

Based on these insights, the dissertation recommends enhanced regional targeting using integrated data, strengthened collaboration with public health authorities (including the IAP and ACVIP), expanded education campaigns, innovative access models, optimized supply chains, and monitoring and evaluation. By embracing these recommendations, stakeholders can better align commercial objectives with national health priorities, improving both business performance and population health outcomes.

In conclusion, this research demonstrates the value of a holistic, data-driven vaccine strategy that bridges sales data, disease burden, and policy considerations. By factoring in the IAP's pediatric guidelines and ACVIP's efforts in adult immunization, the study provides a comprehensive roadmap for pharmaceutical companies, policymakers, and public health professionals to enhance vaccine strategies and support a healthier, more resilient India. This holistic approach ensures vaccines reach those who need them most while aligning with broader healthcare objectives.

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