

Analyzing The Regional Medical Staff Distribution In Sri Lanka

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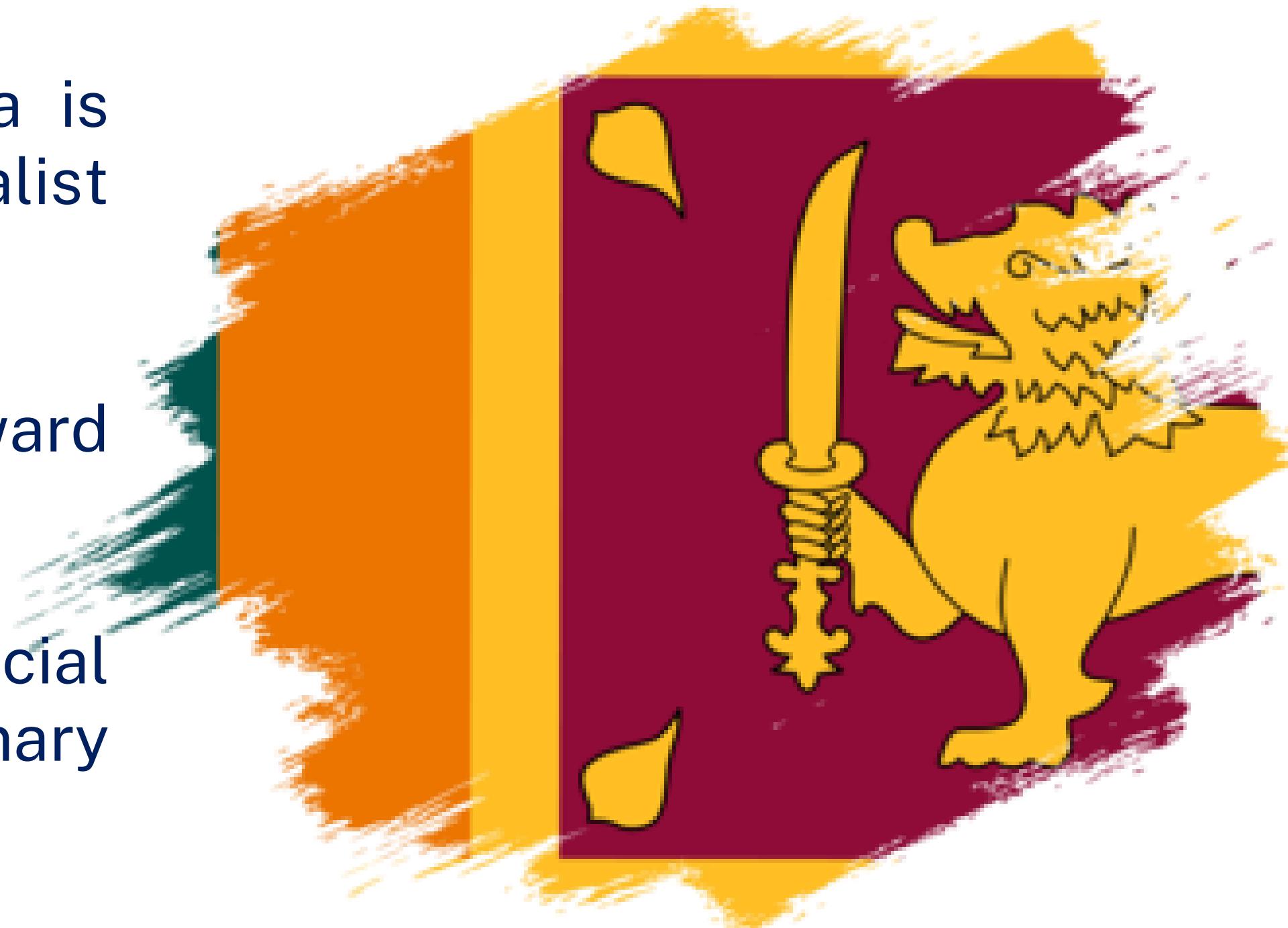
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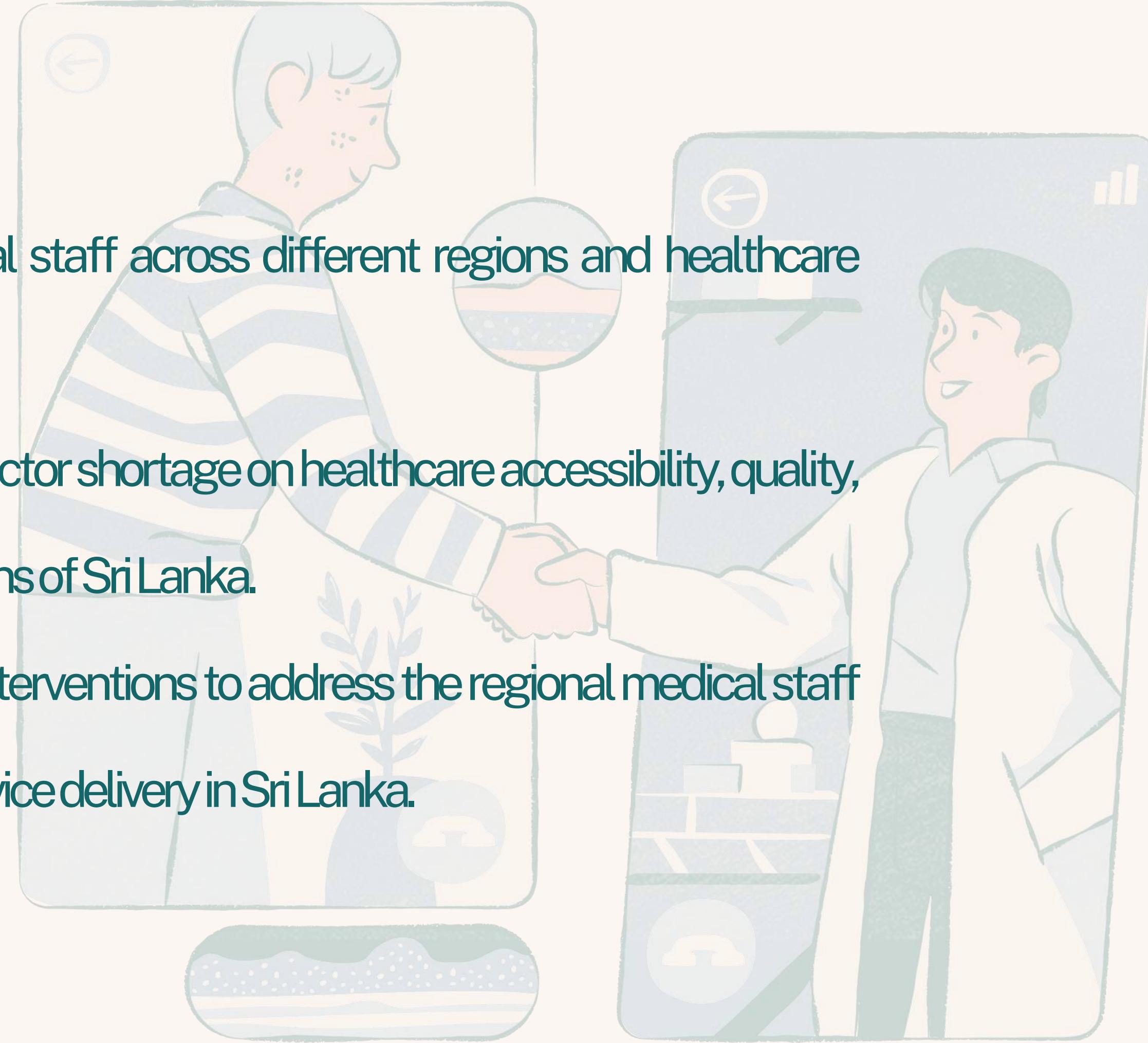
01. Introduction

- . The healthcare system of Sri Lanka is facing a critical shortage of specialist doctors.
- . There is an Increasing trend of outward migration among healthcare workers.
- . Particularly evident in provincial hospitals, district hospitals, and primary healthcare centers.



02. Objectives

- To assess the distribution of medical staff across different regions and healthcare facilities in Sri Lanka.
- To examine the implications of the doctor shortage on healthcare accessibility, quality, and patient outcomes in various regions of Sri Lanka.
- To explore potential strategies and interventions to address the regional medical staff shortage and improve healthcare service delivery in Sri Lanka.



03. Dataset Information

01. Healthcare workforce dataset

- Year – 2020
- Number of distribution of doctors, nurses, and other healthcare professionals in 26 RDHS divisions
- Downloaded from the open data portal of the Ministry of Health Sri Lanka



03. Dataset Information

02. Population dataset

- Year – 2020
- Contains data on the regional population of Sri Lanka
- Data was manually extracted from the official website of The Department of Census and Statistics, Sri Lanka



04. Methodology

01. Data Preparation

- Data Extraction
- Data Collection
- Data Duplication
- Merging Data
- Renaming Columns

02 Data Preparation

- Normality Test
 - Shapiro-Wilk test
- Medical Officers Analysis
- Nurses Analysis
- Dental Surgeons Analysis
- Clustering and Visualization
 - Conditional based on the Fried Man test

03. OR Analysis

- Identification of International Standards
 - 2006 WHO Report
 - WHO
- Data Preparation
- Data Analysis
- Comparison with International Standards

04. Methodology

04. Calculation of Medical Staff availability

- Medical Officers (MO)
- Nurses
- Dental Surgeons
- Mid Wives

05. Data Visualization

- Population Distribution
- Medical Officer Distribution
- Correlation Heatmap
 - Population
 - Total Medical Officers (MO)
 - Total Nurses
 - Total Midwives
 - Total Dental Surgeons

06. Dashboard Creation

- Power BI
- Data Preparation
- Exporting Data
- Data Visualization

06. Results and Discussion



04. Results and Discussion

Per 100,000 Population - 2020



97.9
Medical Doctors



211.6
Nurses

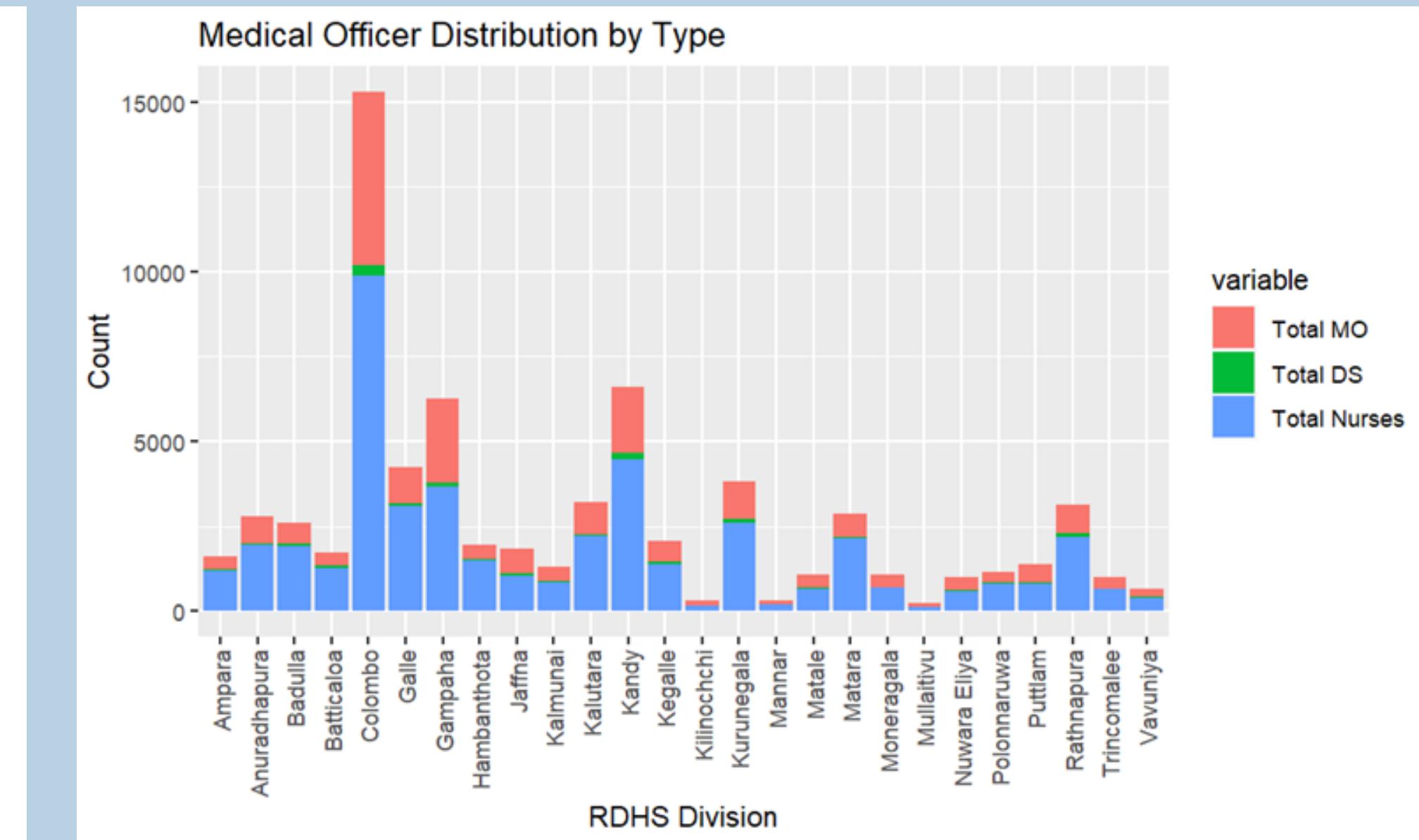
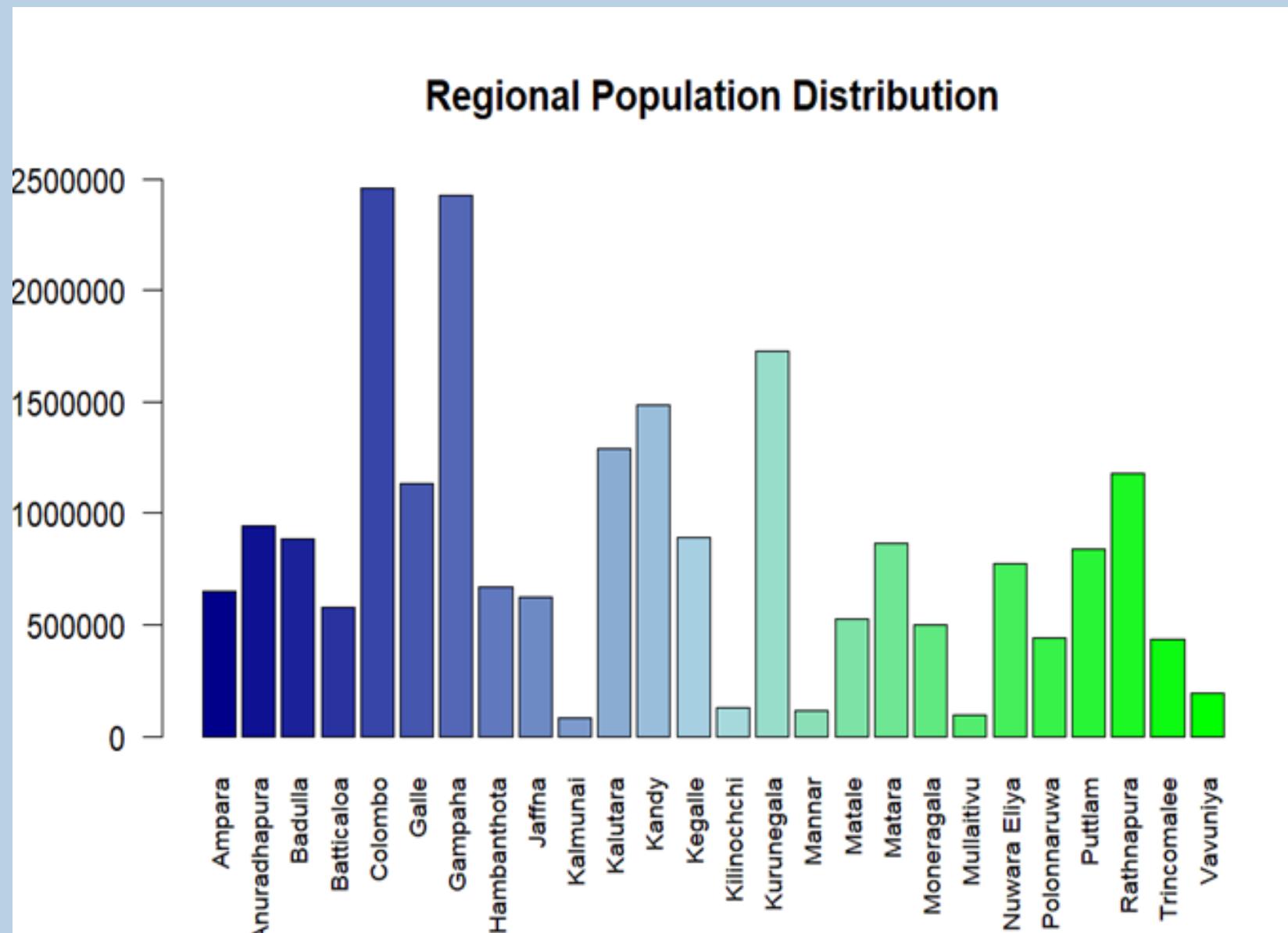


26.9
Mid Wives

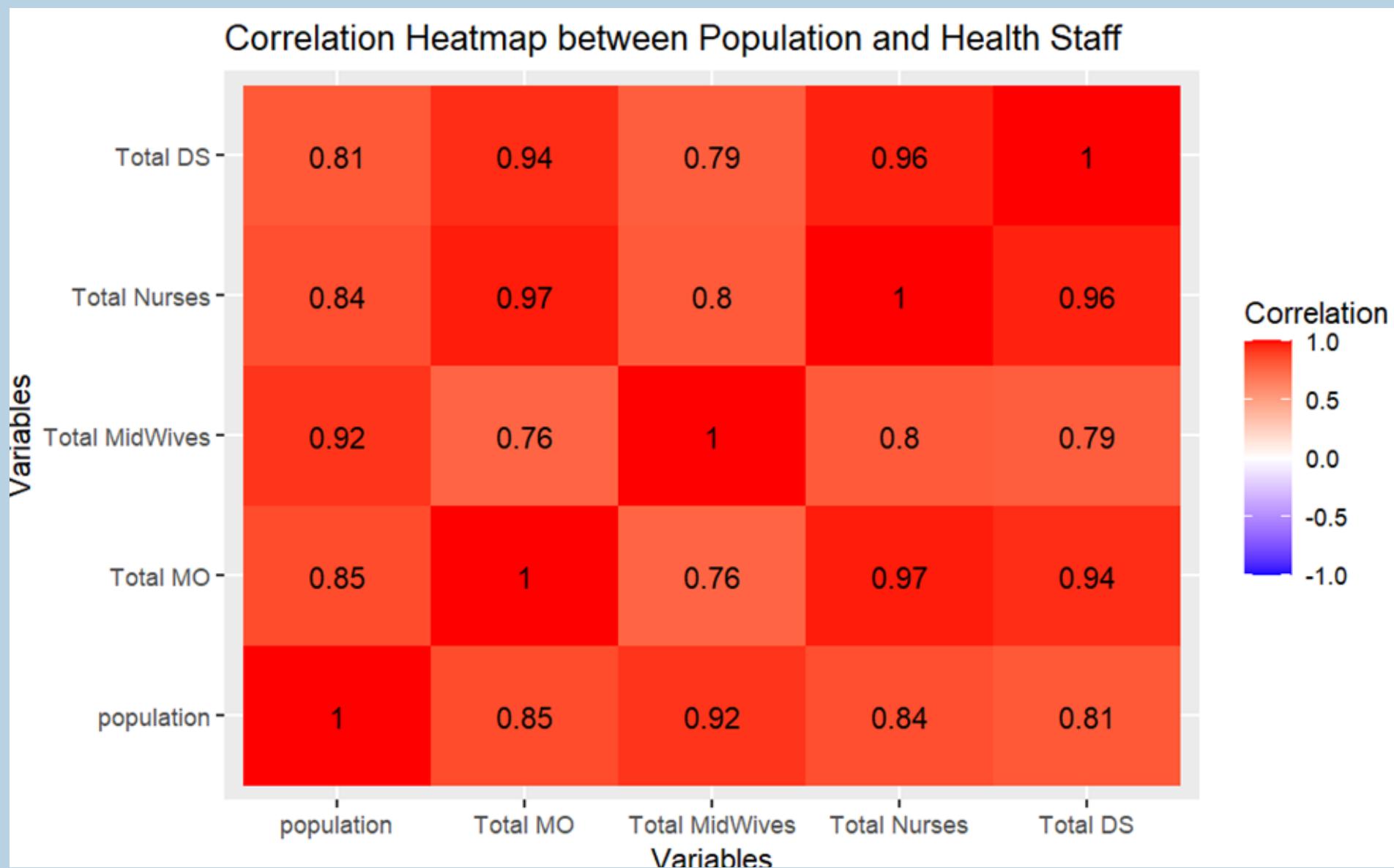


7.1
Dental Surgeons

04. Results and Discussion



O1. Correlation Heat Map



- **Null Hypothesis (H0):** There is a significant correlation between the population and the number of medical staff in each region.

- **Alternative Hypothesis (H1):** There is no strong correlation between the population and the number of medical staff in each region

- It's important to note that correlation does not imply causation. While correlation can suggest associations between variables, it doesn't prove that changes in one variable cause changes in another.

O2. Medical Officers

Groups and Range



● **Targeting Resources:** Policymakers can use this analysis to target areas with the greatest need for additional doctors (likely districts in clusters with shorter bars).

● **Benchmarking:** Clusters with a higher doctor count can serve as benchmarks for improvement in lower doctor clusters.

● Studying best practices in those areas might inform policies for increasing doctor availability elsewhere.

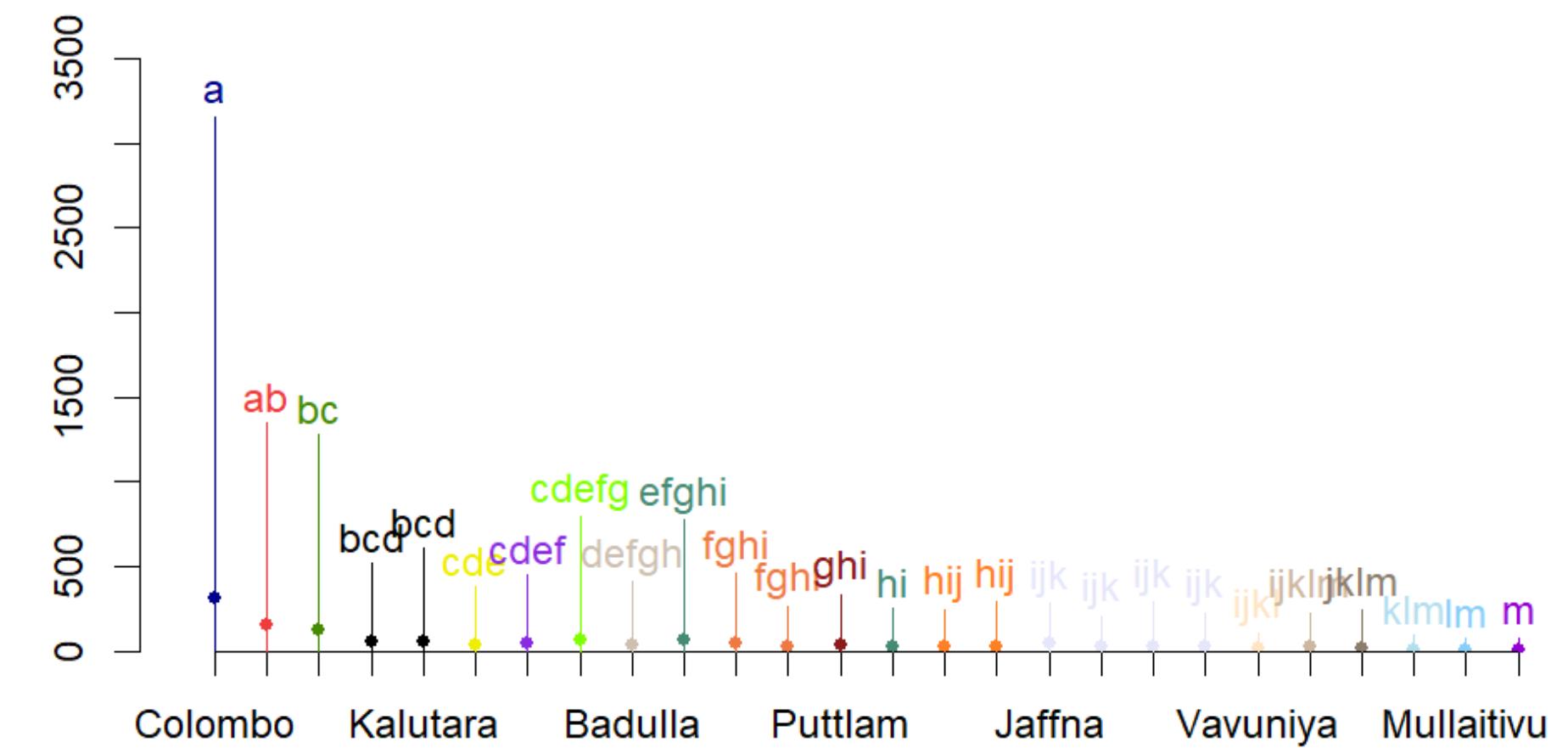
● **Regional Collaboration:** Districts within the same cluster could potentially collaborate on solutions to improve doctor availability

O4. Nurses and Dental Surgeons

Groups and Range



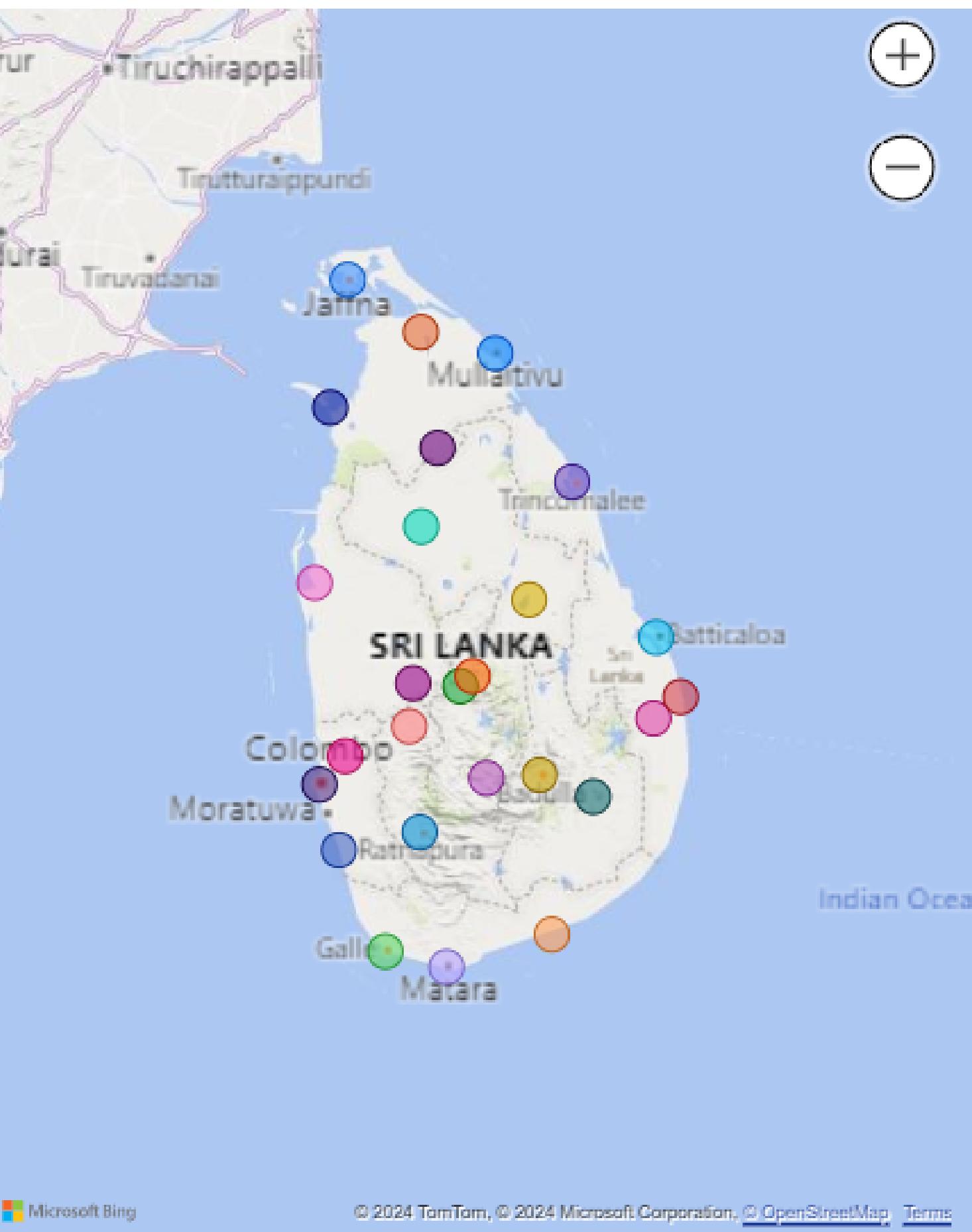
Groups and Range



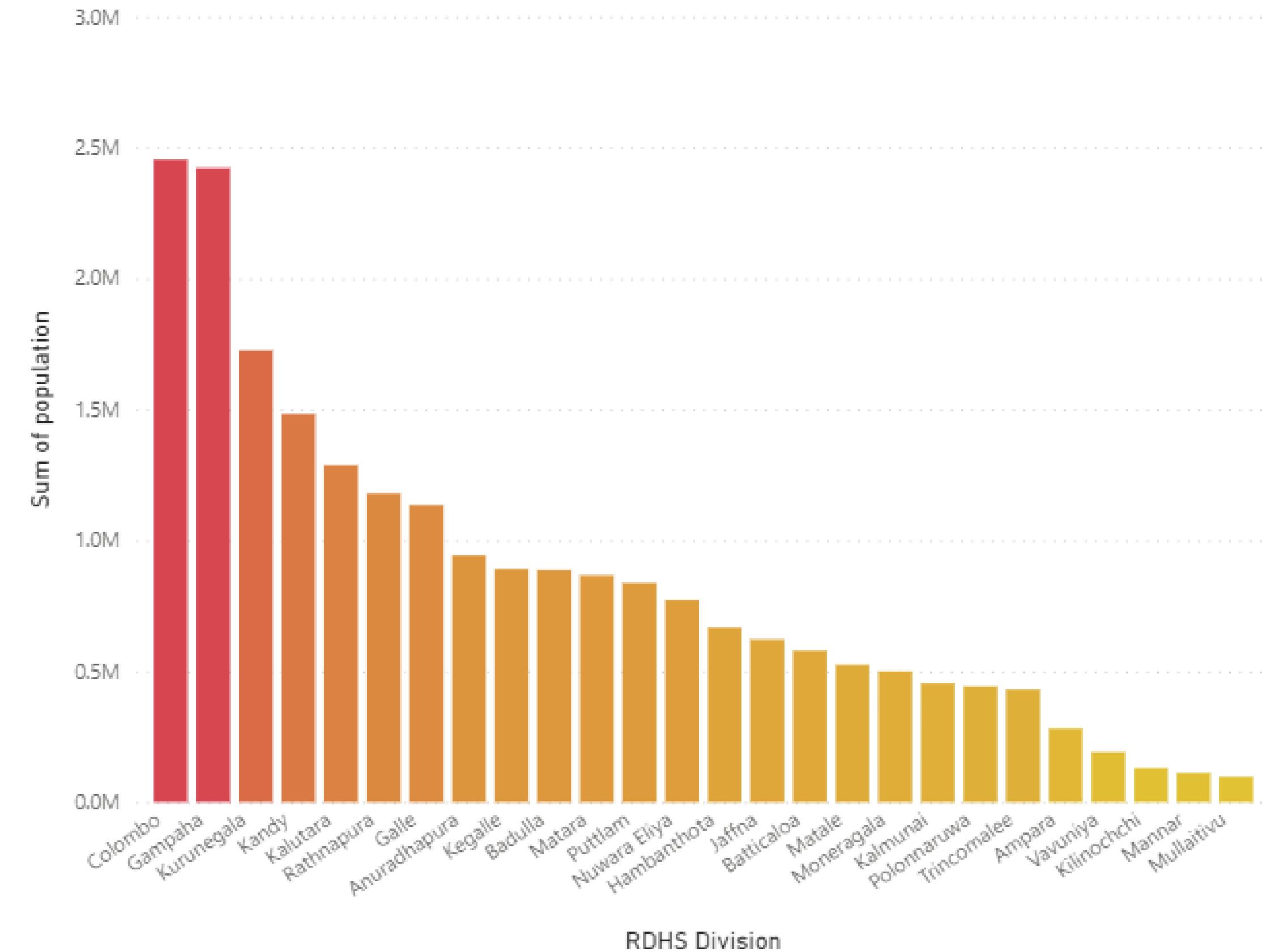
Analyzing the Medical Staff Distribution in Sri Lanka - 2020

RDHS Division

All



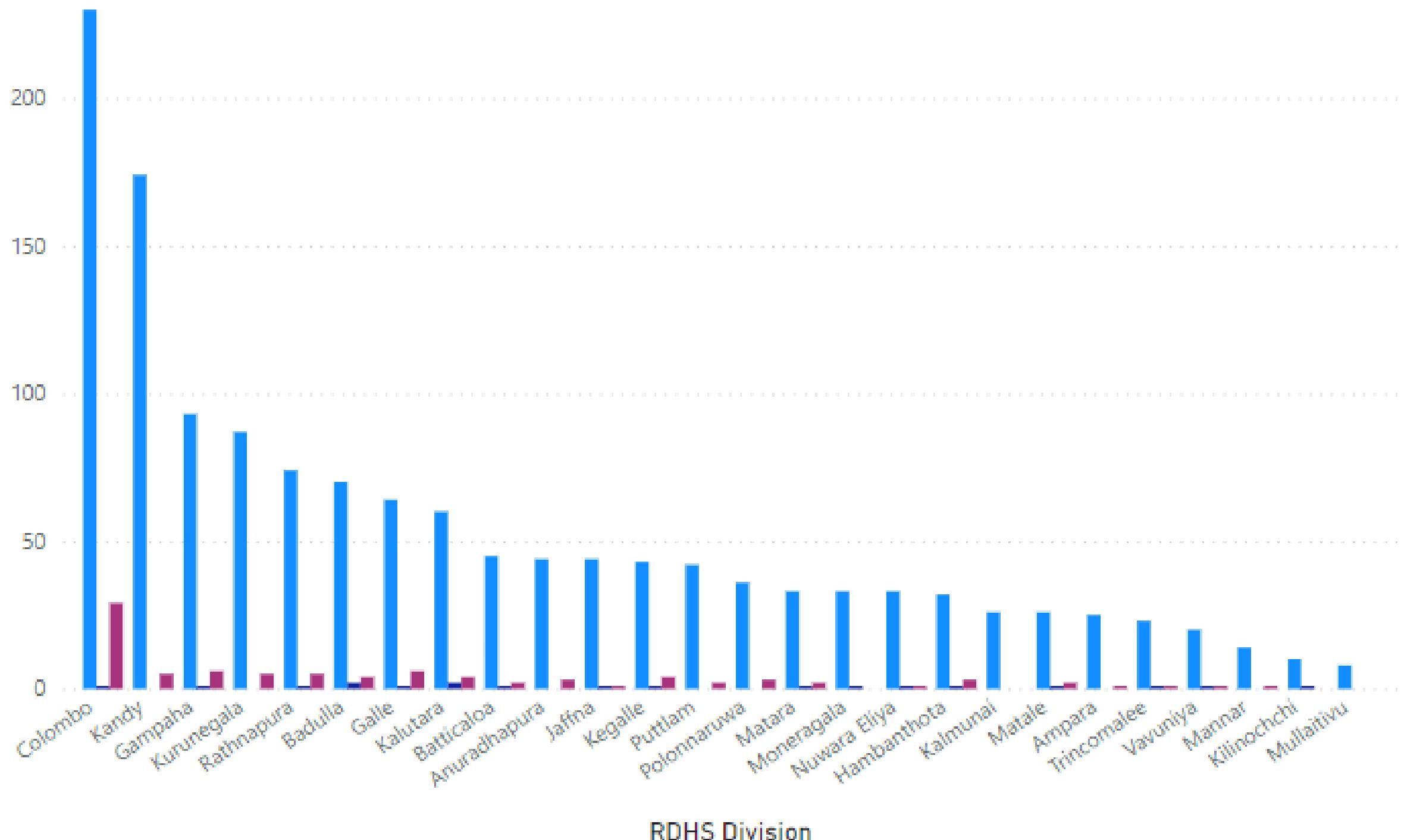
Sum of population by RDHS Division



Distribution of Dental Surgeons - 2020

Distribution of Dental Surgeons

● Sum of Dental Surgeons ● Sum of Regional Dental Surgeons ● Sum of Consultant Dental Surgeons



Consultant Dental Surgeons

0 29

Dental Surgeons

8 230

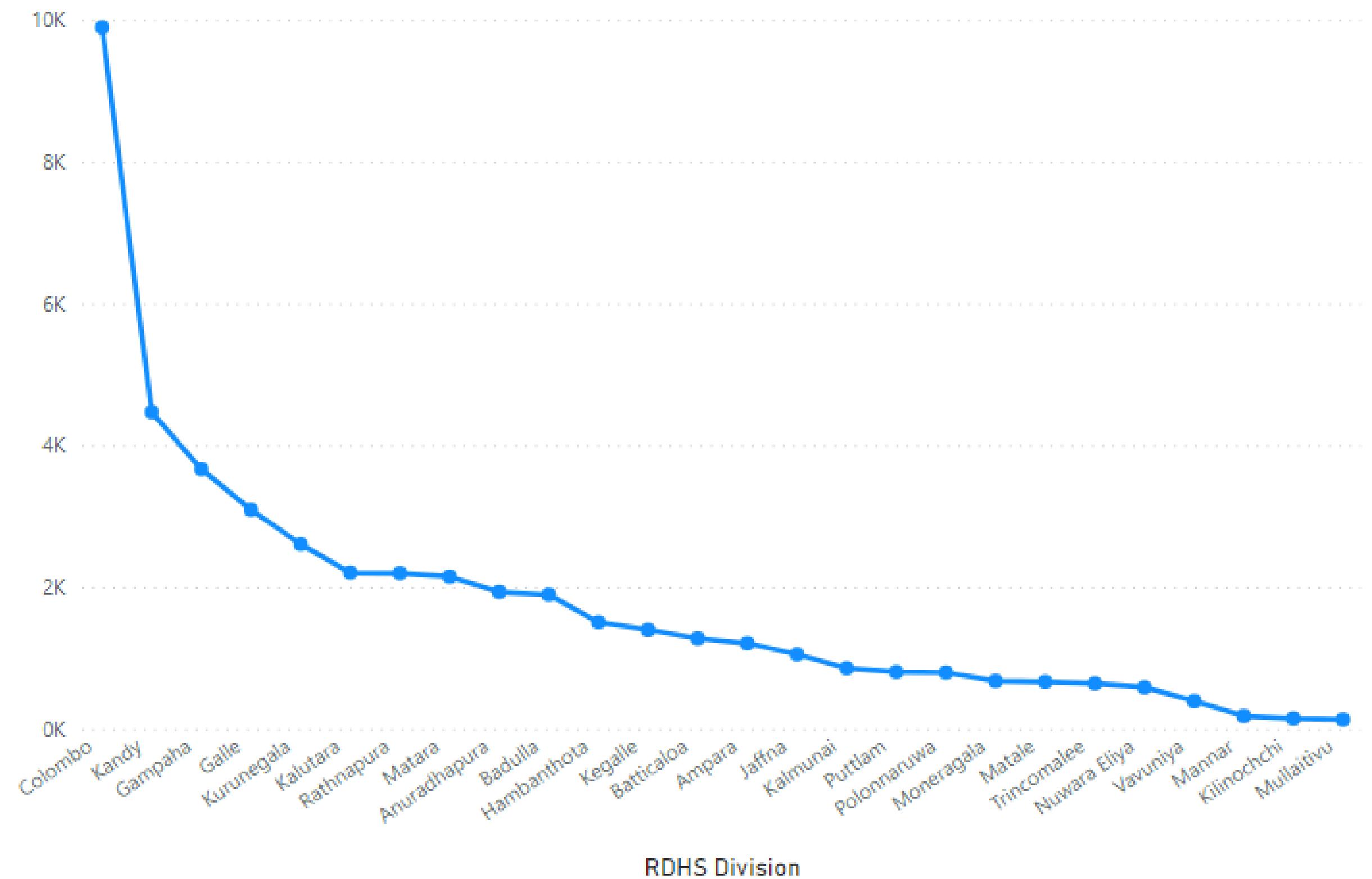
Regional Dental Surgeons

0 2



Distribution of Nurses - 2020

Sum of Total Nurses by RDHS Division



Division	Pupil Nurses	PH Nursing Officers
Gampaha	794	18
Kurunegala	0	12
Rathnapura	352	12
Kalutara	414	10
Hambantota	293	7
Kandy	529	7
Colombo	532	6
Anuradhapura	296	5
Kegalle	2	5
Moneragala	0	5
Galle	516	4
Nuwara Eliya	2	3
Trincomalee	0	3
Badulla	406	2
Matale	1	2
Puttalam	0	2
Polonnaruwa	0	1
Vavuniya	135	1
Ampara	580	0
Batticaloa	362	0
Jaffna	160	0
Kalmunai	0	0
Kilinochchi	0	0
Mannar	0	0
Total	5994	105

Distribution of MidWives – 2020

RDHS Division

Multiple selections

Sum of Total Midwives by RDHS Division

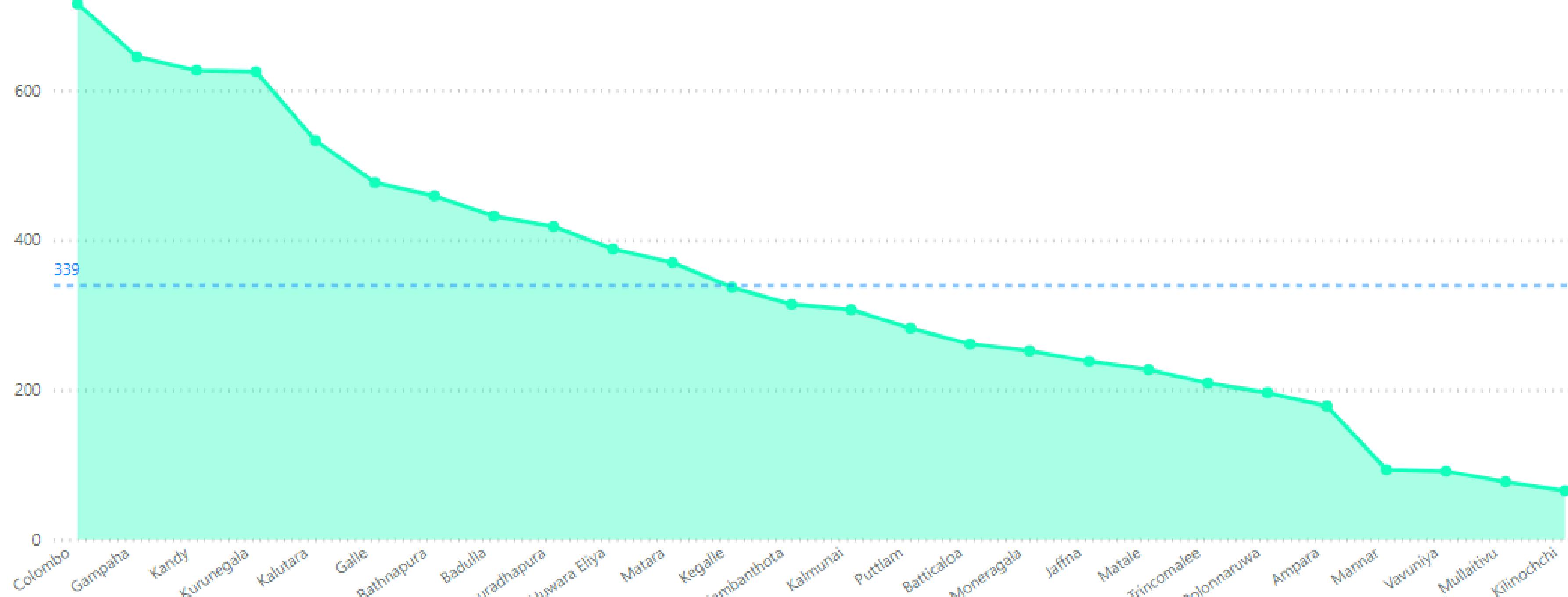
800

600

400

200

0



RDHS Division

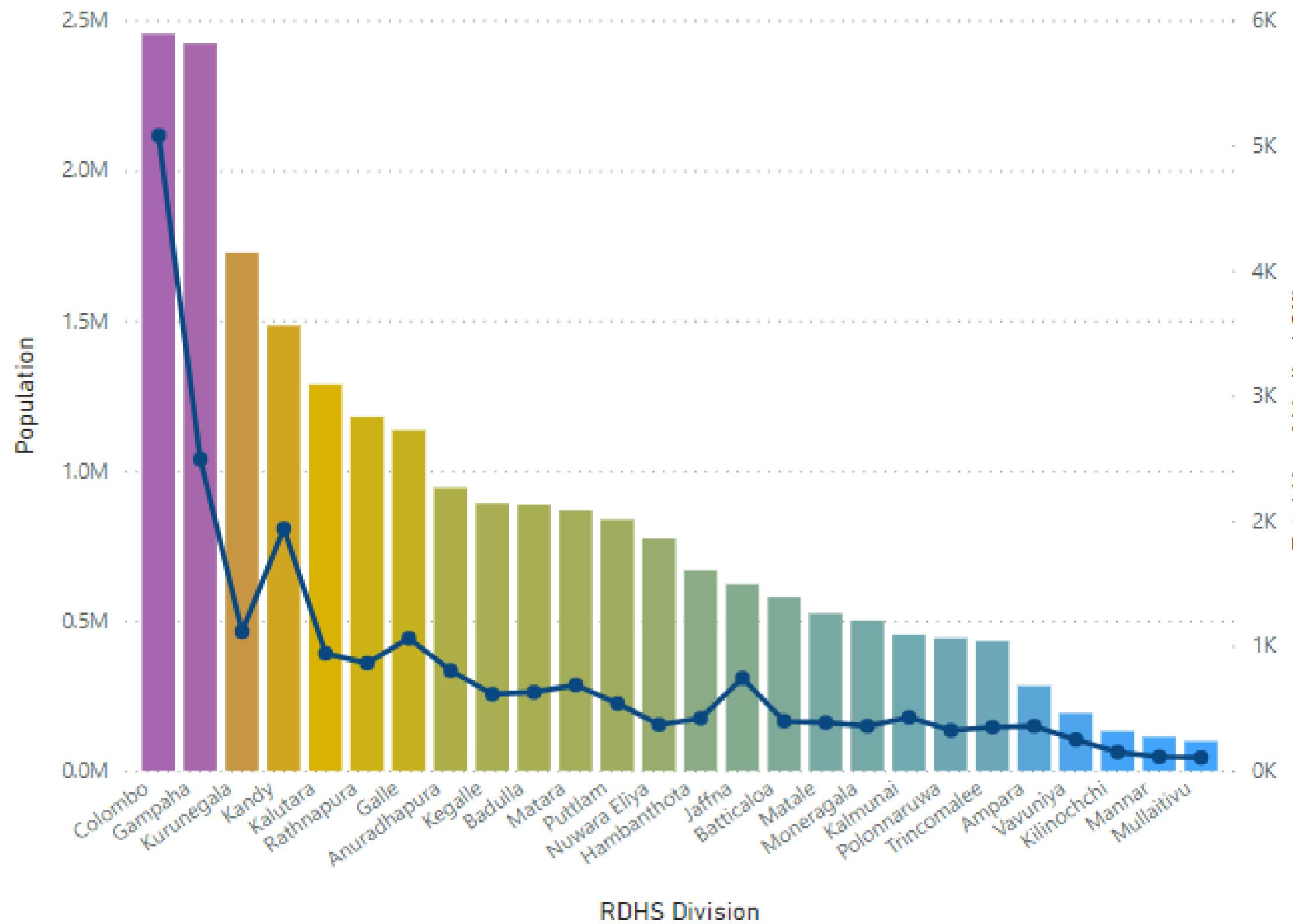
Distribution of Total No. of Medical Officers - 2020

RDHS Division

Multiple selections

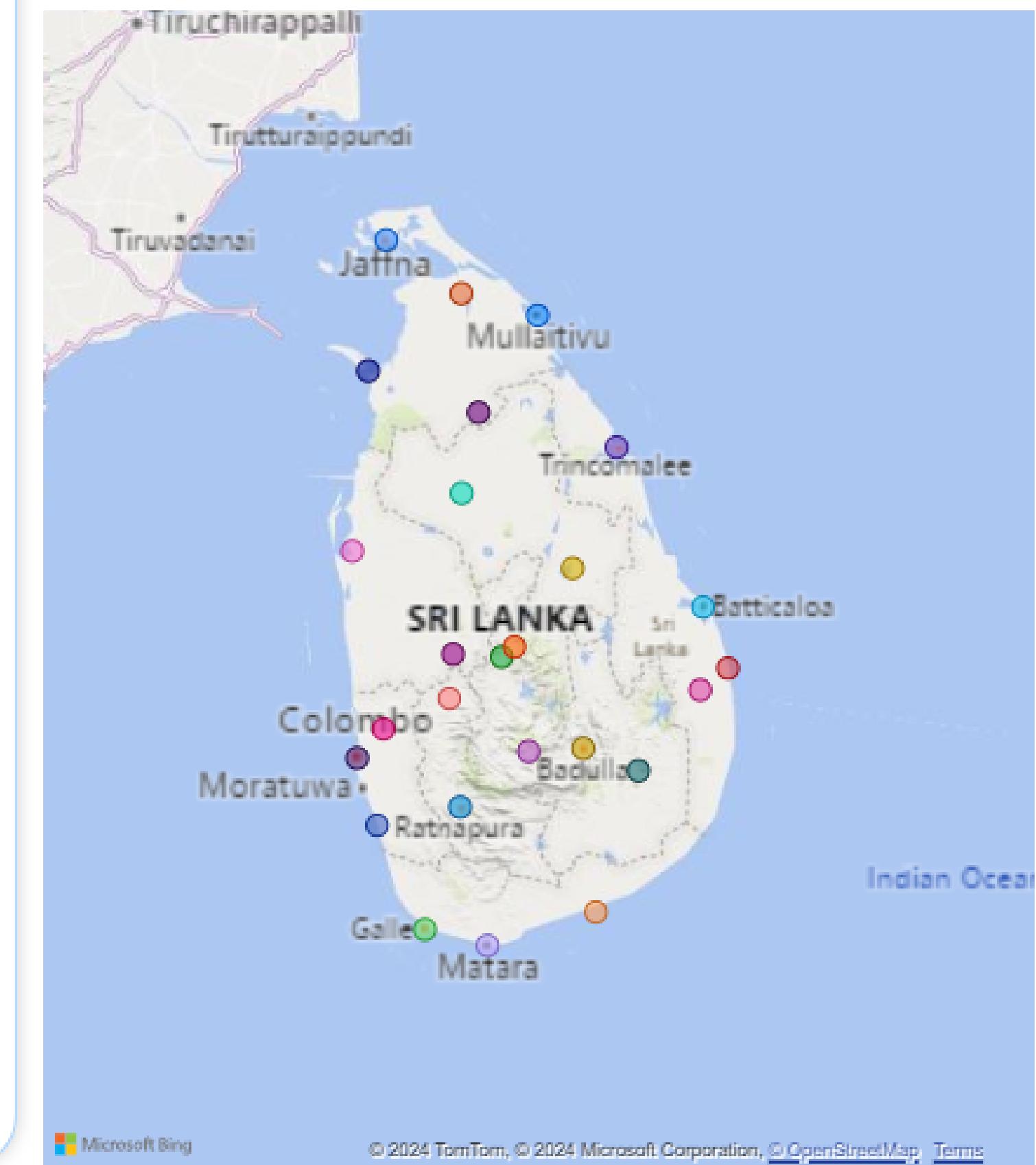
Population and Total No. of Medical Officers by RDHS Division

● Population ● Total No. of Medical Officers



RDHS Division and population

population ● 97551 ● 111930 ● 130823 ● 191322 ● 282484 ● 431562



O4. Operational Research Analysis

The World Health Report of 2006 suggests that countries with fewer than 23 physicians, nurses, and midwives per 10,000 population may find it challenging to achieve sufficient coverage for primary healthcare interventions

The WHO recommends a minimum of 2.5 medical staff (physicians, nurses, and midwives) per 1,000 people to ensure adequate coverage



World Health Organization

O4. Operational Research Analysis

Region	MO	Nurses	Mid Wives	Total	population	Medical Personnel Density (per 10,000 Population)	Adequacy of Medical Personnel(According to the 2006 world health report)	Adequacy of Medical Personnel(According to the WHO)
Colombo	5079	9893	716	15688	2455025	63.90	Adequate	Adequate
Gampaha	2490	3662	645	6797	2422450	28.06	Adequate	Adequate
Kalutara	938	2203	533	3674	1286864	28.55	Adequate	Adequate
Kandy	1936	4468	627	7031	1483105	47.41	Adequate	Adequate
Matale	384	663	227	1274	524601	24.29	Adequate	Inadequate
Nuwara Eliya	367	586	388	1341	773166	17.34	Inadequate	Inadequate
Galle	1058	3089	477	4624	1134947	40.74	Adequate	Adequate
Matara	684	2146	370	3200	866488	36.93	Adequate	Adequate
Hambanthota	419	1504	314	2237	667615	33.51	Adequate	Adequate
Jaffna	739	1051	238	2028	621335	32.64	Adequate	Adequate
Kilinochchi	147	146	65	358	130823	27.37	Adequate	Adequate
Mannar	110	181	93	384	111930	34.31	Adequate	Adequate
Vavuniya	247	393	91	731	191322	38.21	Adequate	Adequate
Mullaithivu	104	131	77	312	97551	31.98	Adequate	Adequate
Batticaloa	396	1276	261	1933	578828	33.40	Adequate	Adequate
Ampara	356	1206	178	1740	282484	61.60	Adequate	Adequate
Trincomalee	347	641	209	1197	431562	27.74	Adequate	Adequate
Kalmunai	426	855	307	1588	454081	34.97	Adequate	Adequate
Kurunegala	1112	2605	625	4342	1725808	25.16	Adequate	Adequate
Puttalam	537	802	282	1621	836878	19.37	Inadequate	Inadequate
Anuradhapura	800	1932	418	3150	942892	33.41	Adequate	Adequate
Polonnaruwa	321	793	196	1310	442573	29.60	Adequate	Adequate
Badulla	627	1893	432	2952	886349	33.31	Adequate	Adequate
Moneragala	356	675	252	1283	500330	25.64	Adequate	Adequate
Rathnapura	859	2195	459	3513	1179566	29.78	Adequate	Adequate
Kegalle	611	1396	337	2344	890840	26.31	Adequate	Adequate
Sri Lanka	21450	46385	8817	76652	21919413	34.97	Adequate	Adequate

Matale

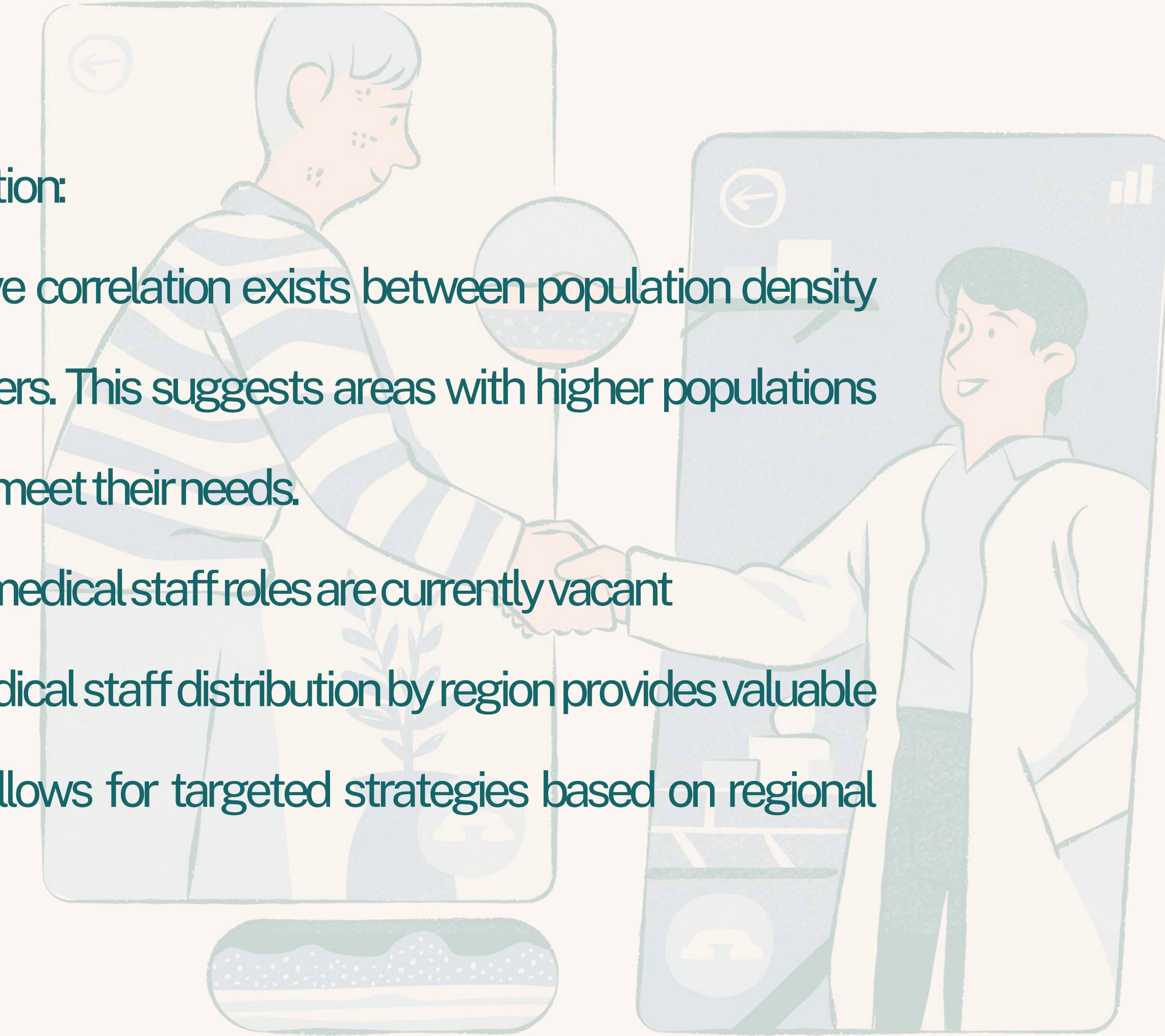
Nuwara Eliya

Puttalam

06. Conclusion

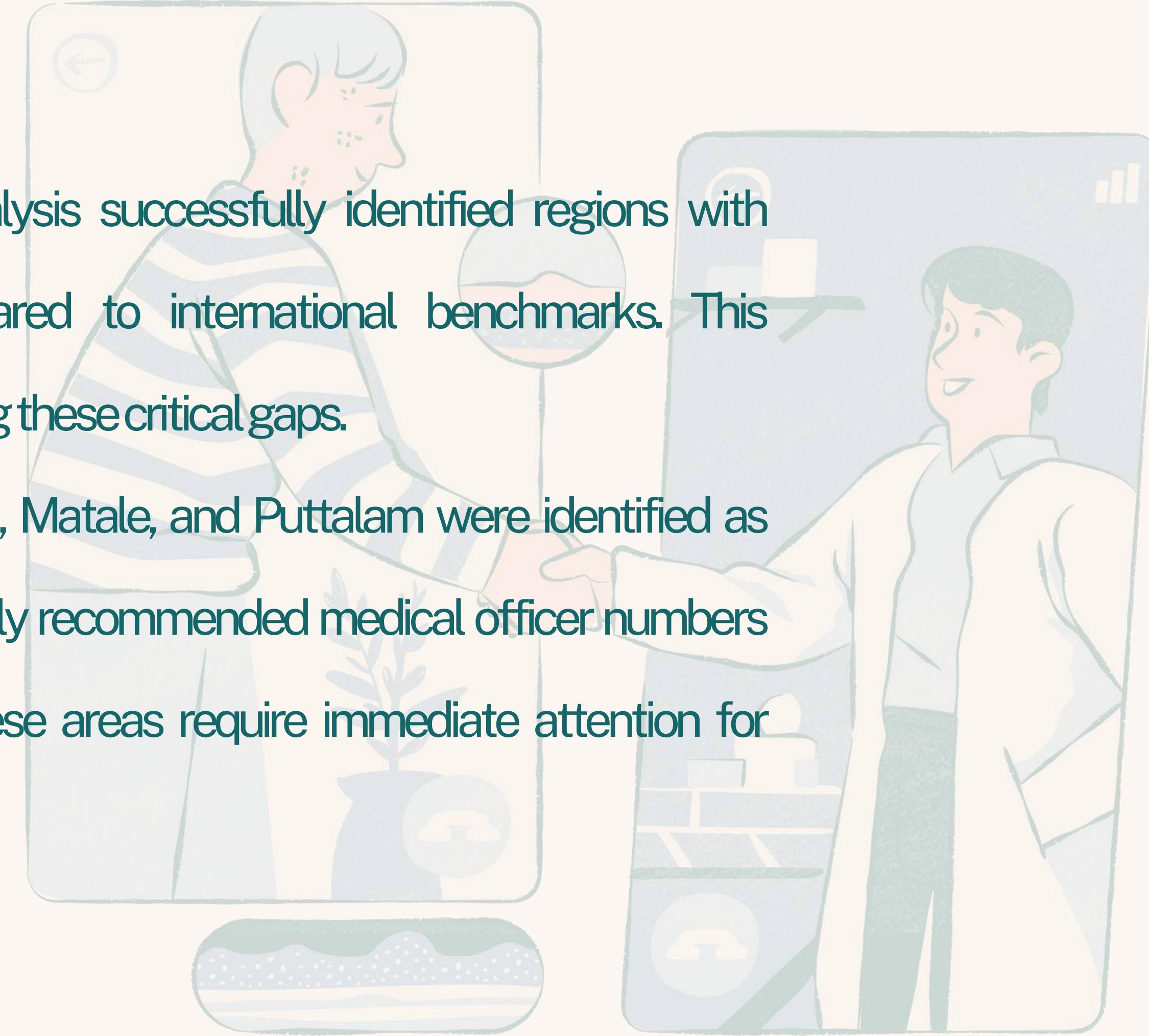
Key Findings on Medical Staff Distribution:

- **Population Correlation:** A positive correlation exists between population density and the number of medical officers. This suggests areas with higher populations have more medical staff, likely to meet their needs.
- Identified regions where specific medical staff roles are currently vacant
- **Grouping Benefits:** Grouping medical staff distribution by region provides valuable insights for policymakers. This allows for targeted strategies based on regional similarities.



06. Conclusion

- **Shortage Identification:** The analysis successfully identified regions with medical staff shortages compared to international benchmarks. This information is crucial for addressing these critical gaps.
- **Specific Examples:** Nuwara Eliya, Matale, and Puttalam were identified as regions falling below internationally recommended medical officer numbers based on population density. These areas require immediate attention for improvement.



References

- Abeysinghe, A. (2023, March 4). *Paediatric wards close as more medical specialists leave the country*. SRI LANKA. <https://www.asianews.it/news-en/Paediatric-wards-close-as-more-medical-specialists-leave-the-country-58106.html>
- Alwis , I. (2023, July 24). *Sri Lanka's exodus of Healthcare Workers*. Himal Southasian. <https://www.himalmag.com/comment/sri-lanka-healthcare-governance-workers-migration-economic-crisis#:~:text=Following%20Sri%20Lanka's%20economic%20crisis,health%20equity%20in%20the%20country.>
- Embogama, D. (2023, November 13). *Amidst severe doctor shortage Anuradhapura hospitals face closure*. Daily Mirror - Print Edition. <https://www.dailymirror.lk/print/front-page/Amidst-severe-Doctor-shortage-Anuradhapura-Hospitals-face-closure/238-271149>
- Gunasekara, S. (2023, July 1). *Critical shortage of specialist doctors: Urgent measures needed to retain healthcare professionals*. Latest in the News Sphere | The Morning. <https://www.themorning.lk/articles/C008J5sluhrCUTtp8xRS>

References

Madhavi, W. D. S. (2023, December 20). *Doctors' brain drain: Health security concern in Sri Lanka*. Ministry of Defence - Sri Lanka. https://www.defence.lk/Article/view_article/27725

Metadata Glossary. Databank. (n.d.). [https://databank.worldbank.org/metadataglossary/health-nutrition-and-population-statistics/series/SH.MED.NUMW.P3#:~:text=The%20WHO%20estimates%20that%20at,%2C%20World%20Health%20Report%202006\).&text=The%20WHO%20compiles%20data%20from,%2C%20censuses%2C%20and%20administrative%20records.](https://databank.worldbank.org/metadataglossary/health-nutrition-and-population-statistics/series/SH.MED.NUMW.P3#:~:text=The%20WHO%20estimates%20that%20at,%2C%20World%20Health%20Report%202006).&text=The%20WHO%20compiles%20data%20from,%2C%20censuses%2C%20and%20administrative%20records.)

Rajawasam, N. (2023, November 28). *100 Sri Lanka Hospitals on verge of closure due to doctor shortage*. EconomyNext. <https://economynext.com/100-sri-lanka-hospitals-on-verge-of-closure-due-to-doctor-shortage-141703/>

World Health Organization. (2006). (rep.). *Working together for health : The World Health Report 2006*. Retrieved from https://iris.who.int/bitstream/handle/10665/69256/WHR06_overview_eng.pdf?sequence=1.

Q&A



Thank you