UTTAR PRADESH
TECHNICAL SUPPORT UNIT

An empirical analysis of dengue disease pattern in Uttar Pradesh, India using unified disease surveillance platform data (May'2023 to Dec'2024)

17-07-2025

2025 Southeast Asian Stata Conference
17 July | Bangkok

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Content

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- Data and analysis
- Key findings
  - Geographical clustering of dengue disease pattern
  - Testing pattern and case positivity by profile
  - Disease progression over time and place
  - Disease outbreak
- Conclusion

Context

- Dengue epidemics are now common occurrences in India and across Asia posing a significant public health challenge
- Rapid urbanization, poor water storage, and inefficient waste management are fueling mosquito breeding in densely populated areas
- Rising temperatures and erratic rainfall are extending the breeding season of Aedes aegypti, the primary dengue vector.
- A real-time disease surveillance platform is crucial for timely detection, monitoring, and response to outbreaks
- The insights from this study will help in **detecting and confirming disease outbreaks** at the micro (village/ward) level for immediate response, **identifying districts with suboptimal testing coverage** and **enquiring facilities/labs that are not conducting tests** enabling targeted interventions to improve diagnostic efforts

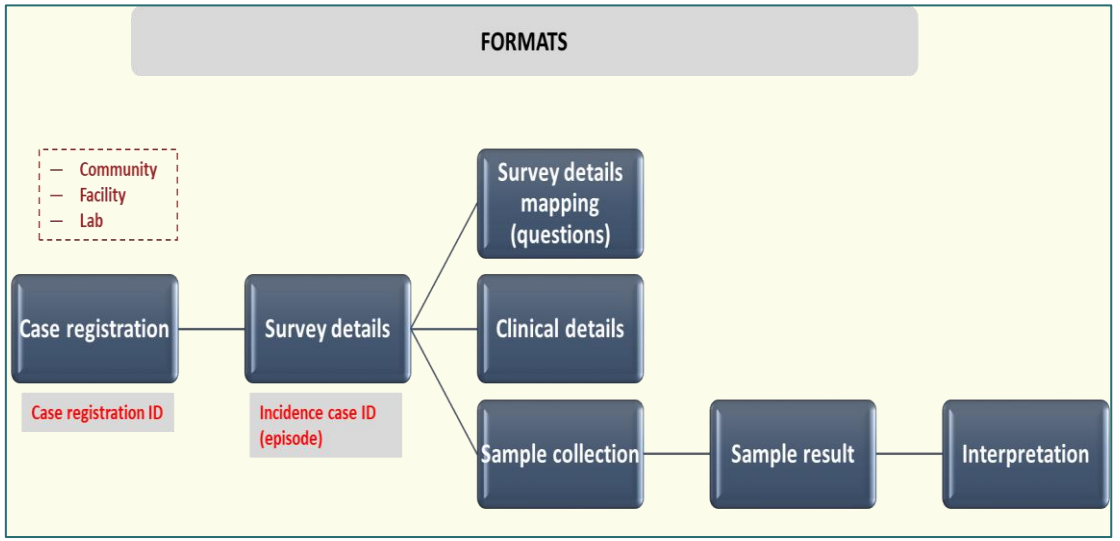
Data

- This study utilized the dengue surveillance data from the **Unified Disease Surveillance Platform (UDSP)** for period **May'2023 to Dec'2024** in Uttar Pradesh, India

- The platform integrates community, facility and lab-based surveillance, enabling real-time disease monitoring

- Data helps determine the disease outbreaks and send triggers based on alerts to the disease surveillance team for immediate actions to curtail the spread of the outbreak

UDSP data structure



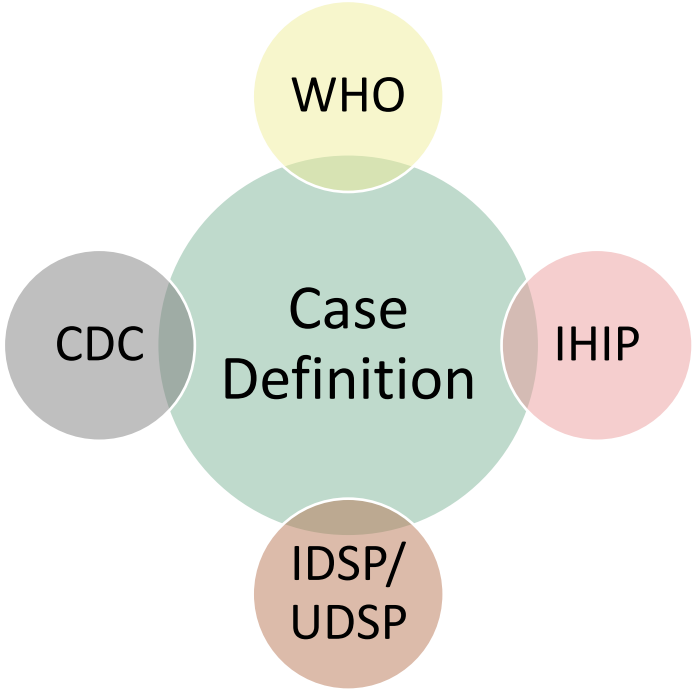
- ❑ There are a total of 154 tables including **data tables**, **master tables** (identifier, variables, categories etc) and **mapping** tables (linking questions to symptom, symptom to test, test to disease)
- ❑ All the tables contain system generated ID and that helps in building the linkages between various tables.

Analysis

- This present study analysed dengue disease case positivity and testing patterns over **PLACE, PERSON, TIME** approach and depicts:
  - PLACE: Geographical clustering of dengue case positivity and testing patterns
  - PERSON: Profile of individuals tested for Dengue and positivity by characteristics
  - TIME: Disease progression over time (epi-curve) and place
  - Disease outbreak

- STATA was used for data extraction from online portal and analysis. The results are visualized using STATA's unique features, such as spmap for mapping and two-way graphs for graphical representation

Sources used to 'refer' case definition



Case definition

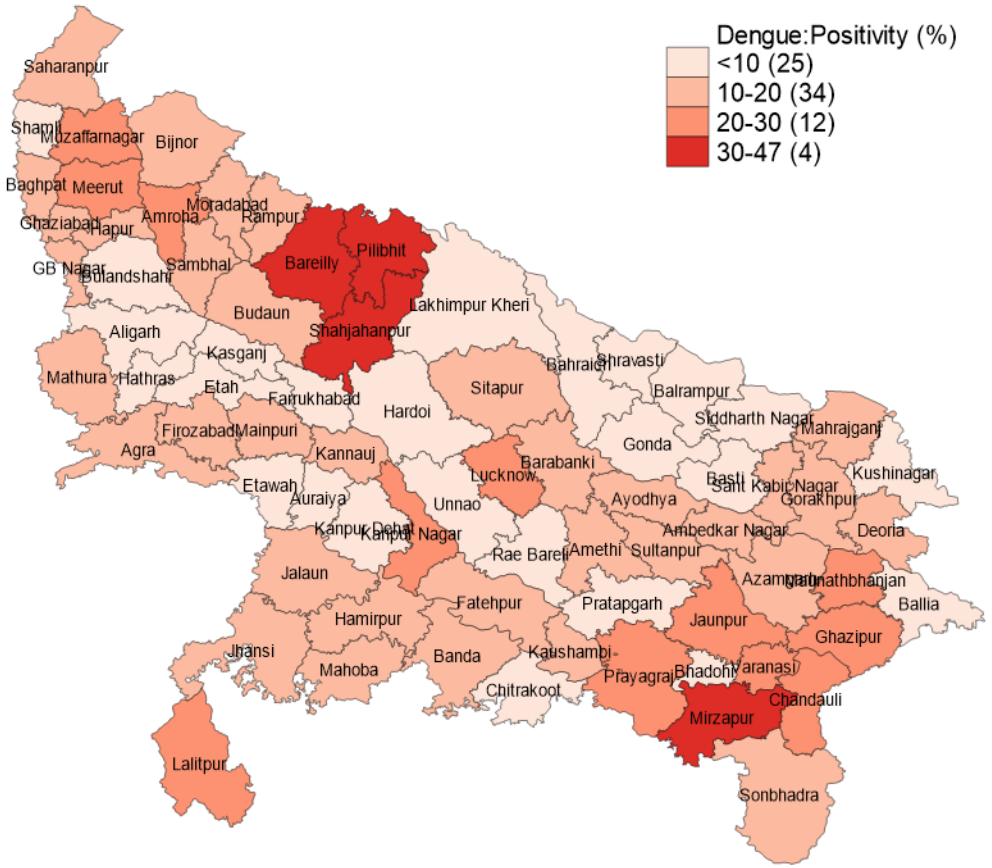
The present analysis is based on 5,59,392 tests with a confirmed lab based test result (positive/negative) by any of the four methods IgM; NS1-Elisa; PCR(Qualitative); NS1-RDT/antigen)

District-level clustering of dengue positivity and testing

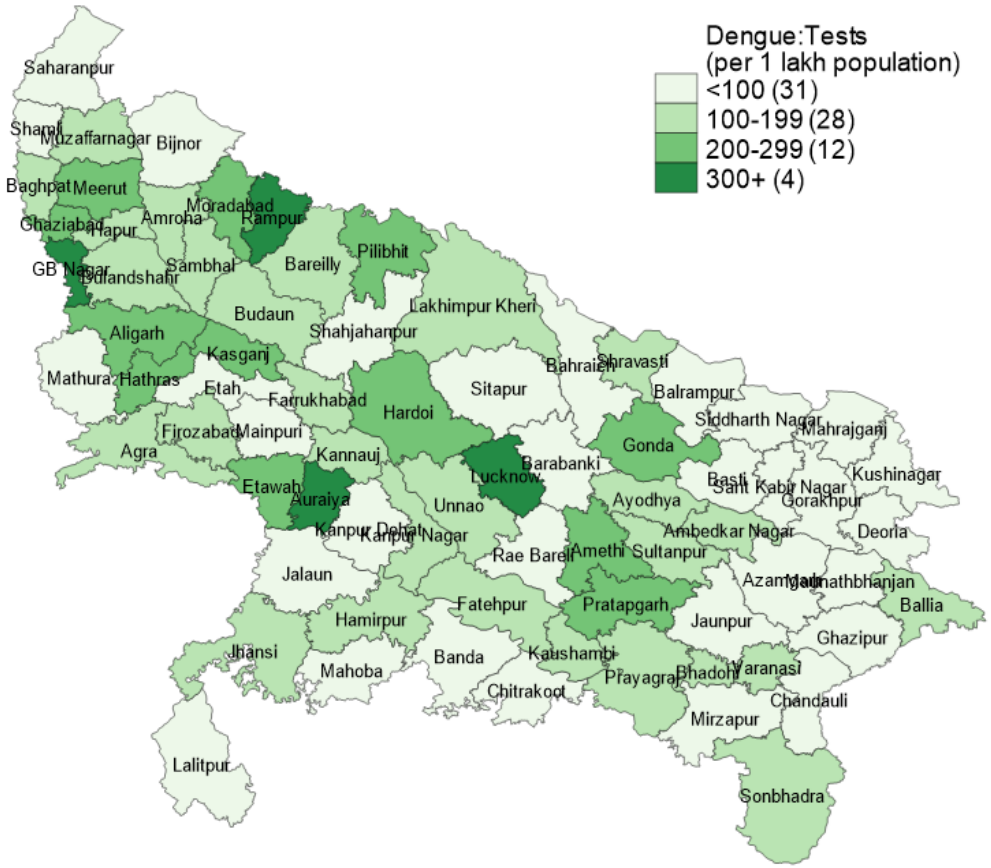
Overall positivity: **14.6%**

Total tests done per 1 lakh population: **140**

Dengue positivity (%) across districts in Uttar Pradesh



Dengue testing rate (per 1 lakh population) across districts in Uttar Pradesh



Wide heterogeneity in dengue tests done per 1 lakh population

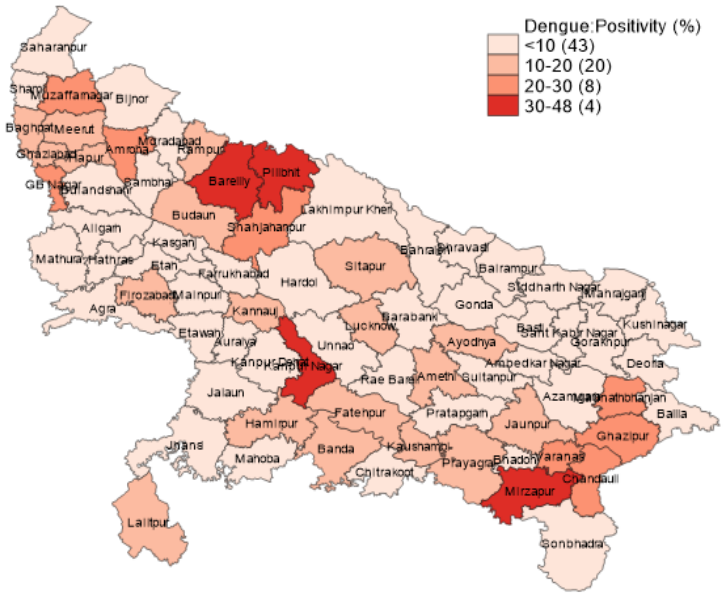
District-level clustering of dengue positivity and testing by Rural and Urban

Positivity (%)
- Overall: 14.6%
- Rural: 10.0%
- Urban: 20.5%

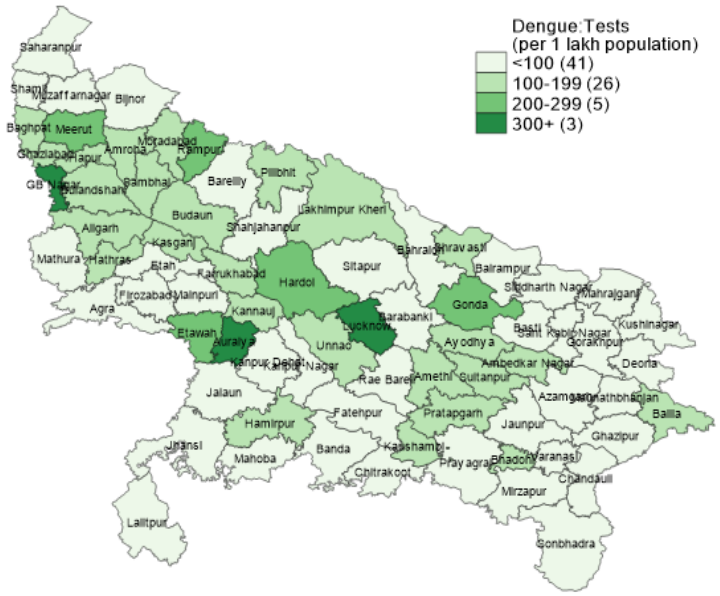
Tests done per 1 lakh population:
- Overall: 140
- Rural: 103
- Urban: 255

Urban dengue positivity rate is double of rural areas and testing is also more than two times compared to rural.

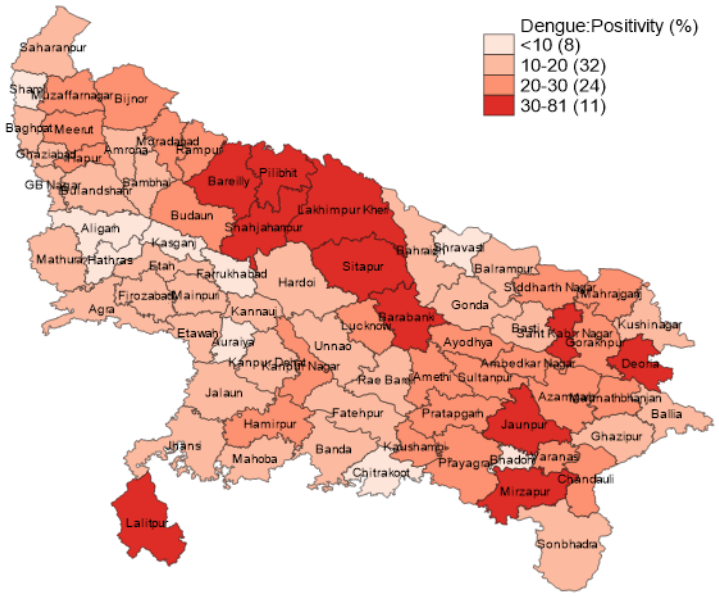
Rural positivity (%)



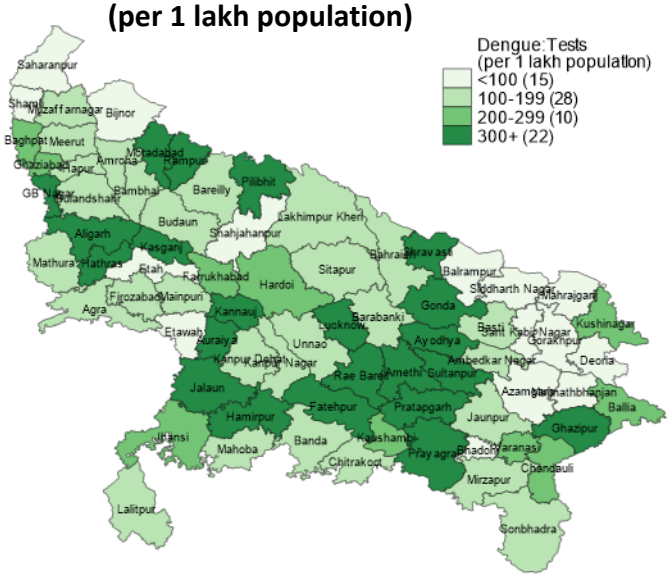
Rural testing



Urban positivity (%)

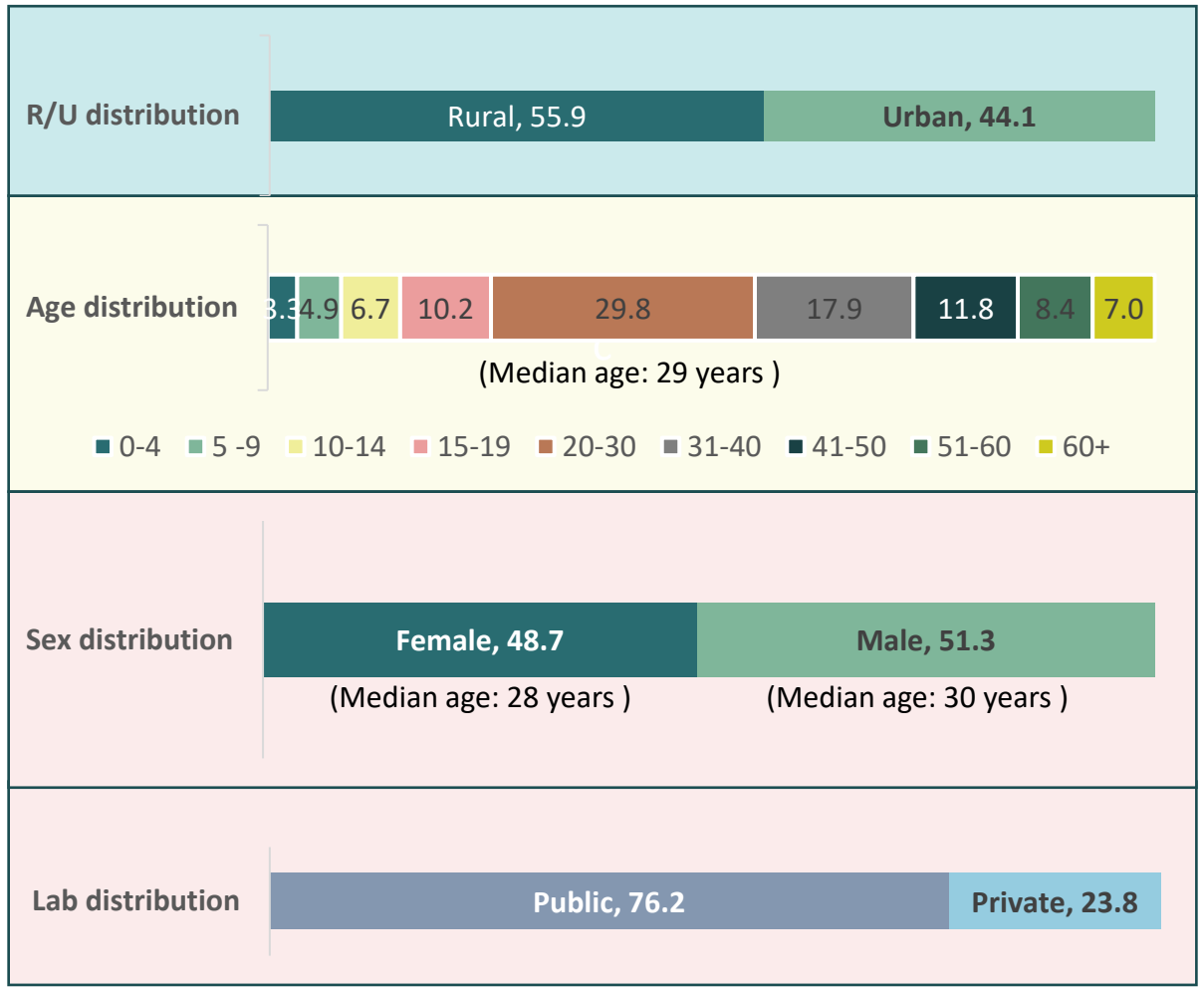


Urban testing (per 1 lakh population)

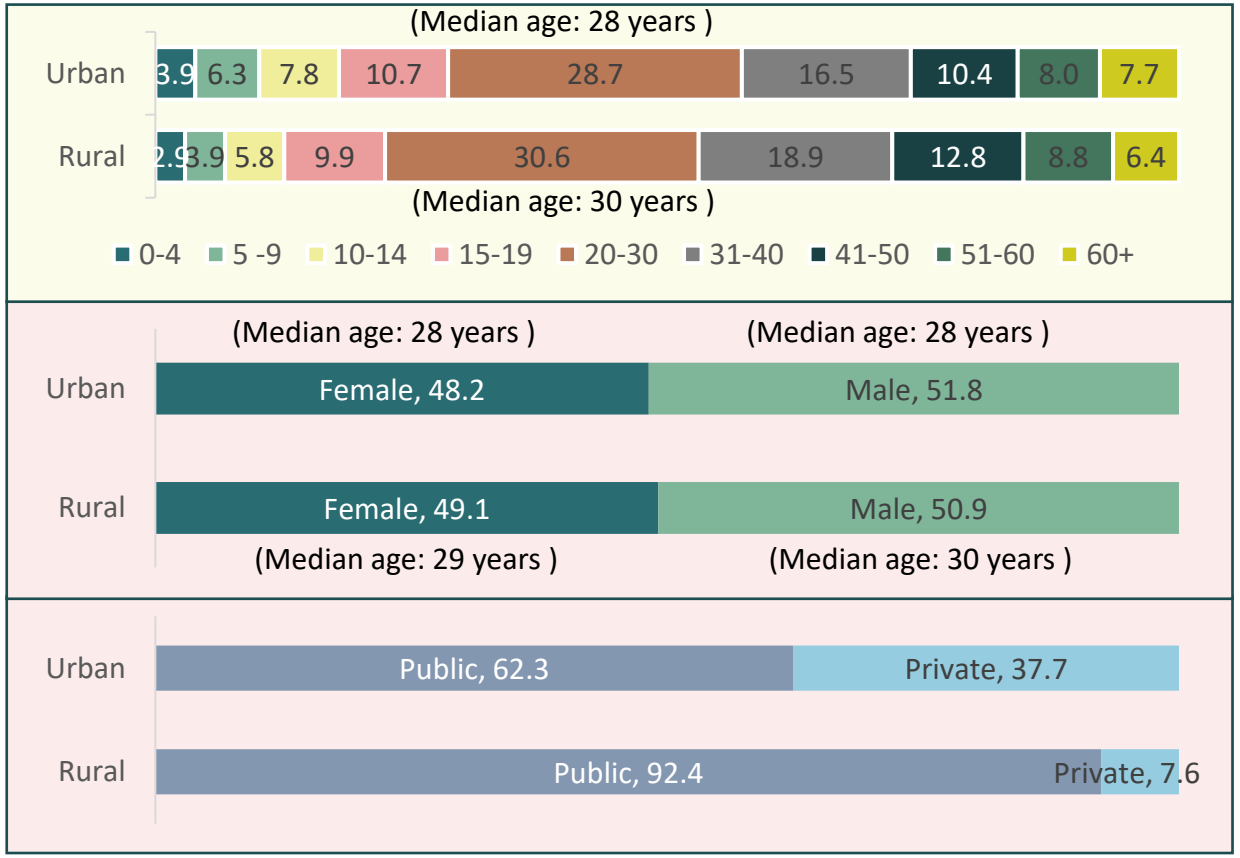


Profile distribution of dengue tests

Profile distribution of tests

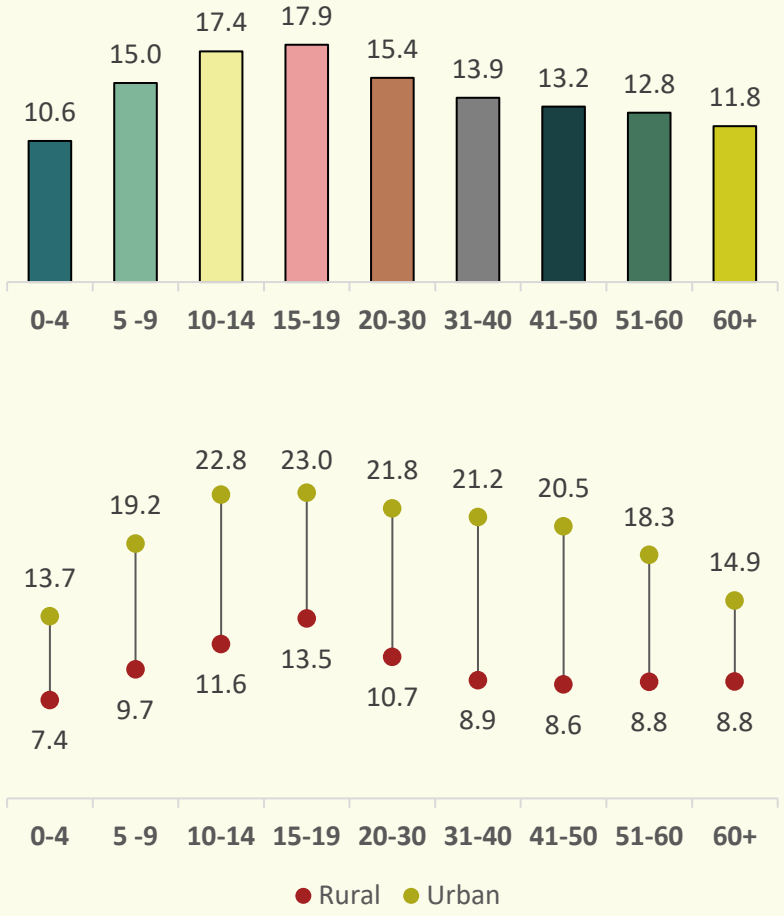


Profile of tests stratified by location

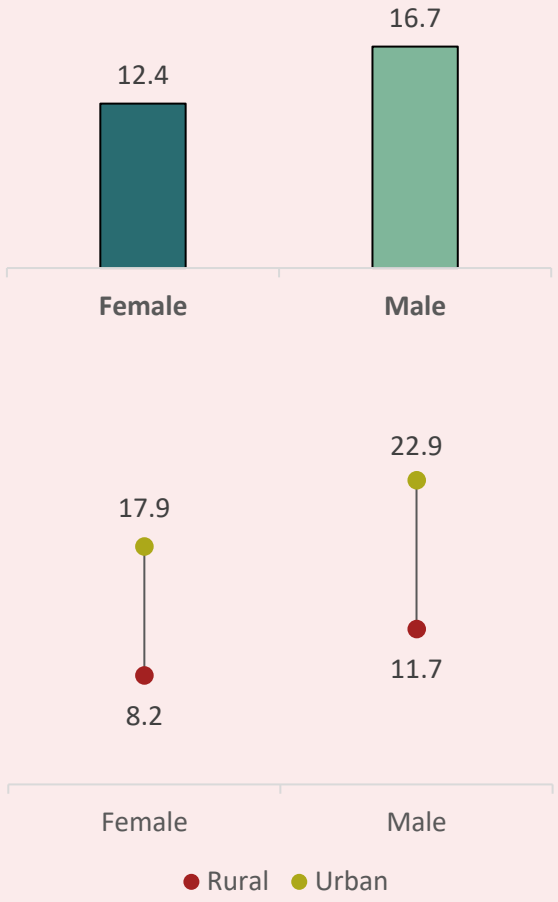


Dengue positivity: Higher in younger ages and among men mostly in urban areas

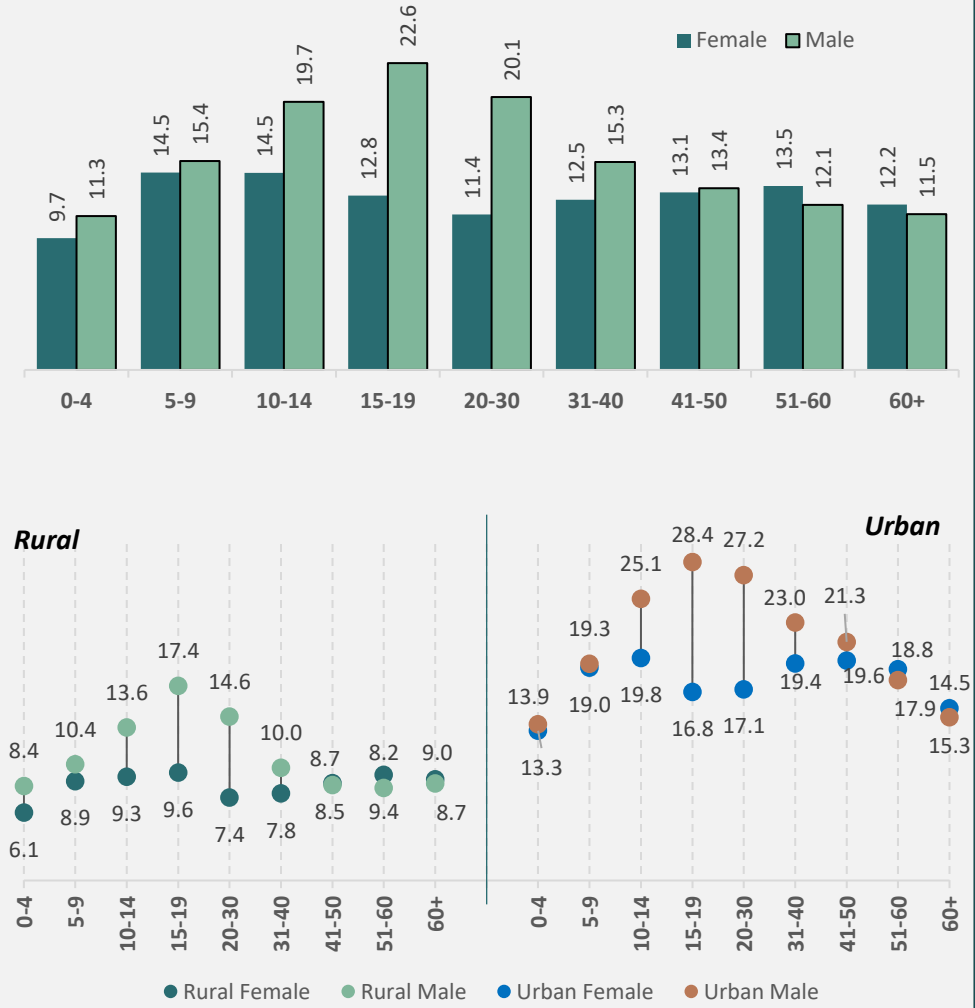
Positivity rate (%) by age



Positivity rate (%) by sex



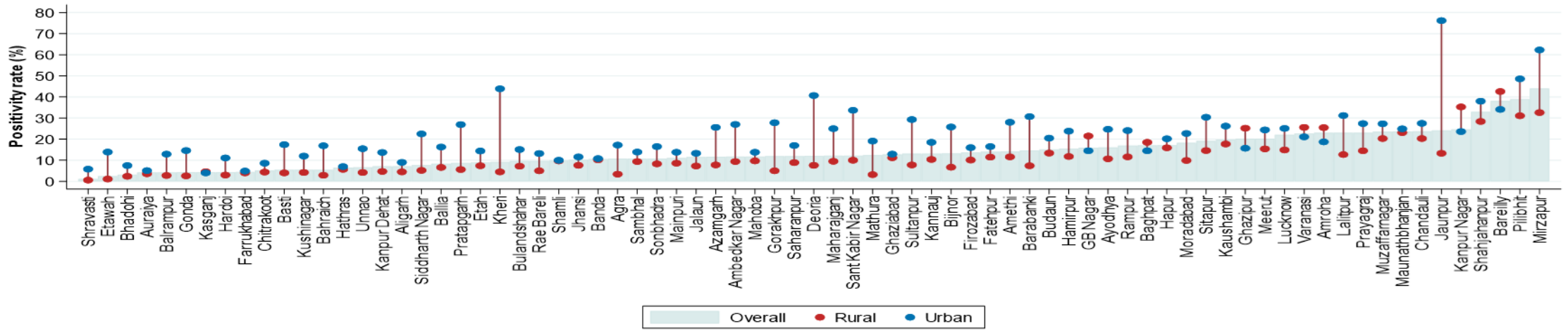
Positivity rate (%) by age and sex



District-wise R/U differentials in tests and positivity rate

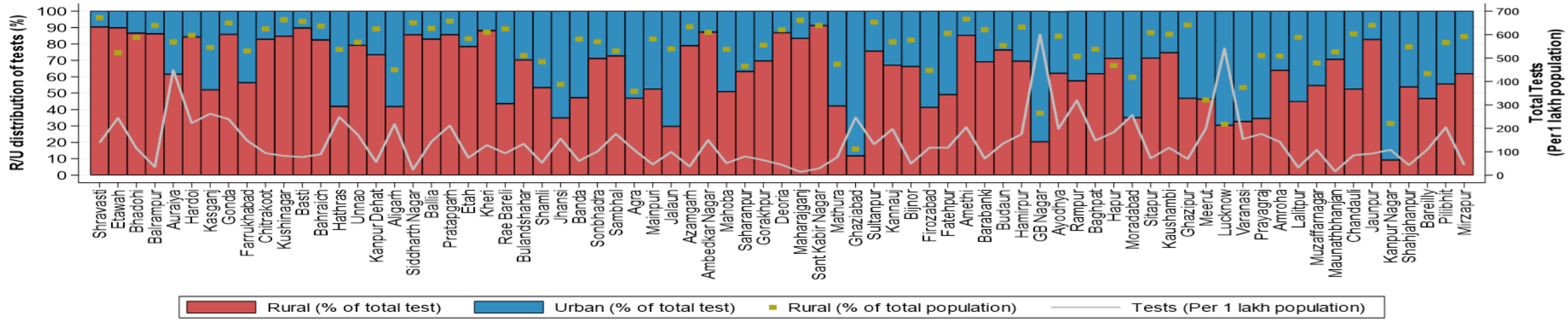
Positivity by R/U (%)

UP [Overall: 14.6% | Rural: 10.0% | Urban: 20.5%]

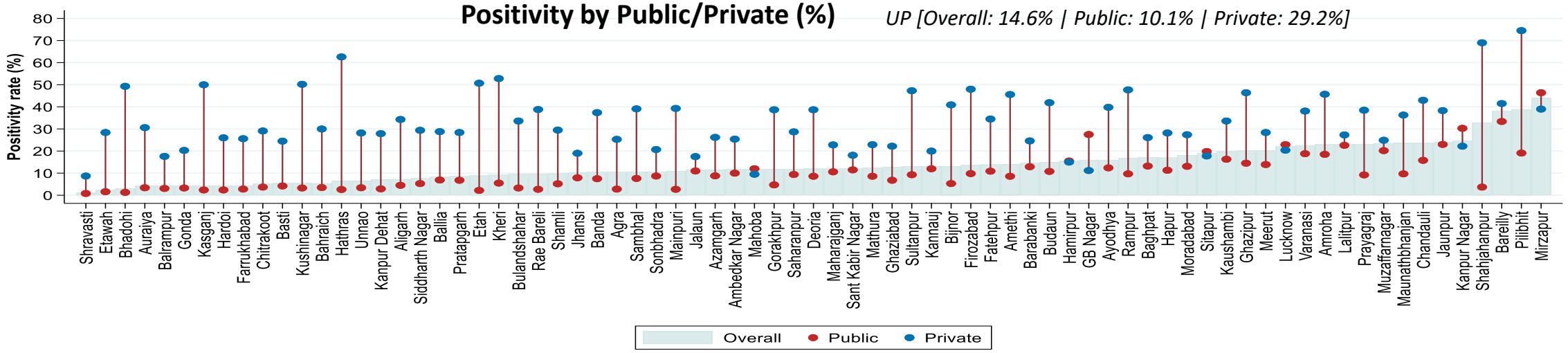


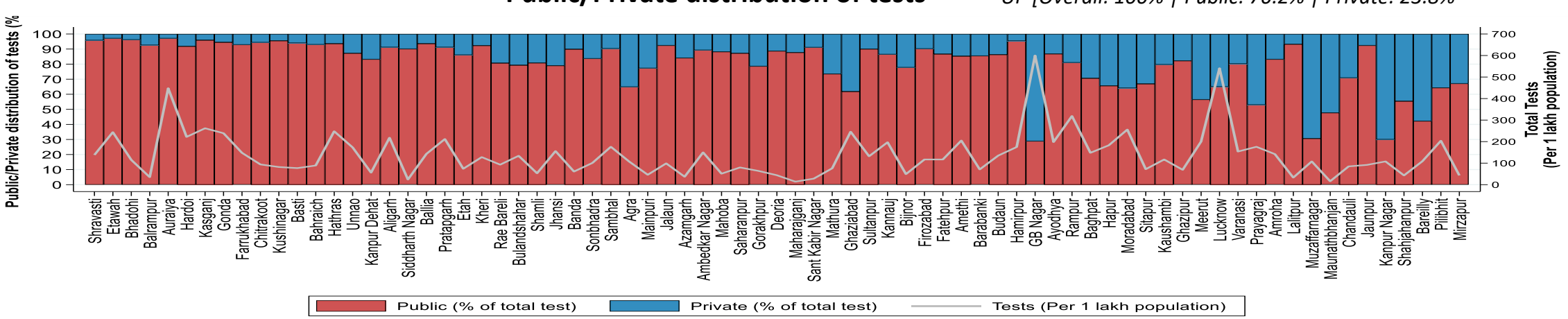
R/U distribution of tests

UP [Overall: 100% | Rural: 55.9% | Urban: 44.1% | Rural population: 76%]



District-wise lab-type differentials in tests and positivity rate





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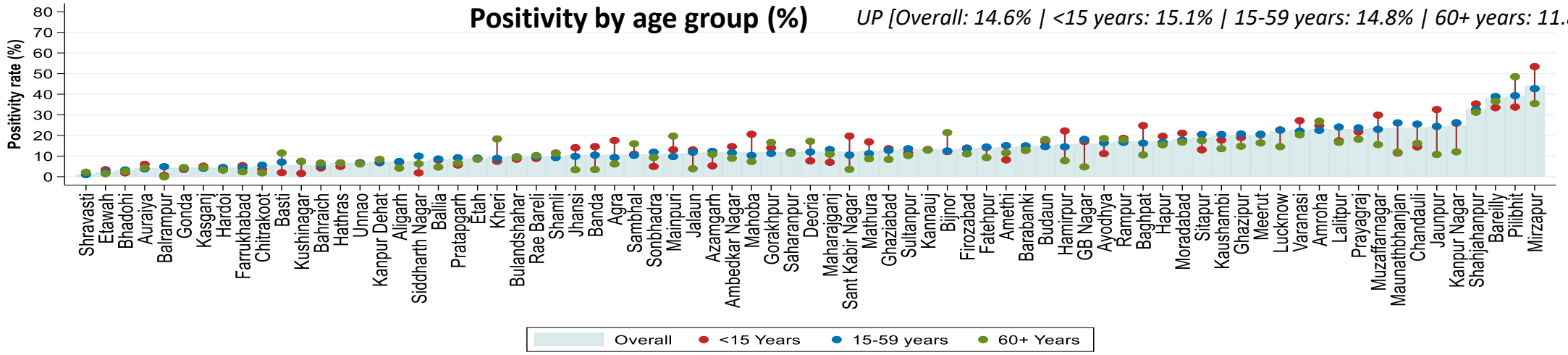
District-wise age group differentials in tests and positivity rate

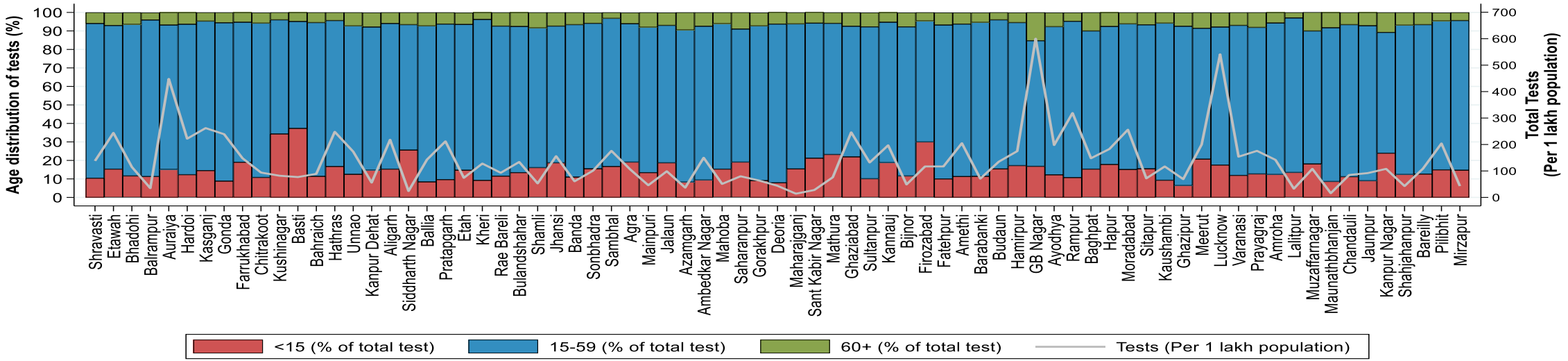
Positivity by age group (%)

UP [Overall: 14.6% | <15 years: 15.1% | 15-59 years: 14.8% | 60+ years: 11.8%]

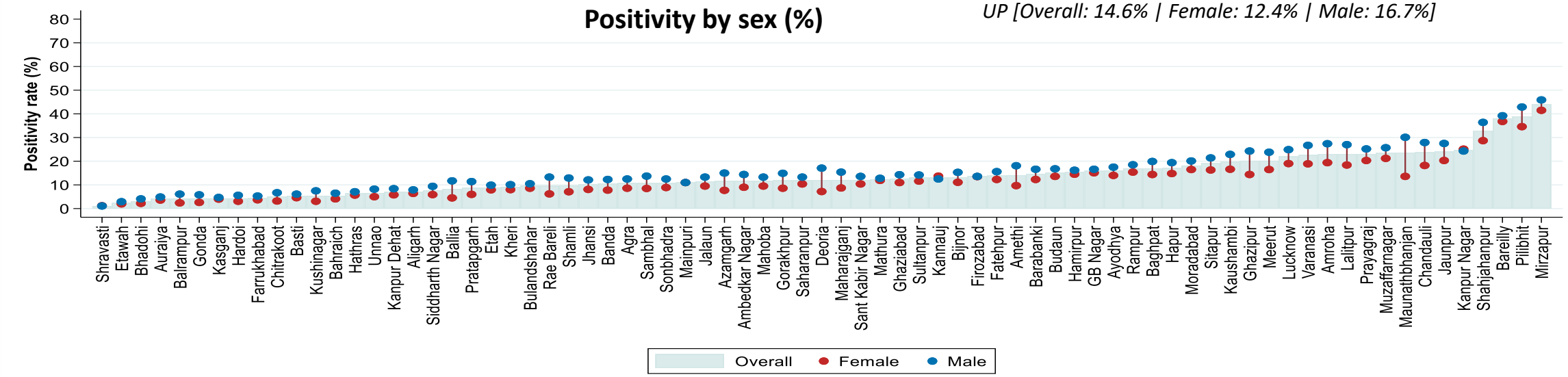


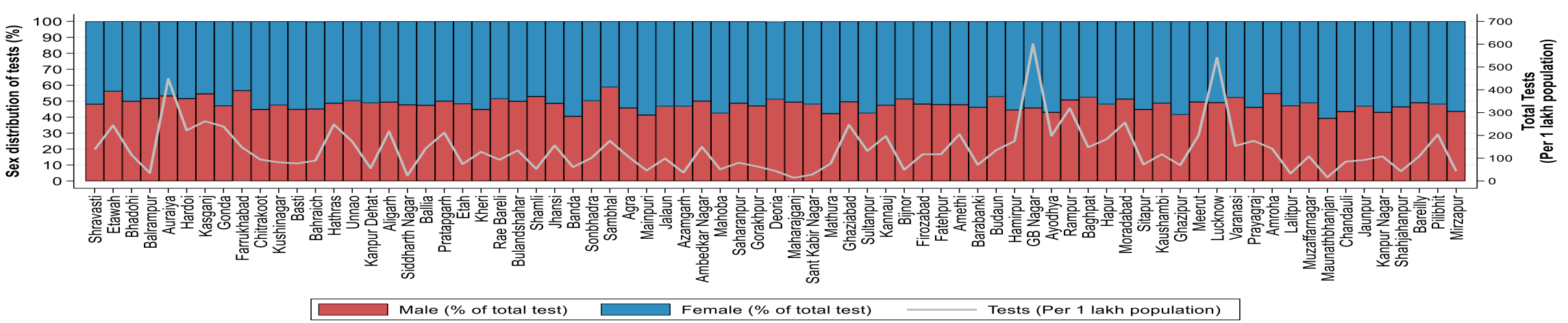
Age distribution of tests

UP [Overall: 100% | <15 years: 14.9% | 15-59 years: 78.0% | 60+ years:7.0%]



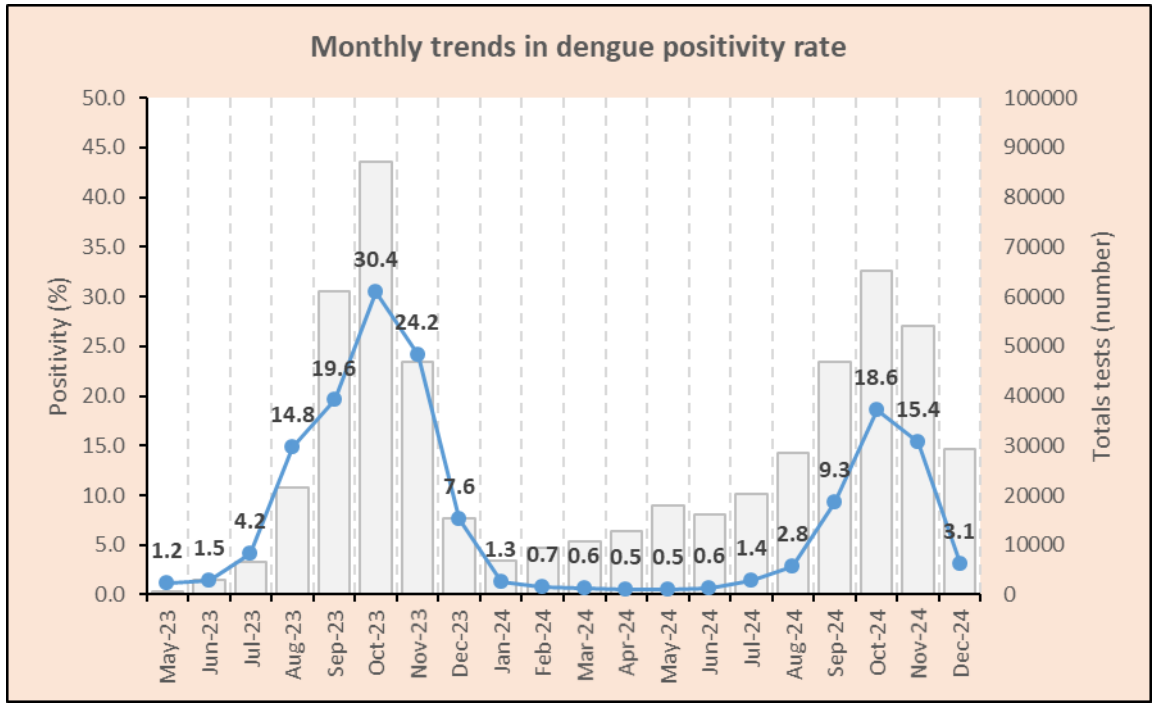
District-wise sex differentials in tests and positivity rate

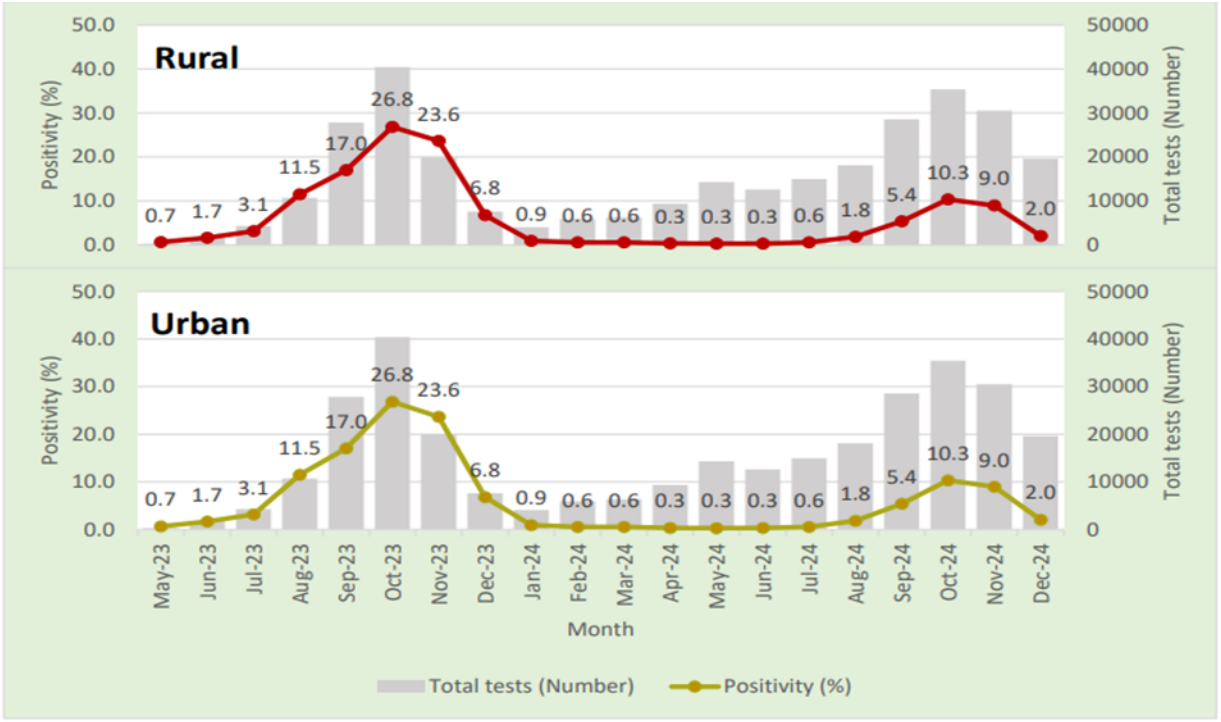




Epi-curve of dengue positivity

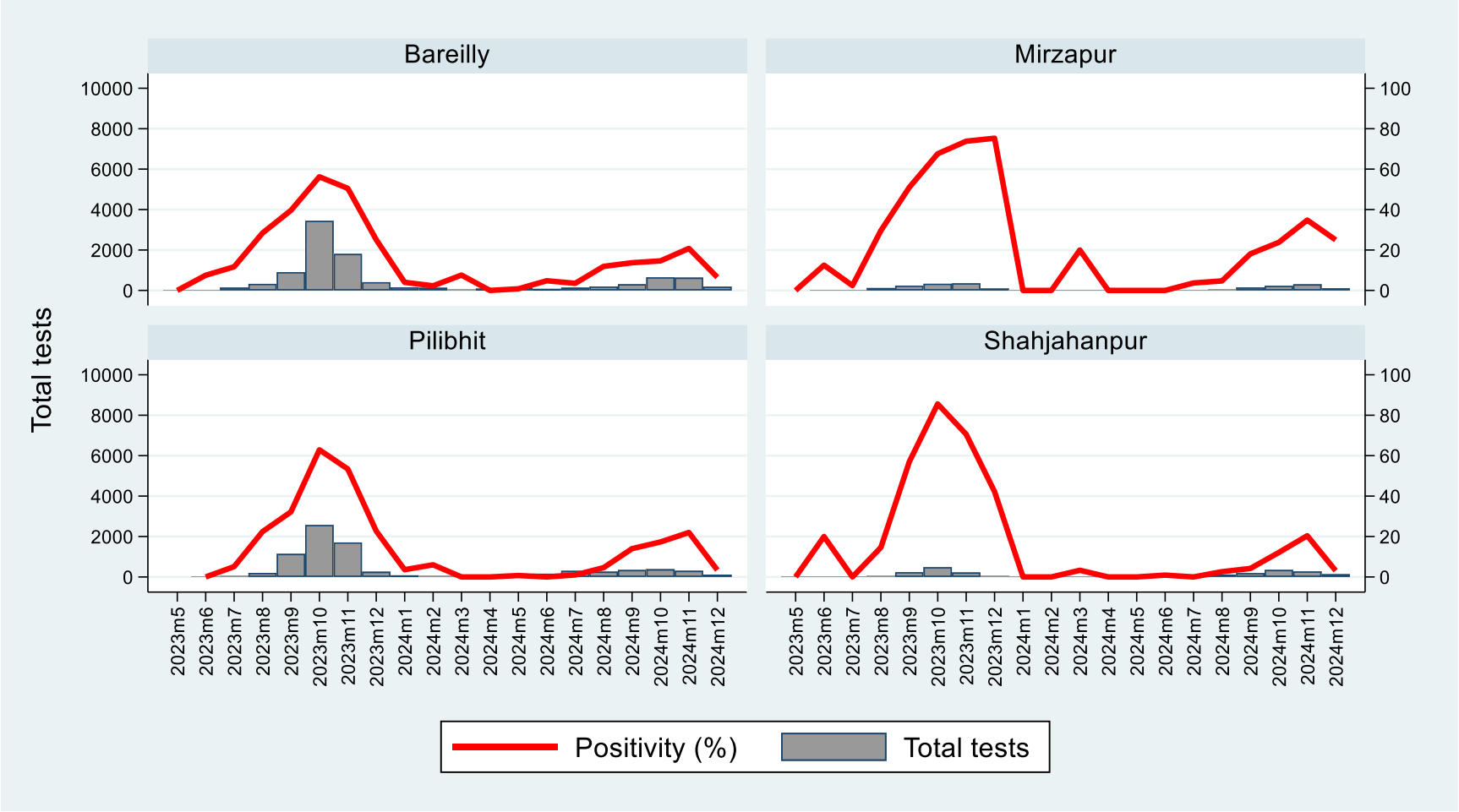
Monthly trends in dengue positivity rate (Overall)





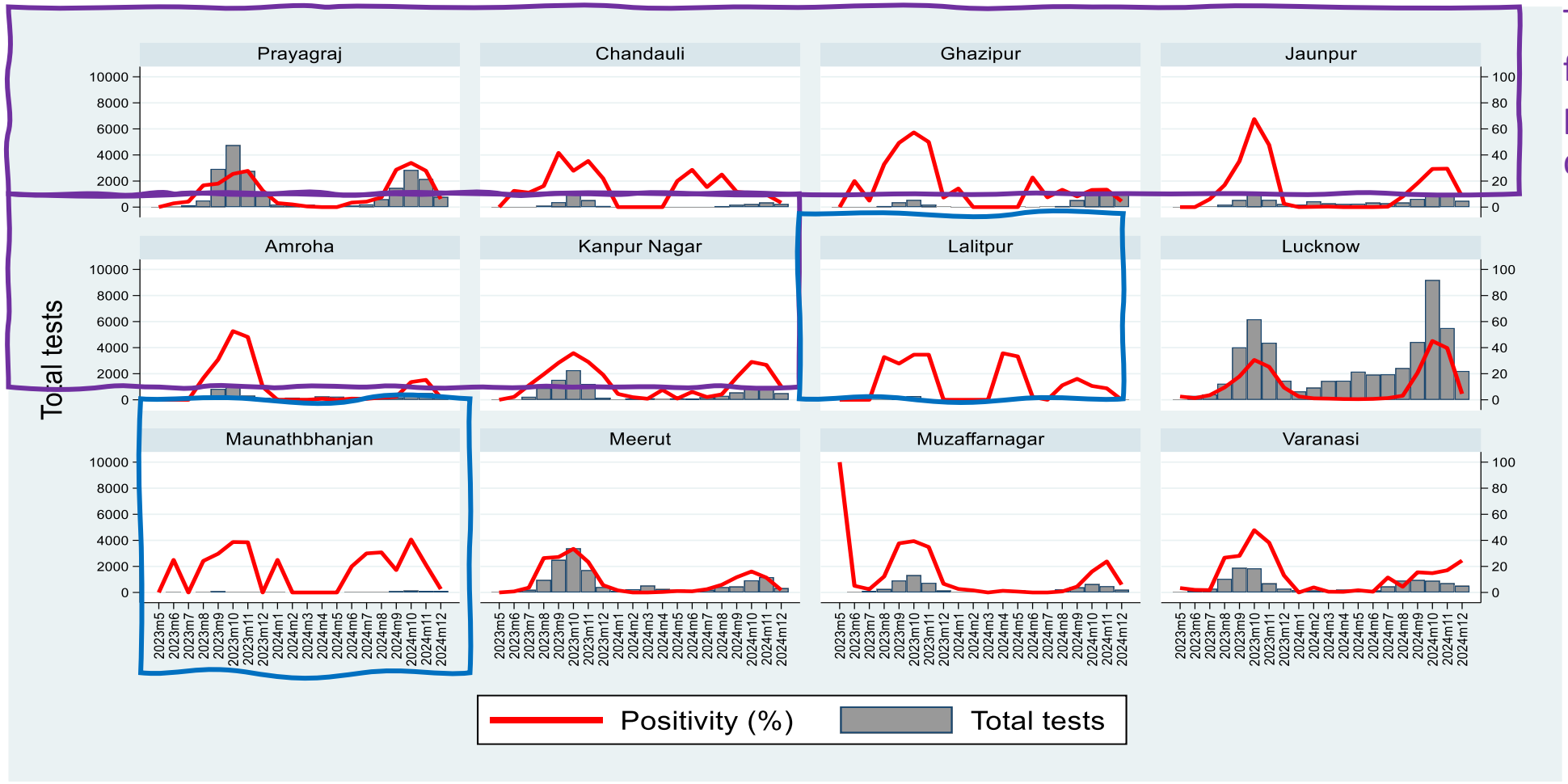
- Disease peaked during October-2023 with some differences in urban and rural locations
- Overall dengue cases appears to be lower in 2024 as compared to 2023
- Number of public labs conducting dengue test increased from 1949 in 2023 to 9835 in 2024, while a slight decline observed in private lab reporting in 2024 (661 to 531 during 2023 and 2024)
- More prevention strategies could be planned in lean months (Feb-May) for better prevention

Dengue: District positivity >=30%



While test positivity rates are high in Mirzapur and Shahjahanpur; less tests were conducted during peak season compared to rest of the two districts

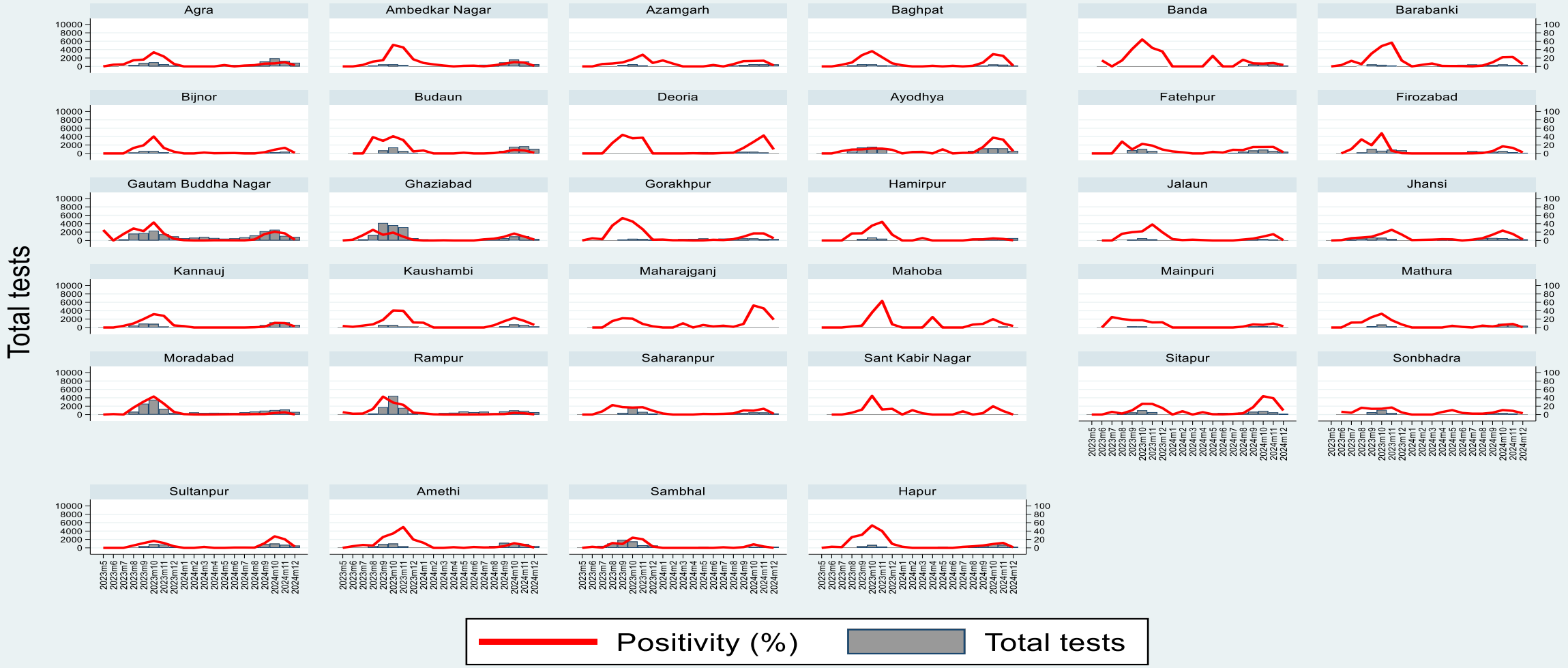
Dengue: District positivity 20 -30%



These districts followed overall pattern of disease spread

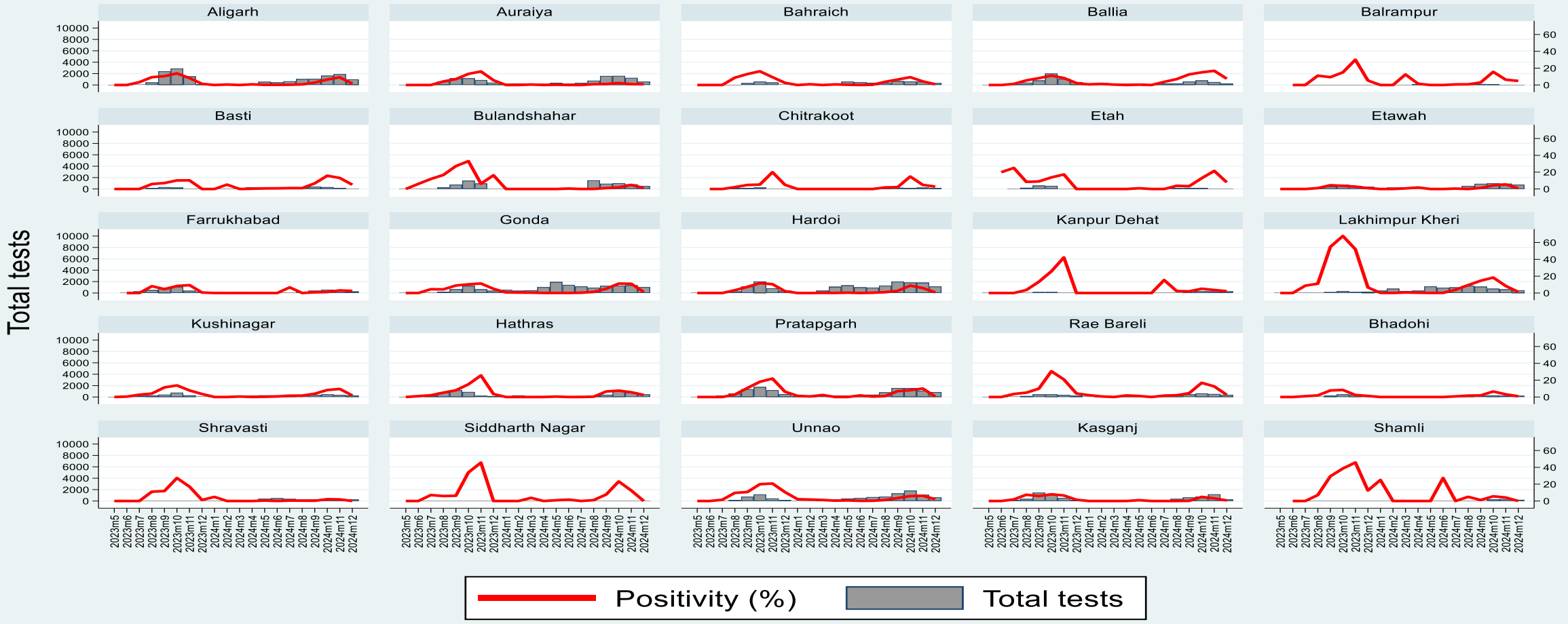
Lalitpur and Mau had multiple episodes with very less testing

Dengue: District positivity 10 – 20%



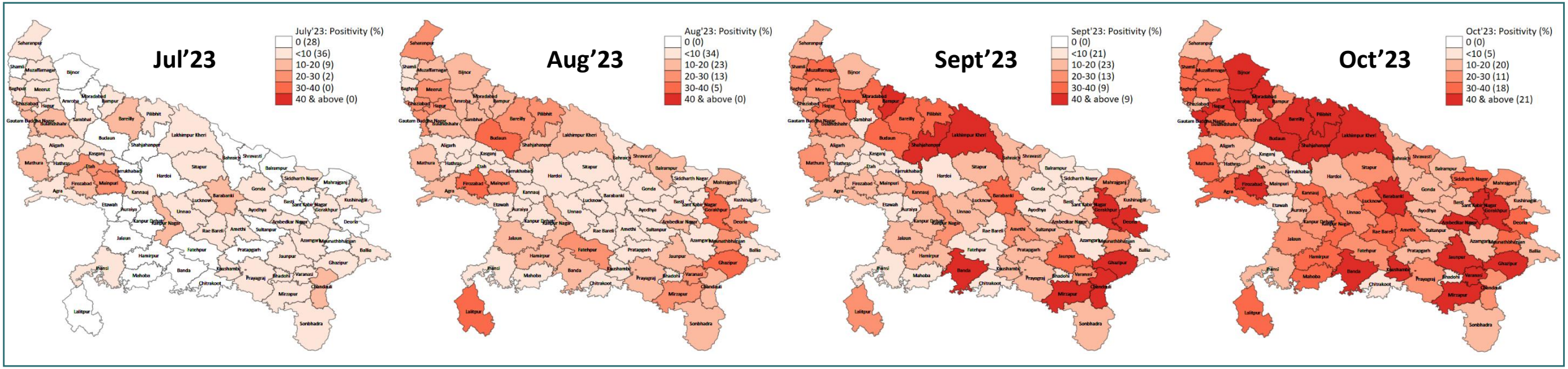
Very few districts had conducted testing across different months, including the peak period

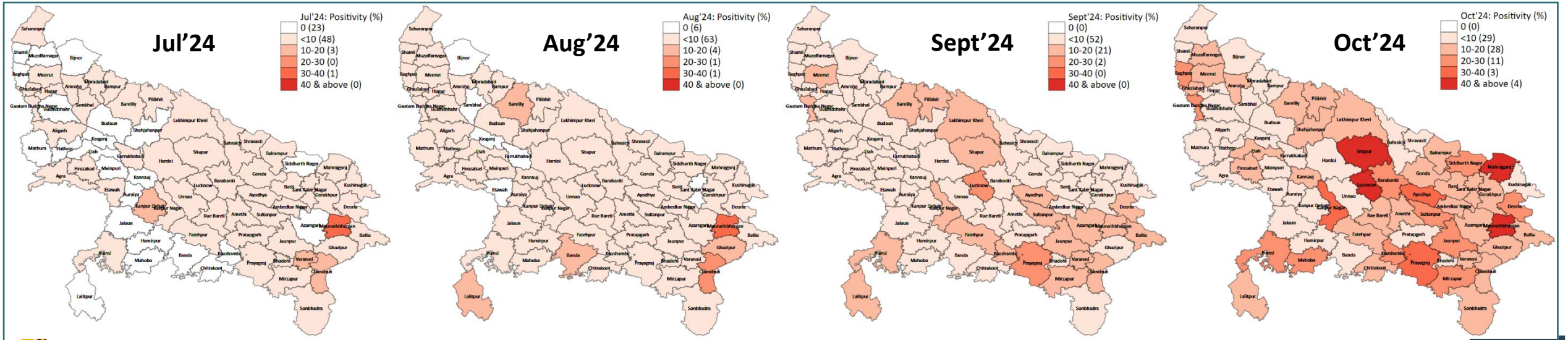
Dengue: District positivity <10%



The overall positivity remain low in Aligarh, Auraiya, Gonda, Hardoi, Pratapgarh despite tests being done

District: Monthly trend of dengue positivity rate (%)





Dengue outbreaks

Dengue outbreak definition: Villages/wards with 4 and more positives in a week

822 blocks
75 districts

Total number of villages in udsp: **95,438**
- Number of villages with at least 1 test: **50950**
- Number of villages with at least 1 positive: **12,963**

Total number of wards: **10,748**
- Number of wards with at least 1 test: **7,776**
- Number of wards with at least 1 positive: **4,901**

Rural outbreaks

4+ positives in a week	Number	# of Blocks (Districts)
# of rural outbreaks with 4+ positives in a week	781	
# of villages with any outbreaks	413	199 (59)
# of villages with multiple outbreaks	141	92 (43)
# of villages with recurrence of outbreaks in 2023 & 2024	18	14 (9)
3+ positives in a week		
# of rural outbreaks with 3+ positives in a week	1365	
# of villages with any outbreaks	724	278 (63)
# of villages with multiple outbreaks	256	129 (50)
# of villages with recurrence of outbreaks in 2023 & 2024	42	31 (22)
2+ positives in a week		
# of rural outbreaks with 2+ positives in a week	4104	
# of villages with any outbreaks	**2,444**	**546 (75)**
# of villages with multiple outbreaks	662	245 (60)
# of villages with recurrence of outbreaks in 2023 & 2024	156	105 (44)

Urban outbreaks

4+ positives in a week	Number	# of Blocks (Districts)
# of urban outbreaks with 4+ positives in a week	2651	
# of wards with any outbreaks	671	170 (68)
# of wards with multiple outbreaks	403	125 (63)
# of wards with recurrence of outbreaks in 2023 & 2024	128	58 (44)
3+ positives in a week		
# of urban outbreaks with 3+ positives in a week	3962	
# of wards with any outbreaks	1028	216 (71)
# of wards with multiple outbreaks	601	160 (66)
# of wards with recurrence of outbreaks in 2023 & 2024	214	77 (54)
2+ positives in a week		
# of urban outbreaks with 2+ positives in a week	7410	
# of wards with any outbreaks	**1,982**	**288 (75)**
# of wards with multiple outbreaks	1,129	229 (73)
# of wards with recurrence of outbreaks in 2023 & 2024	484	135 (67)

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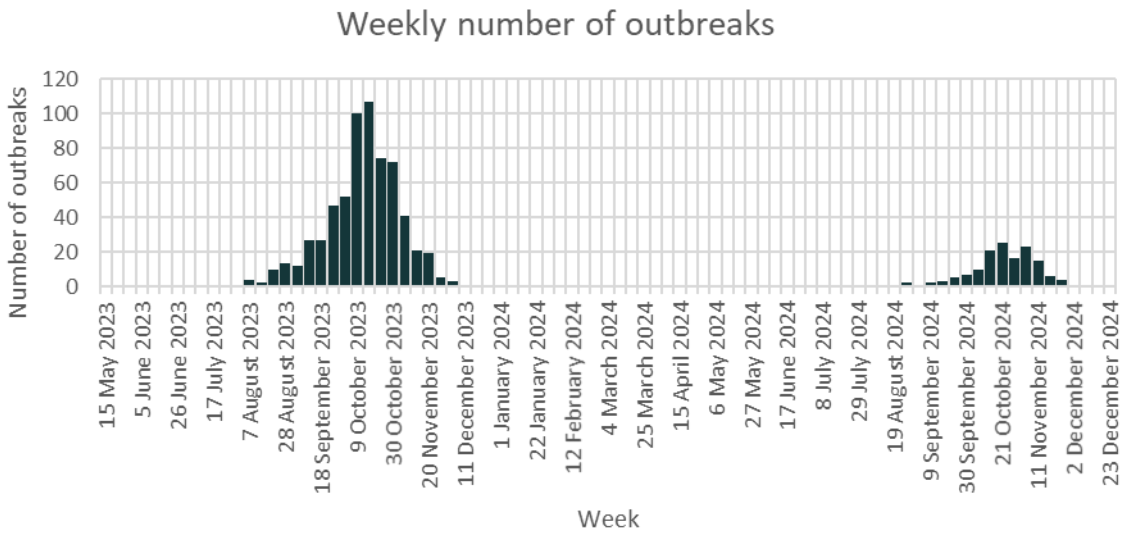
**Data as on 31st May-2025*

List of villages and urban wards by different cut-offs are provided in the excel sheet for action planning

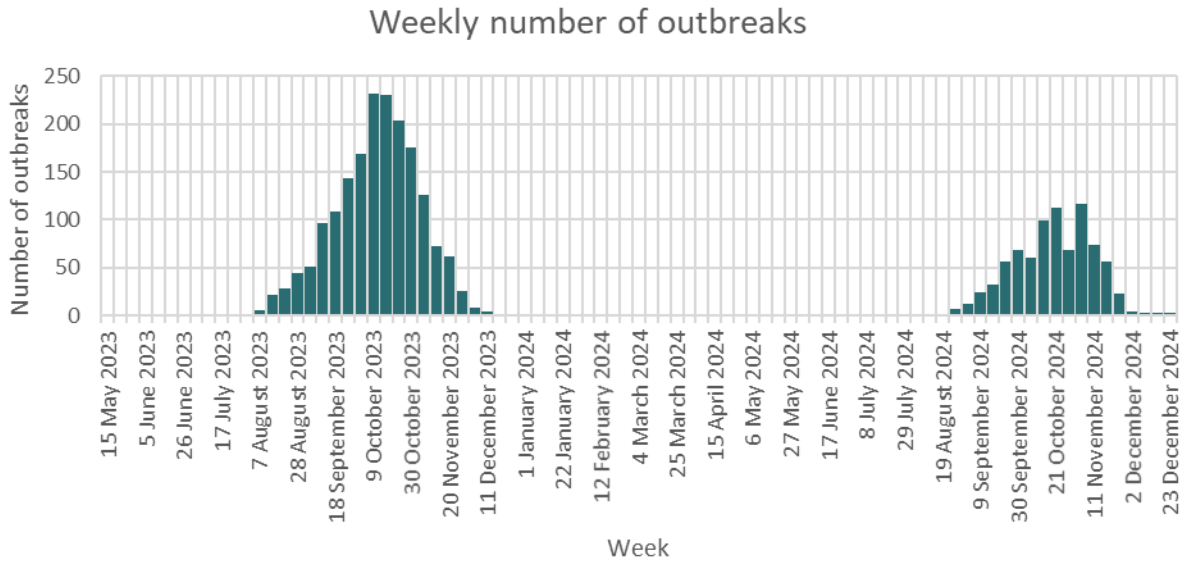
Dengue outbreak

Dengue outbreak definition: Villages with 4 and more positives in a week

Weekly number of outbreaks in rural areas (4+ positives in a week in a village)

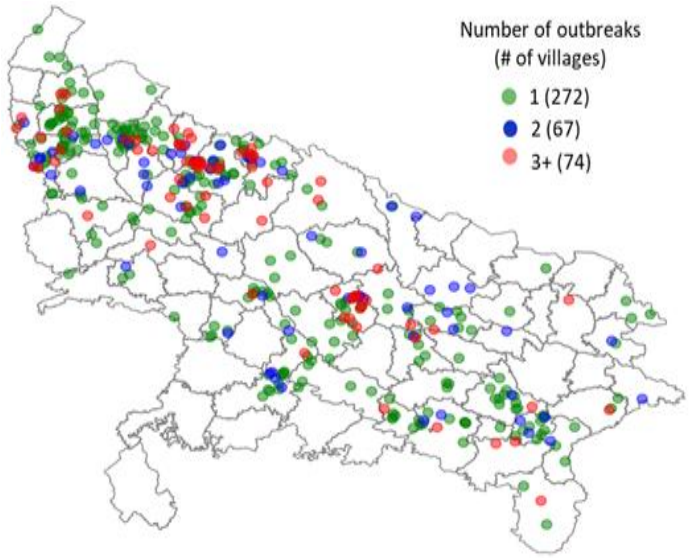


Weekly number of outbreaks in urban areas (4+ positives in a week in a ward)

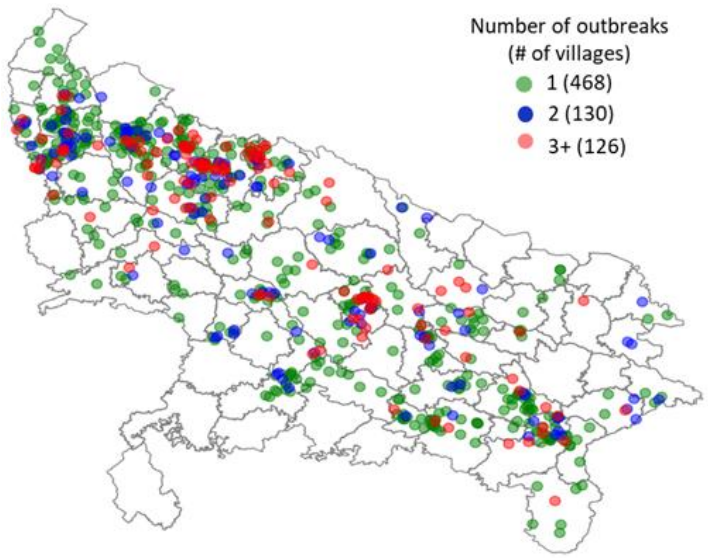


Spatial distribution of villages with dengue outbreaks

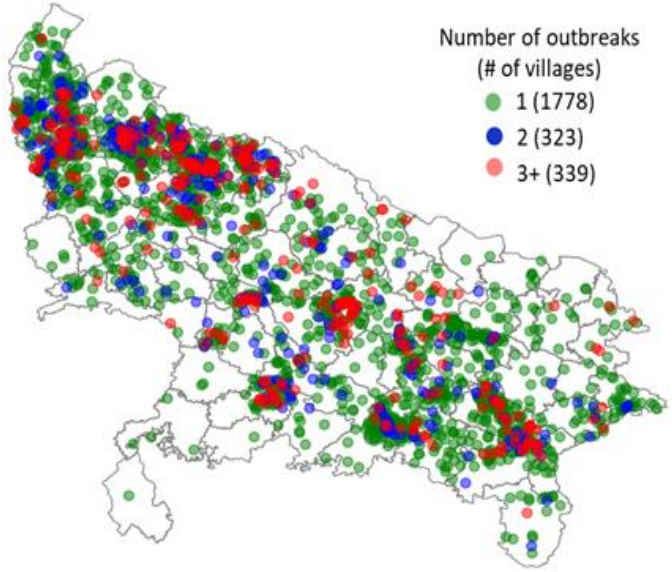
Outbreak:
4+ positives in a week



Outbreak:
3+ positives in a week



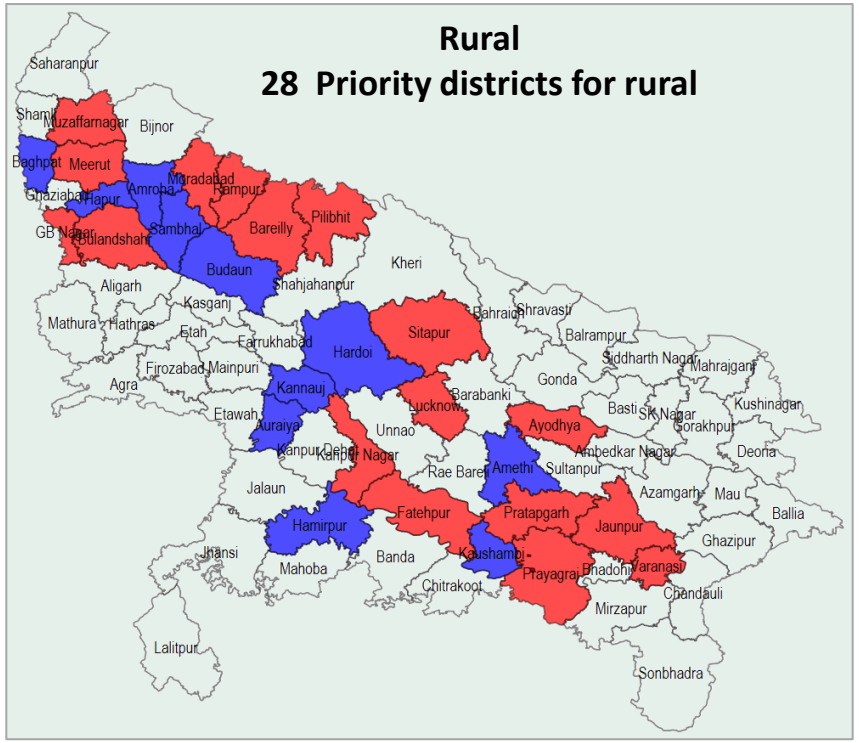
Outbreak:
2+ positives in a week



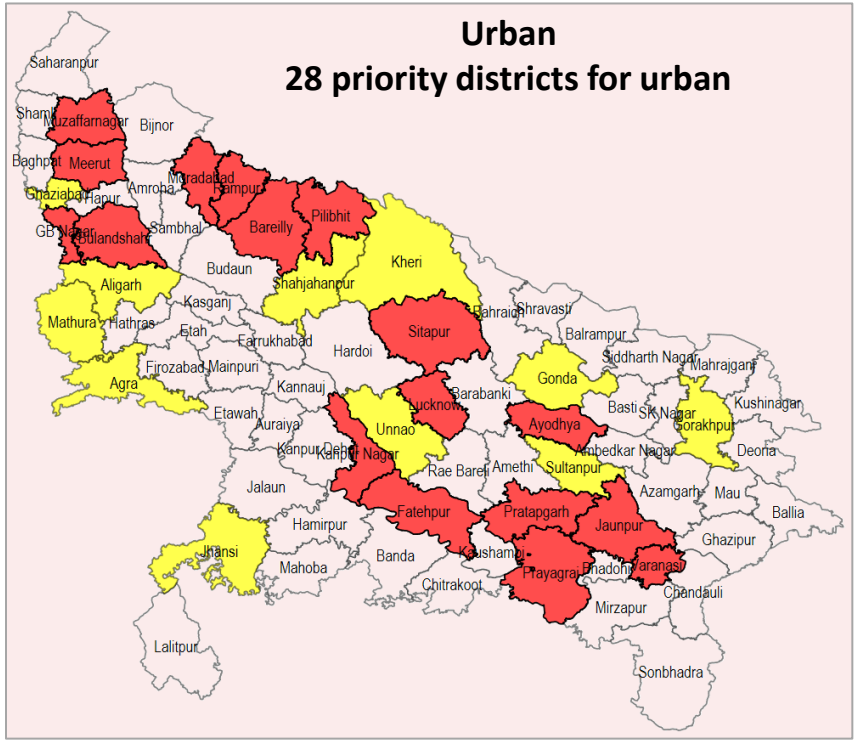
Note: Villages with outbreak are shown in dots

Priority districts (based on 2+ positives in a week) contributing to 80% of total outbreaks

37% districts (28/75) contributing to 80% of total rural outbreaks



37% districts (28/75) contributing to 80% of total urban outbreaks



Rural	Rural and urban	Urban

39 (of 75) priority districts
contributing 80% of total outbreaks

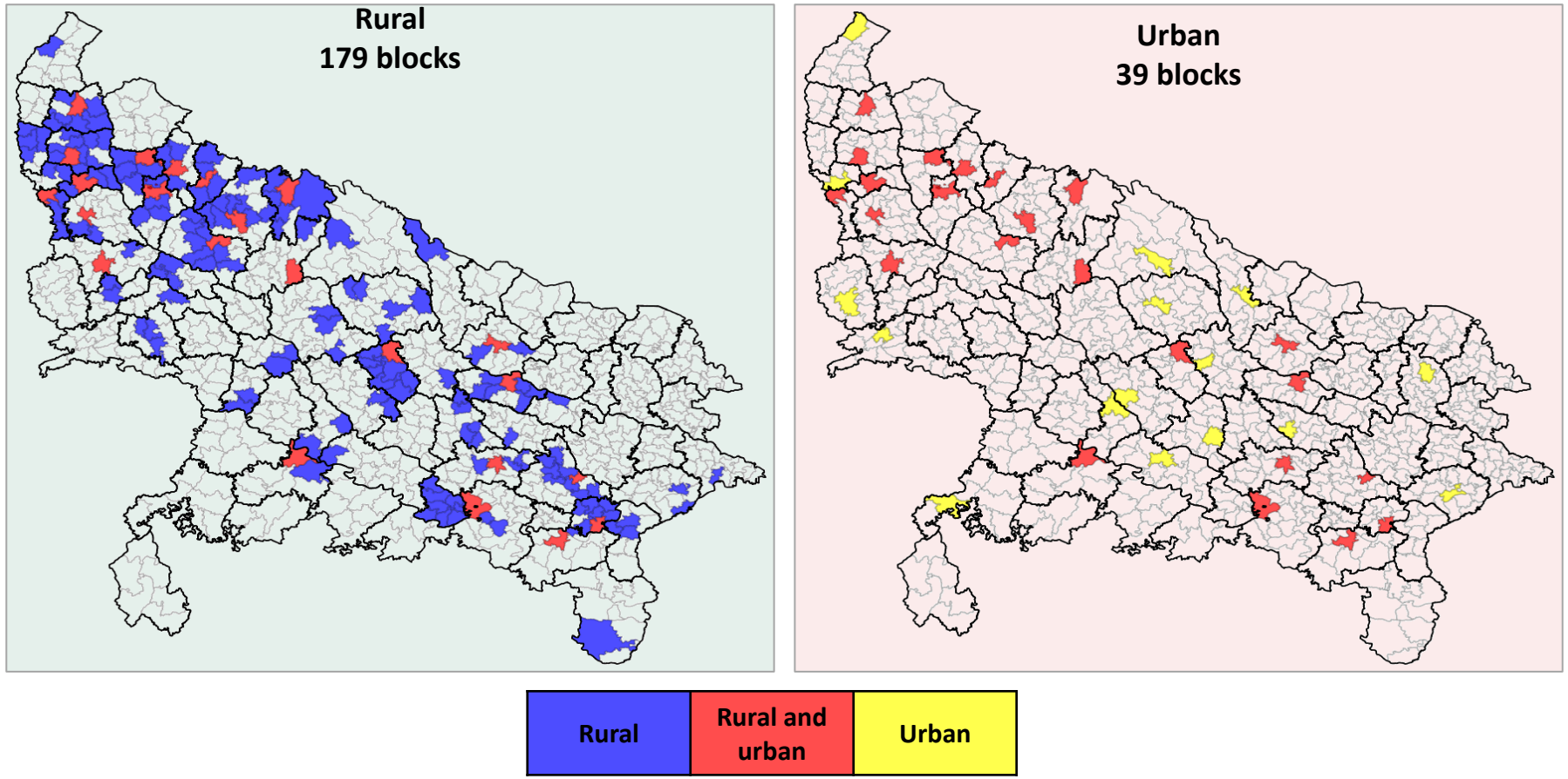
- 17 districts are common for rural and urban
- 11 districts are only rural
- 11 districts are only urban

Rural and Urban (17 districts)	Rural (11 districts)	Urban (11 districts)
Prayagraj	Auraiya	Agra
Bareilly	Baghpat	Aligarh
Bulandshahar	Budaun	Ghaziabad
Ayodhya	Hamirpur	Gonda
Fatehpur	Hardoi	Gorakhpur
GB Nagar	Amroha	Jhansi
Jaunpur	Kannauj	Kheri
Kanpur Nagar	Kaushambi	Mathura
Lucknow	Amethi	Shahjahanpur
Meerut	Sambhal	
Moradabad	Hapur	Sultanpur
Muzaffarnagar		Unnao
Pilibhit		
Pratapgarh		
Rampur		
Sitapur		
Varanasi		

Priority blocks (based on 2+ positives in a week) contributing to 80% of total outbreaks

33% blocks (179/546) contributing to 80% of total rural outbreaks

13% blocks (39/288) contributing to 80% of total urban outbreaks



195 priority blocks (33% of 595 blocks)

- 23 blocks/wards common for rural and urban
- 156 blocks are only rural
- 16 wards are only urban

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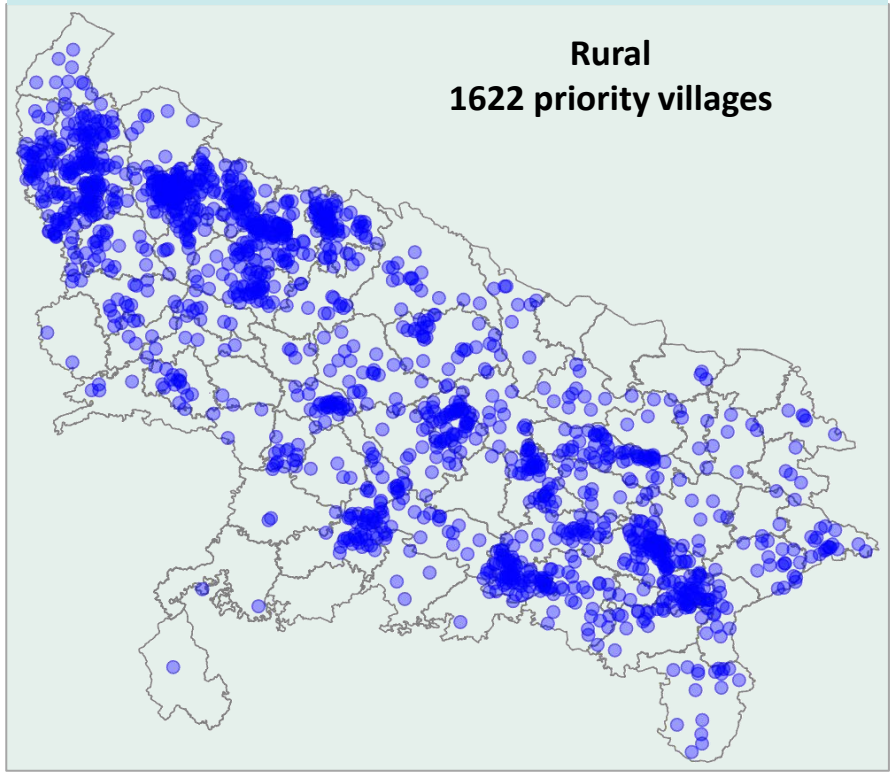
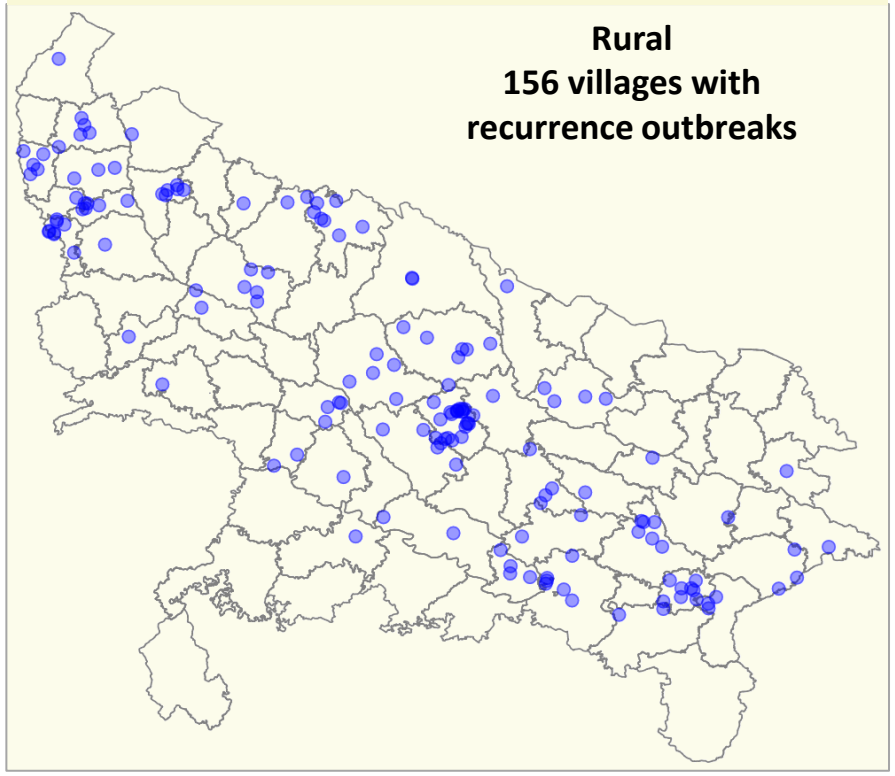
Priority villages (based on 2+ positives in a week) contributing to 80% of total outbreaks

66% villages (1623/2444) from 452 blocks contributing to 80% of total rural outbreaks



156 villages from 105 blocks with recurrence of outbreaks in 2023 & 2024



Priority urban wards

- 41% urban wards (814/1982) from 190 blocks contributing to 80% of total urban outbreaks
- 484 urban wards from 135 blocks with recurrence of outbreaks in 2023 and 2024

Key messages

- While overall dengue positivity is high in urban areas; districts like GB Nagar, Kanpur Nagar, Amroha, and Bareilly have higher positivity in rural areas

- Districts with inadequate test in rural areas:
  - Jalaun, Raebarelli, Fatehpur, Prayagraj, Lalitpur, Chandauli, Hathras, Unnao, Mainpuri, Banda

- Higher positivity in the private labs except GB Nagar, Kanpur Nagar and Mirzapur
- Relatively wider Dengue male-female positivity gaps Ghazipur, Chandauli, and Mau compared to other districts
- Epi-curve depicts that majority of districts need to intensify the testing during the peak of the disease outbreak; possibility of missing a bunch of suspected cases
- A significant number of villages and urban wards reported disease outbreaks. This call for the need to real-time surveillance in the UDSP and action on the ground
- Reach out the places with multiple outbreaks for understanding the reason and prevention strategies
- Decline in reporting of tests/cases by private labs requires further follow-up

Thank You

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