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ORIGINAL ARTICLE

ASSESSMENT OF INTEGRATED HEALTH INFORMATION PLATFORM - INTEGRATED DISEASE SURVEILLANCE PROGRAMME IN TAMIL NADU, 2022-2024

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ABSTRACT

INTRODUCTION : The effective control of communicable diseases relies on robust surveillance systems that facilitate timely identification and prompt response to public health threats. The Integrated Health Information Platform (IHIP-IDSP) was introduced in 2021 as an extension of the Integrated Disease Surveillance Programme (IDSP), which was started in 2004 by the Ministry of Health and Family Welfare, Government of India. In order to improve disease monitoring and outbreak preparedness, this digital platform prioritizes real-time data reporting and geotagging with an emphasis on improved analytics. The aim of this study is to evaluate the performance trends of IHIP-IDSP surveillance units across the districts of Tamil Nadu from January 2022 to December 2024.

METHODS : A retrospective cross-sectional analysis was conducted using district-wise secondary data extracted from the IHIP-IDSP portal, with official permission from the Directorate of Public Health and Preventive Medicine, Tamil Nadu. Timely reporting of syndromic, presumed, and laboratory-confirmed cases; outbreak response; urban mapping; and coverage of health facilities were among the key performance indicators. Using IBM SPSS Version 21, data were analyzed, and descriptive statistics and graphical representations were used to present the results.

RESULTS: Most districts showed an overall upward trend in performance, with the biggest improvements occurring in Tiruppur (35.92), Sivagangai (25.95), and Madurai (25.38). The performance of Tuticorin (-7.15), Kallakurichi (-5.15), and Cuddalore (-3.67) decreased, on the other hand. In performance dashboards, Ariyalur and Kalakurichi showed remarkable total scores, while Dharmapuri reported the highest cumulative performance score (74.22). The timely reporting and outbreak response categories showed the most improvement, indicating improved operational effectiveness and training efficacy in a number of districts.

CONCLUSION: The results highlight how the incorporation of digital platforms and improved data reporting mechanisms has led to the public health surveillance system in Tamil Nadu developing its capacity. To maintain and increase the gains made, district-by-district performance variances underscore the necessity of specialised interventions, regular training, recurring assessments, and localized policy support. In addition to adding to the larger conversation on digital health governance in India, the study offers state and national stakeholders in public health planning a useful resource.

KEYWORDS : Surveillance, health information platform, integrated disease surveillance Programme.

INTRODUCTION

Programmes for disease prevention and control can also be monitored, assessed, and improved with the use of a surveillance system. As it offers vital information for the best possible health care delivery and a financially sensible health plan, disease surveillance is therefore an important part of the health system.[1]

In order to improve the surveillance of communicable diseases in India, the Ministry of Health and Family Welfare (MoHFW) started the Integrated Disease Surveillance Programme (IDSP) in November 2004 with World Bank support. The next generation, highly improved IDSP, was introduced in April 2021 as IHIP-IDSP, an overarching platform from the Integrated Health Information Platform (IHIP) with multiple updates. The National Digital Health Mission (NDHM) is aligned with it. Major diseases that are prone to epidemics are the focus of this decentralized state-based surveillance system.[2]

HIP is intended to collect disaggregated data at different levels of healthcare and, in contrast to IDSP, helps prevent resource waste, pool resources, and provide prompt information and response with higher quality and efficiency. The platform's creativity is found in the incorporation of Geographic Information System (GIS) enhanced data

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representation and geo-tagging of symptomatic cases and medical facilities, which greatly simplifies surveillance and follow-up. Raising event and outbreak alerts is made simple with near real-time/daily data reporting, which aids in prompt intervention and disaster prevention. Additionally, all patient information and health-related data are centralized for the convenience of patients, data users, and health planners.[4]

According to the IDSP-IHIP nationwide performance report for January through October 2023, Tamil Nadu scored 80.25, higher than India's mean performance score of 70.24.[3] Despite this overall progress, limited evidence exists regarding district-level disparities and longitudinal trends in the performance of surveillance units across the state. This study aims to fill that gap by assessing the performance and progress of district-level surveillance units under the IHIP-IDSP framework in Tamil Nadu over a three-year period (January 2022 to December 2024). The findings are expected to inform policy decisions, resource allocation, and targeted interventions aimed at strengthening disease surveillance systems at the subnational level.

METHODS

Using a cross-sectional design, this study evaluated the performance and advancement of surveillance units in Tamil Nadu, India, at the district level over a two-year period from January 2022 to December 2024. The Integrated Disease Surveillance Programme (IDSP) and the Integrated Health Information Platform (IHIP) online platform provided the data was used in this analysis. Encompassing all 38 district surveillance units in Tamil Nadu, the IHIP-IDSP system serves as a powerful surveillance tool. Approval was obtained from the Directorate of Public Health and Preventive Medicine (DPH & PM), which is overseen by the Joint Director of Communicable Disease/State Surveillance Officer.

An extensive dashboard for tracking and assessing each district's performance is offered by the IHIP-IDSP platform. For monitoring numerous metrics pertaining to disease surveillance, case reporting, and outbreak responses across districts, this dashboard is an essential tool. A performance ranking system, which is based on multiple weighted indicators, is used to enable a nuanced understanding of district-level progress. Figure 1 illustrates the distribution of weights assigned to each performance metric. The scoring methodology is intended to record the timeliness and accuracy of surveillance operations. The following are the primary metrics used to evaluate the districts' performance:

Outbreak Response (20%): Outbreak responses are graded using a variety of performance indicators that assess the district's capacity to detect, investigate, and manage disease outbreaks. Each of these indicators is given a maximum score of 10 points. The total score for outbreak response is then scaled to account for 20% of the overall performance ranking.

Syndromic Form (S) Reporting (20%): The percentage of reporting units (RUs) that submit Syndromic (S) forms on a daily basis is calculated. The score for this category is based on the total percentage of RUs reporting syndromic cases, including nil reporting. A maximum of 20 points is allocated for this category.

Laboratory Form (L) Reporting (20%): Similar to the syndromic reporting, the percentage of RUs that submit laboratory (L) forms daily is measured. The performance is evaluated based on the completeness and accuracy of laboratory-based case reporting. A maximum of 20 points is assigned to this category.

Presumptive Form (P) Reporting (20%): The percentage of RUs reporting daily Presumptive (P) forms is evaluated. The reporting rate for presumptive cases is considered in this metric, contributing to a score of up to 20 points.

Case Reporting (10%): The percentage of reporting units that report at least one case on a given day, excluding nil reporting, is assessed for all three types of forms (S, P, L). This category accounts for 10% of the total performance score.

Urban Mapping (10%): Urban mapping evaluates the percentage of urban wards that are mapped with a subcenter. This category aims to measure the extent to which urban areas are included in the surveillance framework. As of 2024, this metric is merged with the case reporting category, but it still retains its separate weight of 10% in the overall scoring system.

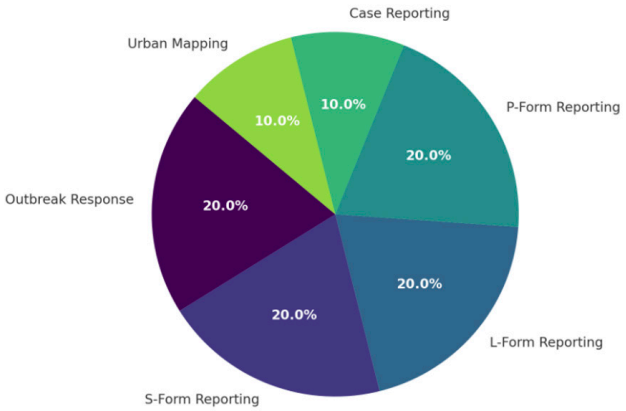

Figure 1. Proportional Weightage of Surveillance Indicators in District-Level Performance Assessment under IHIP-IDSP (2022–2024)

RESULT

A comparative analysis of district-level performance scores under the Integrated Health Information Platform–Integrated Disease Surveillance Programme (IHIP-IDSP) for the periods 2022–2023 and 2023–2024 is done in districts of Tamil Nadu. Table 1. summarizes the degree of improvement by ranking districts in descending order of performance enhancement from January 2022 to December 2024.

The improvement performance score of Tiruppur district is **+35.92 points accounting to +81.69%** improvement, followed by Sivagangai (+25.95; +45.99%) and Madurai (+25.38; +47.49%) improvements in performance score respectively. The improvement of performance score for one-year period is observed in Chennai (20.70; +131.60%), Thanjavur (0.72; +30.16%), and Tenkasi (+24.39; +36.85%).

Numerous other districts, such as Thiruvallur, Vellore, and Ramanathapuram, demonstrated improvements in performance score of 15–20 points. A few districts, however, showed decrease in performance scores, including Tuticorin (-7.15), Kallakurichi (-5.15), and Cuddalore (-3.67).

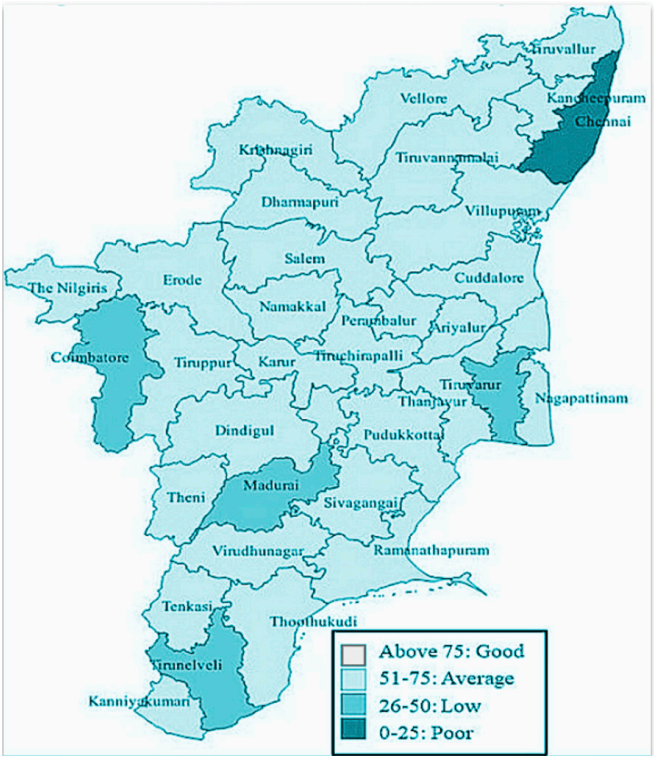

Figure 2: District-level Mean Performance Scores in Tamil Nadu (2022–2024)

The Comparison of S Form scores of the districts between 2022 and 2023 and 2023 and 2024 is listed in Table 2. The S form performance score of Madurai showed improvement of 6.72 points, followed by Tiruppur 6.10 points and Theni 4.99 points. The S form performance scores of Tenkasi, Tirupathur, Tirunelveli, Thiruvallur, and Ranipet, showed improvements exceeding 4 points.

These districts show improved adherence to reporting syndromic surveillance during the monitored time frame. On the other hand, the S form performance score of districts like Coimbatore (-1.73) and Chengalpattu (-3.38) showed a decline, while Tiruvannamalai showed the least improvement at +0.05 points. Chennai did not exhibit any change over the period.

Table 1: Comparative Analysis of the district's overall performance scores under IHIP-IDSP, 2022–2023 vs 2023–2024, in Tamil Nadu.

District	2022-2023	2023-2024	Absolute change in Overall Performance (2023–2024 vs 2022–2023)	Percentage of progress in Overall Performance (2023–2024 vs 2022–2023)
Tiruppur	43.97	79.89	35.92	81.69
Sivaganga	56.43	82.38	25.95	45.99
Madurai	53.44	78.82	25.38	47.49
Tenkasi	66.18	90.57	24.39	36.85
Thanjavur	68.71	89.43	20.72	30.16
Chennai	15.73	36.43	20.7	131.6
Thiruvallur	49.18	69.14	19.96	40.59
Vellore	58.2	77.24	19.04	32.71
Ramanathapuram	54.51	72.64	18.13	33.26
Kanniyakumari	60.98	78.96	17.98	29.49
Namakkal	65.15	82.37	17.22	26.43
Chengalpattu	41.89	58.67	16.78	40.06
Tirupathur	59.11	74.62	15.51	26.24
Erode	62.3	77.64	15.34	24.62
Tirunelveli	59.57	74.33	14.76	24.78
Salem	72.66	86.98	14.32	19.71
Dindigul	55.38	69.51	14.13	25.51
Tiruchirappalli	56.89	69.81	12.92	22.71
Thiruvarur	48.9	61.41	12.51	25.58
Virudhunagar	63.61	75.91	12.3	19.34
The Nilgiris	53.09	64.02	10.93	20.59
Mayiladuthurai	66.65	77.16	10.51	15.77
Coimbatore	56.07	65.75	9.68	17.26
Nagapattinam	66.25	75.69	9.44	14.25
Villupuram	62.91	72.08	9.17	14.58
Ranipet	60.29	68.89	8.6	14.26
Krishnagiri	70.95	79.04	8.09	11.4
Theni	55.59	63.57	7.98	14.36
Tiruvannamalai	69.89	75.59	5.7	8.16
Dharmapuri	81.41	86.66	5.25	6.45
Perambalur	65.54	70.48	4.94	7.54
Karur	71.55	76.18	4.63	6.47
Ariyalur	83.82	87.89	4.07	4.86
Pudukkottai	82.6	84.01	1.41	1.71
Kanchipuram	66.85	67.57	0.72	1.08
Cuddalore	70.99	67.32	-3.67	-5.17
Kallakurichi	84.05	78.9	-5.15	-6.13
Tuticorin	66.97	59.82	-7.15	-10.68

Table 2. Year wise variation in S Form Performance Scores by District, Tamil Nadu, 2022–2024

Rank	District	2022-2023	2023-2024	Percentage of progress in Overall Performance (2023–2024 vs 2022–2023)
1	Madurai	4.59	11.31	146.41
2	Tiruppur	6.79	12.89	89.84
3	Theni	8.05	13.04	61.99
4	Tenkasi	10.01	14.77	47.55
5	Tirupathur	9.12	13.84	51.75
6	Tirunelveli	6.7	11.4	70.15
7	Thiruvallur	7.03	11.64	65.58
8	Ranipet	7.48	11.85	58.42
9	Dindigul	8.99	13.35	48.50
10	Thiruvarur	6.92	11.18	61.56

Table 3. Year wise Variation in L Form Performance Scores by District, Tamil Nadu, 2022–2024

Rank	District	2022-2023	2023-2024	Percentage of progress in Overall Performance (2023–2024 vs 2022–2023)
1	Chennai	5.29	12.9	143.86
2	Tiruppur	12.73	19.45	52.79
3	Madurai	14.56	18.4	26.37
4	Kanniyakumari	15.57	19.21	23.38
5	Chengalpattu	11.68	15.14	29.62
6	The Nilgiris	15.43	18.39	19.18
7	Vellore	13.81	16.64	20.49
8	Tirunelveli	14.05	16.86	20
9	Dindigul	15.23	17.84	143.86
10	Thiruvarur	13.95	16.41	52.79

An analysis of L Form scores across districts between 2022–2023 and 2023–2024 is done and listed below in Table 3. The improvement of L form performance score of Chennai is +7.61 points, followed by Tiruppur (+6.72) and Madurai (+3.84). The improvement of L form performance score of Kanniyakumari, Chengalpattu, and The Nilgiris, each exceeds a 2.5-point increase. In contrast, some districts exhibited little to no change. The improvement of L form performance scores by Tiruvannamalai is +0.54 and Tuticorin is +0.16.

Table 4. Year wise Variation in P Form Performance Scores by District, Tamil Nadu (2022–2024)

Rank	District	2022-2023	2023-2024	Percentage of progress in Overall Performance (2023–2024 vs 2022–2023)
1	Tiruppur	10.8	14.9	72.18
2	Chennai	5.5	9.47	20.88
3	Kanniyakumari	12.98	15.69	14.31
4	Madurai	14.4	16.46	15.41
5	Tenkasi	13.17	15.2	10.92
6	Thiruvallur	14.65	16.25	13.08
7	Chengalpattu	12.23	13.83	10.28
8	Tirunelveli	14.11	15.56	9.50
9	The Nilgiris	15.05	16.48	7.89
10	Ramanathapuram	15.96	17.22	72.18

The descriptive analysis revealed an overall improvement in P Form scores across most districts. The improvement in P- performance score of Tiruppur is +4.10 points, followed by Chennai (+3.97) and Kanniyakumari (+2.71). Additionally, improvement in P- performance score of Madurai, Tenkasi, and Thiruvallur is at 1.5 points, indicating consistent advancements in the reporting of presumptive cases.

DISCUSSION

This study uses secondary data to assess the implementation of the Integrated Health Information Platform–Integrated Disease Surveillance Programme (IHIP-IDSP) in Tamil Nadu during the January 2022–January 2024 period.

The analysis covers all districts' form-based data submissions (S, P, and L Forms), case reporting, outbreak response, and other surveillance components. According to the data, performance scores show an overall upward trend, suggesting that reporting procedures are being followed more closely and that system engagement has increased throughout the state.

A small percentage of districts showed either marginal improvement or decline in their surveillance metrics, whereas the majority showed notable gains.

Several studies have emphasised the role that digital health interventions can play in bolstering surveillance systems. For example, a study conducted in 2023 by Kumar et al. highlighted how IHIP's automated outbreak alerts, geospatial mapping, and real-time reporting greatly increase the effectiveness of disease detection and response in India.[6]

The implementation of IHIP-IDSP in Tamil Nadu also led to a higher state performance score (80.25), as compared to the national average (70.24), according to research by Sampath et al. (2023).[7]

In our study the performance at the district level, in addition to assessments based on individual indicators, identified a number of significant trends. Notably, some districts showed steady progress in all three of the primary surveillance metrics: reporting on the S Form, P Form, and L Form.

In all three domains, Tiruppur, Madurai, and Chennai were among the districts with the best performance. Although more qualitative research would be necessary to support such hypotheses, this raises the prospect of comprehensive system strengthening in these areas, possibly through better data practices, increased workforce engagement, or local leadership.

Notable advancements were also made in districts like Ramanathapuram, Tirunelveli, and the Nilgiris, which helped to improve reporting procedures generally.

Despite overall progress, notable intra-district discrepancies were observed. Some districts displayed strong gains in specific form types (e.g., L Form reporting) but showed stagnation or decline in others. Such discrepancies highlight the uneven development of surveillance capabilities within districts, possibly due to differences in infrastructure or operational priorities between primary reporting levels (S/P Forms) and confirmatory laboratory systems (L Form). The mean absolute change across S, P, and L form scores for each district was used to create a composite improvement score, which better reflects integrated performance progress. Districts like Tiruppur, Chennai, and Madurai consistently rank in the top tier of performance across S, P, and L forms, which highlights the possibility of systemic improvements in surveillance operations. On the other extreme, districts like Tuticorin (+0.01) and Tiruvannamalai (+0.11) demonstrated the least amount of progress, indicating that performance stagnated over the period under observation. Even though the quantitative data supports different degrees of progress, more contextual research is necessary to comprehend the district-specific elements affecting reporting patterns.

A comprehensive evaluation of district-level surveillance system improvement is made possible by this metric. High composite score districts might be used as models for integrated surveillance advancement, whereas districts with low composite scores might need targeted capacity-building initiatives.

A few districts, like Tiruvannamalai and Tuticorin, which continuously showed little to no improvement in all metrics, became possible causes for concern. These outliers might profit from focused audits, capacity evaluations, or policy reviews to find and fix obstacles to improving performance.

Although spatial and geopolitical analysis was not within the scope of this study, future evaluations could incorporate regional mapping of performance data to examine potential alignment with zonal administrative divisions, health infrastructure clusters, or ecological characteristics (e.g., deltaic districts, hilly regions). Such spatial analysis, combined with qualitative insights, may help elucidate systemic trends affecting program efficiency. Previous work has highlighted the potential of real-time digital surveillance systems like IHIP in enhancing disease detection and reporting[4,7] further underscoring the value of continuous, data-informed evaluation frameworks.

CONCLUSION

This study provides a descriptive analysis of district-level performance under the Integrated Health Information Platform–Integrated Disease Surveillance Programme (IHIP-IDSP) in Tamil Nadu between January 2022 and December 2024. The analysis uses secondary data from the IHIP-IDSP portal to show changes and improvements in surveillance scores across laboratory-confirmed, syndromic, and presumptive case reporting indicators. Most districts showed improvements in their performance scores from year to year, but some showed no change at all.

The results highlight the existence of district-level variation in trends in surveillance reporting. Throughout the observed period, districts like Tuticorin and Tiruvannamalai demonstrated little improvement, while districts like Tiruppur, Madurai, and Chennai continuously placed among the top improvers across a number of indicators. These distinctions do not represent causal inferences; rather, they are descriptive. Although performance trends over time and indicators are recorded in the study, the operational and qualitative factors that underlie these trends are not evaluated. The factors influencing inter-district differences may require more research that includes qualitative or contextual data. However, within the IHIP-IDSP framework, the analysis provides a baseline for surveillance performance monitoring and can help with future administrative review and policy planning.

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CONFLICT OF INTEREST

None

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