

Analysis of Vector Control in Supporting Environmental Sanitation at Thursina Duri Hospital, Bengkalis Regency, Riau Province in 2026

¹Siti Manna*, ²Herniwanti, ³Welly Rahma Devita, ⁴Hasyir Jumanuddin

¹ Public Health Study Program, Faculty of Public Health, Universitas Hang Tuah,

Pekanbaru, Indonesia*; mannanasution16@gmail.com

² Universitas Hang Tuah, Pekanbaru, Indonesia

³ Universitas Hang Tuah, Pekanbaru, Indonesia

⁴ Universitas Hang Tuah, Pekanbaru, Indonesia

*Correspondence

Article Information

Submitted: 27 July 2026

Accepted: 21 August 2026

Publish: 31 August 2026

Keyword: Vector Control;
Environmental Sanitation;
Hospital; Residency;
Environmental Health;

Copyright holder: Siti Manna,
Herniwanti, Welly Rahma
Devita, Hasyir Jumanuddin

Year: 2026

This is an open access article
under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Abstract

Introduction: Hospital environmental sanitation is a crucial component in preventing disease transmission. One crucial aspect of environmental sanitation is vector control, as the presence of flies, mosquitoes, cockroaches, and rats can degrade environmental quality and increase the risk of disease. **Objective:** The objective of this residency was to identify vector control implementation, analyze problems and their causes, prioritize problems, and develop alternative solutions to support environmental sanitation at Thursina Hospital in Bengkalis Regency in 2026. **Method:** The method used was a problem-solving cycle approach through situation analysis, problem identification, prioritization using the USG (Urgency, Seriousness, Growth) method, and root cause analysis using fishbone analysis. Data were obtained through observation, interviews, document review, and triangulation of sources, methods, and data. **Results and Discussion:** The analysis revealed that the priority problem was the continued presence of vectors in several areas of the hospital with the highest USG score (15). Causal factors included human resources, methods, facilities, materials, management, and budget. The chosen alternative solution was the development of an Integrated Vector Control Program, which included standard operating procedures (SOPs), a monitoring schedule, environmental sanitation inspections, and periodic evaluations. **Conclusion:** The study's conclusions indicate that vector control at Thursina Hospital still requires strengthening through a structured, integrated, and sustainable program to improve the effectiveness of environmental sanitation and reduce the risk of vector-borne diseases in the hospital.

Introduction

Hospitals are healthcare facilities that play a vital role in providing safe, high-quality healthcare services that prioritize patient safety (Damayanti, 2025); (Flora, 2024); (Dewi Agustina et al., 2023); (Asyiah, 2020). Hospitals are required to maintain a clean, healthy environment that meets sanitation requirements. Hospital environmental sanitation is an effort to prevent disease transmission and protect patients, staff, visitors, and the surrounding community from various environmental health risks (Halimah & Budhiartie, 2020). In Indonesia, this obligation is governed under Ministry of Health Regulation (Permenkes) No. 3 of 2026 concerning Disease Control, which places environmental health within its scope alongside communicable and non-communicable disease control, and explicitly classifies vector-borne and animal-transmitted diseases as a category of communicable disease that healthcare facilities are required to prevent and manage.

One crucial aspect of hospital environmental sanitation is vector control. Vectors such as mosquitoes, flies, cockroaches, and rats can transmit various diseases and contaminate the hospital environment (S. Aisyah & Ardan, 2024); (Cahyaning et al., 2025). The presence of vectors in hospital areas can also reduce the quality of environmental sanitation, disrupt patient and visitor comfort, and increase the risk of healthcare-related infections. Therefore, vector control must be implemented in a planned, sustainable manner, and in accordance with hospital environmental health standards (Hikmawati, 2025); (N. I. Aisyah & Mitoriana Porusia, 2020); (Bayani et al., 2023); (Sapphira & Sari, 2022). Technical requirements for vector control at the national level are specifically set out in Permenkes No. 50 of 2017 concerning Environmental Health Quality Standards and Health Requirements for Vectors and Disease-Carrying Animals and Their Control. At the international level, the World Health Organization's Global Vector Control Response (GVCR) 2017–2030, adopted through World Health Assembly resolution WHA70.16, provides the overarching guideline recommending an integrated, evidence-based approach to vector control across health facilities and sectors.

Thursina Hospital in Bengkalis Regency is one of the hospitals striving to improve the quality of healthcare services, including environmental health aspects. Based on observations during the residency program, vectors were still found in several areas of the hospital, potentially impacting the quality of environmental sanitation. This situation indicates that vector control implementation still needs to be evaluated and improved to support the creation of a healthy, safe hospital environment that meets sanitation requirements. Residency activities are a form of field learning that provide students with the opportunity to apply the knowledge they have acquired during their studies to address public health issues in healthcare institutions. Through these activities, students can identify problems, analyze causal factors, and develop recommendations or implement programs for improvement. Based on this description, this residency report aims to analyze the implementation of vector control in supporting environmental sanitation at Thursina Hospital, Bengkalis Regency, Riau Province, entitled "Analysis of Vector Control in Supporting Environmental Sanitation at Thursina Hospital, Bengkalis Regency, Riau Province, 2026." It is hoped that the results of this report will provide an overview of vector control implementation in hospitals and serve as input for efforts to improve the quality of environmental sanitation at Thursina Hospital, Bengkalis Regency.

Method

This residency program employed a qualitative descriptive approach using the problem-solving cycle method. The program took place at Thursina Hospital in Bengkalis Regency, Riau Province, from June to July 2026. Informants were selected using purposive sampling based on their involvement and authority in implementing environmental health programs, including hospital management, environmental health officers, heads of relevant units, and operational officers. Data collection was conducted through field observations, in-depth interviews, and document review. Primary data were obtained from observations of environmental sanitation conditions and interviews with informants regarding vector control implementation. Secondary data were obtained from monthly reports, annual reports, and supporting documents available at the hospital. Data validity was achieved using source triangulation, method triangulation, and data triangulation. Data analysis consisted of situation analysis, problem identification, problem prioritization using the Urgency, Seriousness, and Growth (USG) method, root cause analysis using fishbone analysis, development of alternative solutions, and prioritization of solutions based on effectiveness, efficiency, resource availability, and management support. The results of the analysis are used as the basis for compiling an Integrated Vector Control Program to support environmental sanitation at Thursina Hospital, Bengkalis Regency.

Result and Discussion

The residency program was conducted at Thursina Hospital with the aim of identifying, analyzing, and developing alternative solutions to environmental health problems in the hospital, particularly those related to vector and disease-carrying animal control. Problem identification was conducted through field observations, interviews with staff, document reviews, and analysis of the hospital's environmental sanitation. The identification results indicated that several factors potentially impact the effectiveness of the vector control program, necessitating comprehensive improvement efforts to minimize the risk of vector-borne disease transmission. Based on the analysis using a Fishbone diagram (cause and effect diagram) with the 5M+1E approach, it was discovered that vector control problems at Thursina Hospital are influenced by several interrelated factors: Human Resources, Methods, Machines, Materials, Management, and Money. This approach was used to systematically identify the root causes of problems so that the designed alternative solutions can be more targeted and sustainable.

Man: Observations indicate that human resource factors remain a contributing factor to the suboptimal implementation of vector control at Thursina Hospital. Some staff have limited knowledge of vector control and environmental sanitation, resulting in control activities not fully aligning with integrated vector control principles. Furthermore, staff compliance with the use of Personal Protective Equipment (PPE) during work is still suboptimal. Observations also indicate that not all staff understand the Standard Operating Procedures (SOPs) for vector control, resulting in inconsistent implementation of activities in the field. According to Handiny et al. (2021), the success of a vector control program is greatly influenced by the competence of officers, compliance with work procedures, and behavior in maintaining environmental sanitation. Research (Kadir, 2024) also states that increasing human resource capacity through training and routine supervision can improve the effectiveness of environmental health program implementation in hospitals. Furthermore (Istigfari & Dwiantoro, 2022) explain that staff

compliance with PPE use and SOP implementation is a crucial part of creating a safe work environment while supporting successful vector control. Based on these conditions, training and outreach regarding vector control, increased compliance with PPE use through education and routine supervision, and monitoring staff compliance using an environmental sanitation inspection checklist are necessary to improve the quality of program implementation.

Method: Based on the identification results, the vector control implementation method at Thursina Hospital still requires improvement. Vector density monitoring is not routinely conducted, and a structured implementation schedule is not yet available. Furthermore, evaluation of vector control activity results has not been conducted periodically, making it difficult to objectively measure the program's effectiveness. (Sapphira & Sari, 2022) stated that the success of vector control is influenced by a continuous monitoring system, routine sanitation inspections, and periodic program evaluations. Scheduled monitoring allows hospitals to detect increases in vector populations early, allowing control measures to be implemented before they pose a health risk. Therefore, it is necessary to develop more structured vector control standard operating procedures (SOPs), schedule regular vector density monitoring, conduct sanitation inspections using a checklist form, and evaluate the program monthly to provide a basis for improving subsequent activities. (Misriyah, 2021).

Machine: Based on observations, the vector control facilities and equipment at Thursina Hospital are still insufficient to meet needs. The number of fly traps, insect killers, and rat traps is still limited, resulting in suboptimal control coverage. Furthermore, several sanitation facilities require maintenance, while drainage in several locations is not functioning optimally, potentially creating breeding grounds for vectors. According to (Marlinae et al., 2024), Providing adequate vector control facilities is an important factor in supporting the effectiveness of vector control programs in health service facilities. (Handiny et al., 2021) and (Saidah, 2021) also explained that regular maintenance of sanitation and drainage facilities can reduce potential vector habitats, thereby reducing the risk of disease transmission. Based on these conditions, it is necessary to increase the number of vector control facilities according to hospital needs, routine maintenance of sanitation and drainage facilities, and placement of vector traps in high-risk locations.

Material: Material aspects indicate that the availability of vector control materials at Thursina Hospital is still suboptimal. Insecticide and rodenticide supplies are insufficient to meet operational needs. Furthermore, some trash bins still do not meet sanitation standards, and several areas of the hospital environment still have the potential to become breeding grounds for vectors. (Kesuma et al., 2021) stated that the availability of adequate vector control materials is an important component in the success of vector control programs in health care facilities. (Marlinae et al., 2024) also explained that good environmental management through eliminating vector habitat is part of an integrated vector control strategy. Thus, hospitals need to complete the need for insecticides, rodenticides and other control materials, repair rubbish bins that do not meet standards, and carry out sustainable environmental management to eliminate vector breeding sites.

Management: The analysis shows that management aspects still need strengthening. A comprehensive, integrated vector control program is not yet available, coordination between units is not optimal, and program monitoring and evaluation are not ongoing. According to (Husein et al., 2025) Successful vector control in hospitals requires management support through the development of integrated programs, the formation of implementation teams, cross-unit coordination, and regular monitoring and evaluation. A good management system will increase the effectiveness of program implementation while ensuring the sustainability of vector control activities (Kurniasi, 2025). Therefore, it is necessary to prepare an Integrated Vector Control Program, establish an environmental sanitation monitoring team, improve coordination between units, and carry out periodic monitoring and evaluation which is reported to hospital management as a basis for decision making.

Money: Based on the identification results, one of the obstacles to implementing vector control at Thursina Hospital is the limited budget allocated for the activity. This situation has resulted in the procurement of vector control equipment being carried out in stages, thus not meeting all needs. Furthermore, the budget for monitoring and evaluation activities is still limited, so oversight cannot be carried out optimally. Financial support is a crucial component in implementing vector control programs at hospitals. (Anisa et al., 2025) Adequate budget allocation is needed for procurement of facilities, provision of control materials, implementation of monitoring, evaluation, and increasing human resource capacity (Aji et al., 2022). In line with this, (Indah et al., 2024) explained that budget constraints often hinder the implementation of vector control programs, necessitating targeted budget planning and prioritization based on risk levels. Based on these conditions, Thursina Hospital needs to propose an additional vector control budget in the Hospital Work Plan and Budget (RKARS), prioritize the procurement of vector control facilities, and optimize the use of environmental sanitation funds to support ongoing monitoring and evaluation activities. With adequate financial support, the implementation of vector control programs is expected to be more effective, efficient, and sustainable, thereby minimizing the risk of vector-borne diseases in the hospital environment.

Conclusion

Based on the results of the root cause analysis of the problem, several alternative solutions were prepared that were adapted to the hospital's conditions and resources. The results of the assessment of alternative solutions show that the preparation of an Integrated Vector Control Program is a priority solution because it has the highest level of effectiveness, efficiency, resource support and management support. The program includes the preparation of Standard Operating Procedures (SOP), vector density monitoring schedules, periodic environmental sanitation inspections, program evaluation, increasing the capacity of officers through training, as well as strengthening coordination between units in implementing vector control. The intervention plan prepared includes coordination activities with hospital management and related units, identification and mapping of locations that have the potential to become vector habitat, monitoring vector density, preparing an Integrated Vector Control Program which includes SOPs, monitoring schedules and sanitation inspection forms, socializing the program to hospital staff, as well as monitoring and evaluating program implementation.

Siti Manna, Herniwanti, Welly Rahma Devita, Hasyir Jumanuddin/KESANS
Analysis of Vector Control in Supporting Environmental Sanitation at Thursina Duri Hospital, Bengkalis Regency, Riau Province in 2026

It is hoped that the POA can serve as a guideline for Thursina Duri Hospital in implementing a vector control program in a structured, sustainable and integrated manner so as to improve the sanitation quality of the hospital environment, reduce the risk of transmission of vector-based diseases, and support the creation of health services that are safe, high quality and oriented towards patient safety.

Reference

- Aisyah, N. I., & Mitoriana Porusia, S. K. M. (2020). *Gambaran Keberadaan Vektor Penyakit dan Binatang Pengganggu di Rumah Sakit Universitas Sebelas Maret (UNS) Tahun 2020*. Universitas Muhammadiyah Surakarta.
- Aisyah, S., & Ardan, M. A. (2024). *Evaluasi Sistem Pengendalian Vektor Dan Binatang Pengganggu Di Rumah Sakit Umum Medika Sangatta*. *Jurnal Pengabdian Kepada Masyarakat Nusantara*, 5(2), 2021–2027. <https://doi.org/10.55338/jpkmn.v5i2.3162>
- Aji, S. P., Saktiawati, A. M. I., & Ani, N. (2022). *Implementasi Anggaran Kesehatan di Bidang Kesehatan Sesuai dengan SPM (Standar Penilaian Minimal)*. *Journal of Social Research*, 1(6), 500-506.
- Hidayati, F. A. N., & Sari, D. P. (2021, June). *Perencanaan Pembiayaan Kesehatan di Rumah Sakit*. In *Prosiding Seminar Informasi Kesehatan Nasional* (pp. 226-233).
- Asyiah, N. (2020). *KESELAMATAN PASIEN SEBAGAI PRIORITAS UTAMA DALAM MENINGKATKAN PELAYANAN RUMAH SAKIT*. *OSF*. <https://doi.org/10.31219/osf.io/aer5v>
- Bayani, C. ... Demiyati, C. (2023). *Analisis Pengendalian Vektor Penyakit dan Binatang Pengganggu di Bagian Instalasi Gizi Rumah Sakit*. *Jurnal Masyarakat Sehat Indonesia*, 2(03), 117–126. <https://doi.org/10.70304/jmsi.v2i03.154>
- Cahyaning, N. E. ... Setiyadi, F. (2025). *Analisis Tingkat Kepadatan Vektor dan Binatang Pembawa Penyakit di RSI Surabaya Jemursari Tahun 2025*. *Sulolipu: Media Komunikasi Sivitas Akademika Dan Masyarakat*, 25(2), 211–226. <https://doi.org/10.32382/sulo.v25i2.1606>
- Damayanti, E. (2025). *Jaminan Mutu Pelayanan Kesehatan Dan Keselamatan Pasien*. *Jurnal Ad Dustur*, 1(2), 1–11. <https://doi.org/10.58326/jad.v1i2.329>
- Dewi Agustina ... Deliana S. (2023). *STRATEGI PENINGKATAN MUTU PELAYANAN KESEHATAN DI RUMAH SAKIT*. *Detector: Jurnal Inovasi Riset Ilmu Kesehatan*, 1(3), 64–70. <https://doi.org/10.55606/detector.v1i3.2088>
- Flora, H. S. (2024). *TANGGUNG JAWAB RUMAH SAKIT TERHADAP TENAGA MEDIS DALAM PELAYANAN KESEHATAN: HOSPITAL RESPONSIBILITY TO MEDICAL PERSONNEL IN HEALTH SERVICES*. *Jurnal Hukum Justice*, 66–77.
- Halimah, N., & Budhiartie, A. (2020). *Kebijakan Rumah Sakit dalam Sistem Pengelolaan Kesehatan Lingkungan: Rumah Sakit, Kesehatan Lingkungan, Limbah, Kebijakan*. *Mendapo: Journal of Administrative Law*, 1(1), 22–36. <https://doi.org/10.22437/mendapo.v1i1.8853>
- Handiny, F. ... Rizyana, N. P. (2021). *Pengendalian Vektor Penyakit*. Ahli Media Press.
- Hikmawati, W. O. (2025). *Gambaran keberadaan vektor penyakit dan binatang pengganggu di Rumah Sakit Umum Daerah Kota Kendari tahun 2024*. *Journal of Health Sciences Leksia (JHSL)*, 3(2), 66–76.
- Husein, A. H. ... Alfajri, I. (2025). *Evaluasi Efektivitas Strategi Pengendalian Vektor Penyakit di Rumah Sakit X Kota Batam Tahun 2024*. *Jurnal Promotif Preventif*, 8(3), 389–399.
- Indah, V. F. ... Aprin, S. (2024). *TANTANGAN DAN HAMBATAN DALAM IMPLEMENTASI KEBIJAKAN PEMBENTUKAN TIM RENSTRA DI KESBANGPOL KABUPATEN OGAN KOMERING ILIR*. *Jurnal Ilmu Administrasi Dan Studi Kebijakan (JIASK)*, 7(1).

- Istigfari, S. N., & Dwiantoro, L. (2022). [Kepatuhan Penggunaan Alat Pelindung Diri pada Petugas Kesehatan di Rumah Sakit melalui Pengembangan Metode Human Factor Design : Kajian Literatur](#). *Jurnal of Holistic*, 5(1), 111–124.
- Kadir, N. A. (2024). [Analisis Strategi Pelatihan dan Pengembangan Sumber Daya Manusia Berbasis Kompetensi terhadap Kinerja Karyawan pada PT Siloam Hospital Cabang Surabaya](#). *Syntax Literate: Jurnal Ilmiah Indonesia*, 9(12). <https://doi.org/10.36418/syntax-literate.v9i12.17176>
- Kesuma, A. P. ... Ridha, M. R. (2021). *Pengendalian Vektor dan Rodent*. CV. EUREKA MEDIA AKSARA.
- Kurniasi, G. (2025). Strategi Manajemen dalam Meningkatkan Efektivitas dan Efisiensi Organisasi. *Jurnal Dinamika Sosial Dan Sains*, 2(2), 498–502.
- Marlinae, L. ... Andiarsa, D. (2024). *Pengendalian Vektor dan Binatang Pengganggu* (Issue 197). CV. Mine.
- Misriyah. (2021). *Kebijakan Nasional Pengendalian Vektor*.
- Saidah, H. (2021). *Drainase Perkotaan*. Yayasan Kita Menulis.
- Sapphira, N. P., & Sari, E. (2022). [EVALUASI PROGRAM PENGENDALIAN VEKTOR DBD DI PUSKESMAS MEDOKAN AYU KOTA SURABAYA TAHUN 2022](#). *Jurnal Higiene Sanitasi*, 2(2), 64–71. <https://doi.org/10.36568/hisan.v2i2.32>