JURNAL KESEHATAN BUDI LUHUR
P-ISSN: 1978-8479
E-ISSN: 2581-0111
Published By: STIKes Budi Luhur Cimahi

Knowledge, Attitude, and Risk Perception Associated with Malaria Control Among Workers in Indonesia's New Capital City

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ABSTRACT

Malaria remains a public health concern in Indonesia, particularly in Indonesia's New Capital City (IKN) development area, where environmental changes and worker mobility may increase transmission risk. This study aimed to examine the association between knowledge, attitude, risk perception, and malaria control among workers in the IKN area. A cross-sectional study was conducted among 167 workers in the IKN development area, East Kalimantan, Indonesia. Data were collected using validated self-administered questionnaires. Chi-square tests were used to examine bivariate associations, and multiple binary logistic regression was performed to identify the strongest factor associated with malaria control behavior. Most respondents had moderate knowledge (46.7%), positive attitudes (57.5%), good risk perception (55.1%), and good malaria control behavior (54.5%). Knowledge (p=0.001), attitude (p=0.001), and risk perception (p=0.001) were significantly associated with malaria control. Multivariate analysis showed that risk perception was the strongest determinant (OR=8.559; 95% CI=3.184-23.004), followed by knowledge (OR=6.309; 95% CI=2.145-18.552) and attitude (OR=4.558; 95% CI=1.732-11.994). Knowledge, attitude, and risk perception were significantly associated with malaria control among IKN workers, with risk perception emerging as the dominant factor. These findings contribute evidence for strengthening workplace-based malaria prevention through contextual health education, routine risk communication, early screening, and environmental control in rapidly developing occupational settings.

Keywords: malaria control, knowledge, attitude, risk perception, workers

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How to cite:
Sangaji, R. M. P. N., Setiawan, Y., & Gunawan, I. A. (2026). Knowledge, attitude, and risk perception associated with malaria control among workers in Indonesia's new capital city. *Jurnal Kesehatan Budi Luhur: Jurnal Ilmu-Ilmu Kesehatan Masyarakat, Keperawatan, dan Kebidanan, 19*(2), 394–403. https://doi.org/10.62817/jkbl.v19i2.524

INTRODUCTION

Malaria remains one of the most important vector-borne diseases worldwide and continues to pose substantial health, social, and economic burdens. According to the World Health Organization (WHO), an estimated 263 million malaria cases and 597,000 malaria-related deaths occurred globally in 2023, with the majority of cases concentrated in tropical and subtropical regions. Despite substantial progress in malaria prevention and treatment, achieving malaria

elimination remains challenging due to environmental changes, population mobility, and persistent transmission in endemic areas (WHO, 2024).

Indonesia has committed to achieving national malaria elimination by 2030 through the National Malaria Elimination Roadmap 2025–2045. Although several provinces have successfully achieved malaria-free status, malaria transmission remains a concern in eastern Indonesia and parts of Kalimantan. In 2024, Indonesia reported an increase in malaria cases compared to the previous year, highlighting the need for strengthened prevention and surveillance strategies (Ministry of Health of the Republic of Indonesia, 2024).

East Kalimantan Province has experienced fluctuating malaria incidence over the past decade. Penajam Paser Utara Regency, the location of Indonesia's New Capital City (IKN), remains one of the areas vulnerable to malaria transmission. The development of IKN has resulted in substantial environmental modifications, including land clearing, infrastructure construction, and increased human mobility. Such environmental and demographic changes may alter vector ecology and increase opportunities for malaria transmission among workers and surrounding communities.

The relationship between environmental change and malaria transmission has been well documented. Deforestation, land-use transformation, and urban expansion may create favorable breeding habitats for Anopheles mosquitoes while increasing human-vector contact. Furthermore, large-scale infrastructure projects attract workers from various regions, including malaria-endemic areas, potentially contributing to imported malaria cases and increasing transmission risk (Bauhoff & Busch, 2020).

Behavioral factors play a crucial role in malaria prevention and control. The Health Belief Model suggests that health-related actions are influenced by individuals' perceptions of susceptibility, severity, benefits, and barriers, while the Knowledge, Attitude, and Practice framework explains that knowledge and attitude contribute to preventive behavior. Individuals with adequate knowledge about malaria transmission and prevention are more likely to adopt protective behaviors. Likewise, positive attitudes and heightened perceptions of susceptibility and disease severity may encourage participation in preventive measures and prompt healthcare-seeking behavior (Rosenstock, 1974; Ma'moun et al., 2020; Notoatmodjo, 2012).

Previous studies have demonstrated significant relationships between knowledge, attitudes, and malaria prevention practices. Communities with higher malaria-related knowledge tend to utilize insecticide-treated nets, eliminate mosquito breeding sites, and seek early diagnosis and treatment. Similarly, favorable attitudes and strong risk perceptions have been associated with increased compliance with malaria control interventions (Rahim et al., 2024; Addis & Wondmeneh, 2023; Casella et al., 2024).

Despite growing evidence regarding behavioral determinants of malaria prevention, limited studies have specifically examined these factors among workers in the IKN development area. The unique environmental and occupational characteristics of this rapidly developing region warrant further investigation. Understanding how knowledge, attitudes, and risk perceptions influence malaria control behavior among workers is essential for designing effective prevention strategies and supporting malaria elimination efforts.

Therefore, this study aimed to examine the association between knowledge, attitude, risk perception, and malaria control among workers in the IKN area, East Kalimantan, Indonesia.

METHODS

Study Design

This study employed an analytical observational design with a cross-sectional approach. The cross-sectional design was selected because it allows the measurement of independent

variables (knowledge, attitude, and risk perception) and the dependent variable (malaria control) simultaneously at a single point in time. This design is appropriate for identifying factors associated with malaria control behavior among workers in the Indonesia New Capital City (IKN) development area.

Study Setting and Period

The study was conducted in the Indonesia New Capital City (IKN) development area located in Penajam Paser Utara Regency, East Kalimantan Province, Indonesia. Data collection was carried out in April 2026. The study setting was selected due to ongoing large-scale infrastructure development activities that involve a high number of workers and environmental modifications that may influence malaria transmission risk.

Population and Sample

The target population consisted of workers employed in the IKN development area. These included construction workers, technical personnel, operational staff, and supporting workers involved in various development projects.

Because the exact number of workers continuously changed according to project phases and workforce mobility, the population size was considered dynamic and difficult to determine precisely. Therefore, sample size calculation was performed using Cochran's formula for large or unknown populations: $n = Z^2pq/d^2$. The calculation used a 95% confidence level (Z=1.96), an estimated proportion of 0.50, q=0.50, and a precision level of 0.08, resulting in a minimum sample of approximately 151 respondents. After adding a 10% allowance for possible non-response or incomplete data, the minimum required sample became 167 respondents.

Sampling Technique

Participants were selected using purposive sampling. Respondents were recruited based on predetermined inclusion and exclusion criteria. Inclusion criteria were: (1) workers currently employed in the IKN development area, (2) aged 18 years or older, (3) willing to participate in the study, and (4) able to complete the questionnaire independently. Workers who submitted incomplete questionnaires were excluded from the analysis.

Variables and Measurement

The dependent variable was malaria control behavior. Independent variables included knowledge, attitude, and risk perception related to malaria.

Knowledge was defined as respondents' understanding of malaria transmission, symptoms, risk factors, prevention methods, and control measures. Knowledge was assessed using a structured questionnaire consisting of multiple-choice and true-false items. Correct responses received a score of one, whereas incorrect responses received a score of zero. Scores were categorized into poor, moderate, and good levels.

Attitude referred to respondents' evaluations and feelings regarding malaria prevention and control. Attitude was measured using Likert-scale statements ranging from strongly disagree to strongly agree. Higher scores reflected more positive attitudes toward malaria prevention.

Risk perception was defined as respondents' perception of susceptibility to malaria, perceived severity of the disease, perceived benefits of prevention, and perceived barriers to preventive actions. Responses were measured using a Likert scale and categorized based on median values.

Malaria control behavior referred to respondents' preventive actions, including the use of personal protective measures against mosquito bites, environmental management, early healthcare-seeking behavior, and adherence to malaria prevention recommendations. Malaria control scores were classified into good and poor categories according to the median score.

Instrument Validity and Reliability

Prior to the main survey, a pilot study was conducted among 30 respondents outside the study sample. Validity testing was performed using Pearson Product-Moment correlation analysis. Questionnaire items with correlation coefficients greater than the critical value ($r > 0.361$) were considered valid. Items that did not meet the validity criterion were revised or excluded before the main data collection.

Reliability testing was performed using Cronbach's Alpha coefficient for each construct, including knowledge, attitude, risk perception, and malaria control behavior. Instruments with Cronbach's Alpha values of 0.70 or higher were considered reliable and suitable for data collection. The final questionnaire used in the main study consisted only of items that fulfilled the validity and reliability criteria.

Data Collection Procedure

Data were collected using self-administered questionnaires distributed directly to eligible respondents. Before participation, respondents received information regarding the study objectives, procedures, confidentiality, and voluntary nature of participation. Written informed consent was obtained from all participants prior to questionnaire completion.

Researchers and trained assistants supervised the data collection process to ensure completeness of responses and provide clarification when necessary. Completed questionnaires were checked immediately for missing data before being entered into the database.

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize respondents' characteristics and study variables. Categorical variables were presented as frequencies and percentages.

Bivariate analysis was performed using the Chi-square test to examine associations between knowledge, attitude, risk perception, and malaria control behavior. Respondent characteristics such as age, education level, length of work, history of malaria, and residence were examined descriptively and considered as potential contextual factors in interpreting the findings. Variables with p-values less than 0.25 in the bivariate analysis were included in multivariate analysis.

Multiple logistic regression analysis was conducted to identify the most dominant factor associated with malaria control behavior. Adjusted Odds Ratios (AORs) and 95% Confidence Intervals (CIs) were calculated. Statistical significance was determined at $p < 0.05$. The interpretation of the regression model focused on the magnitude and direction of associations rather than causal inference because of the cross-sectional design.

RESULTS

A total of 167 workers participated in this study. Most respondents were male (84.4%), had completed senior high school education (59.9%), and worked as construction or field workers (59.9%). Nearly half of the respondents had worked in the IKN development area for 6–12 months

(47.9%). Most respondents had no history of malaria in the previous year (77.2%) and lived in worker dormitories or barracks (58.7%).

Table 1. Characteristics of Respondents (n = 167)

Characteristics	n	%
Sex		
Male	141	84.4
Female	26	15.6
Education		
Elementary school	4	2.4
Junior high school	22	13.1
Senior high school	100	59.9
Diploma	24	14.4
Bachelor degree	16	9.6
Postgraduate degree	1	0.6
Occupation		
Construction/field worker	100	59.9
Technical staff	23	13.8
Supervisor	11	6.6
Administrative staff	10	6.0
Security	7	4.2
Driver/operator	7	4.2
Others	9	5.4
Length of work		
<6 months	44	26.3
6–12 months	80	47.9
>1 year	43	25.7
History of malaria in the previous year		
Yes	38	22.8
No	129	77.2
Residence		
Worker dormitory/barrack	98	58.7
Rented house	49	29.3
Private house	16	9.6
Others	4	2.4

Source: Primary data, 2026.

The mean age of respondents was 36.51 years with a standard deviation of 11.146. The mean knowledge score was 11.84 ± 2.762, while the average knowledge percentage was 74.02%. The mean attitude score was 35.81 ± 11.836, the mean risk perception score was 40.08 ± 14.160, and the mean malaria control score was 30.46 ± 10.806.

Most respondents had moderate knowledge (46.7%), positive attitudes (57.5%), good risk perception (55.1%), and good malaria control behavior (54.5%).

Table 2.
Distribution of Knowledge, Attitude, Risk Perception, and Malaria Control (n = 167)

Variable	n	%
Knowledge		
Good	76	45.5
Moderate	78	46.7
Poor	13	7.8
Attitude		
Positive	96	57.5
Negative	71	42.5
Risk perception		
Good	92	55.1
Poor	75	44.9
Malaria control		
Good	91	54.5
Poor	76	45.5

Source: Primary data, 2026.

Bivariate analysis showed significant associations between knowledge, attitude, risk perception, and malaria control among IKN workers. Respondents with good knowledge had a higher proportion of good malaria control (84.2%) than those with moderate knowledge (34.6%) and poor knowledge (0.0%). Respondents with positive attitudes had better malaria control (70.8%) than those with negative attitudes (32.4%). Similarly, respondents with good risk perception had better malaria control (78.3%) than those with poor risk perception (25.3%).

Table 3. Association Between Knowledge, Attitude, Risk Perception, and Malaria Control

Variables	Good malaria control n (%)	Poor malaria control n (%)	Total	p-value
Knowledge				0.001
Good	64 (84.2)	12 (15.8)	76	
Moderate	27 (34.6)	51 (65.4)	78	
Poor	0 (0.0)	13 (100.0)	13	
Attitude				0.001
Positive	68 (70.8)	28 (29.2)	96	
Negative	23 (32.4)	48 (67.6)	71	
Risk perception				0.001
Good	72 (78.3)	20 (21.7)	92	
Poor	19 (25.3)	56 (74.7)	75	

Source: Primary data, 2026.

Multiple binary logistic regression analysis showed that knowledge, attitude, and risk perception were significantly associated with malaria control. Risk perception was the strongest determinant. Workers with good risk perception were 8.559 times more likely to perform good malaria control than those with poor risk perception (95% CI: 3.184–23.004; p<0.001). Knowledge was also significantly associated with malaria control (OR=6.309; 95% CI: 2.145–18.552; p=0.001), followed by attitude (OR=4.558; 95% CI: 1.732–11.994; p=0.002).

Table 4.
Multiple Logistic Regression Analysis of Factors Associated with Malaria Control

Variables	B	Wald	p-value	OR	95% CI
Knowledge	1.842	14.621	0.001	6.309	2.145–18.552
Attitude	1.517	10.384	0.002	4.558	1.732–11.994
Risk perception	2.147	18.932	<0.001	8.559	3.184–23.004
Constant	-4.126	21.417	<0.001	0.016	—

Source: Primary data, 2026.

DISCUSSION

The present study found that knowledge, attitude, and risk perception were significantly associated with malaria control among workers in the IKN development area. These findings indicate that malaria control behavior among workers is not only influenced by environmental exposure but also by cognitive, affective, and perceptual factors. This is particularly important in the IKN context, where large-scale land transformation, worker mobility, and ecological changes may increase the risk of vector-borne disease transmission (Ortiz et al., 2021; World Health Organization, 2024).

Knowledge was significantly associated with malaria control. Workers with good knowledge had a higher proportion of good malaria control behavior compared with those who had moderate or poor knowledge. This finding suggests that understanding malaria transmission, symptoms, vector breeding sites, and prevention strategies may encourage workers to adopt protective behaviors. This result is consistent with the *Knowledge, Attitude, and Practice* framework, which explains that knowledge is an important precursor to health-related behavior (Notoatmodjo, 2012; Wan et al., 2016).

This finding is also supported by previous studies showing that malaria-related knowledge contributes to better prevention practices. Rahim et al. (2024) emphasized that community knowledge plays an important role in strengthening malaria programs, while Addis and Wondmeneh (2023) reported that knowledge was associated with malaria prevention practices in malaria-endemic communities. Therefore, increasing workers' knowledge through contextual health education is essential to improve malaria control behavior in the IKN development area (Addis & Wondmeneh, 2023; Rahim et al., 2024).

Attitude was also significantly associated with malaria control. Workers with positive attitudes were more likely to demonstrate good malaria control practices than those with negative attitudes. A positive attitude may reflect acceptance of malaria prevention, willingness to follow health recommendations, and readiness to participate in environmental control activities. This is in line with the concept that attitude acts as an affective determinant that influences an individual's readiness to perform health behaviors (Notoatmodjo, 2012; Anggraeni & Nurrachmawati, 2017).

The association between attitude and malaria control also supports the theoretical assumption of the *Knowledge, Attitude, and Practice* model, in which attitude serves as a bridge between knowledge and actual practice. Workers who have positive attitudes toward malaria prevention are more likely to accept preventive measures such as using repellents, maintaining environmental hygiene, and seeking early diagnosis when symptoms occur. Similar findings have been reported in previous malaria-related KAP studies, where positive attitudes were associated with better preventive practices (De Sousa Pinto et al., 2021; Tairou et al., 2022).

Risk perception emerged as the strongest determinant of malaria control. Workers with good risk perception were more likely to perform appropriate malaria control behaviors than those with poor risk perception. This finding supports the Health Belief Model, which suggests that individuals are more likely to perform preventive behaviors when they perceive themselves as susceptible to disease and believe that the disease has serious consequences (Rosenstock, 1974; Ma'moun et al., 2020).

The dominance of risk perception in this study is highly relevant to the IKN development context. Workers in construction and field activities may be exposed to mosquito breeding sites, temporary settlements, vegetation changes, and standing water around work areas. In this context, knowledge alone may not be sufficient to produce consistent preventive behavior unless workers also perceive malaria as a real and immediate occupational threat. Perceived susceptibility may encourage workers to use personal protection, while perceived severity may increase their willingness to seek early diagnosis and comply with prevention recommendations. Previous evidence also suggests that psychosocial determinants, including perceived susceptibility, perceived severity, and perceived benefits, influence malaria-related behaviors in low-transmission and changing-risk settings (Casella et al., 2024).

These findings have practical implications for malaria control policy in the IKN development area. Health promotion programs should integrate malaria education into occupational health and safety activities. Project managers, health authorities, and the IKN authority should provide routine risk communication, mosquito bite prevention facilities, early screening, and environmental management programs. Strengthening workers' risk perception may be particularly effective in improving malaria control behavior and supporting malaria elimination strategies in rapidly developing regions (Kementerian Kesehatan RI, 2024; Musoke et al., 2023).

This study also highlights the need for an integrated malaria control approach. Malaria prevention should not depend solely on individual behavior but should be supported by workplace policies, environmental management, and surveillance systems. Integrated interventions, including personal protection, vector control, environmental sanitation, and early case detection, have been shown to be more effective in reducing malaria burden than single interventions (Musoke et al., 2023; World Health Organization, 2024).

This study has several limitations. First, the cross-sectional design limits causal interpretation because exposure and outcome variables were measured at the same time. Second, self-reported questionnaire data may be affected by recall bias or social desirability bias. Third, the dynamic nature of the IKN workforce may limit the generalizability of findings to all workers involved in the project. Fourth, several potential confounding factors, such as detailed workplace exposure, availability of preventive facilities, housing conditions, and environmental risk around settlements, were not fully measured. Future research should consider longitudinal or mixed-method designs and include environmental, occupational, and organizational factors that may influence malaria control behavior (Notoatmodjo, 2018; Sugiyono, 2019).

CONCLUSION

Knowledge, attitude, and risk perception were significantly associated with malaria control among workers in the Indonesia New Capital City development area. Workers with good knowledge, positive attitudes, and favorable risk perceptions were more likely to demonstrate good malaria control behavior. Risk perception was identified as the strongest determinant, indicating that workers' perceived susceptibility to malaria and perceived seriousness of the disease are important factors in shaping preventive behavior. These findings suggest that malaria prevention programs in the IKN development area should not only increase knowledge but also strengthen risk perception through contextual health education, routine risk communication, workplace-based prevention, early screening, and environmental control.

RECOMMENDATION

Health authorities, the IKN authority, and project management stakeholders should integrate malaria prevention into occupational health and safety programs. Routine health education, risk communication, early malaria screening, mosquito bite prevention, and

environmental management should be implemented consistently in worker settlements and project areas. Health education materials should emphasize workers' real exposure to malaria risk, the seriousness of malaria complications, and practical prevention measures that can be performed at work and in residential areas. Future studies should examine additional determinants of malaria control, including workplace policies, availability of preventive facilities, housing conditions, environmental risk factors, and access to health services using longitudinal or mixed-method approaches.

ACKNOWLEDGMENTS

The authors would like to thank the Graduate School of Universitas Mulawarman, all respondents who participated in this study, and all parties who supported the implementation of this research.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

AUTHOR CONTRIBUTIONS

Raden Mohammad Pradendi Nikita Sangaji: Conceptualization, methodology, data collection, formal analysis, and writing original draft.

Yunianto Setiawan: Supervision, methodology review, validation, and writing review.

Ike Anggraeni Gunawan: Supervision, validation, critical review, and writing review

REFERENCES

Addis, D., & Wondmeneh, T. (2023). Assessment of malaria prevention knowledge, attitude, and practice and associated factors among households living in rural malaria-endemic areas in the Afar Pastoral Region of Ethiopia. *Frontiers in Public Health, 11*. https://doi.org/10.3389/fpubh.2023.1258594

Anggraeni, D., & Nurrachmawati, A. (2017). Malaria in pregnancy: A qualitative study on Health Belief Model in Muara Wahau, East Kalimantan. *Jurnal Kesehatan Masyarakat Andalas, 11*(2), 84–92. https://doi.org/10.24893/jkma.11.2.84-92.2017

Bauhoff, S., & Busch, J. (2020). Does deforestation increase malaria prevalence? Evidence from satellite data and health surveys. *World Development, 127*, 104734. https://doi.org/10.1016/j.worlddev.2019.104734

Casella, A., Monroe, A., Toso, M., Hunter, G., Underwood, C., Pillai, R., Hughes, J., Van Lith, L., Cash, S., Hwang, J., & Babalola, S. (2024). Understanding psychosocial determinants of malaria behaviours in low-transmission settings: A scoping review. *Malaria Journal, 23*(1), 15. https://doi.org/10.1186/s12936-023-04831-9

De Sousa Pinto, L., Arroz, J., Martins, M., Hartz, Z., Negrão, N., Muchanga, V., Cossa, A., & Zulliger, R. (2021). Malaria prevention knowledge, attitudes, and practices in Zambezia Province, Mozambique. *Malaria Journal, 20*, 293. https://doi.org/10.1186/s12936-021-03825-9

Kementerian Kesehatan Republik Indonesia. (2024). *Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/MENKES/1988/2024 tentang Peta Jalan Eliminasi Malaria dan Pencegahan Penularan Kembali di Indonesia Tahun 2025–2045*. Kementerian Kesehatan Republik Indonesia.

Ma'moun, A., Alhelalat, J. A., Masadeh, M. A., & Al-Ababneh, M. M. (2020). Use of the Health Belief Model (HBM) to examine food handlers' practices in five stars hotels at Petra City, Jordan. *Journal of International Business and Economics, 8*(1), 32–39.

Musoke, D., Atusingwize, E., Namata, C., Ndejjo, R., Wanyenze, R., & Kamya, M. (2023). Integrated malaria prevention in low- and middle-income countries: A systematic review. *Malaria Journal, 22*, 81. https://doi.org/10.1186/s12936-023-04500-x

Notoatmodjo, S. (2012). *Promosi kesehatan dan perilaku kesehatan*. Rineka Cipta.

Notoatmodjo, S. (2018). *Metodologi penelitian kesehatan*. Rineka Cipta.

Ortiz, D., Piche-Ovares, M., Romero-Vega, L., Wagman, J., & Troyo, A. (2021). The impact of deforestation, urbanization, and changing land use patterns on the ecology of mosquito and tick-borne diseases in Central America. *Insects, 13*(1), 20. https://doi.org/10.3390/insects13010020

Rahim, F. A. A., Mutalip, M., Ngesom, A., Mahmud, M., & Yoep, N. (2024). Unveiling the impact of community knowledge in malaria programmes: A scoping review protocol. *PLOS ONE, 19*, e0306776. https://doi.org/10.1371/journal.pone.0306776

Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs, 2*(4), 328–335.

Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.

Tairou, F., Nawaz, S., Tahita, M., Herrera, S., Faye, B., & Tine, R. (2022). Malaria prevention knowledge, attitudes, and practices (KAP) among adolescents living in an area of persistent transmission in Senegal: Results from a cross-sectional study. *PLOS ONE, 17*, e0274656. https://doi.org/10.1371/journal.pone.0274656

Wan, T. T., Rav-Marathe, K., & Marathe, S. (2016). A systematic review of KAP-O framework for diabetes. *Medical Research Archives, 3*(9).

World Health Organization. (2024). *World malaria report 2024*. World Health Organization. https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2024