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Comparative Analysis of Disease Patterns Between Mainland and Island Regions: Epidemiological, Environmental and Socioeconomic Perspectives

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A B S T R A C T

Geographic context plays a fundamental role in shaping disease distribution, transmission dynamics and health outcomes; however, systematic comparisons between mainland and island regions remain limited and fragmented. Existing studies often focus on individual diseases, specific regions or isolated determinants such as mobility or environment, providing valuable insights but lacking an integrated perspective that captures how geography interacts with epidemiological, socioeconomic and healthcare factors. As a result, public health strategies are frequently developed using generalized assumptions that may not adequately reflect the distinct vulnerabilities and strengths of mainland and island populations. This paper synthesizes existing evidence to compare disease patterns between mainland and island regions, with particular emphasis on differences in disease burden, transmission dynamics, environmental and socioeconomic drivers and mortality profiles. By integrating findings across infectious and non-communicable diseases and incorporating real-world mortality evidence, the study provides a consolidated overview of how geographic settings influence health risks and outcomes. Understanding these differences is important for improving disease surveillance, preparedness and policy design. The findings highlight the need for geography-aware public health approaches, harmonized and spatially disaggregated health data and context-specific intervention strategies. Such an approach can enhance the effectiveness of disease prevention efforts and support more equitable health planning across diverse geographic settings.

Keywords: Mainland regions, Island populations, Disease burden, Mortality patterns, Transmission dynamics, Public health policy

1. Introduction

Geographical context plays a critical role in shaping disease distribution, transmission dynamics and population health outcomes. In particular, mainland and island regions exhibit distinct epidemiological characteristics due to differences in population density, mobility, environmental exposure, healthcare accessibility and socioeconomic structures. Understanding these differences is essential for designing location-specific disease surveillance systems, prevention strategies and public health policies.

Islands are often characterized by geographical isolation, limited population inflow and controlled points of entry, which can reduce exposure to certain infectious diseases but simultaneously increase vulnerability to outbreak amplification,

delayed medical response and limited healthcare resources. In contrast, mainland regions typically experience higher population density, extensive transportation networks and increased human mobility, facilitating faster disease transmission and broader exposure to both infectious and non-communicable diseases[1-3].

Previous studies have demonstrated that island populations may experience lower incidence of some communicable diseases, particularly during early epidemic phases, due to restricted travel and natural quarantine effects[4,5]. However, islands also face unique health challenges, including higher prevalence of chronic diseases, limited specialist care, dependency on external medical supply chains and heightened sensitivity to environmental changes such as climate variability and extreme weather events[6-8].

From an environmental perspective, climatic conditions, biodiversity and vector ecology differ significantly between mainland and island settings, influencing the spread of vector-borne diseases such as dengue, malaria and Zika virus[9-11]. Islands may also experience ecosystem fragility, where minor environmental disruptions can produce disproportionate health impacts[12].

Socioeconomic disparities further contribute to disease heterogeneity between mainland and island populations. Factors such as income distribution, education levels, occupational exposure and healthcare infrastructure have been shown to significantly influence disease burden and health outcomes[13-15]. Additionally, demographic characteristics such as aging populations are often more pronounced on islands, increasing susceptibility to non-communicable diseases and healthcare system strain[16].

The recent COVID-19 pandemic highlighted stark contrasts between mainland and island disease dynamics, with several island nations demonstrating delayed onset, lower case numbers and reduced mortality through early border control and isolation measures, while mainland regions faced rapid community transmission[17-19]. These observations underscore the importance of geographical context in epidemic preparedness and response.

This mini-review aims to systematically compare disease patterns between mainland and island regions, synthesizing existing literature to identify key differences in disease prevalence, transmission mechanisms, environmental influences and healthcare capacity. By consolidating current evidence, this review seeks to provide insights that support geographically adaptive public health strategies and inform future research directions.

2. Related Work

A substantial body of research has examined disease distribution through a geographical lens, with increasing attention given to comparisons between mainland and island populations. Early epidemiological studies focused on islands as natural laboratories, leveraging their relative isolation to study disease introduction, transmission and extinction dynamics[20,21].

Several comparative studies have reported lower transmission rates of infectious diseases on islands, particularly during the early stages of epidemics, attributed to restricted mobility and border control effectiveness[22,23]. For example, analyses of influenza and COVID-19 outbreaks demonstrated that island regions often experienced delayed epidemic peaks and reduced basic reproduction numbers compared to mainland counterparts[24].

Conversely, research has highlighted that islands are not universally protected from disease burden. Studies on Non-Communicable Diseases (NCDs) indicate higher prevalence of diabetes, cardiovascular diseases and obesity in certain island populations, often linked to dietary transitions, reduced physical activity and healthcare access limitations[25-27]. These findings suggest that geographical isolation may exacerbate chronic disease management challenges.

Environmental and ecological studies emphasize the role of vector dynamics and climate sensitivity in island disease patterns. Island ecosystems often support dense vector populations, increasing the risk of vector-borne diseases under favourable climatic conditions[28]. Mainland regions, while having broader exposure, may benefit from more extensive vector control infrastructure and surveillance systems[29].

Healthcare accessibility has also been extensively studied as a differentiating factor. Mainland regions generally possess higher hospital density, specialized care facilities and emergency response capacity, while islands frequently rely on limited local infrastructure and off-island referrals[30]. These disparities influence disease outcomes, particularly for acute conditions requiring rapid intervention.

Socioeconomic and behavioral determinants further modulate disease risk. Comparative analyses reveal that income inequality, occupational exposure and education levels vary significantly between mainland and island settings, contributing to heterogeneous disease outcomes[31]. Additionally, cultural practices and health-seeking behaviors unique to island communities can influence disease reporting and management[32].

Recent modeling and spatial epidemiology studies have incorporated mobility networks, transportation data and population flow models to quantify disease spread differences between mainland and island regions[33-35]. These approaches have improved understanding of how connectivity shapes epidemic trajectories.

Despite growing interest, existing literature remains fragmented, often focusing on single diseases or specific regions. Comprehensive reviews synthesizing multiple disease categories across mainland and island contexts remain limited. This mini-review addresses this gap by integrating findings across infectious diseases, non-communicable diseases, environmental health and healthcare systems to provide a holistic comparison.

3. Comparative Analysis of Disease Patterns Between Mainland and Island Regions

Geographical context fundamentally shapes disease patterns by influencing population structure, mobility, environmental exposure and healthcare accessibility. Mainland and island regions represent two contrasting epidemiological settings, where differences in connectivity, isolation and resource distribution result in distinct disease burdens and transmission behaviors. This section synthesizes existing evidence to compare disease patterns between mainland and island regions, focusing on overall disease burden, transmission dynamics, environmental and socioeconomic drivers and illustrative real-world examples. Rather than treating these factors independently, the comparison highlights their interconnected role in shaping health outcomes across geographic contexts.

A. Overall disease burden differences

Disease burden varies substantially between mainland and island populations, reflecting differences in demography, lifestyle, healthcare access and exposure risks. Mainland regions typically experience a higher incidence of infectious diseases, driven by dense populations, urbanization and extensive transportation networks. In contrast, island regions often report lower overall infectious disease incidence, particularly in early outbreak phases, but may experience disproportionately severe impacts when outbreaks occur due to limited healthcare capacity and delayed response mechanisms[36-38].

Non-Communicable Diseases (NCDs) such as diabetes, cardiovascular diseases and obesity are frequently more prevalent in island populations. This trend has been linked to dietary transitions, reduced physical activity, aging demographics and healthcare access constraints[39-41]. Mainland regions, while also heavily affected by NCDs, often benefit from earlier diagnosis and better chronic disease management due to more developed healthcare infrastructure (Table 1).

Table 1: Overall disease burden comparison between mainland and island regions.

Aspect	Mainland Regions	Island Regions
Infectious disease incidence	Generally higher	Generally lower but outbreak-prone
Non-communicable diseases	High, but better managed	Often higher prevalence
Mortality variability	Moderate	High during outbreaks
Healthcare dependency	Mostly self-contained	Often mainland-dependent

B. Transmission dynamics

Transmission dynamics differ markedly between mainland and island settings due to variations in population mobility, connectivity and social mixing patterns. Mainland regions exhibit rapid disease spread facilitated by dense urban environments, intercity commuting and international travel corridors, resulting in higher basic reproduction numbers (R_0) for many infectious diseases[42,43].

Island regions, by contrast, benefit from natural geographic containment, where limited entry points allow for early border control and quarantine measures (Table 2). This often leads to delayed epidemic onset and slower initial transmission[44]. However, once community transmission is established, islands may experience accelerated local spread due to close-knit communities and constrained healthcare resources[45].

Table 2: Comparison of disease transmission dynamics.

Factor	Mainland Regions	Island Regions
Population mobility	High	Limited
Epidemic onset	Rapid	Delayed
Community spread	Gradual but widespread	Rapid once established
Border control impact	Limited effectiveness	Highly effective

C. Environmental and socioeconomic drivers

Environmental and socioeconomic conditions strongly modulate disease patterns across geographic contexts. Islands are often characterized by distinct climatic conditions, higher humidity and fragile ecosystems, which can amplify the risk of vector-borne diseases such as dengue and chikungunya under favourable environmental conditions[46]. Mainland regions, while exposed to a broader range of environmental risks, often possess more extensive vector surveillance and control programs[47].

Socioeconomic factors further differentiate disease vulnerability (Table 3). Island populations frequently face higher healthcare access barriers, limited specialist availability and greater dependence on off-island referrals[48]. Additionally, socioeconomic inequalities, employment structure and education levels influence health behaviors and disease outcomes differently across mainland and island contexts[49].

Table 3: Environmental and socioeconomic determinants of disease patterns.

Determinant	Mainland Regions	Island Regions
Climate variability	Moderate	High sensitivity
Vector exposure	Widespread but managed	Localized but intense
Healthcare accessibility	Higher	Limited
Socioeconomic resilience	Higher	Often lower

D. Brief real-world examples

Recent global health events provide clear illustrations of mainland-island disease contrasts. During the COVID-19 pandemic, several island regions demonstrated delayed case introduction and lower cumulative incidence, largely due to early travel restrictions and geographic isolation[50]. In contrast, mainland regions experienced rapid community transmission driven by population density and mobility[51].

Similarly, outbreaks of vector-borne diseases such as dengue have shown episodic but intense transmission in island settings, often linked to climatic anomalies, while mainland regions experience more continuous but spatially heterogeneous transmission patterns[52]. These examples underscore the context-specific nature of disease dynamics across geographic settings (Table 4).

Table 4: Illustrative disease examples in mainland and island regions.

Disease	Mainland Pattern	Island Pattern
COVID-19	Rapid spread	Delayed onset, sharp peaks
Dengue	Endemic, spatially variable	Episodic outbreaks
Influenza	Seasonal, widespread	Delayed seasonal peaks

E. Mortality patterns in mainland and island contexts: Evidence from Korea and Jeju island

Figure 1 presents a comparison of cause-specific mortality between mainland South Korea and Jeju Island using officially reported statistics for 2023. The mainland values represent crude death rates for South Korea overall, while the Jeju values correspond to age-standardized death rates, reflecting differences in population structure and reporting methodology. Despite this limitation, the comparison provides useful insights into contrasting mortality profiles between mainland and island contexts.

The results indicate that mortality from cancer, heart disease and cerebrovascular disease is substantially higher in mainland Korea than in Jeju Island. This pattern is consistent with the mainland's higher population density, urban stressors and lifestyle-related risk factors, which have been shown to elevate the burden of non-communicable diseases in highly urbanized settings[53]. In contrast, Jeju Island exhibits lower age-standardized

mortality rates for major chronic diseases, aligning with previous studies reporting relatively favorable cardiovascular and cancer outcomes in island or semi-isolated regions with distinct environmental and lifestyle characteristics[54].

Notably, suicide mortality appears comparable between mainland Korea and Jeju Island, highlighting that mental health–related mortality does not necessarily follow the same geographic gradients as other non-communicable diseases. This finding is consistent with national evidence indicating that suicide risk in Korea is influenced more strongly by psychosocial and economic factors than by geographic location alone[55]. For island regions, social isolation, limited mental health services and demographic aging may offset potential protective effects of lower population density[56].

Overall, the mortality comparison underscores two important points. First, mainland regions tend to carry a higher absolute burden of chronic disease mortality, while island regions may experience different vulnerability profiles rather than uniformly lower risk. Second, the comparison highlights a key methodological challenge in mainland–island studies: the lack of harmonized mortality indicators, particularly with respect to age standardization and spatial disaggregation. Addressing these data inconsistencies is essential for producing more accurate and comparable assessments of disease burden across geographic contexts.

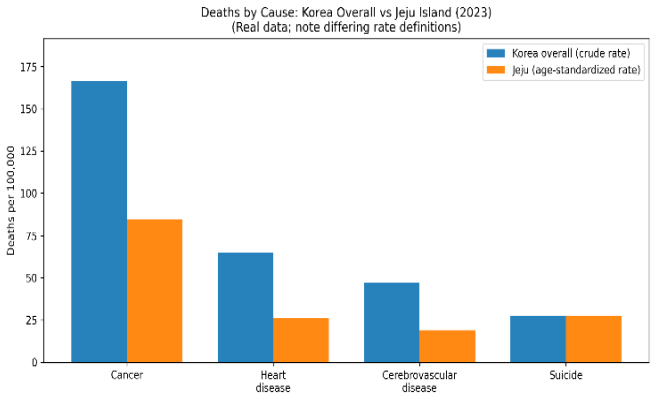

Figure 1: Deaths per 100,000 population by selected causes in 2023 comparing Korea overall (crude rates) and Jeju Island (age-standardized rates).

4. Public Health Implications and Research Gaps

The comparative evidence between mainland and island disease dynamics carries important implications for public health planning, surveillance design and research prioritization. Differences in connectivity, healthcare capacity and environmental sensitivity indicate that uniform disease control strategies are often insufficient, underscoring the need for geographically adaptive approaches.

A. Implications for disease surveillance and early warning systems

The natural containment of island regions offers a strategic advantage for early detection and border-based surveillance, particularly for emerging infectious diseases. Evidence from multiple outbreaks shows that rapid travel screening, quarantine enforcement and targeted testing can significantly delay or suppress disease introduction in island settings[57]. However, reliance on entry-point surveillance alone may create blind spots once community transmission is established.

Mainland regions, by contrast, require high-resolution, decentralized surveillance systems capable of capturing rapid spatial spread across densely connected populations[58]. Integrating mobility data, syndromic surveillance and real-time reporting is therefore more critical for mainland contexts, while islands benefit from early-warning and containment-focused systems[59].

B. Implications for healthcare planning and resource allocation

Healthcare system disparities between mainland and island regions have direct consequences for disease outcomes. Island healthcare systems often face limited specialist availability, diagnostic capacity and surge preparedness, increasing vulnerability during outbreaks and acute health events[60]. These constraints highlight the importance of preemptive resource allocation, telemedicine integration and referral coordination with mainland facilities.

For mainland regions, the primary challenge lies in scalability and equitable access, particularly during widespread epidemics when healthcare demand rapidly exceeds capacity[61]. Policymakers must therefore adopt context-sensitive capacity planning, recognizing that islands require resilience-building strategies, while mainland's require scalability and redundancy[62].

C. Policy and preparedness implications

The contrasting disease trajectories observed between mainland and island regions demonstrate that geography should be treated as a core determinant in public health policy formulation. Island regions benefit from early intervention policies such as travel regulation and targeted vaccination strategies, while mainland regions require sustained mitigation measures addressing mobility, urban density and socioeconomic inequalities[63].

The COVID-19 pandemic reinforced the effectiveness of geographically tailored policies, with island jurisdictions often achieving lower mortality and delayed epidemic peaks through rapid border control and centralized decision-making[64]. Translating these lessons into long-term preparedness frameworks remains a key policy priority.

D. Research gaps and future directions

Despite growing interest, several research gaps persist. First, comparative longitudinal studies examining disease burden across mainland and island contexts remain limited, particularly for non-communicable diseases and mental health outcomes[65]. Second, island populations are frequently underrepresented in global health datasets, leading to biased risk estimates and limited generalizability[66].

Third, there is insufficient integration of environmental, mobility and socioeconomic data in comparative disease modelling frameworks[67]. Advances in spatial epidemiology, remote sensing and data-driven modeling offer opportunities to address these gaps, but remain unevenly applied across regions[68].

Future research should prioritize geography-aware epidemiological models, standardized cross-region datasets and interdisciplinary approaches that jointly consider environmental, social and healthcare system factors[69]. Addressing these gaps

is essential for improving disease preparedness and reducing health inequities between mainland and island populations.

5. Conclusion

This study highlights clear differences in disease burden, transmission patterns and mortality profiles between mainland and island regions, demonstrating the critical role of geographic context in shaping population health outcomes. Mainland regions generally experience higher mortality from major non-communicable and large-scale infectious diseases, whereas island regions exhibit distinct vulnerability patterns driven by environmental sensitivity, healthcare access limitations and demographic structure rather than uniformly lower disease risk.

The findings underscore the importance of geography-aware public health strategies and caution against applying uniform disease control measures across fundamentally different settings. Addressing persistent data gaps, particularly the lack of harmonized and geographically disaggregated mortality indicators, will be essential for improving comparative analyses. Strengthening integrated surveillance systems, standardized reporting and context-specific preparedness frameworks can support more equitable and effective disease prevention and health planning in both mainland and island populations.

6. References

1. Nisarg G. A dual burden dilemma: Navigating the global impact of communicable and non-communicable diseases and the way forward. Int J Med Res. 2024;12(3): 65-77.
2. Justin RV. Convergence of non-communicable and infectious diseases in low-and middle-income countries. Int J Epidemiology. 2013;42(1): 221-227.
3. Humaira HS, Saha S. Burden of non-communicable disease: Global overview. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2010;4(1): 41-47.
4. David CA, Haggett P, Smallman-Raynor M. Island epidemics. Oxford University Press. 2000.
5. Hiroshi N, Wilson N, Baker MG. Quarantine for pandemic influenza control at the borders of small island nations. BMC Infectious Diseases. 2009;9(1): 27.
6. World Health Organization. Human health and climate change in Pacific Island countries. 2015.
7. Kristie EL, Lewis ND, Corvalan C. Climate variability and change and their potential health effects in small island states: Information for adaptation planning in the health sector. Environ health perspectives. 2006;114(12): 1957.
8. Lachlan M, Kim R, Woodward A, et al. Health impacts of climate change in Pacific Island countries: A regional assessment of vulnerabilities and adaptation priorities. Environmental Health Perspectives. 2015;124(11): 1707.
9. Jian M. Climate change drives the transmission and spread of vector-borne diseases: An ecological perspective. Biology. 2022;11(11): 1628.
10. Mohabeer T, Adegboye O, Karl S, et al. Understanding the effect of a changing climate on the re-emergence of mosquito-borne diseases in vulnerable small Island Nations: A Systematic Review. Zoonoses and Public Health. 2025;72(3): 223-247.
11. Sylvie M, Boete C. Global impact of mosquito biodiversity, human vector-borne diseases and environmental change. The importance of biological interactions in the study of biodiversity. 2011: 27-50.
12. Kristie EL, Lewis ND, Corvalan C. Climate variability and change and their potential health effects in small island states: Information for adaptation planning in the health sector. Environmental Health Perspectives. 2006;114(12): 1957.
13. Paul HF. Health challenges of the Pacific region: Insights from history, geography, social determinants, genetics and the microbiome. Frontiers in Immunology. 2019;10: 2184.
14. Eric P. Cancer disparities among Pacific Islanders: a review of sociocultural determinants of health in the Micronesian region. Cancers. 2023;15(5): 1392.
15. Isolde S. Socioeconomic inequalities in non-communicable diseases and their risk factors: an overview of systematic reviews. BMC Public Health. 2015;15(1): 914.
16. World Health Organization. Noncommunicable diseases and mental health in small island developing states. World Health Organization. 2023.
17. Marco C. The COVID-19 pandemic. Critical reviews in clinical laboratory sciences. 2020;57(6): 365-388.
18. Li Y, Liu S, Liu J, et al. COVID-19: Immunopathogenesis and Immunotherapeutics. Signal transduction and targeted therapy. 2020;5(1): 128.
19. Duduzile N, Wiysonge CS. COVID-19 vaccines. Curr Opinion Immunol. 2021;71: 111-116.
20. Robert WJ. Island biogeography: Taking the long view of nature's laboratories. Sci. 2017.
21. Natalie GR, Gruner DS, Lim JY, et al. Island ecology and evolution: Challenges in the Anthropocene. Environ Conservation. 2017;44(4): 323-335.
22. Martin E. Small islands and pandemic influenza: potential benefits and limitations of travel volume reduction as a border control measure. BMC Infect Dis. 2009;9(1): 160.
23. Zhijing X. The extensive networks of frequent population mobility in the Samoan Islands and their implications for infectious disease transmission. Sci Rep. 2018;8(1): 10136.
24. Jonathan MD, Lewis ND. An inevitable pandemic: Geographic insights into the COVID-19 global health emergency. Eurasian Geography and Economics. 2020;61(4-5): 404-422.
25. Erica R. The tide of dietary risks for noncommunicable diseases in Pacific Islands: an analysis of population NCD surveys. BMC Public Health. 2022;22(1): 1521.
26. Amy S, McIver L, Schubert L. The nexus of climate change, food and nutrition security and diet-related non-communicable diseases in Pacific Island Countries and Territories. Climate and Development. 2020;12(2): 120-133.
27. Richard T. Dietary intake, exercise, obesity and noncommunicable disease in rural and urban populations of three Pacific Island countries. J American College of Nutrition. 1992;11(3): 283-293.
28. Andrew GK, Lindsay SW. Climate change and vector-borne diseases: a regional analysis. Bull World Health Organ. 2000;78(9): 1136-1147.
29. Nick G, Wilson AL, Moyes CL, et al. Integrating vector control across diseases. BMC Med. 2015;13(1): 249.
30. Marwa R. The Primary Health Care System of the Republic of the Marshall Islands A Primary Health Care Performance Initiative Assessment. 2023.
31. Thomas PJD. Epidemiology of Island and Mainland Populations: How Does Culture Influence Health Risk Factors Of Non-Communicable, Chronic and Metabolic Diseases? 2023.
32. Amina A. Socio-cultural determinants of health-seeking behaviour on the Kenyan coast: A qualitative study. PloS one. 2013;8(11): 71998.
33. Jack W. Gaps in mobility data and implications for modelling epidemic spread: A scoping review and simulation study. Epidemics. 2023;42: 100666.

34. Lin W, Li X. Spatial epidemiology of networked metapopulation: An overview. Chin Sci Bull. 2014;59(28): 3511-3522.

35. Zhijing X. The extensive networks of frequent population mobility in the Samoan Islands and their implications for infectious disease transmission. Sci Rep. 2018;8(1): 10136.

36. David BE, Cadarette D. Infectious disease threats in the twenty-first century: Strengthening the global response. Fron Immunol. 2019;10: 549.

37. Michael HJ, Brillman JC, Burkle FM. Infectious disease emergencies in disasters. Emerg Med Clin North Am. 1996;14(2): 413-428.

38. David CA, Haggett P, Smallman-Raynor M. Island epidemics. Oxford University Press. 2000.

39. Bushra K. The Role of Lifestyle Interventions in Preventing and Managing Non-Communicable Diseases. Non-Communicable Diseases and Care. 2025;2(1): 50-60.

40. Berrak Itır AB. Increasing Burden of Non-Communicable Disease on Health Systems in Aging Populations and Possible Approaches to Lessen the Burden. Transforming Healthcare Infrastructure. CRC Press, 2025: 135-160.

41. Razak GM, Phillips DR. Aging and the rising burden of noncommunicable diseases in sub-Saharan Africa and other low-and middle-income countries: A call for holistic action. Gerontologist. 2020;60(5): 806-811.

42. Lin-Jie Y. Inter-city movement pattern of notifiable infectious diseases in China: a social network analysis. The Lancet Regional Health-Western Pacific. 2025;54.

43. Xinwu Q, Ukkusuri SV. Modeling the spread of infectious disease in urban areas with travel contagion. 2020.

44. Naser LM. Human mobility and the infectious disease transmission: A systematic review. Geo-Spatial Information Science. 2024;27(6): 1824-1851.

45. Shengjie L. Spatiotemporal patterns, driving factors and seasonal risk of mosquito-borne disease importation into China. Diss. University of Southampton. 2018.

46. Brendan L. Demographic, Environmental and Clinical Variables Associated with Dengue in Saint Lucia. Diss. Walden University. 2020.

47. World Health Organization. Human health and climate change in Pacific Island countries. 2015.

48. Totaro V. Dengue in the Anthropocene: Intersections of environmental change, disease epidemic, management and current challenges in global health. Pathogens and Global Health. 2025: 1-28.

49. Elsayed AS. Human arbovirus diseases in New Zealand: Risk factors and outbreak scenarios. Diss. University of Otago. 2021.

50. Emmanuelle S. Data-driven methods for dengue prediction and surveillance using real-world and Big Data: A systematic review. PLoS neglected tropical diseases. 2022;16(1): 0010056.

51. Nikki M. Measuring COVID-19 and influenza in the real world via person-generated health data. MedRxiv. 2020: 2020-2025.

52. Emmanuelle S. The role of heterogenous real-world data for dengue surveillance in Martinique: observational retrospective study. JMIR Public Health and Surveillance. 2022;8(12): 37122.

53. World Health Organization. The World Health Report 2001: Mental health: new understanding, new hope. 2001.

54. Hyun-Young S. Cause-of-death statistics in the Republic of Korea, 2014. J Korean Med Association. 2016;59(3): 221-232.

55. Jae LS. What does integrative medicine mean to the physician and the ministry of health and welfare? J Korean Med Association. 2012;55(6): 508-511.

56. World Health Organization. Noncommunicable diseases and mental health in small island developing states. World Health Organization. 2023.

57. Tenzin N. Event-based surveillance: providing early warning for communicable disease threats. Canada Communicable Disease Report. 2023;49(2-3): 29.

58. Joseph QE, Engel B, Rochon GL. Early warning systems: A review. J Terrestrial Observation. 2010;2(2): 5.

59. Lezor BK. Implementing the Health Early Warning System based on syndromic and event-based surveillance at the 2019 Hajj. Eastern Mediterranean Health J. 2020;26(12): 1570-1575.

60. Hellen R, Olsson JM. Allocation of health care resources: Principles for decision-making. Pediatrics in Review. 2017;38(7): 320-329.

61. Lalla Aida G. From efficacy to equity: Literature review of decision criteria for resource allocation and healthcare decisionmaking. Cost Eff Resour Alloc. 2012;10(1): 9.

62. Haylee L. Equity in healthcare resource allocation decision making: A systematic review. Social Sci Med. 2017;175: 11-27.

63. Billie G, Vernez-Moudon A, Reis R, et al. City planning and population health: A global challenge. Lancet. 2016;388(10062): 2912-2924.

64. Robert SB. Emergency preparedness after COVID-19: A review of policy statements in the US water sector. Utilities policy 64 (2020): 101058.

65. Wen P. Trends and disparities in non-communicable diseases in the Western Pacific region. Lancet Reg Health West Pac. 2024;43.

66. Mark MGB. A scoping review of health research in four Pacific Island countries and areas (Cook Islands, Fiji, Guam and Tonga) from 2014 to 2024. Lancet Reg Health West Pac. 2025;59.

67. Jamie B. A review and agenda for integrated disease models including social and behavioural factors. Nature Human Behaviour. 2021;5(7): 834-846.

68. Kun L. Geospatial epidemiological approaches to the prevention and control of vector-borne diseases: A systematic review. Infectious Diseases & Immunity. 2024.

69. Michal PJ, Machtmes K. Recognizing the need for an interdisciplinary approach. Int J Nurs Health Care Sci. 2024;4: 2024-2391.