RESEARCH ARTICLE

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Received: 02.04.2025
Acceptance: 10.06.2025
DOI:10.18521/ktd.1671551

Konuralp Medical Journal
e-ISSN1309–3878
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www.konuralptipdergi.duzce.edu.tr

Infectious Epidemic Diseases in National and International Disaster Risk Reduction Strategies: A Comparative Analysis of Türkiye's Disaster Risk Reduction Plan (TARAP) and International Policy Frameworks

ABSTRACT

Objective: This study aims to evaluate how infectious epidemics are integrated into national and international disaster risk reduction strategies comparatively. It aims to compare Türkiye's Disaster Risk Reduction Plan (TARAP) with similar policy and strategy documents to reveal strengths and areas for development. A comprehensive analysis of the relationship between disaster and health management revealed Türkiye's compliance and differences with international policy frameworks.

Method: The study is based on qualitative comparative analysis. The plans were evaluated under four main headings using a thematic coding method: governance and institutional structure, early warning and digital monitoring systems, public awareness and education policies, and financial resources and operational preparedness levels.

Results: The comparative analysis revealed that TARAP has similarities and differences with other countries national disaster risk reduction strategies regarding integrating infectious epidemics. In the countries examined, strategic priorities such as increasing health system resilience, strengthening early warning and epidemiological monitoring mechanisms, increasing public awareness, and encouraging intersectoral cooperation are emphasized. Especially after the COVID-19 pandemic, countries have placed epidemics at the center of their disaster policies; they have prioritized digital epidemiological surveillance systems and effective risk communication strategies. TARAP aligns with international trends by classifying epidemics as a type of disaster. However, the lack of detailed planning in implementing post-disaster digital early warning systems and operational resource allocation continues.

Conclusions: Integrating infectious diseases into disaster policies requires multi-sectoral, holistic approaches that include strong health systems, effective public health education, and digital infrastructure investments. Although TARAP is a starting point in managing epidemic risks, it must be developed in digital monitoring, financial planning, and stakeholder coordination.

Keywords: TARAP, Infectious Diseases, Disaster Risk Reduction, Health System Resilience, Disaster Policy.

Ulusal ve Uluslararası Afet Risk Azaltma Planlarında Bulaşıcı Salgın Hastalıklar: Türkiye Afet Risk Azaltma Planı (TARAP) ve Uluslararası Politika Belgeleri Bağlamında Bir Analiz

ÖZET

Amaç: Çalışmanın amacı, bulaşıcı salgın hastalıkların ulusal ve uluslararası afet risk azaltma stratejilerine nasıl entegre edildiğini karşılaştırmalı olarak değerlendirmektir. Türkiye'nin Afet Risk Azaltma Planının (TARAP), benzer politika ve strateji belgeleriyle karşılaştırılarak güçlü yönlerin, geliştirilmesi gereken alanların ortaya çıkarılması hedeflenmektedir. Uluslararası politika çerçeveleriyle Türkiye'nin uyumu ve farklılıklarını ortaya koyarak afet ve sağlık yönetimi arasındaki ilişkiye dair kapsamlı bir analiz yapılmıştır.

Yöntem: Çalışma karşılaştırmalı nitel analize dayanmaktadır. Planlar, tematik kodlama yöntemi kullanılarak dört temel başlık altında değerlendirilmiştir: yönetişim ve kurumsal yapı, erken uyarı ve dijital izleme sistemleri, toplumsal farkındalık ve eğitim politikaları ile finansal kaynak ve operasyonel hazırlık düzeyleri.

Bulgular: Karşılaştırmalı analiz, bulaşıcı salgın hastalıkların entegrasyonu açısından TARAP'ın diğer ülkelerin ulusal afet risk azaltma stratejileriyle arasında benzerlikler ve farklılıklar olduğunu ortaya koymuştur. İncelenen ülkelerde, sağlık sistemi dayanıklılığının artırılması, erken uyarı ve epidemiyolojik izleme mekanizmalarının güçlendirilmesi, kamuoyu farkındalığının artırılması, sektörler arası iş birliğinin teşvik edilmesi gibi stratejik önceliklere vurgu yapılmaktadır. Özellikle COVID-19 pandemisi sonrasında ülkeler, salgın hastalıkları afet politikalarının merkezine yerleştirmiş; dijital epidemiyolojik gözetim sistemlerine, etkili risk iletişim stratejilerine öncelik vermiştir. TARAP, salgın hastalıkları afet türü olarak sınıflandırarak uluslararası eğilimlerle uyum göstermektedir. Ancak afet sonrası dijital erken uyarı sistemlerinin uygulanması ve operasyonel kaynak tahsisinde ayrıntılı planlamanın eksikliği sürmektedir.

Sonuç: Bulaşıcı hastalıkların afet politikalarına entegrasyonu, güçlü sağlık sistemleri, etkin halk sağlığı eğitimi ve dijital altyapı yatırımlarını kapsayan çok sektörlü, bütüncül yaklaşımlar gerektirmektedir. TARAP, salgın hastalık risklerinin yönetiminde başlangıç noktası oluştursa da dijital izleme, finansal planlama ve paydaş koordinasyonu alanlarında geliştirilmesi gerekmektedir.

Anahtar Kelimeler: TARAP, Bulaşıcı Hastalıklar, Afet Risk Azaltma, Sağlık Sistemi Dirençliliği, Afet Politikası.

INTRODUCTION

Disasters, which have social, cultural, economic, and psychological effects beyond loss of life and property, can be defined as "natural, technological or human-induced events that cause physical, economic and social losses for the whole society or certain segments of society, that stop or interrupt normal life and human activities, and for which the affected society does not have sufficient capacity to cope." (1). The multidimensional effects of disasters, which are not limited to physical losses, necessitate a holistic approach that focuses not only on intervention against these events but also includes preventive, preparatory, and curative strategies. At this point, disaster management should be considered as an intervention mechanism activated in times of crisis and as a system that covers every life cycle stage. Reducing disasters' social, economic, and psychological repercussions is only possible with an integrated management process covering these four stages. An integrated disaster management system is a broad perspective and management process that starts before the disaster occurs, covering all the processes before, during, and after the disaster. An integrated disaster management system consists of four stages: Preparation, preparedness, response, and recovery (2).

Health crises that occur after disasters go beyond physical destruction and pave the way for secondary disasters that directly threaten public health (3). One of the most common secondary crises during post-disaster periods is the risk of spreading infectious diseases (4,5). Epidemic diseases, especially those that occur after large-scale disasters or are exacerbated by existing conditions, seriously strain public health systems and are considered secondary disasters. The COVID-19 pandemic has fundamentally questioned this approach and revealed that epidemics should be considered a fundamental component of disaster risk reduction strategies. Epidemics are no longer viewed solely as health-related issues. Today, they are considered multi-actor crises that influence not only health systems but also social, economic, and political structures.

Diseases and disease risks in disasters are generally examined in three main stages: impact, post-impact, and recovery. The impact phase (0–4 days) is characterized by immediate rescue efforts and the management of acute injuries, particularly soft tissue infections, along with complications such as hypothermia, dehydration, and heat-related illnesses. The post-impact phase, which spans from day four to approximately four weeks after the disaster, presents increased vulnerability to infectious diseases transmitted through air, water, food, or vectors. Common illnesses during this period include cholera, typhoid, bacterial dysentery, hepatitis A and E, leptospirosis, and viral gastroenteritis (e.g., rotavirus, norovirus). Respiratory infections—both viral (e.g., influenza, RSV, adenoviruses) and bacterial (e.g., Streptococcus pneumoniae, tuberculosis, pertussis, Legionella, Mycoplasma pneumoniae)—also pose serious risks, along with respiratory-borne illnesses such as measles, varicella, and meningococcal disease. Tetanus is another critical concern during this stage due to contaminated wounds and lack of immunization coverage. (4-10). In contrast to the generally accepted three stages, Noji (1997) mentions five phases: inter-disaster, pre-disaster, impact, emergency, and rehabilitation. The first two phases mentioned by Noji (1997) contribute to public health and the prevention of epidemics in terms of disaster risk reduction strategies (11)

One of the most common secondary crises post-disaster periods is the risk of spreading infectious diseases. After a disaster, population displacement, crowding in temporary shelters, interruption of health services, failure to provide hygiene conditions, damage to water and sanitation infrastructure, nutritional deficiencies, vaccination rates, endemic organisms, and disruptions in public health systems may lead to the emergence and spread of epidemics (3,4,8,9,10,12).

The integration of disaster risk management with epidemic control is of critical importance in the context of the United Nations Sustainable Development Goals (SDGs). The SDGs outline 17 primary objectives to promote healthy lives, support economic growth, and ensure environmental sustainability. Epidemic outbreaks following disasters are directly linked to several of these goals, particularly Good Health and Well-being (SDG 3), Clean Water and Sanitation (SDG 6), Sustainable Cities and Communities (SDG 11), Climate Action (SDG 13), and Partnerships for the Goals (SDG 17). Accordingly, incorporating preventive measures against epidemics into disaster risk reduction strategies enhances post-disaster resilience and strengthens the capacity of societies to achieve sustainable development. In this regard, aligning national disaster policies with the SDGs will contribute to the protection of global health and the long-term sustainability of communities (13-18).

The interconnection between infectious diseases and the Sustainable Development Goals (SDGs) highlights the need for integrated and cross-sectoral strategies in disaster risk governance and global health policy. In post-disaster settings, epidemic threats can directly hinder progress on several SDGs by exacerbating existing vulnerabilities and disrupting basic services such as healthcare, water, sanitation, and infrastructure. Understanding these intersections is essential to developing effective and inclusive risk reduction strategies that respond to emergencies and support broader development goals. Table 1 outlines the key points of convergence between infectious diseases and selected SDG targets, emphasizing their mutual implications for sustainable and resilient development.

Table 1. Common Intersections Between Infectious Diseases and the Sustainable Development Goals (SDGs)

SDGs	Sub-Target	Relevance to Infectious Diseases	Connection to Disaster Risk Reduction
Goal 1	1.5	Vulnerable communities are disproportionately	Enhancing resilience is a core disaster policy
Goal 3	3.3 / 3. d	Direct: ending diseases and strengthening health systems	Directly overlaps with disaster resilience goals
Goal 6	6.1 / 6.2	Access to clean water and hygiene reduces infection risks	Water infrastructure is a critical risk area in disasters
Goal 11	11.5 / 11. b	Urban areas increase disease spread risk	Resilient urban planning is essential
Goal 13	13.1	Climate impacts create new disease-prone areas	Requires shared early warning systems
Goal 17	17.6	Sharing of information, technology, and data	Essential for international cooperation in disaster response

* Table created by the authors

The multifaceted nature of infectious diseases and their implications for disaster risk management reveals significant overlaps with the Sustainable Development Goals (SDGs). These intersections are not coincidental but reflect systemic vulnerabilities where health, poverty, urbanization, climate, and global cooperation converge. Integrating infectious disease control into SDG-related policies and disaster strategies is beneficial and essential for ensuring long-term resilience and equitable development.

To illustrate this, Table 2 below presents a cross-sectoral analysis of selected SDGs concerning infectious diseases and disaster risk reduction. It highlights how key targets -such as health system strengthening, access to water and sanitation, urban resilience, and climate adaptation- are deeply intertwined with epidemic risk management. By identifying these convergence points, the table underscores the need for integrated governance approaches that align national disaster frameworks with global development agendas.

Table 2. The Relationship Between Sustainable Development Goals (SDGs), Infectious Diseases, and Disaster Risk Reduction

SDGs	Goal	Relevance to Infectious Diseases	Link to Disaster Risk Reduction	Integrated Thematic Analysis and Conceptual Linkage
1	No Poverty	Vulnerable populations face challenges in accessing healthcare	Fragile groups are more severely affected by disasters	Socioeconomic inequalities reduce resilience to epidemics and disasters; these groups must be prioritized in risk reduction strategies.
3	Good Health and Well-being	Directly targets epidemic control	Health systems play a vital role in disaster response	SDG Targets 3.3 and 3.d explicitly focus on controlling infectious diseases and strengthening healthcare infrastructure.
6	Clean Water and Sanitation	Crucial for preventing waterborne diseases	Infrastructure failures increase epidemic risks post-disaster	Ensuring safe water access during disasters is essential to prevent outbreaks; infrastructure protection is key.
11	Sustainable Cities and Communities	Urban density increases health and hygiene burdens	Cities are highly vulnerable to disasters	SDG Target 11.5 emphasizes reducing disaster-related losses in cities, which inherently includes epidemic-related impacts.
13	Climate Action	Climate change influences vector-borne disease spread	Climate-related disasters are increasing	SDG Target 13.1 calls for resilience to climate-related hazards; epidemic risks must be considered within this context.
17	Partnerships for the Goals	Requires global access to vaccines, treatments, and data	Multilateral coordination is crucial during disasters	Following the pandemic, SDG 17.6 emphasizes the role of scientific and technological cooperation in supporting disaster preparedness and response.

*Table created by the authors based on the review of relevant national and international documents.

Integrating infectious disease dynamics into disaster risk reduction (DRR) frameworks has become a critical component of contemporary resilience strategies. Global policy agendas have shifted towards holistic and anticipatory approaches as health-related emergencies increasingly intersect with environmental, social, and economic vulnerabilities. Sendai Framework for Disaster Risk Reduction (SDFFR, 2015–2030) underscores the necessity of addressing biological hazards—such as epidemics and pandemics—through multisectoral coordination, strengthened health systems, and risk-informed planning processes (18, 19). This paradigm reflects an evolving understanding that infectious diseases are not isolated health events but systemic phenomena with cascading impacts on sustainable development, particularly in the aftermath of disasters. The thematic associations presented in Table 2 offer a structured synthesis of how selected SDGs intersect with epidemic vulnerability and disaster resilience, reinforcing the relevance of integrated policy design in national and international contexts.

SFDRR highlights the importance of integrating health considerations into comprehensive disaster risk management strategies by explicitly addressing biological hazards, including epidemics and pandemics. The framework advocates for a multisectoral approach, emphasizing the need to strengthen healthcare systems, enhance preparedness and response capabilities, and ensure that healthcare infrastructure remains resilient and functional during disasters. SFDRR recognizes infectious diseases as not isolated health crises but systemic risks that significantly affect social, economic, and environmental dimensions, causing cascading effects on sustainable development. In light of this, it broadens the scope of disaster risk reduction to include diverse threats such as environmental, technological, biological, and human-induced hazards. Furthermore, SFDRR calls for improved international cooperation and knowledge-sharing mechanisms to enhance global resilience against health emergencies. Consequently, building robust capacities for the prevention, early detection, timely response, and effective control of epidemic diseases emerges as an indispensable element of contemporary DRR policies, underscoring the intersection between public health preparedness and global disaster governance (18, 20, 21)

The increased frequency and impact of epidemic diseases in the 21st century have highlighted the need for fundamental transformations in disaster management systems. Major epidemics such as SARS, H1N1, Ebola, and, notably, the COVID-19 pandemic have demonstrated the necessity for DRR strategies to encompass biological threats. Against this backdrop, it has become evident that disasters involve multidimensional threats, extending beyond physical damage to include health, economic, social, and psychological impacts. Internationally, the SFDRR has recommended enhancing the resilience of health systems and integrating epidemic risks into disaster policies. This approach has prompted many countries, including the United States, Japan, Germany, and Australia, to develop specific scenarios and response plans for epidemic diseases. In alignment with this global trend, Türkiye has also taken strategic steps by defining objectives and actions against epidemic diseases within its Türkiye Disaster Risk Reduction Plan (TARAP). This study compares Türkiye 's efforts in addressing infectious diseases under TARAP with international examples, thereby evaluating the strengths and areas for development within national disaster policies.

The Role and Importance of Infectious and Epidemic Diseases in National Disaster Risk Reduction Policies: This study adopts a qualitative comparative content analysis approach to examine integrating infectious and epidemic diseases into national DRR strategies. Strategic DRR documents from Türkiye (TARAP) and five benchmark countries—the United States, Japan, Germany, Australia, and Canada—were systematically analyzed using thematic coding techniques**.** The analysis focused on four strategic dimensions: (1) governance and institutional frameworks, (2) early warning and digital surveillance systems, (3) public awareness and education, and (4) financial and operational preparedness. This methodological approach facilitated a structured comparison of national strategies, highlighting policy alignments and divergences, implementation challenges, and exemplary practices in integrating epidemic threats into comprehensive disaster risk governance frameworks.

Including infectious and epidemic disease risks in national and international DRR plans is directly associated with several critical developments and global experiences. This trend was institutionalized with the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030. Yet, the rising global awareness of biological threats had already begun to influence policy shifts before its formal adoption. The outbreaks of SARS (2002–2003), H1N1 (2009), and Ebola (2014) demonstrated that disaster management systems must be equipped to respond not only to natural hazards but also to biological disasters. These events compelled disaster risk governance to adopt a multi-hazard approach (18, 22). The COVID-19 pandemic (2020–...) further underscored the prescience of the SFDRR's strategic direction (23). In the aftermath of the pandemic, many countries formally introduced "epidemic diseases" as a primary threat in their DRR plans. This section presents a comparative analysis of integrated DRR approaches, including epidemic threats, through selected country examples, specifically assessing

Türkiye's competence in this area. The study provides a qualitative analysis of the TARAP alongside the national DRR strategies of Japan, the United States, Germany, Australia, and Canada. The plans were analyzed in terms of content using thematic coding and compared across four strategic dimensions: governance and institutional structure, early warning and digital surveillance systems, public awareness and education, and financial resources and operational preparedness.

Within the scope of DRR strategies, Japan has developed a range of measures and policies to combat infectious diseases. The primary objective is to establish a health system resilient to infectious disease threats. This system centers on public health functions and provides through Public Health Centers (PHCs) (24). These centers are responsible for surveillance, control, and public communication of infectious diseases (25). The Ministry of Health, Labor, and Welfare (MHLW) is responsible for formulating national-level policies and strategies for preventing and controlling infectious diseases and coordinating health service delivery (26, 27). Operating under the Prime Minister's Office, the Central Disaster Prevention Council is tasked with determining and coordinating overarching strategies related to disaster risk reduction and management (28).

In the United States, national-level preparedness and response plans for epidemic diseases have been developed through the Federal Emergency Management Agency (FEMA) and the Centers for Disease Control and Prevention (CDC). These plans encompass the necessary strategies for preventing, detecting, and controlling epidemics and are implemented in collaboration with state and local governments. Under the leadership of the CDC, the country maintains a scenario-based national pandemic preparedness plan (29).

Australia has established its national DRR strategies through the Australian Emergency Management Committee, and the National Health Emergency Response Plan is currently in effect. The response to infectious diseases is led by the Australian Health Protection Principal Committee, with planning conducted at both the national and state levels. These plans focus on increasing public awareness and strengthening health systems. The country regularly conducts drills in preparation for biological threats (30). In addition, established early warning systems ensure that the public is informed and protected promptly against epidemic threats (31).

In Germany, disaster risk management is coordinated by the Federal Office of Civil Protection and Disaster Assistance (BBK), which operates through scenario-based, pre-prepared response plans (32). Strategies related to infectious diseases are developed and implemented by the Robert Koch Institute (33, 34). Germany's plans aim to enhance coordination at both federal and state levels and strengthen the healthcare system's resilience.

The Ministry of Public Safety coordinates Canada's DRR strategies. Disaster management plans emphasize risk communication and the strengthening of public health infrastructure. The Ministry of Health implements plan for infectious diseases and epidemics integrated into the disaster management system as "public health emergencies" (35).

In Türkiye, the multifaceted impacts of disasters extend beyond physical destruction to disrupt the country's social and economic structure. The TARAP has been developed and implemented to address these threats through comprehensive strategies. Covering the period 2022–2030, TARAP is a national plan that aims to minimize disaster risks. The plan includes 17 objectives, 66 targets, and 227 actions addressing 11 disasters. TARAP addresses the most frequently occurring disaster types in Türkiye—especially earthquakes—through preventive and risk-reducing strategies, offering an integrated approach based on the principles of sustainability and resilience (36).

TARAP does not regard infectious diseases solely as health-related issues but as disaster components that threaten national order. Accordingly, the plan outlines strategic actions such as establishing early warning systems, expanding epidemiological surveillance, and promoting public health education. The key objectives related to infectious and epidemic diseases within TARAP can summarized as follows (36):

- Establishing a resilient health infrastructure
- Expanding epidemiological surveillance systems
- Enhancing public health awareness
- Strengthening risk communication and alert mechanisms
- Supporting institutional and local capacities through education.

From a disaster risk management perspective, infectious and epidemic diseases are complex hazards with social, environmental, and economic consequences that extend well beyond medical interventions. TARAP is a multidisciplinary, preventive, and resilience-oriented approach to these risks and presents a valuable model for national disaster policy and public health systems. Based on the information presented above, Table 3 summarizes how the issue of infectious and epidemic diseases is addressed in the DRR policies of selected countries.

Evaluation of TARAP Actions on Infectious and Epidemic Diseases: As of March 2025, the implementation rate of TARAP, which consists of 227 actions, stands at 59%. Among the 227 actions addressing 11 different types of disasters, 21 actions—accounting for 9.25% of the total—specifically concern infectious and epidemic

Table 3. The position of infectious diseases in the "National Disaster Risk Reduction Strategies" of selected countries

Country	Strategy / Plan	Approach to Epidemics	Coordinating Institution(s)	Explicit Emphasis
Türkiye	Türkiye Disaster Risk Reduction Plan (TARAP)	Epidemics are recognized as a disaster; strategies focus on strengthening the health system, raising public awareness, and establishing early warning systems.	AFAD and Ministry of Health	Clear designation: "Infectious and epidemic diseases are a type of disaster."
Japan	National Disaster Risk Reduction Strategy	Monitoring and intervention through Public Health Centers; emphasis on public health education and early warning systems.	Ministry of Health, Labour and Welfare; Local Authorities	Specific actions and control systems are listed under biological threats.
United States	National Preparedness Framework; CDC Pandemic Preparedness Plan	Epidemics considered within the scope of disasters; plans include national preparedness levels, disease monitoring systems, and logistical capacity planning.	CDC and FEMA	Epidemics are "large-scale public health emergencies" within the disaster category.
Germany	National Risk Management and Health Security Plan	Scenario-based epidemic response plans; strategies aimed at increasing the healthcare system's capacity.	Federal Ministry of Health, BBK	Epidemics are classified as systemic disasters that may lead to the collapse of critical infrastructures.
Australia	National Health Emergency Preparedness Plan	Developed coordination and information-sharing systems for biological threats; epidemics are treated as part of disaster management.	Ministry of Health, Emergency Agencies	Epidemics are officially recognized as "national-level disasters."
Canada	National Emergency Strategy and Pandemic Plan	Public health threats addressed within disaster preparedness; community-based health education and mobile health services planned.	Public Health Agency of Canada (PHAC)	Pandemics are integrated into the disaster system as "public health emergencies."

*Table created by the authors based on the review of relevant national documents

diseases. Of these 21 actions, 15 are under the responsibility of the Ministry of Health. One action each falls under the responsibility of AFAD and TÜBİTAK. In contrast, two actions are overseen by the Ministry of Agriculture and Forestry and the Presidency of Strategy and Budget. The actions included in TARAP are structured across three timeframes: short-term (2022–2024), medium-term (2022–2028), and long-term (2022–2030). Among the actions related to infectious and epidemic diseases, five are short-term, 14 are medium-term, and two are long-term. Of the five short-term actions, 80% are completed; among the 14 medium-term actions, 66% are complete; and for the two long-term actions, the completion rate is 37.5%. Five actions have been completed, 13 are ongoing, and three have not been initiated. When assessing the performance of the Ministry of Health within TARAP, it was observed that the completion rate for the 15 actions under its responsibility is 72%. The Ministry has completed four actions, while 11 are still in progress. Table 4 presents detailed information regarding the actions on infectious and epidemic diseases included in TARAP.

Table 4. Performance Indicators of the Actions Included in the TARAP

Target	Action No	Action Description	Timeframe	Responsible Institution	Progress Rate (%)
H1	B.S.1.1.	Collection of data on infectious and epidemic diseases and integration into a common digital map	Medium Term	AFAD	0
	B.S.1.2.	Preparation of hazard and risk maps for infectious and epidemic diseases	Medium Term	Ministry of Health	40
H2	B.S.2.1.	Defining the roles and responsibilities of ministries, institutions, and organizations in reducing epidemic disease risks	Medium Term	Ministry of Health	40
	B.S.2.2.	Amending legislation for knowledge sharing, human resource development, and institutional responsibility regarding epidemics	Medium Term	Ministry of Health	90
	B.S.2.3.	Enhancing multisectoral health responsibility through intersectoral collaboration	Short Term	Ministry of Health	100
	B.S.2.4.	Providing informational support to local governments on reducing epidemic risks	Medium Term	Ministry of Health	80
	B.S.2.5.	Ensuring coordination and cooperation in the implementation and evaluation of national preparedness plans for epidemics	Medium Term	Ministry of Health	80
	B.S.2.6.	Ensuring coordination in the preparation, implementation, and evaluation of provincial preparedness plans for epidemics	Long Term	Ministry of Health	75
H3	B.S.3.1.	Cooperating with institutions that will provide funding to reduce epidemic risks	Medium Term	Ministry of Health	100
	B.S.3.2.	Prioritizing budget allocation based on epidemic risk levels	Medium Term	Presidency of Strategy and Budget	69
	B.S.3.3.	Providing financial resources for the development of national vaccines and the establishment of production facilities	Medium Term	Ministry of Health	15
	B.S.3.4.	Providing funding for informing the public, producers, and sellers about reducing epidemic risks	Medium Term	Ministry of Agriculture and Forestry	80
	B.S.3.5.	Supporting and conducting projects aimed at preventing infectious diseases	Medium Term	TÜBİTAK	80
	B.S.3.6.	Providing financial resources for the construction and operation of clean water and sewage systems	Short Term	Presidency of Strategy and Budget	0
H4	B.S.4.1.	Establishing tank security systems and warning mechanisms to reduce infection risk in case of water system failure	Long Term	Municipality	0
	B.S.4.2.	Operational risk communication with relevant agencies on cross-border epidemic threats	Medium Term	Ministry of Health	80
	B.S.4.3.	Taking measures at border checkpoints against potentially contagious individuals	Short Term	Ministry of Health	100
	B.S.4.4.	Taking measures at customs against infectious animals, food, water, seeds, etc.	Short Term	Ministry of Agriculture and Forestry	100
	B.S.4.5.	Preparing educational content and plans to raise public awareness on disease prevention	Short Term	Ministry of Health	100
	B.S.4.6.	Operational risk communication with relevant agencies on cross-border epidemic hazards	Medium Term	Ministry of Health	90
	B.S.4.7.	Integration of Early Warning and Response Systems into institutional mechanisms	Medium Term	Ministry of Health	85

The table created by the authors is based on data retrieved from the TARAP document and the official website www.tarap.afad.gov.tr.

* *Acronyms for Targets:*

H1: Identification of Hazards and Risks Related to Infectious and Epidemic Diseases and Ensuring Data Sharing and Utilization

H2: Establishing Inter-Institutional Cooperation and Defining Roles and Responsibilities on Epidemic Issues

H3: Ensuring Financial Resources for Reducing Infectious and Epidemic Disease Risks

H4: Enhancing Technical Capacity and Public Awareness Related to Infectious and Epidemic Diseases*

Conclusion and Recommendations

One of the key indicators reflecting a country's level of development is the frequency of infectious and epidemic diseases. Since such diseases are not confined to the geographic regions they emerge, they constitute a global risk factor. Given these risks, it has become essential for every country to strengthen its health system to respond effectively to potential outbreaks, among the seven global targets of the SFDRR disaster risk management processes. Within this integration process, it is crucial to develop more comprehensive and sustainable strategic plans and policies in the context of disaster risk governance.

Integrating infectious diseases into disaster risk reduction strategies is the key to addressing systemic risks in disaster management. This study identifies best practices for Türkiye by comparatively analyzing how selected countries incorporate epidemic risks into disaster risk reduction strategies. When the national DRR plans of the countries examined are summarized, it is evident that, in the post-Sendai period, epidemics were classified as disaster risks in all cases. In terms of institutional structure, health and disaster management authorities work collaboratively. Regarding public engagement, information dissemination and education are emphasized in all plans. Concerning early warning systems, digital tracking, and early warning mechanisms have become increasingly widespread across these countries in recent years. Among the countries examined, it is notable that local governments play a more active role in Germany and Japan, particularly in Japan, where Public Health Centers carry out widespread field-level interventions. In contrast, digital surveillance and early warning systems appear more comprehensively implemented in the United States and Australia.

As the first disaster risk reduction plan in the history of the Republic of Türkiye, TARAP adopts a holistic approach toward the sources, transmission pathways, prevention strategies, and response methods related to infectious diseases. While TARAP's infectious disease actions align increasingly with international standards, they remain inadequate regarding digital early warning systems. Additionally, the plan lacks detailed strategies for financing and allocating resources related to these actions. Nonetheless, the fact that TARAP defines infectious diseases as a type of disaster and incorporates a strategic framework with 21 specific actions represents a promising starting point. In the future, it is recommended that TARAP focus on developing digital data monitoring and early warning systems related to infectious and epidemic diseases, enhancing coordination between health and disaster institutions, and systematizing community-based risk communication.

When comparing TARAP with its international counterparts, it was determined that it was prepared comprehensively, addressed the types of disasters separately, and defined specific actions for each type. The publication of TARAP with the Presidential Circular increased its sanction power. Thus, all Ministries follow and implement their actions more professionally against the actions they are responsible for. The quality and quantity of risk reduction plans prepared internationally, especially after COVID-19, regarding infectious and epidemic diseases, have increased. These plans are generally prepared by the authorized institutions responsible for the countries' health, and the number of plans prepared holistically, as in the TARAP example, under the coordination of the institution responsible for disasters and emergencies, is limited. It would be helpful to update and/or revise the actions in TARAP if necessary. Especially considering the requirements of the age, actions can be written on risk reduction, such as conducting hazard and risk analyses related to infectious and epidemic diseases in light of new technologies and governments allocating additional financial resources for this type of disaster.

REFERENCES

1. Afet ve Acil Durum Yönetimi Başkanlığı (AFAD) [Internet]. Açıklamalı Afet Yönetimi Terimleri Sözlüğü, 2022 [cited 2025 Apr 2]. Available from: [https://www.afad.gov.tr/aciklamali-afet-yonetimi-terimleri-sozlugu]
2. Abid SK, Sulaiman N, Chan SW, Nazir U, Abid M, Han H, Ariza-Montes A, Vega-Muñoz A. Toward an Integrated Disaster Management Approach: How Artificial Intelligence Can Boost Disaster Management. Sustainability. 2021;13(22):12560.
3. Pascapurnama DN, Murakami A, Chagan-Yasutan H, Hattori T, Sasaki H, & Egawa S. Integrated health education in disaster risk reduction: Lesson learned from disease outbreak following natural disasters in Indonesia. International Journal of Disaster Risk Reduction. 2018;29:94-102.
4. Kouadio IK, Aljunid S, Kamigaki T, Hammad K, Oshitani H. Infectious diseases following natural disasters: prevention and control measures. Expert Rev Anti Infect Ther. 2012;10(1):95-104.
5. Watson JT, Gayer M, Connolly MA. Epidemics after natural disasters. Emerg Infect Dis. 2007;13(1):1-5.
6. Allworth A. Infectious disease considerations related to sudden flooding disasters for the emergency physician. Emerg Med Australas. 2011;23(2):120-2.

7. Ivers LC, Ryan ET. Infectious diseases of severe weather-related and flood-related natural disasters. Curr Opin Infect Dis. 2006;19(5):408-14.
8. Lemonick DM, Epidemics After Natural Disasters. American Journal of Clinical Medicine, Fall 2011;8(3):144-152.
9. Liang SY, Messenger N. Infectious Diseases After Hydrologic Disasters. Emerg Med Clin North Am. 2018;36(4):835-851.
10. Makwana N. Public health care system's preparedness to combat epidemics after natural disasters. J Family Med Prim Care. 2020;9(10):5107-2.
11. Noji EK. The Nature of Disasters. In: Noji EK editor. The Public Health Consequences of Disaster. New York: Oxford University Press; 1997. p. 3-21.
12. Baran A, Özer A. Prevention of Infectious Diseases after an Earthquake. Cam and Sakura Med J. 2023;3(1):42-47.
13. Ahmad B, Murray V. Disaster risk reduction and sustainable development: the role for occupational health. Occup Med (Lond). 2018;68(7):422-4.
14. Bang, H. Sustainable development goals, disaster risk management, and indigenous knowledge: a critical assessment of the interlinkages. Sustain Earth Reviews. 2024;7:29.
15. Di Marco M, Baker ML, Daszak P, De Barro P, Eskew EA, Godde CM, Harwood TD, Herrero M, Hoskins AJ, Johnson E, Karesh WB, Machalaba C, Garcia JN, Paini D, Pirzl R, Smith MS, Zambrana-Torrelio C, Ferrier S. Opinion: Sustainable development must account for pandemic risk. Proc Natl Acad Sci U S A. 2020;117(8):3888-92.
16. Qazi A, Angell LC, Simsekler MCE, Daghfous A, Al-Mhdawi MKS. Assessing the Impact of Sustainability Risks on Disaster and Pandemic Vulnerabilities: A Global Perspective. Global Transitions. 2025 Mar 13. Advance online publication. doi: 10.1016/j.glt.2025.03.001
17. Palmeiro-Silva Y, Rivera F, Hartinger S. Climate Change and Health Within the Sendai Framework for Disaster Risk Reduction: Opportunities and Challenges. Int J Disaster Risk Sci. 2025;16:33–43.
18. UNDRR. Sendai Framework for Disaster Risk Reduction 2015–2030. [Internet]. United Nations Office for Disaster Risk Reduction. [cited 2025 Apr 2]. Available from: https://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf
19. WHO, Health Emergency and Disaster Risk Management Framework. [Internet]. World Health Organization. 2019 [cited 2025 Apr 2]. Available from: https://iris.who.int/bitstream/handle/10665/326106/9789241516181-eng.pdf
20. Aitsi-Selmi, A., Egawa, S., Sasaki, H. et al. The Sendai Framework for Disaster Risk Reduction: Renewing the Global Commitment to People's Resilience, Health, and Well-being. Int J Disaster Risk Sci. 2015;6:164–76.
21. Busayo ET, Kalumba AM, Afuye GA, Ekundayo OY, Orimoloye IR. Assessment of the Sendai framework for disaster risk reduction studies since 2015. International Journal of Disaster Risk Reduction. 2020;50:101906.
22. Mohapatra S, Menon NG. Factors responsible for the emergence of novel viruses: An emphasis on SARS-CoV-2. Current Opinion in Environmental Science & Health. 2022;27:100358.
23. Djalante R, Shaw R, DeWit A. Building resilience against biological hazards and pandemics: COVID-19 and its implications for the Sendai Framework. Progress in Disaster Science. 2020;6:100080.
24. Ceylan, S. COVID-19 Pandemisinde Sağlık Sistemleri: Japonya Örneği. Toplum ve Hekim. 2021;36:4.
25. Katsuda N, Hinohara Y, Tomita K, Hamajima N. Structure and roles of public health centers (hokenjo) in Japan. Nagoya Journal of Medical Science. 2011;73:1-2:59-68.
26. Ministry of Health, Labour and Welfare (Japan). Global health vision of Ministry of Health, Labour and Welfare of Japan [Internet]. Tokyo: Ministry of Health, Labour and Welfare; 2024 Aug 26 [cited 2025 Mar 10]. 26 p. Available from: https://www.mhlw.go.jp/content/10501000/001295190.pdf.
27. Zhang X, Oyama T. Investigating the health care delivery system in Japan and reviewing the local public hospital reform. Risk Management Health Policy. 2016;9:21-32.
28. Ikeda, M. Experience from Japan, Best practices, Technologies and capacity development tools for earthquake risk reduction from Japan; 2 August 2023; CJK Education and Training Institutes Online Workshop "Tools and Technologies for Earthquake Risk Management: Sharing Experience from Northeast Asia"; 2023.
29. CDC, 2022. CDC Strategy for Global Response to COVID-19 (2020-2023) [Internet]. U.S. Center For Disease Control and Prevention Office. [cited 2025 March 9] Available from: www.cdc.gov/coronavirus/2019-ncov/global-covid-19.
30. Safe Work Australia. National hazard exposure worker surveillance – exposure to biological hazards and the provision of controls against biological hazards in Australian workplaces [Internet]. Australian Safety and Compensation Council (ASCC); 2011 Mar [cited 2025 Feb 21]. 25 p. Available from: https://www.safeworkaustralia.gov.au/system/files/documents/1702/nhews_biologicalmaterials.pdf. ISBN: 978-0-642-33164-9.

31. Australian Institute for Disaster Resilience. Australian emergency management arrangements [Internet]. Australian Government National Emergency Management Agency; 2023 [cited 2025 Feb 14]. 28 p. Available from: https://knowledge.aidr.org.au/media/10162/handbook_aema_web_2023.pdf. ISBN: 978-0-6457560-0-5.
32. Federal Office of Civil Protection and Disaster Assistance (BBK). Germany Guide for emergency preparedness and correct action in emergency situations [Internet]. Disaster Alarm. 2018 [cited 2025 Mar 22]. Available from:https://www.bbk.bund.de/ SharedDocs/Downloads/EN/Mediathek/Publikationen/ratgeber-englisch-disasters-alarm.pdf?__blob=publicationFile. ISBN: 978-3-939347-54-5.
33. Robert Koch Institute. The Robert Koch Institute flyer [Internet]. Berlin: Robert Koch Institute; [cited 2025 March 9]. Available from: https://www.rki.de/EN/Home/ home_node.html.
34. The Robert Koch Institute Mission. [Internet]. Germany: [cited 2025 March 15] Available from: https://www.rki.de/EN/Institute/The-RKI/ Mission-statement/ mission-statement-node.html.
35. Canada Ministry of Health. Canadian emergency management guideline [Internet]. Ottawa: Canada Ministry of Health; 2024 Feb. [cited 2025 Mar 20]. Available from: https://www.canada.ca/en/health-canada/services/emergency-management-guideline.html. ISBN:978-1-4868-7720-1.
36. Türkiye Afet Risk Azaltma Planı, TARAP [Internet]. Ankara: AFAD; 2022 [cited 2025 March 1]. Available from: https://www.afad.gov.tr/kurumlar/afad.gov.tr/ e_Kutuphane/Planlar/28032022-TARAP-kitap_V6.pdf. AFAD 2022
37. The United Nations Department of Economic and Social Affairs Sustainable Development. [Internet]. [cited 2025 March 18]. Available from: https://sdgs.un.org/goals, https://sdgs.un.org/2030agenda
38. IPCC Sixth Assessment Report. Intergovernmental Panel on Climate Change. [Internet]. 2021, [cited 2025 March 5]. Available from: https://www.ipcc.ch/assessment-report/ar6/
39. UN-Water. Water and Health Report. [Internet]. 2021, [cited 2025 March 5]. Available from: https://unsceb.org/sites/default/files/2022-10/Annual-Report-2021_30June2022.pdf
40. UN-Habitat World Cities Report: Urban Resilience and Sustainability. [Internet]. 2022, [cited 2025 March 5]. Available from: https://unhabitat.org/sites/default/files/2022/06/wcr_2022.pdf