

Highlights from the First National Conference on Neglected Tropical Diseases in Iran

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ABSTRACT

Introduction: Neglected Tropical Diseases (NTDs) are a group of chronic infectious diseases that primarily affect tropical and subtropical regions, particularly among the world's most vulnerable and marginalized communities. The control of many NTDs poses significant challenges to healthcare systems, not only in low-income and tropical regions but increasingly worldwide, driven by climate change and associated factors such as vector migration and urbanization. To address this issue, a comprehensive One Health approach integrating human, animal, and environmental health along with preventive treatment management is essential. In line with this global effort and as part of its public health mission, the Pasteur Institute of Iran commemorated World NTD Day by hosting the First National Conference on Prevalent NTDs in Iran, organized by its Immunotherapy and *Leishmania* Vaccine Research Department. The main objective of the conference was to convene experts, researchers, and students to share recent scientific advances in the control and elimination of NTDs in Iran. The event underscored the critical need for multisectoral collaboration and integrated strategies to accelerate progress toward national NTD elimination goals. **Conference structure and highlights:** Key collaborators included the Ministry of Health and Medical Education, Kerman University of Medical Sciences, the Center for Training and Research on Skin and Leprosy Diseases, and Tehran University of Medical Sciences. The conference agenda addressed key NTDs prevalent in Iran, including parasitic diseases (leishmaniasis, urinary schistosomiasis, fasciolosis, hydatidosis), bacterial infections (trachoma, leprosy), and significant viral threats (rabies, dengue, and chikungunya). The conference was conducted in a hybrid format to maximize participation and ensure broad accessibility. **Conclusion/impact:** The conference highlighted the critical importance of convening regular events to foster multisectoral collaboration among key stakeholders, including government bodies, academic institutions, and research centers, to control, eliminate, and eradicate NTDs in Iran. The feasibility of this goal is evident in recent global successes; for example, a recent WHO report confirmed that Bangladesh has successfully eliminated *visceral leishmaniasis* as a public health problem. Furthermore, sustained national and international efforts, as demonstrated by global progress against Guinea worm disease and lymphatic filariasis, reinforce that NTD elimination is achievable through such coordinated action.

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INTRODUCTION

Neglected tropical diseases (NTDs) affect over 1 billion people globally, primarily in resource-limited settings with limited access to sanitation, clean water, and healthcare [1]. These diseases cause significant morbidity and mortality, imposing a substantial economic burden through healthcare costs and lost productivity, which is

often quantified in disability-adjusted life years (DALYs). Many countries continue to struggle with NTDs, placing substantial strain on their healthcare systems. These systemic challenges hinder disease control efforts, contributing to continued transmission in tropical and subtropical areas [2, 3]. Addressing this issue requires a

comprehensive One Health framework that integrates interventions in water and sanitation, public health, vector control, and preventive treatment management across human, animal, and environmental domains [4]. The 2012 London Declaration, a significant global health initiative, emphasized accelerating the control, elimination, and eradication of specific NTDs through collaborative efforts [5]. Building on such initiatives, the WHO and its partners established World NTD Day (January 30) in 2020 to sustain awareness and reinforce the goal of eliminating NTDs by 2030 [6]. Although complete eradication remains elusive, significant elimination milestones were reached in 2023 by Bangladesh (visceral leishmaniasis), Ghana (human African trypanosomiasis), and several countries for trachoma (Benin, Iraq, Lao PDR, and Mali) [7].

In commemoration of World NTD Day, the Pasteur Institute of Iran convened the First National Conference on Prevalent NTDs in Iran. The event provided a critical platform for the scientific and public health community to share the latest advances in controlling and eliminating these diseases. A collaborative effort, the conference was organized with key partners, including the Ministry of Health and Medical Education, Kerman University of Medical Sciences, the Center for Training and Research on Skin and Leprosy Diseases, and Tehran University of Medical Sciences. Specialized sessions addressed a spectrum of nationally relevant NTDs, including parasitic diseases (leishmaniasis, schistosomiasis, fasciolosis, hydatidosis), bacterial infections (trachoma, leprosy), and emerging arboviral threats such as dengue and chikungunya.

Conference Proceedings

Opening Session

Delaram Doroud (Pasteur Institute of Iran), Conference Chair, opened the conference, welcoming attendees to the hybrid event. She emphasized the urgency of translating fundamental research into applicable technologies and public health tools.

The conference was structured around four specialized panels focusing on leishmaniasis and other NTDs of national importance:

Panel 1: World NTD Day and Prevalent NTDs in Iran

- **Iraj Sharifi** (Kerman University of Medical Sciences): Epidemiology of leishmaniasis in Iran, the region, and the One Health approach.
- **Alireza Firooz** (Tehran University of Medical Sciences): Cutaneous leishmaniasis and patient clinical examination.
- **Ghobad Moradi** (Ministry of Health and Medical Education): World NTD Day and the status of related diseases in Iran.

Panel 2: *Leishmania*: Challenges and Innovations

- **Tahereh Taheri** (Pasteur Institute of Iran): Genome diversity and plasticity, and gene manipulation in *Leishmania*.
- **Homa Hajjarian** (Tehran University of Medical Sciences): *Leishmania* RNA viruses and their role in parasite pathogenesis.
- **Noushin Davoudi** (Pasteur Institute of Iran): MicroRNA-mediated macrophage polarization in *Leishmania* infection.

Panel 3: Prevention and Treatment Strategies

- **Sima Rafati** (Pasteur Institute of Iran): *Leishmania* vaccine development: advances and future prospects.
- **Negar Seyed** (Pasteur Institute of Iran): Application of cutting-edge technologies to advance novel insights into Leishmaniasis.

Panel 4: Control, Elimination, and Eradication of Other NTDs

- **Mehran Zarei-Ghanavati** (Tehran University of Medical Sciences): Trachoma control and its eradication.
- **Gholamreza Molavi** (Tehran University of Medical Sciences): A review of the current status of urinary schistosomiasis in Iran.
- **Mohammad Bagher Rokni** (Tehran University of Medical Sciences): Updates on fasciolosis and hydatidosis.
- **Hamed Zartab** (Tehran University of Medical Sciences): An overview of leprosy.
- **Farzaneh Sheikholeslami** (Pasteur Institute of Iran): Rabies surveillance and control: the role of the National Reference Center.
- **Mohammad Hassan Pouriayevali** (Pasteur Institute of Iran): The contribution of the National Reference Laboratory for Arboviruses and Viral Hemorrhagic Fevers to dengue and chikungunya control and research.

International perspective

- **Fabiana Piovesan Alves** (University of São Paulo and DNDi): Innovation to transform patient care: new therapies for leishmaniasis.

The first speaker, **Iraj Sharifi**, discussed the epidemiology of leishmaniasis in Iran and the region, as well as the One Health approach. He highlighted key challenges in disease control, including the absence of an effective human vaccine or optimal treatment, stressing the need for enhanced education in endemic areas and strengthened surveillance in high-risk zones. **Alireza Firooz** outlined cutaneous leishmaniasis and its clinical aspects. He noted that over 40 treatment methods (including antimonial, non-antimonial, and complementary therapies) exist—a fact that underscores the absence of a single, ideal therapeutic regimen. **Ghobad Moradi** provided an overview of the national NTD situation, presenting official epidemiological data from the Iranian Centers for Disease Control (CDC). He

reported over 20,000 cases of cutaneous leishmaniasis annually [8], with the highest prevalence in Fars, Isfahan, and Khuzestan provinces [9]. His update also covered other key public health threats, including major zoonotic diseases (rabies, brucellosis, hydatidosis, leptospirosis, and fascioliasis) and the burden of snake and scorpion envenomations.

Tahereh Taheri elucidated the genetic diversity, plasticity, and instability of the *Leishmania* genome, as well as its unusual gene regulation mechanisms (such as aneuploidy and gene copy number variations). She highlighted how these genomic features present significant research challenges, particularly in their direct contribution to drug resistance, and discussed genetic manipulation techniques for understanding *Leishmania* biology. **Homa Hajjaran** discussed *Leishmania* RNA viruses (LRV) and their role in disease pathogenesis. She noted that these viruses are predominantly found in *L. major* and presented her research on key parasite genes (*MP1*, *HSP83*, and *GP63*). **Noushin Davoudi** discussed the role of microRNAs (miR-142) in macrophage polarization during *Leishmania* infection. Her findings demonstrated an inhibitory effect on the *ROCK1* and *ROCK2* genes, linking this pathway to the regulation of M1/M2 macrophage responses.

Sima Rafati explored the use of non-pathogenic *Leishmania* (*L. tarentolae*) as a live-attenuated vaccine vector against cutaneous leishmaniasis, highlighting advances in exosome engineering. **Negar Seyed** emphasized the critical need for a deeper understanding of host-pathogen interactions in leishmaniasis. She advocated for applying advanced methodologies, including systems biology and single-cell analysis, to identify novel drug targets and biomarkers.

Mehran Zarei-Ghanavati elaborated on trachoma control and elimination, stressing the critical importance of sustained, post-elimination surveillance to prevent re-emergence. **Gholamreza Molavi** reviewed the status of urinary schistosomiasis, noting that although Iran achieved elimination as a public health problem in 1974, vigilant and continuous monitoring, particularly in high-risk areas like Khuzestan province, remains essential. **Mohammad Bagher Rokni** provided an update on fasciolosis and hydatidosis, highlighting their prevalence in northern Iran (*e.g.*, Gilan province) and specifically emphasizing the definitive host role of dogs in the transmission of hydatidosis. **Hamed Zartab** presented a comprehensive summary of leprosy, covering its epidemiology, transmission dynamics, clinical manifestations, and current treatment protocols. **Farzaneh Sheikholeslami** discussed rabies as a critical neglected disease, emphasizing that its control and elimination depend on robust inter-sectoral collaboration, consistent with a One Health framework. **Mohammad Hassan Pouriayevali** presented on the emerging threats of dengue and chikungunya, outlining their epidemiology,

mortality rates, and control strategies, and stressing the vital importance of establishing research networks.

Furthermore, **Fabiana Piovesan Alves**, a leading researcher from the Drugs for Neglected Diseases Initiative (DNDi) with expertise in tropical diseases (leishmaniasis, Chagas disease, schistosomiasis), presented her work on advancing new therapeutic strategies for NTDs, with a particular focus on leishmaniasis.

Closing Remarks

Sima Rafati, the Scientific Secretary of the conference, summarized the discussions and concluded by emphasizing the critical need for continued collaboration among research institutions, universities, and health authorities to lead to the elimination of NTDs in Iran. This conference underscored the importance of multidisciplinary research, surveillance, and international cooperation in addressing NTDs, aligning with the WHO's 2030 NTD elimination roadmap [6].

CONCLUSION

The World Health Assembly (WHA) declared January 30 as World NTD Day on May 31, 2021, with the aim of accelerating the control, elimination, and eradication of NTDs [10]. In recent years [11-13], numerous international conferences have been organized to showcase significant achievements and address key challenges in the global effort to combat NTDs [14, 15]. Recognizing this global momentum, the Iranian scientific community identified an urgent need to establish a dedicated national forum. This inaugural conference was therefore coordinated to serve as a key platform for sharing data and scientific insights at the national level. This platform was designed to inform strategic decision-making by NTD program managers, implementing partners, donors, scientists, and other key stakeholders through data sharing and policy forums. The conference emphasized the urgent need for sustained research funding, integrated One Health strategies, and regional coordination in line with the WHO's NTD roadmap [16]. Consequently, strengthening surveillance systems and accelerating innovative research translation were identified as key priorities, particularly in Iran's endemic regions.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interests associated with this manuscript.

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DATA AVAILABILITY

All data are presented within the manuscript.

AUTHORS' CONTRIBUTIONS

All authors reviewed and approved the final version of the manuscript.

ETHICS STATEMENT

Not applicable.

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