

## A technology-based infectious diseases training program proposal for emergency teams in Istanbul

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With regard to current information on pandemics, this opinion statement advocates for a new infectious diseases (IDs) training intervention promoting global perspectives toward public health emergencies. This position paper calls for action in prehospital emergency practices and for educational advancement regarding the topical issue of IDs that are of international concern.

### Significance

Improved technology-powered professional trainings will greatly contribute to global skills development for sustainable pandemic prevention. The Disaster and Emergency Medical Services Infectious Diseases (DEMS-ID) Training Program is a preventive measure for protecting populations at large and an effective mass resilience strategy. The proposed action calls for the implementation of a new public health approach in compliance with the World Health Organization (WHO, 2023) declarations on September 2022 for preparing, preventing, and responding to pandemics.

In an era of increased human mobility, disease outbreaks and infection prevention control (IPC) constitute priority issues. Healthcare personnel also face higher risks (Ibrahim, 2020). In May 2023, WHO warned about the possibility of a deadlier outbreak than COVID-19. The world was caught off-guard with COVID-19, with nearly seven million confirmed deaths to date. As a result, WHO (2023) launched the first ever global report on IPC. Future pandemics are inevitable, and multifaceted overlaps of common pathogens continue to pose risks and threaten lives (Celikmen et al., 2024; Feehan & Apostolopoulos, 2021; Ibrahim, 2020; Tunaligil et al., 2023)

### Critical Region

Uniquely situated in Eurasia, Istanbul is an important intercontinental gateway and a strategic location for initiating this program (Tunaligil et al., 2019; Tunaligil et al., 2016). In just over 2.5 months in 2022, ambulances had responded to 35,403 SARS-CoV-2 cases (Celikmen et al., 2024; Aydin, Tunaligil et al., 2022; Aydin, Hincal et al., 2022). Fortunately, “to date, we know of no disease outbreak that started in Istanbul and spread to the world; however, all it takes for this busy metropolis to potentially serve as the epicenter of an emerging pandemic is for one infected person to get off the plane” (I. A. Shaikh, personal communication, August 19, 2022). Densely-populated crossroads and busy transport routes need to be closely monitored.

Transmissible highly IDs (HIDs) cause life-threatening illnesses and present serious hazards (Brouqui, 2009). EMS-responders are observed to face HIDs more often than before. Numerous scientific articles, book chapters, distance-learning degree courses are found for prehospital ID patients; however, specifically designed in-service prehospital EMS certification trainings are rare (Alhallaf, 2020). The aim of the proposed action plan is to protect the “three sides of the coin:” 1) prehospital EMS staff, 2) patients, and 3) the community.

The first Turkish undergraduate paramedicine degree program was launched in 1993 (Tunaligil et al., 2016). Through formal legislation, in-service trainings have become mandatory for EMS providers, physicians, nurses, paramedics, and ambulance drivers. Post-graduate trainings are fairly advanced and conducted at high

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standards. Essential programs include Basic EMS, Adult Advanced Life Support, Pediatric Advanced Life Support, Advanced Trauma Life Support, Ambulance Driving Techniques and Maintenance, and complementary trainings on additional subjects. Comprehensive trainings for National Medical Rescue Teams (Ulusal Medikal Kurtarma Ekipleri, UMKE) include knowledge transfer, skills coaching, drills, and the sharing of extensive disaster response experiences. Presently, extensive curricula contain only brief sections on contagious diseases, providing limited guidance. Determining DEMS-ID is imperative as a fundamental course. Current curricula use face-to-face teaching methods but have yet to officially utilize online learning platforms effectively. Visual, auditory, and kinesthetic techniques are used within traditional classroom settings, with technology-based learning only being used in limited capacities. Practical gains would have occurred if digitally applicable trainings had been available during the COVID-19 crisis. Educational activities were disrupted just when the need for information and other practical resources was of paramount importance. By being withheld from regular periodic trainings, the accumulated number of personnel strained the capacities after resuming the trainings that had been halted. Guidance was provided in ad-hoc sessions around the world. The Turkish Ministry of Health (TR MoH) guided the process with the highest possible standards (TR MoH, 2019, 2022) Current legislation does not comprise a referral screening algorithm or a clear outline for on-scene ID assessments but does acknowledge that directives should be updated and revised.

## Curriculum

### Design and Target Groups

The suggested duration of the program for Disaster Health and EMS practitioners is five workdays, with 1-hour sessions when possible. Caution against and protection from IDs should take into account the safety of the three target groups (i.e., prehospital EMS staff, transported patients, and the general public).

Two types of curricula are to be designed that containing identical course material and meet equivalent educational standards: 1) Face-to-face teaching for ordinary times, with the advantages being instructor-led teaching, peer collaborations, and practical exercises in active physical environments. 2) Online learning for extraordinary circumstances for practicality, flexibility, scalability, and efficiency during transmissible-HID-outbreaks when IPC measures are active. Any number of individuals can take online courses at a time and at their own pace

### Digital Simulations

The model enables life-like experiences in replicated real-life environments. Virtual-reality (VR) scenarios should demonstrate the options and algorithms in the operationally complex prehospital setting, and measurably contribute skill-building and decision-making capabilities. Outcomes are measurable using immediate and accurate feedback. Case series of ID patients who've been selected specifically for educational purposes may be presented with voiceovers, visuals, videos, and/or reading material in a hybrid model of digital simulations. Sessions may include the interplay of interactive technology with educational medical applications for digital watches, telephones, laptops, computers, and other everyday electronic devices.

### Topics

A preliminary content outline as well as learning objectives are hereby presented in sections and subheadings to be improved by section advisors and/or scientific-committees. Topics include general standards, practices and guidelines, and critical principles and warnings regarding staying healthy and keeping patients safe in emergency field operations during outbreaks.

### Sections

**Fundamental knowledge.** 1) Principles of infection spread, essential facts; 2) definitions, sources, host, chain of infection, direct and indirect modes of transmission, the five main disease exposure routes; 3) identifying HIDs and their signs and symptoms (Hu, 2021); 4) the deadliest pandemics in history, updated current and emerging ID threats; 5) staff assignments, deploying supplies, emergency response planning, and disaster management.

**Infectious Diseases in Emergency Medical Services.** 1) Controlling spread and healthcare measures and procedures in various settings; 2) routine prehospital IPC practices; 3) the risks for contracting and transmitting healthcare-associated

infections, standard contact, airborne droplets, and additional precautions; 4) vaccination in healthcare, personal protective equipment (PPE), donning and doffing sequences, isolation principles and breaches, environmental modifications, indications of the need for a prehospital portable isolation unit (PIU), negative pressure containment-pods, WHO's rapid response mobile laboratories (WHO, 2023); 5) patient preparation, management and transportation and team configuration; 6) post-transportation actions, debriefing, vehicle and special medical equipment preparation, cleaning, disinfection, decontamination, and sterilization, reusable PIU/PPE, ambulance repositioning, disposal and waste handling; 7) bioterrorism and biohazard exposure; 8) critical history taking, record keeping, post-mission medical surveillance, data management, strategies, continuous mutual feedback on public health, and safety risks (Alhallaf, 2020).

**Two new algorithms.** 1) Dispatch screening algorithm: Incoming call > symptoms evaluation > local outbreak and exposure screening questions > international travel history. 2) On-scene assessments algorithm: Signs and symptoms > site-observations. Two new algorithms will clearly outline and per se imply recasting of existing legislation. As such, violations will be subject to penalties.

**Case updates.** Adapting the curriculum to new outbreaks and current events is critical for strengthening regional and large-scale response capacities. Two examples being: 1) concerns over anticipated disease outbreaks following the February 2023 earthquakes in Turkey and Syria, and 2) breaking news from WHO regarding measles cases reported in late February in 2023 exceeding the numbers reported in all of 2022 (WHO, 2023).

## Strengthening the Commitment

### Empirical Analysis, Evidence-Based Approach

Critical content-and-methods assessments will rely on current knowledge, past experiences, and novel evidence-based research. Departmental TR MoH permits and ethics approvals are to be obtained in order to conduct research on an IDs digital simulation training module for 112/911-prehospital-EMS and on trainers' opinions and attitudes regarding emergency remote teaching.

### Budgeting

TR MoH National Institutes of Health grant applications may be planned for any additional funds required to develop and/or expand innovative digital simulation operations. A preliminary meeting was held with the Istanbul Development Agency, which affirmed that funds are available for VR medical teaching applications and that VR is considered the technology of the future.

### Dissemination

The WHO European Centre for Preparedness for Humanitarian and Health Emergencies was established in Istanbul in 2020 to strengthen regional operational capabilities and response capacities. If deemed appropriate by TR MoH, the DEMS-ID-Training-Program, based on WHO and TR MoH guidelines, can be ultimately submitted for further development, standardization, and dissemination in the WHO European region. The endeavor preeminently promotes IPC principles for positive global impact regarding EMS practices.

#### Ethical approval

N/A

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#### Disclosure/Declaration of interest statement

The author declares no competing financial interest

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