

# Health disparities in the Middle East: Representative analysis of the region



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**Health care disparities refer to differences in health and health care between groups that are closely associated with governmental, social, economic, and/or environmental policies. To address this gap in knowledge, a forum to address health disparities in different regions of the world was developed as an American Academy of Allergy, Asthma & Immunology (AAAAI) presidential initiative (under Dr Jonathan Bernstein) in partnership with the World Allergy Organization to better understand political and socioeconomic issues within different countries and how they affect their health care systems. The first region selected was the Middle East. Representatives from Egypt, Israel, Lebanon, and Iran were invited to speak at this forum. Although we were not able to be inclusive of all countries in this region, it is apparent that the health care systems for those that participated are heterogeneous as a result of socioeconomic, educational, and governmental infrastructures. However, all regions noted health disparities that appeared to be linked to social determinants of health. Unfortunately, conflict in this region has had an additional adverse effect on these health care systems, making solutions even more challenging. However, recognition of the problems that loom large for allergy/immunology in particular can provide an opportunity for international collaboration that focuses on providing patient and physician education and identifying strategies to improve access to specialized health care. (J Allergy Clin Immunol Global 2025;4:100350.)**

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Health care disparities refer to differences in health and health care between groups that are closely associated with governmental, social, economic, and/or environmental policies. In the United States, disparities have been linked to socioeconomic status, race/ethnicity, age, gender/sex, disability status, and sexual orientation, which not only affects receipt of health care but also affects the entire population by resulting in unnecessary costs (Fig 1).<sup>1</sup> Addressing health disparities is increasingly important as our population becomes more diverse and has been a priority of the American Academy of Allergy, Asthma & Immunology (AAAAI).<sup>1</sup> It is projected that people of color will account for over half (52%) of the US population in 2050, and a significant percentage of the population will be composed of new immigrants from different regions of the world with diverse cultural and religious preferences that influence their utilization of health care. We are a global society, so it is imperative that nations not only understand the increasing complexities of their own health care systems but also the systems in other regions of the world where there is disparate access to health care.

To address this gap in knowledge, a forum to address health disparities in different regions of the world was developed as an AAAAI presidential initiative (under Dr. Jonathan Bernstein) in partnership with the World Allergy Organization to better understand political and socioeconomic issues within different countries and how they affect their health care systems. The intention of these forums is to create an opportunity to advance research and education in allergy/immunology between countries in the region that can begin to address solutions to health care disparities.

The first region selected was the Middle East (Fig 2).<sup>2</sup> Although it was not possible to include every country in this region because of the dearth of available speakers, there was sufficient representation of countries to illustrate the current strengths and limitations of each health care system. Representatives from Egypt, Israel, Lebanon, and Iran were invited to speak at this forum. Speaker were charged with defining their country's population diversity, demographics, educational level, viability of the allergy/immunology specialty in each country, health care costs, mortality rates of common conditions including asthma, features of their current health care system (eg, socialized, insurance based), access to basic and specialty health care, access to basic and advanced therapeutics, and unique cultural differences and beliefs that affect delivery of traditional health care to subpopulations within each country (Table I). Finally, ideas for regional collaboration in education and research were discussed. The publication of this health forum's proceedings, the first of a series of

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FIG 1. Social determinants of health leading to health disparities.<sup>1</sup>

articles that focuses on allergy/immunology in different regions of the world, is the first step toward this latter objective.

## HEALTH DISPARITIES BY COUNTRY Egypt

Egypt, situated in the northeastern corner of Africa, covers an area of approximately 1.01 million square kilometers (about 387,050 square miles). Ninety-five percent of its over 113 million inhabitants live in a narrow strip of agricultural land within 20 km of the Nile River and its delta. The Egyptian governorates are among the world's most densely populated, averaging over 1,540 persons per square kilometer (3,820 persons per square mile).<sup>3</sup> Unchecked population growth greatly strains the country's health care resources, which mostly fall on the government, and creates tremendous disparities in access to care. Unlike the population age distribution of the United States, which is barrel shaped, the population age distribution for Egypt is shaped like a pyramid: the young, the working-age, and the elderly constitute 32.49%, 62.55%, and 4.96% of the population, respectively.<sup>4</sup> This creates an age disparity, with fewer resources directed to the exploding pediatric population and an overall decreased current life expectancy of 72.69 years.<sup>5</sup> The majority of the population (around 85%)

adheres to Sunni Islam, with a significant number following native Sufi orders. The 15% Coptic Orthodox Christians constitute a religious minority. Egypt hosts 2 major religious institutions: the Coptic Orthodox Church of Alexandria, established in the middle of the first century CE by Saint Mark, and Al-Azhar, founded in 970 CE as the first Islamic university. Although Christians share a common national identity and language with their Muslim compatriots, they often face challenges in law enforcement, state security, public office representation, workforce discrimination, and access to services including health care based on their religion, which is notated on the national identification card of each citizen. The rise in poverty is another cause of disparities in Egypt.

According to the Central Agency for Mobilization and Statistics of Egypt, the percentage of the population living in poverty in recent years ranges 28% to 32%.<sup>6</sup> Poverty is a cause of health care disparities because the poor can only get their care in free government clinics and hospitals; they have no access to physicians in private practice or hospitals. Urban versus rural living and the geographic distinction of Upper Egypt versus Lower Egypt, known as the Delta, underlie another cause of disparity. Egypt has recorded important achievements in improving child and maternal survival and health, but there remains a marked discrepancy in the under-5 mortality rate, with 42 versus 20



**FIG 2.** Map of the Middle East. Created using an Open Access map creator ([www.mapchart.net/middle-east.html](http://www.mapchart.net/middle-east.html)) under a Creative Commons Attribution-ShareAlike 4.0 International License.

deaths per 1,000 live births in rural Upper Egypt vs urban areas. Neonatal mortality is at its highest level in rural Upper Egypt, at 21 compared with 10 neonatal deaths per 1,000 live births in urban Lower Egypt.<sup>7</sup>

Much of the origins of disparities reflect disparities in education. Egypt has one of the largest numbers of students enrolled in higher education in the Middle Eastern and North African region, with a total of around 2.4 million students. The literacy rate, although rising, is only 70% of the population.<sup>8</sup> Public schools, which lack proper facilities, resources, and teachers, educate 92% of students; the remainder, who belong to the upper social classes, attend well-resourced costly private schools run by foreign countries; they may be religious or secular, but both are quite Westernized. This creates a disparity in access to graduate education, including medical schools, even though the path to

medical school appears equitable because it is based on a ranking by the composite score on a national examination. There are 30 registered medical schools in Egypt enrolling 70,000 medical students (as of March 30, 2022). Despite this large number of medical schools, there is a significant physician shortage, with only 10 doctors per 10,000 citizens, compared with a global average of 32 doctors for every 10,000 citizens.<sup>9</sup>

Hospitals are either public (government run and funded) or private. Public hospitals are mostly associated with government-funded medical schools, the first of which was Cairo University Medical School, established in 1827. About a century later, in 1942, the second such school, Alexandria Medical School in Alexandria, was founded. Since 1942, medical schools and hospitals have been established in many governorates to decrease educational and health disparities. In addition, religious

**TABLE I.** Demographics and health care disparities in Middle Eastern countries

Country	Population	Major religions	Poverty rate	Type of health care funding	Disparities	Comments
Egypt	113 million	<ul style="list-style-type: none"> <li>● Muslim (~85%)</li> <li>● Coptic Orthodox Christian (~15%)</li> </ul>	28-32%	<ul style="list-style-type: none"> <li>● Ministry of Health Population provides care free of charge</li> </ul>	<ul style="list-style-type: none"> <li>● Medical education</li> <li>● Physician shortages</li> <li>● Medication shortages</li> </ul>	Health care 4% of GDP, limits health care resources
Israel	10 million	<ul style="list-style-type: none"> <li>● Jewish (~74%)</li> <li>● Muslim (18%)</li> </ul>	21-28%	<ul style="list-style-type: none"> <li>● 4 public health maintenance organizations</li> <li>● Subsidized health basket national insurance law</li> </ul>	<ul style="list-style-type: none"> <li>● Arabs have lower life expectancy</li> <li>● Insufficient health care services in north and south</li> </ul>	War has caused severe medical care disparities
Lebanon	5.5 million	<ul style="list-style-type: none"> <li>● Muslim (69%)</li> <li>● Christian (~30%)</li> </ul>	44%	<ul style="list-style-type: none"> <li>● Fragmented financing of health care system</li> </ul>	<ul style="list-style-type: none"> <li>● 80% of drugs imported, with high costs and shortages</li> <li>● High pollution</li> </ul>	
Iran	88.5 million	<ul style="list-style-type: none"> <li>● Muslim (99.4%)</li> </ul>	~33%	<ul style="list-style-type: none"> <li>● Public/private funding</li> </ul>	<ul style="list-style-type: none"> <li>● Rural areas with higher disparities</li> <li>● Poverty linked to multiple disparities</li> </ul>	Only 5.3% of GDP is allocated to health care

*GDP*, Gross domestic product.

establishments entered health care. The Coptic Hospital in Cairo was established in 1920 through the Coptic Charity, which comprised a group of Coptic doctors who were among the first group of Egyptian medical doctors in Egypt. Until then, the only doctors in Egypt were non-Egyptians. The Al-Azhar Medical School, an Islamic school that only admits Muslim students, was established for men in 1961 and for women in 1964. The Ministry of Health and Population is the major provider of primary, preventive, and curative care, with approximately 5,000 health facilities and more than 80,000 beds distributed nationwide where care is provided free of charge. These facilities are geographically located in both rural and urban parts of the country and provide comprehensive outpatient and inpatient health care resources, including maternal-child health care, immunizations, and diarrheal disease control.<sup>10</sup> However, with health care representing only 4% of the gross domestic product and \$150 per capita, these facilities that serve millions are underresourced and underfunded.<sup>11</sup> In addition, Egypt imports most of its medication, so some essential drugs are only erratically available, even in big cities. Finally, urbanization has led to a high degree of pollution, with carbon dioxide emissions reaching 2.0 metric tons per capita.<sup>12</sup> This is another significant form of disparity: the sources of pollution are often factories located in the most densely populated areas.

In 2018, Egypt introduced overarching health care reform that aimed to provide universal coverage. The policy seeks to reshape the fragmented health care system and encourage collaboration between the public and private sectors. The government plans to produce 150 million packs of 150 different types of medication annually to remedy medication shortages.

In summary, health disparities in Egypt are heterogeneous and have a multitude of causes, among them population age distribution and density, geographic location, social class, religion, education and physician supply, poverty, urbanization, and exposure to pollution.

## Israel

The state of Israel is situated at the eastern end of the Mediterranean with a small area that ranks 152nd in size globally.<sup>13</sup> It has a population of nearly 10 million people, consisting of Jews (74%), Arabs (21%), and other ethnic groups (5%). The Jewish majority is largely an outcome of immigration from numerous countries in Europe, North Africa, and other parts of the world. The central region of the country is highly urbanized and includes the greater Tel Aviv and Jerusalem areas. It is more densely populated than the northern (Galilee) or the southern (Negev) districts, thus creating inequality in the distribution of resources between the center and periphery.<sup>14</sup>

Since its founding in 1948, the state of Israel has developed a strong health care system, as demonstrated by various statistical health parameters.<sup>13</sup> This is the result of several factors, including a solid economy, strong academic medicine, and an infrastructure that began developing before the establishment of an independent state.<sup>13,15</sup> The current system is based on the National Health Insurance law, which was adopted by the parliamentary body, the Knesset, in 1994. According to this law, the state of Israel is obligated to provide each resident with reasonable medical care at an acceptable distance from home on the bases of justice, equality, and mutual assistance. The health care system is mostly public and is primarily operated by 4 health maintenance organizations that act as service providers. However, complimentary and private insurance policies are also available. The medications, procedures, and tests that citizens are entitled to receive from their corresponding health maintenance organizations are dictated by a list known as the health basket. This list is updated annually by a committee appointed by the Ministry of Health on the basis of an evaluation of experts. In the field of allergy and clinical immunology, the health basket covers a wide array of medications, biological drugs, diagnostic tests (eg, skin tests, food and drug challenges), allergen immunotherapy, and other services.

Food desensitization programs are not included in the health basket and therefore must be covered privately by patients.

Despite its favorable design, the Israeli health care system faces several challenges, including sustaining high-level care to elderly patients with complex comorbidities, continuous transfer of services from public coverage to private programs, an increasing shortage of medical staff, and unresolved health disparities.<sup>15</sup> Along with universal determinants of inequality such as income, education, and sex, inequity in Israel is strongly associated with ethnicity and area of residence. Allergy and clinical immunology consultants are insufficiently available in the northern and southern peripheries. In fact, some of the general hospitals in these districts do not maintain allergy/immunology units or training programs, and the districts' residents must seek medical care in the central regions of the country. In 2023, the Israeli Association of Allergy and Clinical Immunology (IAACI) submitted to the Ministry of Health a program that addresses the main topics of disparity. This document advocates developing allergy services in remote districts and in the community as well as encouraging patient education.

Some aspects of health disparity simply relate to the fact that Israel is a country in the Middle East. Several reports have demonstrated inequalities pertaining to the Israeli Arab population, which is the largest minority. In this subpopulation, life expectancy is lower compared with the Jewish majority. Underlying factors have been well studied and include socioeconomic, cultural, and lifestyle differences compared with the Jewish majority.<sup>4</sup> Moreover, the unstable political climate in the region has become a considerable factor that adversely affects health care. Recent reports have described disruptions in medical training, research, and patient care during military conflicts.<sup>16,17</sup> Armed confrontations have significantly harmed local collaborations, such as training Palestinian personnel and treating patients from Gaza in Israeli medical facilities. This regrettable effect is demonstrated by the nearly complete cessation of medical care provided in Israel to Gazan patients with inborn errors of immunity.<sup>17</sup> Of note, the Israel Medical Association and its affiliated societies are active in international organizations. Clinicians belonging to the IAACI are concurrent members of leading international organizations in the United States, Europe, and globally. However, collaboration with regional national societies is disappointingly negligible.<sup>16</sup>

In conclusion, health care in the state of Israel is well developed and efficient, but it faces disparities, mostly as a result of uneven distribution of resources among subpopulation groups and regions of the country. On an international level, distinct efforts should be made to overcome political tensions and create regional medical collaborations.

## Lebanon

Lebanon is a small country located on the Mediterranean Sea; its allergists/immunologists are trained either in the United States or in Europe.<sup>2</sup> The Lebanese health care system is pluralistic and unregulated, with fragmented financing. Many patients are self-payors or are insured by private companies.

Eighty percent of the drugs used in Lebanon are imported; substantial inflation since 2019 has sunk more than half the population into poverty.<sup>18</sup>

The prevalence of ever having asthma, rhinitis, and eczema in Lebanon is 8.3%, 45.2%, and 12.8%, respectively.<sup>19,20</sup> Lebanon has a rich cultural and geographical diversity, with high pollution.

The annual concentration of PM<sub>10</sub> and PM<sub>2.5</sub> (referring to the size, in microns, of the diameter of particulate matter) measured in Beirut in 2012 exceeded the acceptable threshold indicated by the World Health Organization.<sup>21</sup> A recent study found a statistically significant correlation between Mini Rhinoconjunctivitis Quality of Life Questionnaire results and severity of symptoms, with exposure to indoor and/or outdoor pollution exhibiting no differences related to geographic region.<sup>22</sup> A cross-sectional study conducted for 1 year in 2012 looked at the effect of indoor tobacco exposure in children with asthma; smoking among the father and mother was positively correlated with a higher number of hospitalizations for asthma, with infections of the lower respiratory tract, and with asthma exacerbations.<sup>23</sup>

Coronavirus disease 2019 infection was mild to moderate in most inpatients and outpatients with asthma; all continued to receive baseline treatment during infection.<sup>24</sup> Primary immunodeficiency is common because of consanguinity, and there is limited access to intravenous or subcutaneous immunoglobulin replacement therapy.<sup>25</sup> Genetic studies are available, with limited opportunities for bone marrow transplantation. The prevalence of food allergy was found to be 3.73% among Lebanese schoolchildren.<sup>26</sup> Sesame is a major cause of severe IgE-mediated food-allergic reactions in Lebanon.<sup>27</sup> Despite the prevalence of food allergies, epinephrine auto-injectors are not available in the country; they are usually purchased abroad.

The biologics available for severe asthma are omalizumab, dupilumab, and benralizumab, but most patients cannot afford these treatments. In hereditary angioedema, not all treatments are available.<sup>28</sup> Lanadelumab has been recently approved, but its high cost is a real obstacle.<sup>29</sup>

In conclusion, health disparities in allergy/immunology in Lebanon may share similarities with other developed countries. The primary challenges are economic and availability issues.

## Iran

Iran, home to approximately 89 million people, boasts a diverse demographic profile. About 24.11% of its population is under 14 years old, while 5.87% are over 65. Iran's geography includes arid deserts, mountainous regions, and coastal areas along the Caspian Sea and Persian Gulf.<sup>30</sup> The climate varies significantly, from hot and dry in the central deserts to mild and wet in the northern regions. Similar to most other countries, the access and quality of care closely mirrors outcomes of health conditions in Iran. In past decades, health equity analysis has been a popular research topic, and several studies have been conducted at both the provincial and national levels in Iran.<sup>31-33</sup> Examples are large studies such as the Urban HEART (Health Equity Assessment Research Tool) project, which is a collaboration between the World Health Organization and the Ministry of Health and Medical Education;<sup>34</sup> IrMIDHS (Iran's Multiple Indicator Demographic and Health Survey);<sup>31,32</sup> and the Urban and Rural Expenditure–Income Survey.<sup>33</sup> Furthermore, a large number of smaller-size studies or system-based data analyses have investigated the issue of health disparities. The majority of these studies are focused on health care delivery systems, their effect, and their utilization. These investigations have identified financial restrictions as the main challenges to health care equity.<sup>35</sup> A comprehensive systematic review aiming to assess various factors and their contribution to health inequalities in Iran was recently published.<sup>35</sup> This article has identified challenges such as inequitable distribution of the

health resources across the country, especially in deprived and marginalized area, which affects health outcomes across many conditions.<sup>34,36,37</sup>

The role of patient financial difficulties on health outcomes such as life expectancy, mortality, quality of life, and incidence of noncommunicable diseases including diabetes and asthma was investigated in a few articles. These articles have universally found that inequality in demographic and financial variables affects these health outcomes in Iran.<sup>35</sup> Furthermore, a large body of studies has focused on utilization of health services by investigating its availability and accessibility. These articles have also identified unequal distribution of resources among affluent and deprived areas in urban and rural areas of Iran.<sup>35</sup> Factors such as demographic transitions, urbanization, and lifestyle changes have changed the pattern of diseases from communicable to noncommunicable diseases globally, and Iran is no exception.<sup>38-40</sup> With these changes, as well as increased rates of conditions like atopic diseases, more attention has been paid to the patterns and risk factors of allergic conditions in Iran. Initiation of a local allergy/immunology journal—the *Iranian Journal of Allergy, Asthma and Immunology* (JIAAI), an official publication of the Iranian Society of Asthma and Allergy—is an indicator of such attention.

A few studies have specifically investigated the role of social determinant of health factors on asthma and rhinitis incidence and outcomes in Iran.<sup>41-43</sup> Two population-based studies in Iran have estimated the lifetime prevalence of asthma in adults to be between 8% and 9% and the prevalence of current asthma to be between 4.7% and 6.8%.<sup>41-43</sup> The prevalence of allergic rhinitis in the population was estimated to be 23.51%. The rate of asthma was significantly higher in elderly participants, those with smoking exposure, and those with lower educational levels. The relationship between asthma and neighborhoods showed a marked difference among different geographic regions and higher rates in impoverished outskirts of cities.<sup>43,44</sup> One study found that the prevalence of asthma was higher in illiterate patients (12.7%), subjects with the lowest income level (10.6%), and patients living in urban areas (24.1%).<sup>44</sup> The risk factors for poor outcomes and asthma-related mortality were smoking, exposure to ambient particulate matter, and high body mass index, which are all closely related to poverty.<sup>43,44</sup>

Childhood asthma risk factors were also assessed in a few studies conducted in Iran.<sup>2,45-47</sup> Several factors linked to poor socioeconomic conditions—including lack of property ownership, exposure to pests in the home environment, exposure to mold in the property, and secondhand tobacco smoke exposure—were identified as risk factors for asthma in children.<sup>47</sup> Another ongoing large population-based study called the PERSIAN birth cohort, which aims to investigate the incidence of multiple allergic conditions in 4 cities in Iran, is indicative of significant differences in the prevalence of atopic dermatitis and food allergy in different cities in Iran, which was linked to living in cities with exposure to low air quality and lack of breast-feeding. Overall, the patterns and risk factors for health inequity in Iran in both children and adults are similar to many other regions, which in many ways are reflective of the global phenomenon of environmental injustice.<sup>48</sup>

## CONCLUSIONS

This inaugural forum addresses health disparities in a sample of countries from the Middle East. Although we were not able to include all the countries in this region, it is apparent that the health care systems for those that participated are heterogeneous as a

result of socioeconomic, educational, and governmental infrastructures. However, all regions noted health disparities that appeared to be linked to social determinants of health. Unfortunately, conflict in this region has had an additional impact on these health care systems, making solutions even more challenging. However, recognition of the problems that loom specifically related to allergy/immunology can provide the opportunity for international collaboration that focuses on educating patients and physicians and identifying strategies to improve access to specialized health care.

Similar to the United States, there are a spectrum of basic challenges for solving health care issues in the Middle East, including limited capacity to address social determinants of health, declining or absent funding for prevention through public health and health care workforce initiatives, and ongoing gaps in data to measure and understand disparities.<sup>44</sup> It is hoped that creating awareness of these disparities that our international colleagues continuously face is the first step for finding ways to narrow the gap between the haves and the have-nots.<sup>1</sup> Although allergy/immunology diseases are seldom fatal, in most cases, there is a great impact on day-to-day quality of life and productivity. Discussing health disparities in different regions is an opportunity to collaborate as we all try to find common solutions for improving patient care.

## DISCLOSURE STATEMENT

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