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# Compromised Constitutions: The Iranian Experience with the 1918 Influenza Pandemic

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SUMMARY: The global demographic impact of the 1918–19 influenza pandemic continues to fascinate researchers and scholars. This paper examines the social and demographic effects of this outbreak on Iranian society, through a comprehensive investigation of the modes of transmission and propagation, mortality rates, and other distinctive features of the region, and reveals the importance of taking a country's unique sociopolitical settings into account. Iran was one of the regions hit hardest by the pandemic, with mortality rates significantly higher than in most regions of the world. Though globally the victims of influenza lived primarily in urban areas, it was Iran's rural regions that suffered the most casualties. In addition, contrary to the prevailing notion that the 1918 influenza targeted the young and healthy, this paper suggests that famine, opium consumption, malaria, and anemia were fundamentally responsible for the high mortality in Iran.

KEYWORDS: Iran, influenza, pandemic, mortality, 1918, malaria, anemia, opium

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## Introduction

> Of the occurrence in Persia [Iran] of pestilence's [*sic*], such as bubonic plague, cholera, and the type of influenza which swept over the world in 1918–1920, costing more in human life than four years of war, there is little documentary evidence in Persia.[1]

The 1918 influenza pandemic had a devastating impact across the globe. Killing more than fifty million people worldwide, it dwarfed the casualties suffered at the front lines of the First World War.[2] The course of the pandemic was characterized by three distinct waves (though a fourth wave was experienced in some locations). A first, milder wave that emerged in March 1918 in the United States was subsequently introduced into Europe and the rest of the world by the American Expeditionary Forces.[3] This was followed by a virulent second outbreak, which began simultaneously in three port cities on three different continents in the last week of August 1918.[4] A third and final wave emerged in the winter of 1919; this last upsurge was intermittent and sporadic in character.[5]

The disease of influenza is a common contagious viral infection of the upper respiratory tract (nose, throat, and lungs). While its benign symptoms are always present in humankind's experience with illness, it can nevertheless lead to acute complications such as pneumonia, cardiac involvement (myositis), and neurological syndromes. When the stricken individual coughs or sneezes, the flu virus is transmitted rapidly via aerial droplets and infects its host upon inhalation. The 1918 influenza pandemic, however, distinguished itself from previous outbreaks by its significant virulence: it was twenty-five times deadlier than ordinary influ-

1. Sir Arnold T. Wilson, *Persia* (London: Ernest Benn, 1932), p. 368.

2. A recent article in the *Bulletin* called for a reevaluation of the global mortality and patterns of the 1918 pandemic: see Niall P. A. S. Johnson and Juergen Mueller, "Updating the Accounts: Global Mortality of the 1918–1920 'Spanish' Influenza Pandemic," *Bull. Hist. Med.,* 2002, *76:* 105–15.

3. The first reported cases at the time came from Spain, which led to calling the pandemic the "Spanish Flu": see Alfred W. Crosby, *America's Forgotten Pandemic: The Influenza of 1918* (Cambridge: Cambridge University Press, 1989), pp. 25–26.

4. Ibid., p. 37; F. McFarlane Burnet and Ellen Clark, *Influenza: A Survey of the Last Fifty Years in the Light of Modern Work on the Virus of Epidemic Influenza* (London: Macmillan, 1942), p. 72.

5. K. David Patterson and Gerald F. Pyle, "The Geography and Mortality of the 1918 Influenza Pandemic," *Bull. Hist. Med.,* 1991, *65:* 4–21, on p. 4.

enzas.[6] By this time the germ theory of disease was well established, but Western medicine was more than a decade away from discovering the actual viral pathogen that caused influenza. Consequently, during the outbreak there was little available by way of treatment, even in the West, and the cause of the disease remained a topic of controversy among physicians of the time.[7]

Iran was one of the regions hit hardest by the pandemic, with mortality rates significantly higher than in most countries. While globally the victims of influenza lived primarily in urban areas, it was Iran's rural regions that recorded the most casualties. In addition, contrary to the prevailing notion that the 1918 influenza targeted the young and healthy, in Iran malaria, anemia, and other extenuating conditions significantly raised the number of fatalities.

The global demographic impact of the 1918 influenza pandemic, with its unusually short duration and abrupt halt, continues to fascinate researchers and historians of medicine. Though much has been said in the past few years about this subject, many questions still remain to be answered.[8] I attempt here to add to the ongoing debate by examining the

6. Gina Kolata, *Flu: The Story of the Great Influenza Pandemic of 1918 and the Search for the Virus That Caused It* (New York: Straus and Giroux, 1999), p. 7.

7. Terence Ranger, "The Influenza Pandemic in Southern Rhodesia: A Crisis of Comprehension," in *Imperial Medicine and Indigenous Societies,* ed. David Arnold (Manchester: Manchester University Press, 1988), pp. 172–88, on p. 172.

8. To mark the eightieth anniversary of the epidemic, an international conference was organized under the auspices of Cape Town University. The meeting was entitled "Reflections on the Spanish Flu Pandemic after Eighty Years: Causes, Course, and Consequences," and brought together an array of researchers. I was invited but unable to attend; however, I am grateful for the constructive comments on my paper by Dr. Howard Phillips of Cape Town University. Some of the recent works on the topic include Christopher M. Langford and P. Storey, "Influenza in Sri Lanka, 1918–19: The Impact of a New Disease in a Premodern Third World Setting," *Health Transition Rev.,* 1992, *2:* 97–123; Svenn-Erik Mamlund, "The Spanish Influenza among Norwegian Ethnic Minorities, 1918–1919" (working paper), *Center for Demography and Ecology University of Wisconsin-Madison,* 2001, *11:* 1–46; Colin Brown, "The Influenza Pandemic of 1918 in Indonesia," in *Death and Disease in Southeast Asia: Explorations in Social, Medical and Demographic History,* ed. Norman G. Owen (Oxford: Oxford University Press, 1987), pp. 235–56; Beatriz Echeverri Dávila, *La gripe española: La pandemia de 1918–1919* (Madrid: Centro de Investigaciones Sociológicas, 1993); Ian D. Mills, "The 1918–1919 Influenza Pandemic—The Indian Experience," *Indian Econ. & Soc. Hist. Rev.,* 1986, *23:* 1–40; David Patterson, "The Influenza Epidemic of 1918–19 in the Gold Coast," *J. Afr. Hist.,* 1983, *24:* 485–502; Howard Phillips, *"Black October": The Impact of the Spanish Influenza Epidemic of 1918 on South Africa,* Archives Year Book for South African History (Pretoria: Government Printer, 1990); Geoffrey W. Rice (with assistance from Linda Bryder), *Black November: The 1918 Influenza Pandemic in New Zealand* (Wellington: Allen & Unwin, 1988); Sandra M. Tomkins, "The Influenza Epidemic of 1918–19 in Western Samoa," *J. Pacific Hist.,* 1992, *27:* 181–97; idem, "Colonial Administration in British

social and demographic consequences of the outbreak on Iranian society through a comprehensive investigation of the modes of transmission and propagation, together with the mortality rates and other distinctive features of the region. To understand this visitation within the cultural and geographical confines of Iran, one also has to consider the historical context of the country—for in Iran's case especially, the pathological and psychological impact of the epidemic is as much an outcome of the country's social situation as it is a reflection of the flu's distinctive virulence.

## A Ravaged Nation: Iran during the Great War

The outbreak of World War I in 1914 marked the beginning of a painful period for the Iranian population at large. Although Iran's government had declared its neutrality to all belligerent powers, its territory was nonetheless used as a battlefield by warring armies. This trend began in 1914 with the Ottomans, who moved their troops into northwestern Azarbaijan on the heels of the withdrawing Imperial Russian army.[9] In 1915 the "German Lawrence," Wilhelm Wassmuss, organized a revolt among the Qashghâi tribesmen of southern Iran against the British, who held oilfields and naval installations in the southern tribal region.[10] Shortly thereafter, the Russians mounted a counterattack against the Ottomans, driving them back from their gains and thereby allowing the British to recover control of southern Iran by 1916. In 1917–18, a revolutionary Iranian group known as the Jangalis emerged from the confusion of war and took control of the countryside in the northern Iranian Caspian province of Gilan.[11]

These martial clashes were inevitably followed by massive material devastation and the disruption of economic production. It is not surpris-

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Africa during the Influenza Epidemic of 1918–19," *Can. J. Afr. Stud.,* 1994, *28:* 60–83. None of these works indicate anything about the role of other illnesses and conditions in significantly increasing mortality among those who were sick with influenza.

9. Peter Avery, Gavin Hambly, and Charles Melville, eds., *The Cambridge History of Iran.* Vol. 7, *From Nadir Shah to the Islamic Republic* (Cambridge: Cambridge University Press, 1991), p. 208; Michael Zirinsky, "American Presbyterian Missionaries at Urumia during the Great War," *J. Assyr. Acad. Stud.,* 1998, *12:* 6–27.

10. In 1915, during an escape from the British Expeditionary Force sent to capture the city of Bushihr, Wilhelm Wassmuss's German diplomatic codebook fell into the hands of the British. This book allowed British intelligence to read almost every top-level diplomatic message sent from Berlin for the remainder of the war, including the infamous "Zimmermann Telegram" sent to the Mexican government in 1917.

11. Cosroe Chaqueri, *The Soviet Socialist Republic of Iran, 1920–1921: The Birth of the Trauma* (Pittsburgh: University of Pittsburgh Press, 1995).

ing that Iran's economic disorder, together with the occupying armies' forceful requisitioning and looting, led to widespread famine and disease among the populace throughout the Great War. Ironically Iran, a neutral power in the war, lost as many citizens to war-related catastrophes as belligerent countries lost in the trenches. This crisis was further compounded by the fact that the Iranian government had become a de facto protectorate, left to the whim of Great Power *Kriegpolitik;* as a result, it was incapable of alleviating the suffering of its people.[12] The lack of effective administration, together with the emotionally disturbed and feeble nature of Ahmad Shah, the Iranian monarch, compounded the country's chaotic state, and the day-to-day management of Iran's various regions fell into the hands of unscrupulous tribal warlords and magnates.

By late 1917, following the Bolshevik revolution, the Russian armies in Iran revolted and retired to the Caspian Sea in complete disorder. This retreat did not go unnoticed by the Ottomans, who prepared to reinvade the undefended Azarbaijan province, after having earlier suffered military defeats, the loss of their Arabian territories, and rising pan-Turkish aspirations. To counter this danger, the British War Office ordered Major General Dunsterville to depart from Baghdad with a handful of specially picked men, in order to defend the threatened and strategically important Caucasian city of Baku. It was in this environment of massive troop movements and clashing armies that the 1918 influenza pandemic made its appearance in Iran.[13]

12. In 1907, the British and Russian governments settled their differences in Iran by dividing the country into three spheres of influence. Northern and central Iran, including the important cities of Tehran and Isfahan, were in the Russian sphere; southeastern Iran, an area rich in oil deposits, was in the British sphere; and the area between the two spheres of influence was considered a neutral zone. Later, in the secret Anglo-Russian agreement of 1915, the Russians were promised the postwar control of Istanbul and the Straits; in return, the Russians granted the British postwar control of the Iranian neutral zone: see Avery et. al., *Cambridge History of Iran* (n. 9), pp. 205–8.

13. A number of works have been written on the Iranian position during the Great War. These include Mohammad Hossein Rowknzâdeh-Âdamiyat, *Fârs va jang i bein al mîlal* (Persia and the World War) (Tehran: Eqbal, 1357 [1978]); William J. Olson, *Anglo-Iranian Relations during World War I* (London: Frank Cass, 1984); Brig.-General William Edmund Ritchie Dickson, *East Persia: A Backwater of the Great War* (London: Edward Arnold, 1924); G. M. Bayliss, *Operations in Persia, 1914–1919* (London: Her Majesty's Stationery Office, 1987). In addition, recent Persian historiography has witnessed a "vogue" in publishing primary source materials from the Iranian National Archives. This includes a compilation of records on northern Iran during World War I: Mohammad Nâder Nasîrî Moghadam, *Gôzîdeh i asnâd i Daryâ i Khazar dar Jang i Jahani i Aval* (Tehran: Idârh i Intshar i Asnâd, 1374 [1995]). Unfortunately, none of these published Persian primary or secondary sources makes any mention of the Spanish Flu.

## The Horsemen of the Apocalypse: War, Famine, and Pestilence

During the Great War, Iran frequently suffered countrywide famine and accompanying epidemic diseases. Two dry summers in 1916 and 1917 led to failing crops, which, when coupled with the policy of the Ottoman, Russian, and British occupying armies of requisitioning what food was left, brought about starvation throughout the land. Indeed, even with war's end in 1918, Iranians had to face a terrible famine (1918–19), a tragedy that was worsened by hoarders and speculators:[14]

> The country was in a terrible state and the peasantry was in the last stages of starvation. Every time I was forced to stop my car, I was surrounded by hundreds of near-skeletons who screamed and fought for such scraps as I was able to spare. In a single day's journey of fifty-six miles between the towns of Kirind and Kermanshah, I counted twenty-seven corpses by the roadside, most of them those of women and children, and the general condition of life amongst the peasants was so frightful that I was ashamed to eat my simple rations in their presence.[15]

The ubiquity of contagious diseases was an even greater curse. Outbreaks of bubonic plague, for example, were reported monthly from Iranian ports throughout the Persian Gulf. In addition, there were recurrent eruptions of Asiatic cholera: records indicate that from 1915 through 1918, cholera had become endemic throughout the country.[16] It is thus not surprising that observers referred to Iran as "a veritable hell on earth."[17]

At the dawn of influenza's outbreak in Iran in the spring of 1918, grain supplies were at a low point, and prices had already more than doubled from the preceding six months (when they had reached a ten-year peak). This scarcity continued even following the spring harvest, and villagers, especially in the southern and central provinces, were scarcely surviving on millet-meal and berries.[18] Worse yet, the growing British military buildup in southern Iran, together with their sponsorship of a large

14. Great Britain, Public Records Office, Foreign Office, General Correspondence, 371/3892 (henceforth cited as FO 371/3892), no. 257, Percy Cox to George N. Curzon, Tehran, 8 March 1920, insert # 1, Anthony R. Neligan to Percy Cox.

15. F. A. C. Forbes-Leith, *Checkmate: Fighting Tradition in Central Persia* (New York: McBride, 1927; rept. New York: Arno Press, 1973), pp. 20–21.

16. Anthony R. Neligan, "Public Health in Persia 1914–1924: Part II," *Lancet,* 1926, *210:* 690–94, on p. 690.

17. Forbes-Leith, *Checkmate* (n. 15), p. 21.

18. Government of India, *Administration Report of the Persian Gulf Residency for the Year 1918* (Delhi: Superintendent of Government Printing, 1920), p. 23.

native military contingent known as the "South Persia Rifles," contributed substantially to the scarcity, due to long-term contracts that the British had made with large landowners for grain to feed the troops.[19] As if starvation were not enough, in 1918 the Iranian people also had to grapple with a widespread typhus epidemic, which was taking its toll in both urban and rural areas.[20] Consequently, the flu came into an environment already beset by the calamities of war, famine, and disease.

## Ambivalent Advance: The Progress of the Spanish Flu in Iran

### *The First Wave*

The influenza pandemic invaded Iran from several different directions, probably caused by the number of armies fighting within its territory and by its geographical centrality within the Eurasian plateau (see Fig. 1). One of the earliest points of entry for the flu was via the Russian city of Ashkabad. Ironically, the Russians themselves had contracted the disease from the American expeditionary force, which had landed its infected troops at the Baltic port of Archangel in October.[21] The infected Tsarist Russian troops, in retreat from the Bolshevik onslaught, then unwittingly transmitted the illness southward along their withdrawal lines through central Asia into Iran.

From Ashkabad, the flu reached the northeastern Iranian city of Mashhad by the third week of August. From Mashhad, a Shi'i pilgrimage center and an important supply route for the White Russian and British armies, the disease was disseminated throughout the country, as a result of the ubiquitous presence of both soldiers and hordes of pilgrims from all parts of the Shi'i world. The disease spread southward, overtaking the city of Birjand by the fourth week of August and the provincial capital of Nasratabad a little later. By the second week of September, the eastern provinces of Khurasan and Sistan were full of influenza; in the following month, the more central provincial capital of Yazd succumbed as well. The disease also followed the westward Mashhad-Tehran highway, infecting villages and towns along that road.[22]

The prime propagators of influenza in the northeastern provinces of Iran were the Bolshevik and British troops. These armies were contending

19. Ibid.
20. Neligan, "Public Health in Persia: II" (n. 16), p. 692.
21. Crosby, *America's Forgotten Pandemic* (n. 3), pp. 145–46.
22. FO 371/3892, no. 257.

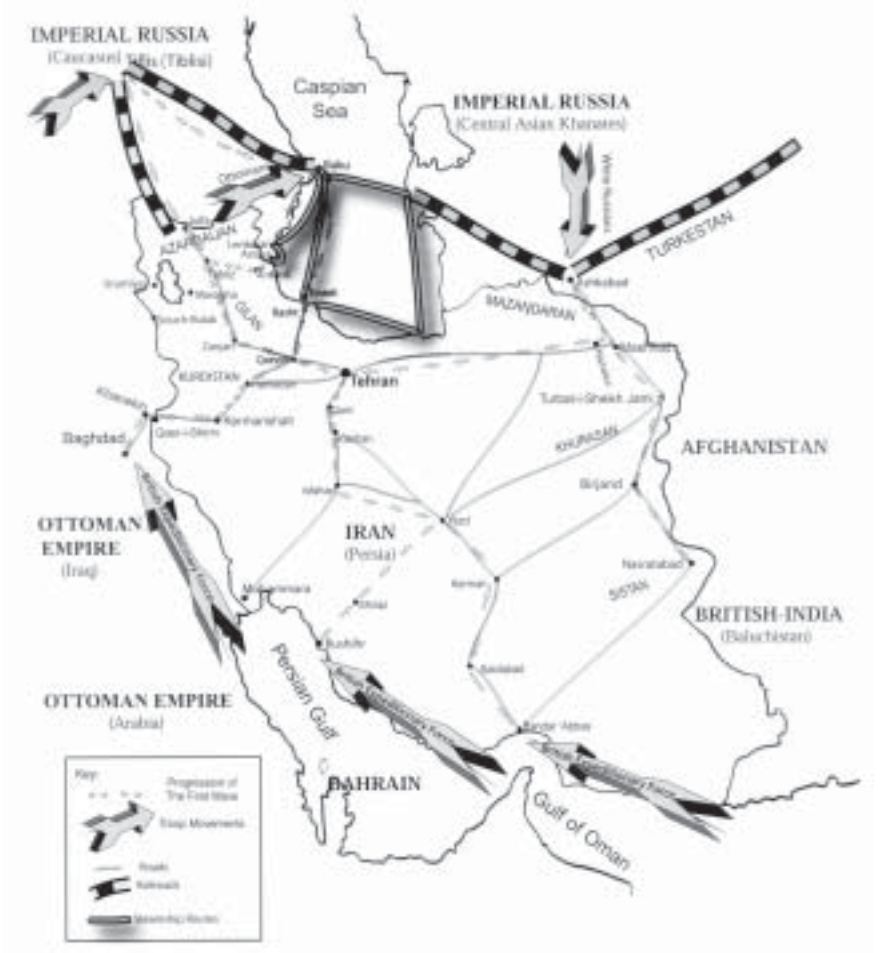


Fig. 1. First wave of the 1918–1919 influenza pandemic in Iran. *Sources:* Great Britain, Public Records Office, Foreign Office, General Correspondence, 317/3892; Anthony R. Neligan, *Hints for Residents and Travellers in Persia* (London: Bale & Danielsson, 1914).

for the control of the Transcaspian Region, which was seen as a strategic gateway to Central Asia. True to its nondiscriminatory nature, the flu incapacitated both forces in this area. However, the Bolshevik troops were the first to succumb—contributing to their surrender at Tashkent on 28 August 1918.[23] Ironically, their defeat and the subsequent British territorial gains helped transmit the flu to the British forces, which had

23. Bayliss, *Operations in Persia* (n. 13), p. 366.

thus far managed to remain uninfected. From that point the contagion spread down British supply lines to Mashhad.

The first wave of influenza also invaded Iran from the west via the Russian-Caucasian city of Baku, reaching the Caspian seaport of Enzeli by the fourth week of August. While the epidemic was raging in Baku, the Turkish army mounted a heavy assault on the British forces defending the city. Without adequate local support, and with the increasing number of casualties inflicted by influenza, the British troops had to retreat to Enzeli by 15 September, leaving the Turks in control of Baku and the whole of western Azarbaijan.[24] Indeed, throughout the Caucasus and Transcaspia, the flu had incapacitated a significant number of the outnumbered British forces fighting the Ottoman Turks and the Bolsheviks. By 2 September the disease had reached the northwestern Iranian city of Tabriz.

As in the rest of the world, the speed of modern transportation was a key factor in the movement of the 1918 pandemic into Iran. To reach the seaport of Enzeli, the disease had followed Caspian steamship routes from Baku and the Tiflis-Julfa railway, which rapidly carried the outbreak through the otherwise difficult terrain of the Caucasian highlands.[25] Once in the country, its progression reflected regional variations in travel facility.[26] Better roads between Mesopotamia and southern Iran, in conjunction with the use of automobiles by British troops, contributed to the accelerated transmission of the influenza in that part of the country.

The Persian Gulf ports of Bandar ʿAbbas and Bushihr were other points of entry for the first wave of the pandemic. The carriers of infection here were British and Indian troops who had embarked at Bombay City as part of the British Expeditionary Force into the Middle East. As early as 29 May 1918, flu cases had begun to spread across Bombay City,[27] and as a consequence British forces brought influenza with them when they docked in Iranian harbors.[28] The final route of the

24. Ibid., p. 364.

25. FO 371/3892, no. 258.

26. Following the Great War, Iran still lacked a countrywide railway network, and a paved highway system would only emerge in the 1940s due to the need, on the part of allied countries, to supply a beleaguered Soviet Union via the Persian Gulf (during this time, Iran earned the sobriquet "The Bridge to Victory").

27. Mills, "1918–1919 Influenza Pandemic" (n. 8), p. 4.

28. The first port city affected was Bushihr, where the illness was detected on the fourth week of September. Influenza also emerged at Bandar ʿAbbas in the first week of October; this outbreak was mild, but it took more than three months to extinguish. Following its initial outbreak in Bushihr, the flu spread to Shiraz by the third week of October and reached Saidabad by the end of that month. On 17 November, cases of the illness surfaced

influenza's first wave into Iran was via the Mesopotamian frontier, where the British troops were making significant headway against the Ottoman army. The patterns of the epidemic in this region unsurprisingly followed the temporal pattern of outbreaks on the Indian subcontinent, due to the presence of British troops common to both areas.[29]

Influenza broke out in Tehran unexpectedly, a shock that coincided with the emergence of a strong western wind on 24 September, fueling the popularly held belief that the outbreak was caused by "corrupt winds." (This belief was so pervasive that at this time influenza became popularly known as *nâkhushî i bâd,* "the illness of wind.")[30] Native physicians in the capital noted that people who were outdoors on that day invariably fell ill.[31] The death rate was reported to have been significantly

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in the city of Kerman, in the center of the Iranian plateau. See FO 371/3892, nos. 258–64; India, *Administration Report* (n. 18), p. 24.

29. The first wave of the flu was ubiquitous in the Bombay Presidency by the third week of June, and in under a week it traveled to the Mesopotamian theater and invaded Iran at Qasr-i-Shirin on the Baghdad-Kermanshah road. The heavy motor traffic on this road was responsible for the rapid transmission of the epidemic inland. Kermanshah was infected in the fourth week of August, followed by Hamedan in the second week of September. By 15 September, the disease was transmitted to Qazvin by troops arriving from Hamedan; from Qazvin, it spread rapidly along the motorcar routes northward, appearing after a few days at the Caspian town of Rasht. Rasht's proximity to Enzeli, where the epidemic was already raging, makes it possible that the flu attacked Rasht simultaneously from Qazvin in the south and Enzeli in the west. Because Tehran was off the main military traffic line moving north, it was overtaken by influenza on the relatively late date of 22 September. Evidence seems to indicate that, like Rasht, the infection was brought into the capital by travelers from Qazvin: see FO 371/3892, nos. 258–60.

30. It is interesting to note that the rapid propagation of the flu within Tehran itself took place within a day or two of the high wind. The onset of the epidemic in Mashhad also coincided with violent cold gales. Winds play a significant role in Iranian traditional beliefs, and curiously, influenza's outbreak and rapid transmission probably played a serendipitous role in enforcing this belief. Inhabitants of the southern coast, for example, believe that the winds (which are personified as spirits) have the power (*ghodrat*) to exercise control over the health, destinies, and fortune of men. Indeed, "evil winds" have always been credited as an important harbinger of epidemics in Iranian medical lore (probably as a result of the Hippocratic influence on the Iranian intellectual tradition) ever since the earliest medical compendium written in the Persian language. See FO 371/3892, nos. 260–61; Kaveh Safa, "Reading Saedi's Ahl-e Hava: Pattern and Significance in Spirit Possession Beliefs on the Southern Coasts of Iran," *Cult., Med. & Psychiatry,* 1988, *12:* 85–111; Barat Zanjani, ed., *Danishnamah: The Oldest Medical Compendium in Persian Verse,* by Hakim Maysari (Tehran: Tehran University Press, 1987); A. L. F. A. Beelaert, "Medical Imagery in the Description of the Seasons in Classical Persian Poetry," *Persica,* 1990–92, *14:* 21–35.

31. This included the eighty British motor transport men, who were living in the open: practically every member fell ill. A number of neurological and cardiac complications were observed among the people struck with the disease in Tehran, including cases of pericarditis, orchitis, mastoiditis, meningitis, optic neuritis, paralysis of the palate, and mania: see FO 371/3892, no. 261.

higher among the poor; their bodies were removed in cartloads from the slums and were piled up at the cemeteries awaiting burial. An inordinate number of casualties occurred among those living in rural districts around Tehran. As in Europe, the Iranian administration (even in the capital) was caught off-guard, and the response to the epidemic, arriving too late, was largely disorganized. Following the outbreak of this first wave in Tehran, the epidemic spread down the country's southern arteries, reaching the central city of Isfahan by the third week of October and from there spreading farther south to Yazd, where it was already raging.

## *The Second Wave*

The second, more virulent form of influenza overwhelmed the Bombay Presidency by the month of September (see Fig. 2).[32] In less than two weeks, the epidemic made its way across the Indian Ocean and the Persian Gulf, via shipping lanes, to the port city of Bushihr. The severity of the outbreak in Bushihr brought all mercantile activity in the bustling port to a complete halt.[33] The town of Muhammara also acquired this new wave of the disease through the Mesopotamian port of Basra, which had itself acquired it via British troop transports bound from India.[34]

Whether this second wave of the flu came forth as a single mutation of the influenza virus, as Alfred Crosby has reasoned,[35] or as an extraterrestrial pathogen, as Fred Hoyle and Chandra Wickramasinghe have argued, remains controversial.[36] Nevertheless, the greater virulence and malignancy with which this wave of the pandemic bore down on the globe relative to its more benign predecessor is uncontested. In the case of Iran, the second surge followed on the heels of the first, marching across the Baghdad-Kermanshah road and catching up with Tehran by the closing days of September. In most provinces of Iran, the predominant means of transportation was the sluggish animal-driven caravan, to which observers have credited the relatively slow progress of the influenza

32. Mills, "1918–1919 Influenza Pandemic" (n. 8), p. 6.

33. FO 371/3892, no. 262.

34. FO 371/3892, no. 264.

35. Crosby, *America's Forgotten Pandemic* (n. 3), p. 37.

36. Fred Hoyle and Chandra Wickramasinghe, "Influenza from Space?" *New Scientist,* 1978, *79:* 946–48; cited in Mills, "1918–1919 Influenza Pandemic" (n. 8), p. 6. This view seems to have been marginalized by a 1999 report from the Armed Forces Institute of Pathology that indicated that the 1918 influenza virus, though unique, was closely related to the swine flu—suggesting that the influenza gene was adapting in humans or in swine for several years before it broke out as a pandemic virus.

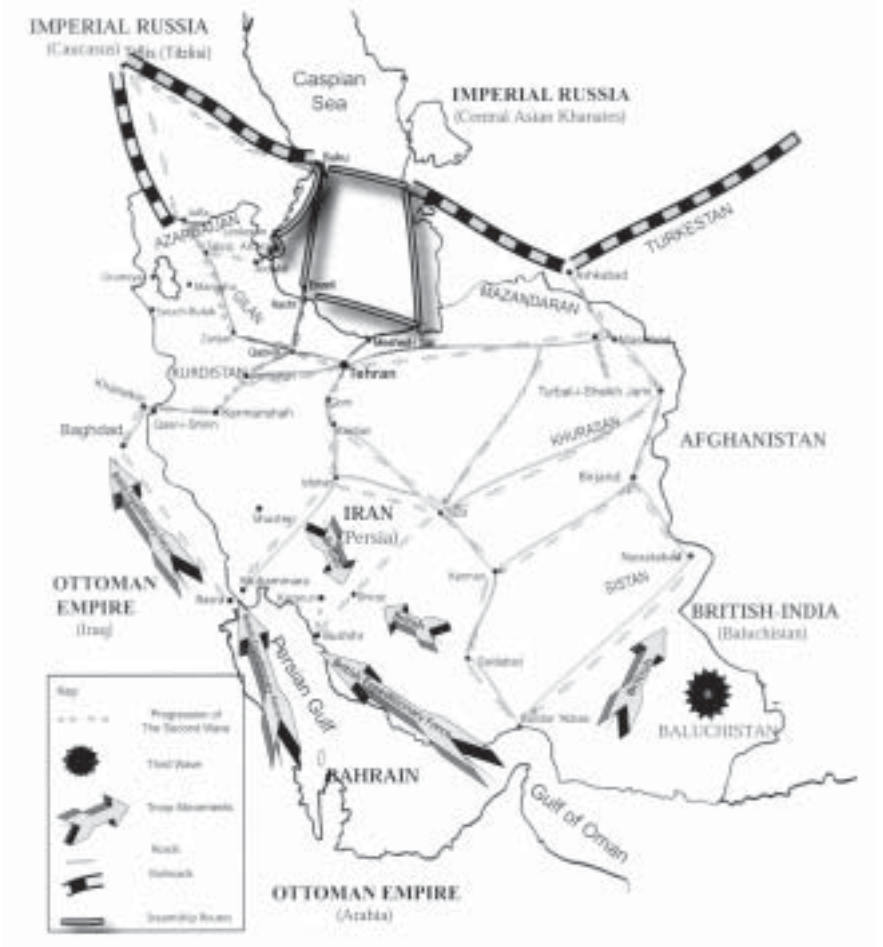


Fig. 2. Second and third waves of the 1918–1919 influenza pandemic in Iran. *Sources:* Great Britain, Public Records Office, Foreign Office, General Correspondence, 317/3892; Anthony R. Neligan, *Hints for Residents and Travellers in Persia* (London: Bale & Danielsson, 1914).

to the peripheries of the country.[37] Once again, however, the better roads leading from Mesopotamia into Iran, together with the use of mechanized transport by British troops in the area, assisted the rapid march of this second wave of the flu into the southern part of the country.

On its northbound trek from Mesopotamia, this wave of influenza was especially virulent in the cities of Kermanshah and Hamedan, due to the

37. FO 371/3892, no. 258.

presence of large numbers of Armenian and Assyrian Christian refugees who had escaped Turkish persecution in the Caucasus, following the retreat of British troops from Baku. During the last two weeks of September, Kermanshah alone had received sixty thousand hungry and diseased refugees, a number equal to the native population of the city.[38] Under these conditions, the inhabitants of these cities not only had to face an unusual scarcity of food and lodgings, they also had to deal with a renewed and much deadlier visitation of the flu, as was explained by a member of the British expeditionary force who witnessed the outbreak:

> We are in the thick of Spanish influenza, and the troops have suffered heavily. Pneumonia and malaria on top of it have caused many deaths, particularly amongst the Indians, and the hospitals here and in Hamedan are full of sick. The epidemic has spread through the towns, and half the population seems to have suffered more or less. My own turn came on the 21st, and all my servants went down with it at the same time.[39]

From its other point of entry, the port of Bushihr, the second wave of influenza spread north to the city of Shiraz and thoroughly covered southern Iran.[40] In Shiraz the flu was extremely severe, and the whole city was caught off-guard; as a result, the response to the outbreak was predictably disorganized. Moreover, a large number of the basic services were paralyzed because medical personnel, transport workers, and telegraph/postal officials succumbed to the epidemic, which added to the difficulties of delivering help where it was needed.[41]

The frequency of improper burials, which were considered humiliating in Iranian culture, showed that the lack of proper care provided for native victims of influenza continued even after death. This situation was brought about by Iranian officials, who had speculated in the cloth used

38. F. Hale, *From Persian Uplands* (New York: Dutton, 1920), pp. 235–36.

39. Ibid., pp. 237–38.

40. The province of Fars bore the greatest share of casualties among all Iranian regions in this period. The outbreak spread through this province at a time when British forces were engaged in heated combat with the Qashghâi tribal confederacy, which had embraced the Axis camp. Fortunately for the British troops, the commander of the expeditionary force, Brigadier-General Sir Percy Sykes, and his chief medical officer, Colonel H. Burden, had made adequate preparations for such a medical catastrophe: when the disease broke out among the British forces, there was an abundance of medical "comforts," which did not necessarily save many lives, but did ensure that the troops were treated with the best means available at the time. The native Iranians were not as fortunate: they not only had to contend with famine and disease, but were also abandoned by their physicians, who had escaped the war-torn areas. See FO 371/3892, nos. 262–63; Sir Percy Sykes, *A History of Persia,* 2 vols. (London: Macmillan, 1921), 2: 515.

41. FO 371/3892, no. 262.

to make the ritually requisite burial shrouds, which led to an acute shortage of the commodity. Faced with the prospects of an inappropriate funeral the townspeople of Shiraz, "in despair, crawled by hundreds to die in the mosques."[42] Even the governor of the Fars province, Abdol Hosein Mirza Farman Farma, was not spared from the pains of the visitation: he, like many of Shiraz's residents, caught the flu and barely recovered from his illness. When General Percy Sykes visited the grandee following his brush with death, he relates that the Farman Farma "explained in his curious French that half of Shiraz was dead"—or, as he put it, "Le demi-mond de Chiraz est Mort."[43] True to his dramatic flare, Sykes also narrates that when the news of the Armistice reached the Allied armies in Fars province, "a salute was fired with difficulty, and the troops, who were unarmed, rose painfully from the ground to cheer."[44]

This wave of the pandemic continued its progress up and down the country, passing through the town of Kazerun in conjunction with violent weather patterns, such as strong winds and hail, which the population regarded as dreadful omens of the oncoming disease. When the new wave of influenza did arrive in the city, it struck such fear that the inhabitants took flight, as they had the habit of doing during cholera and plague outbreaks. Fear of contagion prompted physicians to treat their patients with prescriptions handed through barely opened doors.[45] The pandemic reached the city of Kerman on 17 November, where it killed a number of notables including Nûsrat al-Mamâlik, who had acted as governor-general of the province. By all accounts the general mortality in this region was the highest that had been recorded in Iranian history.[46] The town of Shuster, an important British garrison, also suffered the ravages of the flu in November, particularly among the Indian soldiers stationed there.[47] The epidemic continued its northward trek through

42. Sykes, *History of Persia* (n. 40), 2: 515.

43. Ibid.

44. Ibid.

45. FO 371/3892, no. 262.

46. It is also interesting to note that the only recorded bacteriologic analysis of 1918 influenza patients in Iran was done in Kerman. This analysis showed the presence of a small gram-negative micrococcus in overwhelming quantities compared with the other organisms present. In all probability what was observed was none other than *Hemophilus influenzae* (Pfeiffer's bacillus). Interestingly, a vaccine was prepared for this bacterium and used in five individuals grappling with the flu, and four among them showed marked improvement following the inoculation. See India, *Administration Report* (n. 18), pp. 24–25; FO 371/3892, nos. 262–64.

47. FO 371/3892, no. 264.

the provinces of Sistan and Mazandaran, where its outbreak in the Caspian port town of Meshed-i Sar was particularly severe (see Fig. 2).[48]

### *The Third Wave*

The third and final wave of influenza in Iran was recorded in January 1919. This time, however, the illness was localized in the province of Baluchistan, introduced by nomadic tribes from the Sarhad region (North-West Frontier Province in British India), and it did not spread to other regions.[49]

## Delineating Death: Patterns and Analysis of Mortality

The patterns of transmission were not the only feature that distinguished Iran's encounter with the 1918 pandemic. The significantly higher incidence that was experienced by the Iranian population set it apart from the rest of the world, even by influenza's gruesome standards. In the province of Khorasan, for example, the city of Mashhad had two-thirds of its 100,000 citizens sick with the flu. The epidemic killed about 3,500 people in that area: a 5% mortality rate within city limits, and 7% in outlying villages.[50]

Since deaths were not registered in Iran at this time and an accurate population count was not available, mortality figures from various sources can give us only a very rough picture of the impact of influenza in urban areas.[51] However, even with this lack of "hard" demographic data, observational evidence allows us to draw several assumptions from the patterns of mortality in Iran during the three waves of the influenza outbreak. A recurring opinion, for example, was that the pandemic was more virulent in the countryside than in urban areas. The rural and nomadic Qashghâi tribe in southern Iran was reported to have lost more than one-third of its fighting-age men.[52] The ferocity of the epidemic's

48. FO 371/3892, no. 261.

49. FO 371/3892, no. 262. Sarhad is a very small town in the Persian-Baluchistan province located to the east of Bam, about halfway between that city and the British-Baluchistan frontier. Sarhad is also notable in that it is adjacent to the Nasratabad-Quetta highway, a route that linked Iran to British India.

50. FO 371/3892, no. 261.

51. The first national census of Iran was held in 1956: see Julian Bharier, "A Note on the Population of Iran, 1900–1966," *Pop. Stud.,* 1968, *22* (2): 273–79; Charles Issawi, ed., *The Economic History of Iran, 1800–1914* (Chicago: University of Chicago Press, 1971), pp. 28–29.

52. FO 371/3892, no. 262.

toll on the Qashghâi was vividly recorded in the memoirs of an observer who reported that after seeing five of these tribesmen sick by the roadside, he found them five days later dead beside a stream to which they had probably crawled to drink; their rifles lay beside them, and no one had been left alive to carry them away or bury them.[53] Rural districts and villages in the north around Tehran, in the center surrounding Yazd, and in the south near Muhammara were also reported to have had high mortality.[54] One observer noted that villages around Yazd had lost up to 25% of their population to influenza, and villages in the Kerman district were reported to have had a 30%–40% casualty rate.[55]

Another appraisal was that mortality was considerably higher among those with chronic malaria, as was observed in Armenian and Assyrian refugees in the northern town of Enzeli,[56] and the flu in Iran was much more prevalent and virulent among indigenous Iranians with malaria than among Europeans residing there. In addition, influenza was markedly more lethal among the natives of India in the British army, who were also plagued by malaria and anemia, as compared with either Iranians or Europeans.[57] For example, among the South Persia Rifles in the city of Kerman, there were 1,500 cases of the flu, resulting in 91 deaths (6% case mortality); in the neighboring town of Saidabad, 77 out of 900 ill soldiers succumbed to the outbreak (8.5% case mortality); in the Kerman district town of Narmashir, 150 soldiers contracted influenza and 49 deaths were recorded among them (32.7% case mortality).[58] Following the peak of influenza in Kerman, the province was seized by high rates of fevers, possibly malarial in origin.[59] British-Indian troops stationed in Sistan also had a high casualty rate of 40 individuals out of 139 cases (29% case mortality).[60] In the city of Shiraz, the death rate among the native South Persian Rifles and the Indian troops garrisoned there was 10%. Around that same region, an assignment of Indian and Iranian troops numbering 416 men lost 31% of its strength to the disease. Another post in the area lost 72% of its Indian garrison.[61]

An estimate of the casualties brought about by influenza is not impossible if we consider that Iran's projected population in early 1918 stood at

53. Ibid.
54. FO 371/3892, nos. 261, 264.
55. FO 371/3892, nos. 264, 263.
56. FO 371/3892, no. 262.
57. FO 371/3892, nos. 258–59; Hale, *From Persian Uplands* (n. 38), p. 237.
58. India, *Administration Report* (n. 18), p. 25.
59. Ibid.
60. FO 371/3892, no. 262.
61. Ibid.

11.21 million inhabitants.[62] Of this total, only 2.34 million lived in urban areas, indicating that the remaining 8.87 million were rural residents[63]—that is, only 21% lived in cities.[64] Given this observation and the assessment that rural districts had a mortality rate of 10% to 25%, one can conclude that between 887,000 (10%) and 2,197,500 (25%) people in the districts were struck down. In the urban milieu, at least 1% to 10% (in Kerman) of the citizenry are thought to have passed away—that is, cities lost between 23,400 (1%) and 234,000 (10%) of their population (see Table 1). Taking the sum of rural and urban mortality, Iran probably lost between 910,400 and 2,431,000 of its inhabitants. These numbers are very significant, for they indicate that Iran's losses were anywhere from 8.0% to 21.7% of its population, and would therefore stand near the top of the 1918–19 pandemic's international mortality ladder.[65] To explain this high casualty rate, one must identify the distinctive conditions of the Iranian people during this time, features that might have been instrumental in facilitating the influenza's unusual virulence.

## *Famine*

Influenza entered Iran in a period when its population had been struggling with significant food shortages for two years—a situation that could only exacerbate mortality. Studies do not indicate any positive correlation between increased morbidity and low caloric intake; on the other hand, mortality could have been increased by the famine.[66] There are also some cofactors to famine in Iran, such as increased opium consumption, which could have a direct impact on fatalities due to influenza.

62. Julian Bharier, *Economic Development in Iran, 1900–1970* (London: Oxford University Press, 1971), p. 26. Iran's population in 1918 was not very different from the population in 1913, the dawn of the Great War (estimated at about 11 million): see Issawi, *Economic History* (n. 51), p. 29.

63. Bharier, *Economic Development* (n. 62), p. 27.

64. Eckart Ehlers and Willem Floor, "Urban Change in Iran, 1920–1941," *Iranian Stud.,* 1993, *26* (3–4): 251–75, on p. 253. This 21% ratio of urban dwellers had been consistently maintained since the mid-nineteenth century. Massive urbanization in Iran is a very recent phenomenon, dating back to the 1960s and gaining momentum with the oil boom of the 1970s.

65. Patterson and Pyle, "Geography and Mortality" (n. 5), pp. 14–15.

66. It has been shown that there is no marked increase in cases of the flu among people who have been kept in a semistarved condition: see Ancel Keys et al., eds., *The Biology of Human Starvation* (Minneapolis: University of Minnesota Press, 1950), chap. 10, "Infectious Diseases and Under-nutrition," pp. 1002–13.

Table 1. Morbidity and Mortality during the 1918–1919 Influenza Pandemic in Urban Iran, According to Available Data

| City | Population | Morbidity | Mortality | Mortality (%) | Mortality/ Morbidity (%) |
|---|---|---|---|---|---|
| Mashhad | 100,000 | 66,667 | 3,500 | 3.5 | 5.2 |
| Birjand | | 12,000 | 100 | | .8 |
| Nasratabad | | 7,000 | 120 | | 1.7 |
| Enzeli | 10,000 | | | | 2.0 |
| Mashhad-i-Sar | | | | | 10.0 |
| Tabriz | 200,000 | 100,000 | | | |
| Hamedan | 30,000 | | 1,000 | 3.3 | 10.0 |
| Tehran | 250,000 | | 2,000 | .8 | |
| Isfahan | 80,000 | | 300 | .4 | |
| Yazd | 40,000 | | 250 | .6 | |
| Bushihr | 30,000 | 15,000 | 1,500 | 5.0 | 10.0 |
| Muhammara | | 6,000 | 250 | | 4.2 |
| Shiraz | 50,000 | | 2,000 | 4.0 | |
| Kerman | 40,000 | | 4,000 | 10.0 | 10.0 |
| Bam | 13,000 | | 6,000 | 46.2 | |

*Source:* Great Britain, Public Records Office, Foreign Office, General Correspondence, 371/3892, no. 257, Percy Cox to George N. Curzon, Tehran, 8 March 1920, insert # 1, Anthony R. Neligan to Percy Cox.

## *Opium*

The cultivation of opium was traditionally one of the largest and most lucrative aspects of the Iranian agrarian economy from the mid-nineteenth century onward. In 1917–18, although production had dropped due to drought and the vagaries of war, the export, nonetheless, stood at a striking 749,482 lbs.[67] The use of opium in Iran at the dawn of the Great War was widespread, and addicts numbered in the hundreds of thousands. In 1914, it was estimated that the municipality of Tehran, alone, had 25,000 addicts (*shîrê-i*) out of a population of 250,000.[68] An estimation in 1923–24 concluded that 609,166 lbs. of opium were consumed in

67. Anthony R. Neligan, *The Opium Question with Special Reference to Persia* (London: Bale & Danielsson, 1927), p. 13. Iran's production and consumption of opium dwarfed those of Western Europe and North America, which had actively engaged in the control and regulation of the drugs in their territories through the International Opium Commission and domestic legislation. See Elizabeth P. MacCallan, *Twenty Years of Persian Opium (1908–1928): A Study* (New York: Foreign Policy Association, 1928).

68. Neligan, *Opium Question* (n. 67), p. 27.

Iran proper.[69] Certain localities were notorious for their considerable consumption, such as the city of Kerman, one of the urban centers hardest hit by the 1918 influenza: in this city of 40,000 inhabitants, there were more than 4,000 casualties, with a case mortality of 10% within the town and 7% among those who were treated in the Church Mission Society Hospital.[70] In 1925, it was estimated that out of a population of 60,000, Kerman had more than 25,000 addicts.[71]

Even among nonaddicts, opium was periodically used as a sedative tonic, as was tobacco. An observer in Iran at this time noted: "in a country where doctors are few and far between, opium is a great solace to people in pain or attacked by malaria."[72] This was particularly true for rural people, who lacked access to trained physicians and instead had to rely on household remedies or traditional practitioners. Indeed, the Iranian *hakim* readily prescribed and dispensed opium when challenged by an illness that he could not treat.[73] The use of opium was so ingrained in the culture that it was not unusual for mothers to puff opium smoke in their babies' faces to calm them, put them to sleep, or relieve them of simple teething pains.[74] More importantly, in times of famine, Iranian opium consumption would skyrocket, since it was the cheapest and most readily available crop, as well as the best means available for relieving the stomach cramps associated with acute hunger. In rural areas, peasants had especially easy access to the opium crop because most farmers had their own private opium plots for personal consumption.

Though the impact of opium use on influenza mortality is not known, studies have indicated that opium consumption was associated with significantly higher mortality rates among chronic malaria patients.[75] Therefore, the pattern of malaria-opium comorbidity could have significantly added

69. Ibid.

70. FO 371/3892, no. 263.

71. Neligan, *Opium Question* (n. 67), p. 27.

72. Anthony R. Neligan, "Public Health in Persia 1914–1924: Part III," *Lancet,* 1926, *210:* 743.

73. Edward G. Browne, *A Year Amongst the Persians* (rept. ed., Cambridge: Cambridge University Press, 1959); C. J. Wills, *Persia as It Is* (London: Sampson, Low, Marston, Searle & Revington, 1886); Rosalie S. Morton, *A Doctor's Holiday in Iran* (London: Funk & Wagnalls, 1940); Neligan, *Opium Question* (n. 67).

74. As a result it was not uncommon to find a number of emaciated and addicted children throughout Iran at this time: see Morton, *Doctor's Holiday* (n. 73); Neligan, *Opium Question* (n. 67), p. 23.

75. M. J. Dobson, "Malaria in England: A Geographical and Historical Perspective," *Parasitologia,* 1994, *36* (1–2): 35–60, on p. 52; Neligan, "Public Health in Persia: III" (n. 72), p. 743.

to the general mortality resulting from the visitation of influenza in Iran. It is not accidental that south-central Iran, the country's opium-producing region, was also hardest hit by the flu.[76] The city of Shiraz, for example, with its population of 50,000, was estimated to have lost 2,000 inhabitants to the pandemic.[77] In addition, the township of Bam had an aberrantly high mortality of 6,000 out of a total population of 13,000 (46%).[78]

## *Malaria*

> By far the most serious disease in Persia is malaria. It causes heavy mortality every year, and keeps the inhabitants of the whole districts in a low physical condition, which makes them an easy prey to other infections, such as tuberculosis, pneumonia, or influenza.[79]

Malaria, regarded as Iran's most serious health problem well into the 1950s, was endemic throughout the country. The Caspian provinces were traditionally the most heavily infected regions due to the superabundant rainfall and water supply in that area.[80] However, with the wider expansion of cultivated land in the nineteenth century, the scourge radiated to the central plateau, the Persian Gulf littoral, and Khuzestan plain in the south.[81] Surveys conducted in 1925 revealed that both Khuzestan and the northern Azarbaijan-Gilan provinces were hyperendemic foci for malaria, and a nationwide survey in 1949 showed that nearly all of Iran's territories were either hyperendemic or mesoendemic for anopheline infections.[82] At the time of the 1918 influenza visitation, malaria was especially widespread in rural areas throughout the whole Iranian plateau (see Fig. 3). This was partly due to problematic irrigation methods, which relied heavily on open and closed canals (*qanâts*) drawn from

76. FO 371/3892, no. 263; Sykes, *History of Persia* (n. 40), 2: 515.

77. FO 371/3892, no. 262.

78. FO 371/3892, no. 263.

79. Neligan, "Public Health in Persia: II" (n. 16), p. 692.

80. When Peter the Great's, and later Catherine the Great's, armies attempted an invasion of northern Iran in the eighteenth century, their troops were decimated by the "fevers" and "ague" in the Caspian Provinces of Iran and they had to give up their invasion plans.

81. M. Motabar, I. Tabibzadeh, and A. V. Manouchehri, "Malaria and Its Control in Iran," *Trop. & Geog. Med.,* 1975, *27:* 71–78, on pp. 71–74.

82. Ibid., pp. 72–73.

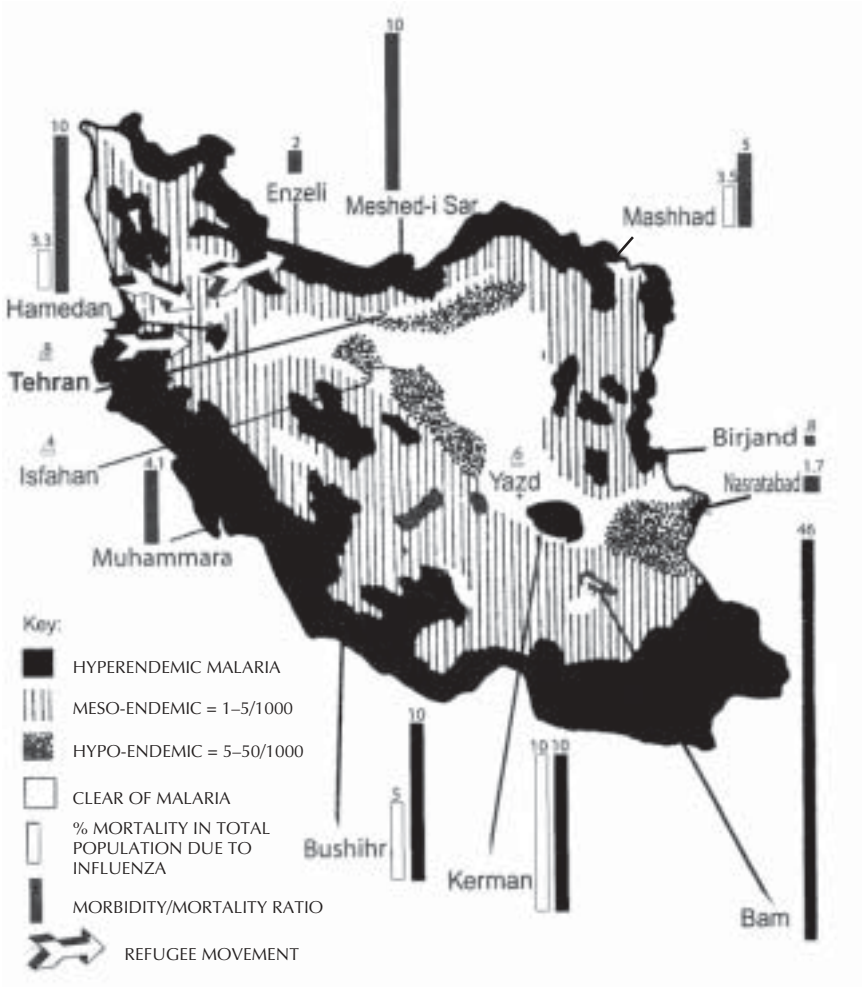


Fig. 3. Regional malaria incidence and influenza mortality correlates in Iran, 1918–1919. *Sources:* Great Britain, Public Records Office, Foreign Office, General Correspondence, 317/3892; M. Motabar, I. Tabibzadeh, and A. V. Manouchehri, "Malaria and Its Control in Iran," *Trop. & Geog. Med.*, 1975, *27:* 71–78, on pp. 71–74.

rivers: these canals often leaked, and the subsequent swamp formation provided an ideal breeding ground for anopheline mosquitoes.[83] Iran was also several decades away from engaging in any widespread public health effort to rid itself of existing swamps and eradicate breeding

83. John Gilmour, *Report on an Investigation into the Sanitary Conditions in Persia: Undertaken on Behalf of the Health Committee of the League of Nations at the Request of the Persian Government* (Geneva: League of Nations, 1925), p. 44.

grounds for the mosquitoes. The malaria vectors' extensive presence in Iran was reflected in the vast numbers of infected among the populace. One investigation conducted in the villages of northern Iran revealed that 85% to 100% of the children had enlarged spleens, a pathological sign of malaria.[84] Moreover, the same study surmised that nearly all of Iran's agricultural population was infected by malaria, and that all of these people revealed a marked state of anemia due to the illness.[85]

The interaction between the malarial infection and the influenza virus remains to be investigated. Nevertheless, there are several epidemiologic indications that point to a possible synergism between the two agents in causing increased fatalities. To begin with, narrative observations of the flu pandemic in Iran indicate that people who had malarial fevers had a substantially worse prognosis when they contracted influenza; this included refugees in northern Iran, and Indian natives in the British Expeditionary Force.[86] There was also significantly higher flu morbidity and mortality in geographic areas that were known to be hyperendemic foci for malaria (see Fig. 3).[87] For example, the town of Mashhad, located in a hyperendemic area for malaria, had a mortality rate of 3.5%, while Tehran, Isfahan, and Yazd, located in areas clear of malaria, had a mortality rate of less than 1%. Isfahan, in central Iran, probably had the mildest encounter with the pandemic, having lost an estimated 300 casualties out of a total urban population of 80,000.[88] This geographic correlation between the prevalence of malaria and the higher mortality due to influenza is striking. Moreover, this is not the only occasion of epidemiologic comorbidity between malaria and a virus.[89]

Another important association that reinforces the picture of an interaction of malaria and influenza to increase mortality is the month of

84. Ibid.

85. Ibid., p. 43.

86. "The mortality was heavy among those people who had chronic malaria" (FO 371/3892, no. 259). See also Hale, *From Persian Uplands* (n. 38), p. 237.

87. Motabar, Tabibzadeh, and Manouchehri, "Malaria and Its Control" (n. 81), pp. 72–73.

88. FO 371/3892, no. 261.

89. "The discovery of the Epstein-Barr (EB) virus in 1964 resulted from the description by Denis Burkitt of a geographically restricted tumor occurring in African children. Burkitt noted that the geographical distribution of the tumor in Africa corresponded to that of hyperendemic malaria. Because of this observation Burkitt suggested that the tumor had an infectious aetiological agent for which the mosquito was the vector" (Arie J. Zuckerman, Jehangir E. Banatvala, and John R. Pattison, eds., *Principles and Practice of Clinical Virology* [Chichester: Wiley, 1987], p. 111). See also G. Klien, "Epstein-Barr Virus, Malaria, and Burkitt's Lymphoma," *Scand. J. Infect. Dis.,* 1982, *36* (Suppl.): 15–23.

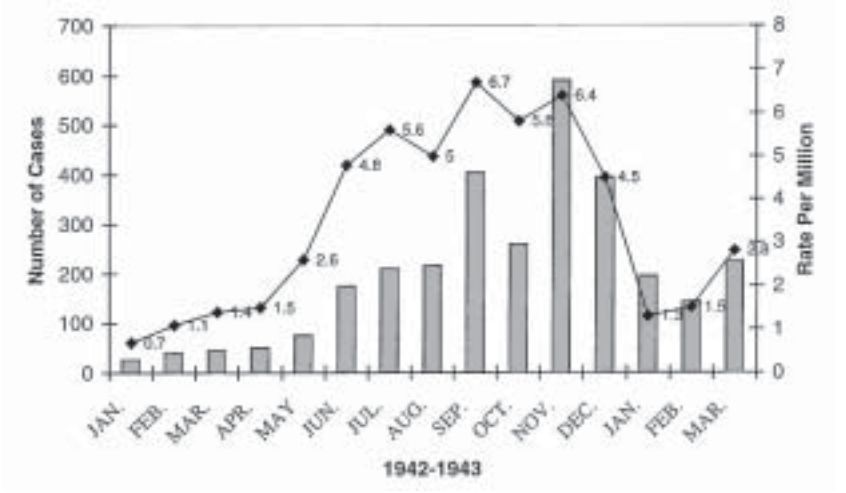


Fig. 4. Incidence of malaria in Iran, 1942–1943. *Source:* "Sanitary Strategies, 1939–45 War," Royal Army Medical Corps Muniment Collection (740/1/1), Contemporary Medical Archives Center, Wellcome Institute for the History of Medicine, London.

November, which marked the high point of mortality associated with the influenza pandemic in Iran and was also a peak period for malignant tertian malarial fevers among Iranians (see Fig. 4).[90] Though at first the malarial epidemic may seem unrelated to the second, more virulent wave of the flu, a closer examination of the geography of mortality reveals that the casualty peak moved from northern Iran (during the first wave, mortality was highest in Azarbaijan, Kurdistan, and Gilan provinces) to the central province of Fars (during the second wave). Taking into account that the age demographics in the southern and northern provinces were largely the same, and the age-specific target of the flu's second wave would therefore not have biased mortality results, it would be expected that the more virulent strain of the flu should have kept a certain degree of consistency in mortality across the country—yet by January, when the epidemic reached northern Iran and the cases of malarial fevers had decreased, the outbreak was much less lethal. This contrast in mortality is striking, and when we take into consideration the fact that the second wave of influenza maintained its virulence across the globe, it is naive to settle for the explanation that the virus might have

90. Gilmour, *Report on an Investigation* (n. 83), p. 45.

simply lost its virulence over time.[91] The only remaining explanation is that by the time the 1918 influenza had worked its way to northern Iran, the country had passed through its peak period of malarial fevers, and consequently the fatal interaction of the two pathogens could not have claimed as many lives.

## *Anemia*

The virulence of the 1918 influenza pandemic in Iran was not only determined by its geography and its interaction with other afflictions but was also mirrored in the varying ethnicity of the people affected. More than anywhere else, Iran during the Great War provides an opportunity to observe the impact of influenza on several races and cultures. The political situation in the Middle East brought in armies whose soldiers were of diverse geographic backgrounds. The British armed force in Iran, for example, was composed of European troops from the British Isles, Indian troops from the subcontinent, and Iranian levies that made up the newly formed South Persia Rifles. This multiethnic presence allowed British physicians serving with the Indian Medical Service to ascertain that fatalities due to influenza were particularly heavy among the natives of India.[92]

Unlike many other epidemic diseases, the 1918 influenza pandemic was unbiased in its selection of victims. Its airborne transmission was rapid and pervasive; preventives were futile, and prophylaxis, nonexistent. If the flu did not pick its victims based on their ethnic background, and there was no treatment available, what were the attributes that would make Indians and Iranians more likely than their European counterparts to succumb to the disease? The answer to this question can be sought in a medical report composed in 1944 regarding Indian troops serving with the British army in the Middle East during World War II. This second conflict brought to the attention of army physicians the significant problem of anemia among Indian soldiers, compared with those from the British Isles. The report in question concluded that anemia among these troops was considerable and largely independent of the environment or any chronic maladies.[93] Al-

91. I. D. Mills offers this speculation in looking at the decreasing mortality rates in the progress of influenza from the west of India to the east—though, to his credit, he does tell us that this idea has been discounted in the case of influenza in the United States. See Mills, "1918–1919 Influenza Pandemic" (n. 8), p. 13.

92. FO 371/3892, no. 259.

93. "Anaemia in Indian Troops in Painforce," Royal Army Medical Corps Muniment Collection (RAMC) 792, box 162, Contemporary Medical Archives Center at the Wellcome Institute for the History of Medicine, London.

though the study was inconclusive as to the cause of the anemia, it hinted at possible dietary reasons.[94] There is every reason to assume that the Indian troops in Iran in 1918 were as anemic as their counterparts in World War II. Anemia was also rampant among Iranians on account of the severe malaria and hookworm disease prevalent throughout the country.[95]

Two factors contributed to the severe anemia seen in people with the malarial infection: the first is that the mature malaria parasite physically destroys its host red blood cell as it matures; the second is that cytokines such as TNF-alpha, released as a result of red blood cell rupture by the parasite, suppress hematopoiesis (the production of red blood cells).[96] Hookworm infestation of the bowels, for its part, brought about post-hemorrhagic iron-deficiency anemia.[97] Consequently, it seems safe to assume that the only constitutionally unifying factor between the Iranians and Indians that set them apart from Europeans was their anemic status.

## Conclusion

The physical impact of influenza on Iran was enormous. With between 8.0% and 21.7% of its total population dead, Iran ranks as one of the countries most devastated by the 1918–19 pandemic. This experience indicates that there still remains much to learn about this elusive disease, and that there is a need for a review of some of the long-held assumptions regarding its nature. Influenza should be explored within the micro-framework of the cultural and ethnic boundaries of its victims, so as to carry debate beyond the popular "global" approach to the pandemic.[98] We also need to turn our focus away from the urban milieu and toward the more difficult arena of the rural consequences of influenza. The important role played by malaria, anemia, and other extenuating conditions that increased the mortality in Iran forces us to reassess our long-held belief that the pandemic mainly targeted the "healthy" in the urban

94. Ibid.

95. Gilmour, *Report on an Investigation* (n. 83), p. 2.

96. Gerald L. Mandell et al., *Principles and Practice of Infectious Diseases,* 5th ed., Vol. 1 (Philadelphia: Churchill Livingstone, 2000), p. 2823.

97. Ibid., p. 2942.

98. The monograph of Christopher M. Langford and P. Storey ("Influenza in Sri Lanka" [n. 8]) and that of Svenn-Erik Mamlund ("Spanish Influenza" [n. 8]) are examples of the microapproach to examining the biological impact of influenza on two completely different societies and ethnic groups. Mamlund argues that confounding factors such as wealth, height, occupation structure, and settlement patterns among minorities in Norway affected mortality and the lethality of the influenza pandemic. Langford and Storey, on the other hand, have looked at the deleterious impact of influenza on fertility rates in Sri Lanka.

milieu. This in turn demonstrates the need for exploring the conditions that may have led to the emergence of these cofactors, such as the disruption of the traditional agrarian society in Iran due to the ravages of World War I.

The Iranian experience with this outbreak also reveals that the 1918 influenza exhibited a certain distinctiveness in that country.[99] The prevalence of famine, opium consumption, malaria, and anemia, together with the country's unique ecology, were fundamentally responsible for the high mortality there. In addition, the way in which great armies abetted the transmission of influenza, and varying regional mortality rates associated with the outbreak, point to the emergence of certain biological realities within the pictorial frontiers illustrated on a map, even with a seemingly widespread and homogeneous disease such as the 1918 pandemic.[100] These traits, in turn, existed within a unique sociopolitical setting that was conducive to their emergence. Within this framework, the Iranian nation's distinctively deadly encounter with influenza becomes comprehensible.[101]

99. I have put forward a similar argument vis-à-vis the unique venues of transmission for the Asiatic cholera pandemics as they occurred in Iran during the nineteenth century: see Amir Arsalan Afkhami, "Disease and Environment in Iran: The Case of Cholera in the Nineteenth Century," in *Transformations of Middle Eastern Natural Environments: Legacies and Lessons,* ed. Jeff Albert, Magnus Bernhardsson, and Roger Kenna (New Haven: Bulletin Series, Yale School of Forestry and Environment Studies no. 103, 1998); Amir Arsalan Afkhami, "Epidemics and the Emergence of an International Sanitary Policy in Iran," *Comp. Stud. South Asia, Africa & Middle East,* 1999, *19:* 122–36 (http://www.afkhami.org/bulletin3/pdf; http://www.afkhami.org/Guarded%20Domain.pdf)

100. In recent years, the subject of national identity and issues dealing with the verity of topographic boundaries as reflections of a tangible identity have been an immense source of controversy among academics and have led to numerous publications dealing with the debate. See Peter Jackson and Jan Penrose, eds., *Construction of Race, Place, and Nation* (Minneapolis: University of Minnesota Press, 1994); Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (New York: Verso Books, 1991); Eric J. Hobsbawm, *Nations and Nationalism since 1780: Program, Myth, Reality* (Cambridge: Cambridge University Press, 1990); Eric Hobsbawm and Terence Ranger, eds., *The Invention of Tradition* (Cambridge: Cambridge University Press, 1983).

101. In a country beset by war, famines, and epidemics, the 1918 influenza pandemic came to represent just another killer among many that an embattled Iranian population had to face. However, unsuspected at the time, the flu, and especially the mortality brought about by its visitation, came to play a pivotal role in the history of public health in Iran: it was fundamentally as a result of the reports of the Spanish Flu's ravages in his country that Prince Firouz Nostrat-ed-Dowleh, minister of foreign affairs and chief of the Iranian mission to the Paris Peace Conference, initiated the efforts that led to the inauguration of the Pasteur Institute of Tehran in 1921. See Gilmour, *Report on an Investigation* (n. 83), p. 26.