

# Disease and Public Health (Ottoman Empire/Middle East)

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## Summary

From 1914-1918 infectious diseases, such as typhus, recurrent fever, dysentery, malaria, etc., took advantage of the social disruption caused by a world at war. More Ottoman soldiers perished from the deadly effects of microbes and bacteria than from bullets and bombs. By outlining the causes, geographical distribution, and mortalities from the most prevalent infectious diseases in the Ottoman context, this article highlights not only the destructive effects of infectious diseases, but also their formative consequences in terms of the state's responses to improve public health and sanitation for soldiers and civilians alike.

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## Introduction

For the [Ottoman Empire](#) the [Balkan Wars \(1912-1913\)](#) were a logistical disaster, as invisible microbes and bacteria rather than bullets and bombs decimated the [empire's](#) military. Infectious diseases — such as cholera, smallpox, and typhus — caused massive suffering and deaths among its soldiers, exposing the ineptitudes of the Ottoman military in providing the most basic [medical services](#) to its troops. To avoid a replay of that catastrophic episode in the future, the [Ottoman government](#) initiated significant reforms to its military's medical services, and articulated new public sanitation regulations in the immediate aftermath of the wars. Despite these reforms, widespread epidemics consumed Ottoman soldiers and civilians alike during the Great War that followed. Typhus, malaria, and relapsing fever, transmitted via disease-infected lice, mosquitoes, and ticks respectively, were the deadliest assailants, followed by bacterial diseases like dysentery and typhoid.<sup>1</sup> Indeed, typhus was so common

among Ottoman soldiers that it was referred to as “military fever.”<sup>2</sup> Cholera epidemics, although constantly cited as a danger lurking in water and food supplies able to wipe out large segments of the population, were largely avoided. Besides these most fatal diseases, historical sources mention [venereal disease](#) (mainly syphilis), trachoma, and occasional cases of smallpox as challenges to the empire’s medical regime. By outlining the causes, and some of the prophylactic and therapeutic measures advocated, legislated, and implemented by military and civilian medical officers, this entry highlights the reality of an overwhelming disease threat in the Ottoman Empire. The goal here is to provide a brief overview, rather than a comprehensive study, bringing out accomplishments and lacunae in the study of diseases and public health in the context of the Ottoman Empire during World War I and to inspire further research on this important subject.

In the last two decades, historians of western countries have increasingly studied the impact of diseases on both soldiers and civilians during World War I. Social and cultural historians in particular have focused on topics such as medicine and public health, and generally agree on three points.<sup>3</sup> First, the war’s mixed contribution to the medical field was marked by both breakthroughs in terms of medical knowledge and treatments, such as blood transfusions, and setbacks or at least stagnations as in the work of German pathologists.<sup>4</sup> Second, shifting the provision of medical services to favor soldiers caused disease to spread among civilians. Third, the war exposed certain “inequalities in wartime patterns of health.”<sup>5</sup> In Ottoman historiography the struggle against epidemics has long been included in a larger discourse on modernity and as part and parcel of Ottoman centralization efforts in the late-18<sup>th</sup> and 19<sup>th</sup> centuries.<sup>6</sup> And recently, a new generation of environmental historians has taken up the subject of infectious disease, challenging dominant narratives of religiously dictated fatalism in the face of epidemics in the early modern Ottoman Empire and normative understandings of historical agency.<sup>7</sup> Another related and expansive field is the history of Ottoman medicine, medical education, and science.<sup>8</sup> When it comes to the effects of infectious diseases during World War I, Ottoman historians have mainly focused on the military, and experiences with disease on the battlefields have generally overshadowed those on the home front.<sup>9</sup> Indeed, scholars have examined the Ottoman military records, and have provided detailed accounts of deaths from diseases, as well as military health and sanitation policies. The first publication mentioning the disproportionate mortality of soldiers from disease was [Ahmet Emin Yalman’s \(1888-1972\) \*Turkey in the World War\*](#) from 1930.<sup>10</sup> In the 1980s, Turkish medical historians began to pay greater attention to the typhus epidemic during the war.<sup>11</sup> More recently historians have outlined the geographic distribution of prevalent diseases, as

well as government policies in terms of prophylactic and therapeutic measures, based on Ottoman military archives.<sup>12</sup> Hikmet Özdemir's work on the Ottoman army, for example, outlines official military policies and individual soldiers' and medical officials' experiences beginning in 1914. He shows the ineffectiveness of Ottoman medical services, but does not account for any progress made in disease regulation. Oya Dağlar – beginning with the Balkan Wars – broadens the frame by including the state's legal attempts to regulate sanitation and provide medical services to both soldiers and civilians. Both studies are largely empirical and neither addresses larger questions of war, epidemics, modernity, and diseases as social agents; both also ignore civilians' experiences as well as the deadly contributions of infectious diseases to the [state's genocidal campaign](#) against its Christian minorities.

## Pre-War Public Health and Military Reforms

There is an inherent danger in linking the study of infectious diseases to war. It implies that states and societies have little reason to deal with epidemics in peacetime.<sup>13</sup> Instead, rather than being driven by war, historians have shown that in the Ottoman case public health reforms and medical progress often resulted from the desire to create a stable health environment for commerce.<sup>14</sup> Still, if one looks at the Balkan War and World War I, it is clear that war *accelerated* state intervention in regulating citizens' sanitary behavior through organized surveillance, reporting, and education. Following the disastrous experiences of the Balkan Wars, the Ottoman government invited German military advisers to aid in restructuring and improving its military in terms of mobilization and military operations. The German general, [Otto Liman von Sanders \(1855-1929\)](#), named the Inspector General to the Ottoman army, arrived in Istanbul to lead the commission on 14 December of 1913.<sup>15</sup> What the commission found was devastating. Liman von Sanders described poor or even non-existing hygiene, vermin infestations, and rampant sicknesses among the troops he inspected. There were no bathing facilities in the barracks and the military [hospitals](#) were in an appalling state. A permeating stench and overwhelming dirt met the inspector as he entered overcrowded hospital rooms. There was no separation between patients with physical injuries and those infected with diseases; men slept in the same beds or crowded on the floor; the medical personnel simply inspected the sick from afar and prescribed "mounds" of medications.<sup>16</sup> Liman von Sanders reported the misery to the Ottoman military command and issued suggestions to improve the state of affairs. His propositions were ignored, evaded, or met with outright resistance from higher officers of the military, who felt hygiene to be of minor concern. According to Liman von Sanders, it was only after [Enver Pasha \(1881-1922\)](#) became Minister of War that his advice, although at times still reluctantly, was heard. With the help of Dr. Maner, sanitary officer of the German Commission, and Chief of the Health

Directorate of the Ottoman military [Süleiman Sabri Pasha \(1873-1941\)](#), Enver and Liman von Sanders worked to improve first sanitation in the military and later to civilians.<sup>17</sup>

Among other measures, the state created municipal isolation stations and promised mobile disinfection units where needed. The reforms stipulated reporting procedures, the examination and treatment of infectious diseases, and assigned specific responsibilities to municipalities, local administrators, and physicians in case of epidemic outbreaks; it also ordered heads of households to report any suspicious illness afflicting their families.<sup>18</sup> Epidemic typhus, the most prolific killer during the Balkan Wars, received special attention from Ottoman health officials. The ministries of war and health worked together to publish an instructional manual, listing precautionary measures and sanitary guidelines to educate the public about the transmission and dangers of typhus.<sup>19</sup>

Using German military manuals as templates, the Ottomans restructured medical and sanitary services in the army, replacing 1,200 permanent physicians and medical personnel with 200 younger medical experts to meet peacetime medical needs. In case of war, personnel would be increased through conscription of civilian physicians.<sup>20</sup> The military's Chief of Staff issued small pocket pamphlets in vernacular Turkish to instruct individual soldiers in personal hygiene, but low literacy rendered this a futile effort.<sup>21</sup> Moreover, the government distributed educational materials to military physicians, emphasizing correct diagnosis through the use of microscopes to analyze blood.<sup>22</sup> This was important since the initial symptoms of typhus in particular, such as headaches, muscle pain, cough, chills, and high fever, could easily be mistaken for those of the common flu or relapsing fever, and only recognized when the patient began to suffer from severe diarrhea and a dull red rash.<sup>23</sup>

## Wartime Predicaments: Movement, Crowding and Lack of Hygiene

Although there seemed to be appropriate mechanisms for prevention, reporting and personnel recruitment in place before the war, the government never fully put them into practice. Health conditions in villages, towns and cities remained unstable, even if by 1914 "municipal laws were perfect on paper."<sup>24</sup> The constant threat of epidemics after November 1914 increased pressure on officials to implement these new and other ad hoc regulations. However, this proved far more difficult than anticipated before the war and seemingly impossible during the war.

Disease posed a problem on all Ottoman fronts; their prevalence depended on climate and

the particular circumstances at the frontlines. Typhus, for example, played a significant role in decimating the 3<sup>rd</sup> Army during the campaign against Russia led by Enver in January of 1915. While the climate in the Caucasus exacerbated the spread of typhus, this “winter disease” posed a problem on all fronts and especially where crowded and unsanitary circumstances facilitated the spread of lice. Malaria was most common in warmer climates and was the most frequent cause of sickness in soldiers stationed in Mesopotamia and [Gallipoli](#). Deaths from bacterial disease, caused by consuming contaminated water or food, or else through oral contact with exposed utensils or drinking vessels, peaked among troops of the 3<sup>rd</sup> Army fighting in Palestine during March and April of 1915. The situation at the Gallipoli front was especially bad not only because the surrounding regions’ environment (such as marshes) was a breeding ground for malaria, but also because the soldiers were housed in abhorrent conditions; the barracks had no bunk beds and soldiers slept crowded on the floor. Moreover, a general shortage of water, a lack of water pumps, inadequate field toilets and innumerable flies swarming around them proved to be a deadly combination. Flies easily transmitted microbes and bacteria, contaminating water and food supplies and causing an epidemic outbreak of dysentery in May 1915. The worst were the green ugly “corpse flies” which feasted on the bodies left on the battlefield. The inability to bury fallen soldiers, as fighting was continuous, constituted another problems. The decaying corpses covered in flies quickly became cesspools of diseases.<sup>25</sup> Being a soldier at Gallipoli, no doubt, meant fighting not only a human enemy, but also an invisible and perhaps more dangerous one. It was an enemy – albeit tiny in appearance – that reigned supreme, as the only weapons against it, i.e. adequate hospital beds, medical staff and medicine, were in short supply.

Besides unbearable conditions on the fronts, wartime movement, resulting in overcrowding and lack of hygiene, continuously handicapped Ottoman efforts. Even in the military, as we will see, the sanitary improvements crumbled under the pressure of war. Soldiers, deserters, civilian [refugees](#), and deportees on the move often carried with them microbes, bacteria, and typhus-infected lice. The empire’s poor infrastructure contributed to the spread of disease. Limited trains to and from the fronts were often packed to capacity, meaning that common soldiers and microbes were crammed under unsanitary conditions into freight cars over long stretches of time. Passenger train upholstery generally turned into breeding grounds for lice.<sup>26</sup> The fact that soldiers often had to march to and from the front made it difficult for Ottoman sanitary officials to maintain adequate hygiene.<sup>27</sup> It was during these marches that soldiers would at random mingle with civilians, picking up or leaving behind germs and microbes. Military transfer centers were a particular challenge for Ottoman health officials. Here soldiers slept crowded on the floor, making it nearly impossible to prevent louse-borne diseases, such as typhus and relapsing fever. This was made worse by the fact that the chaos

of incoming and outgoing troops often caused sanitary precautions to be neglected.<sup>28</sup> In addition, demobilization and post-battle chaos meant that soldiers were outside of the military's sanitary regime.<sup>29</sup> After defeats in the Caucasus, for example, soldiers swept into towns and villages, simultaneously spreading and contracting typhus-infected lice. Once infested, getting rid of lice was nearly impossible, triggering a typhus epidemic of unprecedented proportion. The large number of deserters roaming the countryside and hiding in villages constituted yet another group falling outside the military's sanitary regime.<sup>30</sup>

Large numbers of displaced civilians added pressure to the empire's health concerns. Refugees and deported [minority populations](#) not only were exposed to diseases, but also contributed to their dissemination. For instance, refugees from Russian-conquered territories carried cholera into the empire. Although the Ottomans tightened control of their borders, infected refugees continued to slip past. Often civilians followed the defeated Ottoman army as it withdrew from the fronts, creating a post-battle chaos conducive to the spread of diseases. However, the most vulnerable group was the empire's forcefully deported Christian, mainly Armenians, minorities. Using war as justification, the [Committee of Union and Progress](#) (CUP) government – partially driven by its nationalist desire to homogenize Anatolia – sought to rid its eastern provinces of unwanted minorities, launching a full-fledged [genocide](#) in April 1915.<sup>31</sup> The deportation of men, women and children toward the Syrian Desert was part of this process. The marches were dire, as the government neither guaranteed the deportees' security, nor their adequate hygienic conditions, medical care, or preventative vaccinations. Frequent attacks by armed bands, the extreme climate, and illnesses all but guaranteed death and destruction for the deportees. Eventually, “rotting corpses on the side of the roads” became breeding grounds for disease, posing a great health risk for deportees and local populations alike. For example, local village and town officials wrote complaints to Ottoman officials when a typhus epidemic wreaking havoc among Armenians reached villages along the deportation routes.<sup>32</sup> To deal with the crisis, officials in the north often threw corpses into the Tigris and Euphrates, thus creating large problems downstream.<sup>33</sup>

Many of the deportation convoys passed through transit camps, which would immediately turn into hotbeds of epidemic. A German missionary described the deplorable sanitary situation in one of the camps as follows:

Right at the entrance a heap of dead bodies lay unburied...in the immediate neighborhood of the tents of those who were down with virulent dysentery. The filth in and around these tents was something indescribable. On one single day the burial committee buried as many as 580

people.<sup>34</sup>

Unable to contain diseases in the camps, the Ottomans decided to disband them and sent deportees further south. Still the government made no provisions in terms of proper shelters, clean water, or food supplies for survivors arriving in Syria, resulting in larger numbers of deaths. For example, about fifty to seventy people died daily of typhus and typhoid fever in Aleppo by mid-June 1915.<sup>35</sup> A German eyewitness recounts the desperate situation among survivors who lived in crowded and filthy makeshift shelters in Aleppo:

In run-down caravansaries [khans], I found piles of putrefying dead bodies and among them, people still alive on the point of breathing their last. In other places I found piles of sick and starving people left to fend for themselves [...] Most were suffering from typhus or dysentery.

<sup>36</sup>

Since Aleppo was a major transfer center for Ottoman troops, the epidemic could not be ignored. Consequently, the Commander of the 4<sup>th</sup> Army, [Cemal Pasha \(1872-1922\)](#), had no choice but to approve a plan to build a hospital in the city, specially designated for the treatment of Armenian survivors.<sup>37</sup>

In addition to population movements and resulting unsanitary conditions, the lack of medical staff both on the battle and the home fronts posed another challenge.<sup>38</sup> The number of physicians (2,555) serving in the Ottoman army was inadequate to begin with, considering that the number of active soldiers at times reached 1.2 million.<sup>39</sup> The problem was exacerbated when somewhere between 215 and 349 physicians and pharmacists died while serving in the army; most of them succumbed to the diseases they sought to treat.<sup>40</sup> Despite efforts to train new physicians, conscript medical students, and call older physicians back from retirement, medical staff shortages continued to be felt throughout the war. In cities like Beirut, the municipal authorities tried to remedy these shortages by asking the remaining physicians to hold additional office hours and ordering pharmacies to operate on a rotating emergency schedule. Still, this did little to ameliorate the situation.

## Disease Mortalities

The high number of disease mortalities among soldiers and civilians confirm the Ottomans' incapacity, and in the case of its minority population unwillingness, to deal with wartime exigencies.<sup>41</sup> A medical report of all nine armies and enlistment stations shows the total number of military casualties of the Ottoman army as 771,844,<sup>42</sup> 466,759 of whom died of

illnesses and 68,378 from battle wounds.<sup>43</sup> Özdemir provides more detailed information from military hospital records, which partially reveal the geographical distribution of disease mortalities among soldiers. The hospitals close to the Eastern Anatolian fronts reported the largest number of sick admitted, followed by those in Syria. The hospitals in the Balkans and on the Arabian Peninsula reported the lowest numbers of admittances. Deaths from diseases are distributed along similar lines.<sup>44</sup> Still, these numbers have to be read with caution, since they only reflect the sick and wounded admitted to military hospitals, include multiple admissions, and neither considers the number of deployments nor the duration of campaigns. The types of prevalent diseases at the various fronts (some were more deadly than others), and the availability of medical facilities near the various fronts should also be taken into account. A more detailed study for example would explain why a much larger percentage of men died of diseases during the Arabian and South Arabian campaigns (25 percent) and the Caucasus campaign (18 percent), compared to the relatively smaller number of disease victims in the Syrian and Palestine campaigns (8 percent).<sup>45</sup> When it comes to civilian deaths we only have vague numbers. These range from 2,000,000<sup>46</sup> to 2,150,000,<sup>47</sup> including 1.2 million Armenians.<sup>48</sup> How many of them died as the direct result of diseases is impossible to determine.

## Treatment and Public Health Measures

The devastating effects of louse-born epidemics in the eastern provinces among soldiers and civilians forced the Ottoman Interior and Health Ministries to organize an anti-disease campaign. Initially few provisions had been made to deal with hygiene at the front or in training camps. Not only did the military medical corps have limited stationary and mobile sterilization machines, but also quarantining soldiers during battle was simply impractical. Moreover, shortages in microscopes and medication undermined proper diagnosis and treatment.<sup>49</sup> As the war continued, the Ottoman authorities tried to increase medical services to soldiers, as well as the number of hospitals, and launched a systematic campaign against lice, including regular inspections and disinfection of soldiers' bodies.<sup>50</sup> In the absence of a vaccine against typhus, health officials focused on precautionary measures such as cleanliness and frequent disinfection. By 1917, transfer centers, soldiers' living quarters, and exercise grounds were regularly disinfected, and mobile disinfection units were dispatched to where they were needed. Each unit kept detailed records of illnesses among its troops and forwarded their reports to the military's Sanitary Office.<sup>51</sup> Moreover, health officers and medical staff were instructed to educate the public about typhus and the dangers of lice, and to work in collaboration with civilian institutions.

When typhus outbreaks were reported among civilians in Jerusalem, Aleppo, Damascus and Beirut, municipal officials took up the desperate fight against lice. Municipal physicians inspected the houses of infected people and issued certificates of cleanliness, which the police could demand at any given moment.<sup>52</sup> Officials warned civilians away from visiting hospitals, mixing with soldiers, using congested tramways, and gathering in public places; they published preventative guidelines and urged people to isolate their sick in their homes. To ward off lice officials asked civilians to keep their hair short, carry a tin of naphthalene in their pockets, and apply mercury ointment to collars and places where lice could sneak under people's clothing. The Istanbul municipal Health Directorate declared admittance to public baths free of charge.<sup>53</sup>

Bacterial diseases like dysentery, typhoid and cholera called for a different set of preventative measures. When a sizable cholera outbreak affected a number of Anatolian cities in November 1915, health officials took immediate measures, including the review of vaccines, evacuation of unsanitary barracks, isolation of cholera patients, travel moratoriums, strict food supply controls, and border controls.<sup>54</sup> Since water was easily contaminated, health officials regularly tested water supplies.<sup>55</sup> Improperly disposed feces of sick individuals could mean that bacteria would leak into the ground water, spoiling wells, or that flies could transfer bacteria onto food and water supplies. Hence, officials trained troops in the building and maintenance of proper field toilets. The municipal health directorates instructed civilians to cover up their cisterns, drain stagnant water, boil it before use, isolate infected individuals, disinfect their utensils and drinking vessels, bury the excrements of patients far from water sources, and not to eat raw vegetables. To prevent the spread of malaria health officials urged that nets be hung in front of doors and windows, and that manure be burned to keep mosquitoes at bay.<sup>56</sup>

Faced with the constant threat of disease, Ottoman health officials organized an empire-wide vaccination campaign. Vaccination had been a regular practice before the war. The Imperial Medical School in Istanbul had a vaccination office, and its laboratory produced vaccines against cholera, smallpox, typhoid fever, and dysentery. The laboratory was equipped to analyze and diagnose infectious diseases and experts gave regular lessons in bacteriology. As the demand for serums increased during the war, the government opened additional laboratories and distributed vaccines free of charge to hospitals and vaccination stations throughout the empire.<sup>57</sup> The Imperial Health Directory ordered soldiers to be vaccinated against smallpox, cholera, and typhoid fever, and to carry vaccination cards at all times.<sup>58</sup> Moreover, the government made an effort to offer vaccinations to civilians, and, through local municipal agents, regularly announced the hours and locations of government-sponsored

vaccination stations.<sup>59</sup> Even so, vaccinations were often administered improperly or not recorded on soldiers' identity cards. As I mentioned above however, medical treatments against diseases like malaria were limited. Quinine, the only anti-Malarial medicine known at the time, was in short supply due to the maritime blockade, and pharmacies were often overwhelmed with orders.<sup>60</sup> Still soldiers in high-risk areas received tablets twice a week.<sup>61</sup>

The government worked to increase the number of hospitals and absorbed some existing health institutions with the goal of expanding services to the military. The military leadership, for example, arranged for mobile hospital units for every Corps situated near the battlefronts (at least on paper) and expanded existing hospitals near the fronts.<sup>62</sup> At times the [Red Crescent Society](#) supported these official efforts by adding significant numbers of hospital beds to those provided by the government, opening convalescent units, producing and distributing vaccinations, and treating wounded and sick soldiers and civilians, and assisting refugees as much as they could.<sup>63</sup> In addition, the German and the American [Red Cross](#) sent physicians to work in Ottoman hospitals, providing bacteriology laboratories and aiding the Ottomans in providing medical services to civilians.<sup>64</sup>

## Conclusion

Overall, faced with an onslaught of infectious diseases, the Ottoman state sought to improve sanitary conditions and expand its medical services to both civilians and military personnel. Wartime predicaments such as the massive movements of human bodies, chaos, and overcrowding, made it difficult to implement precautionary measures. The outcome was a vast number of deaths. Still, some campaigns like the anti-lice measures, after which typhus cases decreased in the military records, and the fact that large-scale cholera and smallpox epidemics were avoided, both account for some – albeit minimal – success in state intervention.

To understand the full extent of epidemics in the Ottoman Empire during World War I, future study will need to move beyond the confines of the military, the experiences of the individual soldiers, and official legal measures, and include Ottoman civilians' encounters with epidemic. After all, disease vectors – lice, rats, mosquitoes – and various microbes and bacteria made no distinctions between soldiers and civilians. Studying the civilian experiences across the large territorial span of the empire is not an easy task and perhaps warrants a collective effort, as sources are fragmented and scattered. It will also necessitate a clear methodological shift away from military archives, and toward memoirs, diaries, diplomatic and missionary correspondence, the local press, the reports of local civilian

officials, and municipal and local hospital records wherever available.<sup>65</sup> Furthermore, such studies would greatly benefit from taking into account the historical agency of microbes, bacteria and insects. There is no doubt that such organisms competed with humans for living space, crossing the invisible boundaries between battle and home fronts, and rendering human action simply reactionary and defensive. Indeed there is no area where the totalizing character of World War I is more evident.

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## Notes

1. See: Dağlar, Oya: War, Epidemics and Medicine in the Late Ottoman Empire (1912-1918), Haarlem 2008, pp. 149ff and 223; Yalman, Ahmet Emin: Turkey in the World War, New Haven 1930, p. 253; Özdemir, Hikmet: The Ottoman Army, 1914-1918. Disease and Death on the Battlefield, Salt Lake City 2008, pp. 55, 62, 84-87. ↑
2. Cases of epidemic outbreaks were reported during the Crimean War (1853-1856), the Russo-Turkish War (1877-78), the Greco-Turkish War (1897), and during the Balkan Wars (1912-1913). Typhus, it seems, was not as common among civilians and only occurred sporadically. For example, a number of typhus cases occurred in the Istanbul Hospital for Infectious Diseases in May of 1913, and cases were reported occasionally in the Eastern Anatolian provinces. Tanielian, Melanie Schulze: The War of Famine. Everyday Life in Wartime Beirut and Mount Lebanon (1914-1918), Ph.D. diss., University of California, Berkeley 2012, p. 89; Özdemir, The Ottoman Army 2008, p. 23. ↑
3. For a discussion on the spread and prevention of venereal diseases among the soldiers of belligerent nations see: Bristow, Nancy K.: Making Men Moral. Social Engineering during the Great War, New York 1996. ↑
4. For the history of blood transfusion see: Schlich, Thomas: "Welche Macht über Tod und Leben!"- Die Etablierung der Bluttransfusion im Ersten Weltkrieg, in: Eckart, Wolfgang U. / Gradmann, Christoph (eds.): Die Medizin und der Erste Weltkrieg, Pfaffenweiler 1996. For more on German pathology in World War I and its continued reliance on morbid anatomy in neglect of experimental work see: Prüll, Cay-Rüdiger: Die Sektion als letzter Dienst am Vaterland. Die deutsche "Kriegspathologie", in: Eckart, Wolfgang U. / Gradmann, Christoph (eds.): Die Medizin und der Erste Weltkrieg, Pfaffenweiler 1996. ↑
5. For example, studies of infectious diseases and public health in the European capitals show the disproportionate suffering of elderly and children from respiratory diseases. See: Rollet, Catherine: The 'Other War' I. Protecting Public Health, in: Winter, J. M. / Robert, Jean-Louis (eds.): Capital Cities at War. Paris, London, Berlin 1914-1919, Cambridge 1997, p. 456. ↑

6. It is clear from these works that the Ottoman state – at times responding to needs of the military but not always – introduced and legislated new hygienic practices and medical knowledge with the overall goal of creating a healthy and stable environment to facilitate trade and state security. In response to urbanization, increasing population, war and to secure economic growth and investment, Ottoman, local and foreign officials, merchants, and medical experts negotiated, debated, and at times implemented public health measures. Birsen Bulmuş, for example, argues that the efforts had not only a medical function but also an economic one. Adopting “an infectionist view of the plague and other epidemic diseases,” the state made plans to construct new water and sewage systems, and hospitals, and introduced measures to police the urban poor and pilgrims. The state tended to delegate much of the sanitary measures to provincial municipal and administrative councils, while simultaneously expanding its interventionism through legal measures. For example, in a 1908 imperial edict the state took on the responsibility of inspecting, repairing, and rebuilding sewers and even private homes because they did not meet sanitary standards. In addition, the period leading up to the war saw an increase in medical education, publication of medical journals, the construction of hospitals, and the creation of vaccination centers, particularly in the capital. Panzac, Daniel: *La peste dans l’Empire Ottoman. 1700-1850*, Leuven 1985; Kuhnke, LaVerne: *Lives at Risk. Public Health in Nineteenth-Century Egypt*, Berkeley 1990; Gallagher, Nancy E.: *Egypt’s Other Wars. Epidemics and the Politics of Public Health*, Syracuse 1990; Bulmuş, Birsen: *Plague, Quarantines, and Geopolitics in the Ottoman Empire*, Edinburgh 2012. ↑
7. For two excellent examples of new trends in environmental history see: White, Sam: *Rethinking Disease in Ottoman History*, in: *International Journal of Middle Eastern Studies*, 42/4 (2010), pp. 549-567; Mikhail, Alan: *Nature and Empire in Ottoman Egypt*, New York 2011. Also see: Mitchell, Timothy: *Can the Mosquito Speak?*, in: Mitchell, Timothy: *Rule of Experts. Egypt, Techno-politics, Modernity*, Berkeley 2002, pp. 18-51. This essay is a must read when considering epidemics and movements of microbes and bacteria. ↑
8. For more on the medical history of the Ottoman Empire see: Moulin, Anne Marie / Ülman, Yeşim Işıl (eds.): *Perilous Modernity. History of Medicine in the Ottoman Empire and the Middle East from the 19th Century Onwards*, Istanbul 2010. Gadelrab, Sherry Sayed: *Medical Healers in Ottoman Egypt, 1517–1805*, in: *Medical History* 54/3 (2010), pp. 365–386; Yilmaz, Coskun / Yilmaz, Necdet (ed.): *Osmanlılarda Sağlık. Health in the Ottomans*, Istanbul 2006. Miri Shefer-Mossensohn has written extensively on the subject. See for example: Shefer-Mossensohn, Miri: *Health as a Social Agent in Ottoman Patronage and Authority*, in: *New Perspectives on Turkey*, 37 (2007), pp. 147-175; Shefer-Mossensohn, Miri: *Ottoman Medicine. Healing and Medical Institutions*,

- 1500-1700, Albany 2009. ↑
9. The reason for this might partially be that more soldiers died of diseases than of battle wounds. See for example: Erickson, Edward: *Ordered to Die. A History of the Ottoman Army in the First World War*, Westport 2001; Zürcher, Eric J.: *Between Death and Desertion. The Experience of Ottoman Soldier in World War I*, in: *Turcica*, 28 (1996), pp. 235-258; Zürcher, Eric J.: *Arming the State. Military Conscription in the Middle East and Central Asia, 1775-1925*, London 1999, p. 91; Zürcher, Erik Jan: *Turkey. A Modern History*, London 1998, p. 191. ↑
  10. Yalman, *Turkey in the World War 1930*. ↑
  11. See for example the short article on typhus in the military during the First World War by Unat, Ekrem Kadri: *Birince Dünya Harbinde Türk Ordusunda Tifüs Savaşı*, in: *Cerrahpaşa Tıp Fakültesi Dergisi*, 20, Istanbul 1989, pp. 255-263. ↑
  12. Most importantly, Özdemir, *The Ottoman Army* 2008; and Dağlar, *War, Epidemics and Medicine* 2008. Both these studies are based on official military regulations, military hospital records, reports of military physicians and health officials from the Turkish military archives. ↑
  13. Tanielian, *The War of Famine* 2012, p. 77. ↑
  14. See for example the above-mentioned study of Daniel Panzac. ↑
  15. Von Sanders, *Otto Viktor Karl Liman: Fünf Jahre Türkei*, Berlin 1919, p. 12. ↑
  16. *Ibid.*, p. 22. ↑
  17. *Ibid.*, p. 23. ↑
  18. The two legislations published in 1913 were the “Regulation on the Sanitary Administration of Cities” and the “Regulation on Contagious and Epidemic Diseases.” Combined, these measures prescribed reporting mechanisms as well as treatment—accompanied by isolation and quarantine of the individual, the house, or the entire city quarter. See: Dağlar, *War, Epidemics and Medicine* 2008, pp. 126-128. For an account of how this played out on the ground see the story of the Dandan family in Beirut recounted in: Tanielian, *The War of Famine* 2012, pp. 70f. ↑
  19. The Guidelines for Disinfection Precaution to be Applied against Typhus and on Prevention of its Spread (1914) was published in the press and posted in public spaces. Dağlar, *War, Epidemics and Medicine* 2008, p. 127. ↑
  20. The “Law on the Liabilities of Physicians” issued on 20 July 1914, articulated the details of the recruitment process. According to this law all civilians involved in the medical field, i.e. doctors, pharmacists, nurses, etc., had to register with their local authorities to facilitate conscription. *Ibid.*, pp. 121-125. ↑
  21. The booklets eventually were only given to lower ranking officers who would in turn teach their men. ↑
  22. The manual was titled “Protection and Treatment of Epidemic Diseases during

- Campaign.” Ibid., pp. 121-125. ↑
23. For a discussion on the symptoms of typhus, etc. see: Kelly, Daryl, et al. (eds): *The Past and Present Threat of Rickettsial Diseases to Military Medicine and International Public Health*, in: *Clinical Infectious Diseases*, 34 (2002), pp. S145-S169. ↑
  24. A pre-war study of health in the eastern provinces, for example, concluded that 60 percent of the villages examined were “unhealthy.” Yalman, *Turkey in the World War 1930*, p. 81. ↑
  25. The fighting parties, having become aware of the danger, agreed to a nine-hour cease-fire on 22 March to bury their dead. Özdemir, *The Ottoman Army 2008*, p. 67-72. ↑
  26. Tanielian, *The War of Famine 2012*, p. 75. ↑
  27. For example, the provision of facilities for washing and cleaning soldiers’ clothes was very difficult during these marches. ↑
  28. Istanbul was especially vulnerable, since it served as a hub for demobilized soldiers who were to be redeployed to other areas of the empire. In addition, since it was the main medical center, sick and wounded soldiers flooded the city’s hospitals. The influx meant that the hospitals were overcrowded, and triggered an order to halt the transfer of wounded and sick to the capital. Özdemir, *The Ottoman Army 2008*, p. 74. ↑
  29. A typhus epidemic broke out in Thrace at the end of the war as soldiers moved to their homes and spread the diseases to civilians. Dağlar, *War, Epidemics and Medicine 2008*, p. 235. ↑
  30. For a discussion of deserters see: Zürcher, *Between Death and Desertion 1996*, passim. ↑
  31. For a causal explanation of the Armenian Genocide see: Bloxham, Donald: *The Great Game of Genocide. Imperialism, Nationalism, and the Destruction of the Ottoman Armenians*, Oxford 2005; Akçam, Taner: *The Young Turks’ Crime Against Humanity. The Armenian Genocide and Ethnic Cleansing in the Ottoman Empire*, Princeton 2012. ↑
  32. For a detailed account on the deportations see: Kévorkian, Raymond H.: *The Armenian Genocide. A Complete History*, London 2011, pp. 631 ff. ↑
  33. Ibid., pp. 632 f. ↑
  34. An estimated 60,000 people died of starvation or of typhus in this particular camp from August 1915 to the spring of 1916. During a deadly typhus epidemic in the camp near Bab, 400-500 people died daily from the disease aggravated by starvation and complete lack of medical attention from the state. Ibid., p. 633. ↑
  35. The German Consul Roessler reported this number. Ibid., p. 638. ↑
  36. This description comes from the German Dr. Martin Niepage. Ibid., p. 640. ↑
  37. Ibid., p. 643. ↑
  38. For example, the largest proportion of troops in the 3rd Army were stationed in and around the city of Erzerum. The city was overwhelmed by the influx of wartime

- casualties, as the local hospital could only account for 900 beds. The hospitals in Trabzon as well were crowded with sick troops. Özdemir, *The Ottoman Army* 2008, pp. 51, 53. ↑
39. No doubt that the ratio of physicians to soldiers was extremely high, foiling proper medical care. Yalman, *Turkey in the World War* 1930, p. 252. ↑
40. The highest number is given by the Ottoman General Staff, whereas the lesser number was the result of a study conducted by Dr. Mazhar Osman (1884-1951). Both quoted in: Dağlar, *War, Epidemics and Medicine* 2008, pp. 255 f. ↑
41. Out of those, 1,202 were active and the remaining were reserve surgeons. Yalman, *Turkey in the World War* 1930, p. 252. ↑
42. This number includes 61,487 men missing in action. See: Erickson, *Ordered to Die* 2001, p. 211. ↑
43. Ahmet Emin Yalman first published estimated disease mortalities based on a report issued by the medical department of the Ottoman Ministry of War in 1930. These numbers have subsequently been confirmed and republished as authoritative by scholars since. The total number of men reported sick was 3,515,471, compared to the 763,753 reported wounded. Yalman, *Turkey in the World War* 1930, p. 252; Dağlar, *War, Epidemics and Medicine* 2008, p. 254; Erickson, *Ordered to Die* 2001, p. 241; Özdemir, *The Ottoman Army* 2008, p. 122. ↑
44. Hospitals in Anatolia had the highest number of admittances (1,006,269) followed by those at the Syrian (788,135), Gallipoli (354,634), Iraqi (217,609), and Balkans fronts (47,955), as well as those located on the Arabian Peninsula (16,909). Deaths reported followed a similar distribution: Eastern Anatolia (183,794), Syria (65,205), Gallipoli (44,407), Iraq (33,247), Arabian Peninsula (4,233), and the Balkan front (2,219). Özdemir, *The Ottoman Army* 2008, p. 124. ↑
45. Military historians have written myriad accounts on the various military campaigns mainly based on documents from the entente archives. For such description of the South Arabian campaign (1914-1916), for example, see: Connelly, Mark: *The British Campaign in Aden, 1914-1918*, in: *Journal of the Centre for the First World War Studies*, 2/1 (2005), pp. 65-96. For the Arabian campaign or Arab Revolt (1916-1918) see: Murphy, David: *The Arab Revolt 1916-1918. Lawrence sets Arabia Ablaze*, Oxford 2008. For the Palestine Campaign see: Bruce, Anthony: *The Last Crusade. The Palestine Campaign in the First World War*, London 2002. For Ottoman military historians who account for the Ottoman experience see: Erickson, *Ordered to Die* 2001. ↑
46. Ellis, John/Cox, Michael: *The World War I Databook. The Essential Facts and Figures for all the Combatants*, London 2001, p. 273. ↑
47. Gray, Randal/Argyle, Christopher: *Chronicle of the First World War*, New York 1990, p. 292. ↑

48. The number of victims is disputed and the lack of sources in general makes it difficult to come up with concrete numbers. The estimated 1.2 million deaths is cited in: Dadrian, Vahakn: *The Turkish Military Tribunal's Prosecution of the Authors of the Armenian Genocide. Four Major Court-Martial Series*, in: *Holocaust and Genocide Studies*, 11/1 (1997), pp. 28-59. ↑
49. The Ministry of War did little planning to provide medical services to the Caucasus campaign (1914-1918). As of 3 March 1915, "no medical services can be properly provided due to the lack of all kinds of preventive medical measures" [...] and is "perishing the Ottoman soldiers in unbelievably great numbers." Özdemir, *The Ottoman Army* 2008, p. 54. ↑
50. The fact that the military lacked hospital beds, leading to overcrowding, made hospitals a breeding ground for diseases. For example, the 3rd Army consisted of 189,000 soldiers, but only 1,800 hospital beds had been prepared near the front and another 4,650 behind it. As fighting began, the hospitals soon were overcrowded and generally filthy. The German Consul of Trabzon reports that "all hospitals in the town are full of patients with spotted typhus. That infectious disease has created a real disaster here; of the 900-1000 ill soldiers, 30-50 are dying each day." As quoted in Özdemir, *The Ottoman Army* 2008, p. 53. ↑
51. *Ibid.*, p. 164. ↑
52. Yalman, *Turkey in the World War* 1930, p. 115. ↑
53. Soldiers were prohibited from riding streetcars and the municipal council created a special service for the troops. But still the streetcars were congested, i.e. an ideal place for lice to crawl from one host to the next. Tanielian, *The War of Famine* 2012, pp. 91-101. ↑
54. The cities affected were Bayburt, Trabzon, and Erzerum. Özdemir, *The Ottoman Army* 2008, p. 152f. ↑
55. *Ibid.*, p. 86. ↑
56. *Ibid.*, p. 233. ↑
57. Dağlar, *War, Epidemics and Medicine* 2008, p. 153. ↑
58. *Ibid.*, p. 125. ↑
59. Tanielian, *The War of Famine* 2012, p. 103. ↑
60. Ajay, Nicholas: *Mount Lebanon and the Wilayah of Beirut, 1914-1918. The War Years*, Ph.D. diss., Georgetown University, Washington, D.C. 1973, p. 420. ↑
61. Dağlar, *War, Epidemics and Medicine* 2008, p. 233. ↑
62. The already existing hospitals in the Caucasus and on the Gallipoli Front were expanded. *Ibid.*, p. 131f. ↑
63. For details on the activities of the Red Crescent see: *Ibid.*, p. 134. ↑
64. For example, during the first Suez Campaign the American Red Cross set up a mobile

hospital for wounded Ottoman soldiers. The German Red Cross provided a well-supplied bacteriology laboratory to be run by a Dr. Bentmann, who was appointed as the Chief of Anatolian Laboratory for Contagious diseases. Bentmann issued monthly reports that supply important information on infectious diseases in the Anatolian provinces. The German support of the Ottomans in dealing with diseases also included the German Hygiene Institution in Aleppo that provided some services in the city, which was affected by infectious diseases. Ibid., pp. 124-125. ↑

65. In my own work – a bottom up history of the war in Beirut and Mount Lebanon – I rely on such sources in order to outline the effects of epidemics beyond the military. Tanielian, *The War of Famine* 2012, passim. ↑

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