Chapter Eight

Camp Follower: Tuberculosis in World War II

President Franklin Delano Roosevelt proclaimed a "limited national emergency" on 8 September 1939, a week after Germany invaded Poland. But due to underfunding during the interwar period, one observer wrote that, "to prepare for war the Medical Department had to start almost from scratch."[1] Given the lean years of the 1920s and 1930s and the Army Medical Department's policy of discharging officers with tuberculosis from duty, Surgeon General James C. Magee had to turn to the civilian sector for a tuberculosis expert. He recruited Esmond R. Long, M.D., Ph.D., director of the Henry Phipps Institute for the Study, Prevention and Treatment of Tuberculosis in Philadelphia. He could not have made a better choice. Long was also professor of pathology at the University of Pennsylvania, director of medical research for the National Tuberculosis Association, and the youngest person to be awarded the Trudeau Medal at age forty-two years (in 1932) for his tuberculosis research.[2] He would now become the Army's point man on the disease and stand at the front lines of the Medical Department's struggle with tuberculosis beginning before Pearl Harbor to well after V-J (Victory-Japan) Day.

His mission to reduce the effect of tuberculosis on the Army differed from that of Colonel (Col.) George Bushnell in the previous war because disease was less of a threat. In fact, World War II would be the first war in which more American personnel died of battle wounds than of disease. Of 405,399 recorded fatalities, battle deaths outnumbered those from disease and nonbattle injuries more than two to one: 291,557 to 113,842.[3] Malaria, sexually transmitted diseases, and respiratory infections did sicken millions of soldiers, sailors, Marines, and airmen, but most survived. Thanks in part to sulfa drugs and, beginning in 1943, penicillin to treat bacterial infections, the Army Medical Department had only 14,904 deaths of 14,998,369 disease admissions worldwide, a 0.1 percent death rate.[4] Tuberculosis declined, too, representing only 1 percent of Army hospital admissions for diseases—1.2 per 1,000 cases per year—a rate much lower than the 12 per 1,000 cases per year during World War I. The Medical Department concluded that "tuberculosis was not a major cause of non-effectiveness during the war."[5]

But Sir Arthur S. McNalty, chief medical officer of the British Ministry of Health (1935–40), called tuberculosis "one of the camp followers of war." War abetted tuberculosis, he explained, because of the "lowering of bodily resistance and increased physical or mental strain or both."[6] It also found fertile ground in crowded barracks and camps, and ran rampant in the World War II prison camps and Nazi concentration camps. And just one active case of tuberculosis per thousand in the Army meant thousands of tuberculosis sufferers among the 11 million Americans in uniform, each of whom consumed Medical Department resources: the average hospital stay per case during the war was 113 days.[7]

But if tuberculosis was a camp follower, Esmond Long (Figure 8-1) was a tuberculosis follower.[8] He tracked it down, studied it, and tried to prevent its spread at every stage of American involvement in the war. With war looming in 1940, the National Research Council asked Long to chair the Division of Medical Sciences, Subcommittee for Tuberculosis, to advise the government on preventing and controlling tuberculosis in both civilian and military populations during war mobilization. Once the United States entered the war, Long received a commission as a colonel in the Medical Corps and moved his family from Philadelphia to Washington, DC. Working out of the Office of The Surgeon General, Long set up a screening process with the Selective Service to keep tuberculosis *out* of the Army and then traveled to more than ninety induction camps to ensure adherence to the procedures. He also oversaw the expansion of tuberculosis treatment facilities in the United States, inspected Fitzsimons and other Army tuberculosis hospitals, advised medical officers on treating patients, kept abreast of research developments in the labs, monitored outbreaks of tuberculosis in the theaters of war, and wrote articles for medical and lay periodicals to publicize the Army's antituberculosis program. In 1945 Long traveled to the European theater to inspect hospitals caring for tubercular refugees and liberated prisoners of war (POWs). There he saw the horrors of the concentration camps at Buchenwald and Dachau where Army medical personnel cared for thousands of former prisoners sick and dying of typhus, starvation, and tuberculosis. After the war Long organized the tuberculosis control program for the Allied occupation of Germany, and returned annually in the 1950s to assess its progress. He split his time between the Army Medical Department and the Veterans Administration (VA) to supervise the transition of the federal tuberculosis treatment program from the War Department to the VA. He also helped organize and evaluate the antibiotic trials, which ultimately led to an effective cure for tuberculosis. After returning to civilian life Long continued to study tuberculosis in the Army, and he wrote the key tuberculosis chapters for the Army Medical Department's official history of the war.

With Long as a guide, this chapter shows how war once again served as handmaiden to disease around the globe. This time the Army Medical Department assumed not only national but international responsibilities for the control of tuberculosis in military and civilian populations, among friend and foe. Long and the Army Medical Department did succeed in demoting tuberculosis from the leading cause of disability discharge for American World War I personnel (13.5 percent of discharges), to thirteenth position during the years 1942–45 (1.9 percent

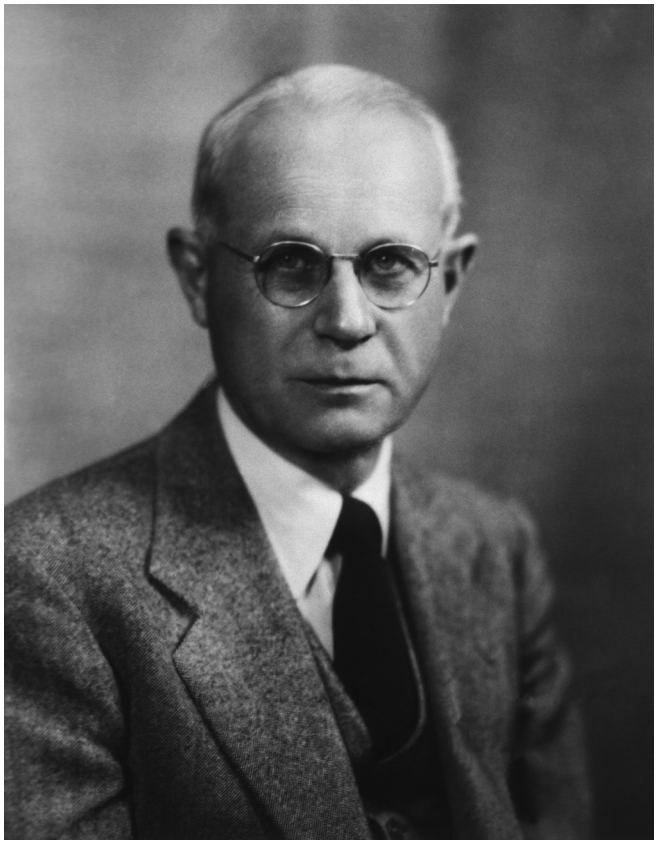

Figure 8-1. Esmond R. Long, who directed the Army tuberculosis program during World War II. Photograph courtesy of the National Library of Medicine, Image #B017302.

of all discharges), behind conditions such as psychoneuroses, ulcers, respiratory diseases, arthritis, and other diseases.[9] But this achievement required continued vigilance, an Army-wide surveillance program, and dedicated personnel and resources. The first step was to keep tuberculosis out of the Army.

Screening Redux

After war broke out in Europe, Congress passed the National Defense Act of 1940, which established the first peacetime military draft in U.S. history, increasing Army strength eightfold from 210,000 in September 1939 to almost 1.7 million (1,686,403) by December 1941. This resulted in a 75 percent rise in the number of patients in military hospitals, straining the Medical Department, which had only seven general hospitals and 119 station hospitals in 1939.[10] The year and a half before Pearl Harbor, therefore, was hectic, and while Congress was

soon appropriating freely, pledging "all of the resources of the country" to meet the crisis, the War Department was constantly readjusting to meet the escalating emergency.[11]

The National Research Council Committee on Medicine, Subcommittee on Tuberculosis, chaired by Long, met for the first time on 24 July 1940 and prioritized its responsibilities: first, develop recommendations on how to screen draft registrants for tuberculosis; second, screen civilians in federal service and wartime industries; third, figure out how to care for people rejected by the draft for the disease; and finally, help civilian and military agencies prepare for tuberculosis in war refugee populations. In its first nine-hour meeting, the subcommittee decided on centralized tuberculosis screening centers at 200 recruiting stations and generated a list of tuberculosis specialists nationwide to evaluate recruits and interpret X-rays at those centers. Subcommittee members stressed the importance of maintaining good records for processing any subsequent benefits claims and, most importantly, called for X-ray screening of all inductees—not just those who looked like they might have tuberculosis.[12]

The War Department leadership initially rejected such comprehensive screening of inductees as expensive and time-consuming. The fact that tuberculosis death rates in the country had fallen two-thirds from 140 per 100,000 people in 1917 to 45 per 100,000 people in 1941, and in the Army from 4.6 per 1,000 in 1922 to 1.4 per 1,000 in 1940, may have led to complacency. But Long, his colleagues, and the national tuberculosis community, mindful of the cost to the nation in sickness, death, and disability benefits in the previous war, persisted.[13] The American College of Chest Surgeons asked in July 1940, "Shall We Spread or Eliminate Tuberculosis in the Army?" and their president, Benjamin Goldberg, reported that the VA had spent almost $1.2 billion on tuberculosis patients through 1940.[14] One medical officer calculated that 31 percent of all veterans who died as a result of World War I service and whose dependents received benefits, had died of tuberculosis.[15] Even the lay press chimed in with a TIME magazine article, "TB Warning," that stressed the importance of chest X-rays.[16] Advocates pointed out that X-ray technology was more available and less expensive than in the previous war, and radiologists were more plentiful and skillful.[17] They were also confident that new technology, such as the development of a lens that allowed the direct and rapid photography of a fluoroscopic image and new 4 x 5 inch films, which made storage and transport easier than that of the 11 x 14 inch films, rendered screening more practical than in 1917–18.[18]

The Army Medical Department agreed with the National Research Council subcommittee. Since 1934 it had required X-rays for all Army personnel assigned overseas, but it had not yet convinced the War Department on universal screening.[19] In June 1941, Brigadier General (Brig. Gen.) Charles Hillman, Chief, Office of The Surgeon General Professional Service Division, told the National Tuberculosis chairman, C. M. Hendricks, that "the desirability of routine X-rays had long been recognized by the Surgeon General's Office," but "considerations other than medical entered the picture and the character of induction

examinations had to be adapted to the limitations of time, place, and available equipment."[20] When Fitzsimons informed Hillman later that new recruits were arriving at the hospital with tuberculosis, he responded almost plaintively. "I am working with the Adjutant General to devise some method by which *every* volunteer for enlistment in the Regular Army will have a chest X-ray and serological test before acceptance." He asked for all available evidence of sick recruits, explaining that "data on Regular Army men of short service now in Fitzsimons with tuberculosis will help me get the thing across."[21] As the data and advice accumulated, in January 1942, the Adjutant General required that all voluntary applicants and reenlisting men be given chest X-rays. Finally, on 15 March 1942, mobilization regulations made chest X-rays mandatory in all induction physicals.[22]

With universal screening in place, Long, as chief of the tuberculosis branch in the Office of The Surgeon General, oversaw the screening process and faced a task similar to that of George Bushnell in 1917–18, finding that fine line between excluding as much tuberculosis as possible from the Army without rejecting too few or too many men. Conscious of his predecessor's miscalculations, Long was careful not to criticize Bushnell's tuberculosis program, at one point noting that World War I medical officers were "not to be reproached for not having knowledge that came into existence only later, any more than the chief of the Army air service in 1917 is to be reproached because more efficient airplanes are available now than then."[23]

The wartime emergency produced a public health campaign regarding tuberculosis and other disease threats. A War Department pamphlet, *What Every Citizen Should Know about Wartime Medicine*, presented the issue as one of maintaining troop health and limiting public costs. "The strenuous activity of soldiering is likely to cause extension of an incipient (early) tuberculous invasion of the lungs, or to precipitate the breakdown and reactivation of arrested cases," it explained. Such illness could result in disability "and the necessity of providing long care of these patients in military hospitals where they must remain isolated from nontuberculous patients."[24] The Public Health Service also created a tuberculosis office to handle the expected increase in tuberculosis, and, as the National Research Council Subcommittee recommended, gave war industry workers chest examinations.[25]

As military and civilian screening boards found thousands of people with active tuberculosis and sent many of them to tuberculosis sanatoriums and hospitals, they generated what a public health nurse referred to as "potentially the greatest case finding program that workers in tuberculosis control have ever known."[26] At the same time, however, war mobilization drew civilian medical personnel into the military, reducing staffing in home front institutions. Army medical personnel ultimately numbered more than 688,000, including 48,000 physicians in the Medical Corps, 14,000 dentists in the Dental Corps, and 56,000 nurses in the Army Nurse Corps—a large portion of the nation's medical professionals.[27] To maintain his nursing staff, VA Director Frank Hynes even asked the Army Nurse Corps in May 1942 not to hire VA nurses away from his hospitals.[28] Given the shortage of

tuberculosis specialists for the local induction boards, Esmond Long requested names of qualified physicians who had been discharged from the Army because of tuberculosis to serve on those boards. But George F. Aycock, director of medical services at Fitzsimons, told him that most such officers were "physically unable to carry on any work which would be of value to state public health offices."[29]

Army tuberculosis rates during World War II, while lower than during World War I, did show a similar "U" curve with high rates at the beginning of the war as the Selective Service built up the military forces and cases that had eluded screening became active during training or combat (Figure 8-2). Tuberculosis rates fell as radiologists became more proficient at identifying tuberculosis infections, and then another sharp, higher increase in cases at the end of the war as discharge examinations found people who had developed active tuberculosis during their service. Postwar studies also revealed a seemingly paradoxical phenomenon that during the war military personnel serving overseas had lower tuberculosis rates than those serving in the United States, yet higher rates when they returned home. Long attributed this to rigorous physical exams military units received prior to

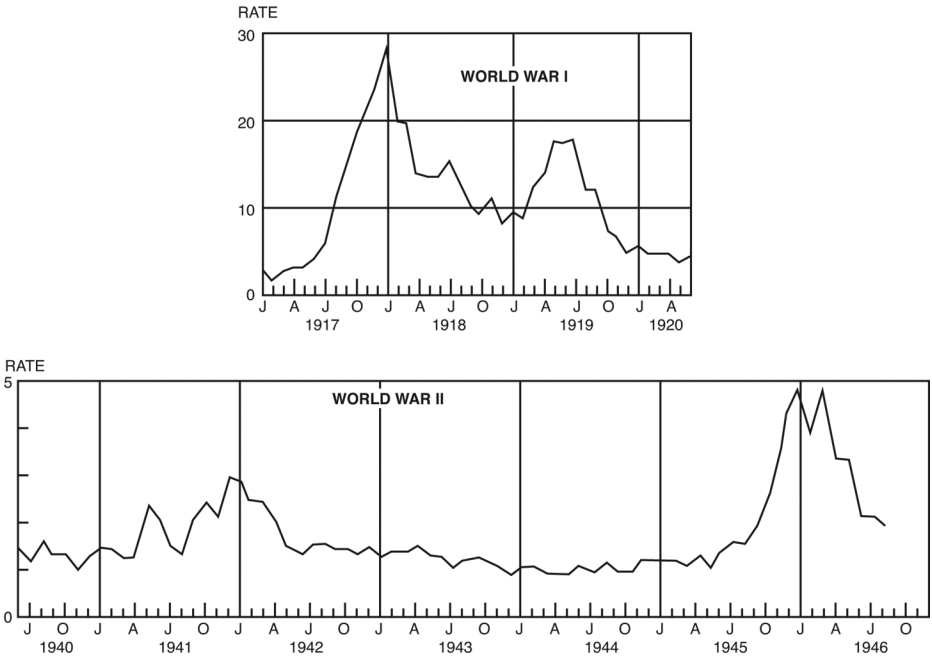

Figure 8-2. Chart comparing the incidence curves of tuberculosis in the Army during World War I and World War II. From Esmond R. Long, "Tuberculosis," in John Boyd Coates, Robert S. Anderson, and W. Paul Havens, eds., *Internal Medicine in World War II, Medical Department, U.S. Army in World War II*, vol. 2, *Infectious Diseases* (Washington, DC: Office of The Surgeon General, Department of the Army, 1961), chart 17, p. 335. Available at http://history.amedd.army.mil/booksdocs/wwii/infectiousdisvolii/chapter11chart17.pdf.

overseas deployment, which eliminated many cases of tuberculosis, and the subsequent lack of surveillance opportunities and skilled diagnosticians in the theaters of war. As a result, troops who developed tuberculosis were not discovered until their separation examinations, conducted when they were once again in the United States.[30]

In the end, the screening process rejected 171,300 men for tuberculosis as the primary cause (thousands more had tuberculosis in addition to the disqualifying condition), and Long calculated that this saved the government millions of dollars in hospitalization costs.[31] After the war, however, Long identified two factors that allowed tuberculous men into the Army: the failure to screen all inductees until March 1942, and the 4 x 5 inch stereoscopic (fluorographic) films, which were used in the interest of speed but which Long believed caused examiners to miss about 10 percent of minimal tuberculosis lesions in recruits. To better understand the latter problem he had two radiologists read the same X-rays and found substantial disagreement between their findings. Long therefore concluded that "if the induction films had each been read by two different radiologists, undoubtedly many more of the men who had tuberculosis at entry could have been excluded from service."[32] The Army ultimately discharged 15,387 enlisted men for tuberculosis during the war, which earned it thirteenth position as a cause of disability discharge.[33] As one medical officer said, "Evidently our record, in spite of the many difficulties and delays experienced, is not too bad."[34]

Tuberculosis in the Theaters of War

American military forces fought in nine theaters of war—five in the Pacific and Asia, the other four in North Africa, the Mediterranean, Europe, and the Middle East. The Allies gave priority to defeating Germany and Italy in Europe beginning with operations in North Africa and the Mediterranean. After fighting in Tunisia in 1942–43, the Allies invaded Sicily on 10 July 1943, and moved up the Italian peninsula. By April 1944—in preparation for the D-Day invasion on 6 June 1944—the United States had more than 3 million soldiers in Europe, supported by 258,000 medical personnel managing a total of 318 hospitals with 252,050 beds.[35] The war against Japan got off to a slower start as U.S. military forces developed the means to execute an island war across vast expanses of ocean. After fighting began in the Southwest Pacific, military forces grew from 62,500 troops in March 1942 to 670,000 in the summer of 1944 with 60,140 medical personnel.[36] Even though military personnel developed tuberculosis in all of the nine theaters, the numbers were not high and tuberculosis was not a major military problem. In the Southwest Pacific theater, for example, only sixty-four of more than 40,000 hospital admissions were for the disease.[37]

Tuberculosis was of the greatest consequence in the North Africa and Mediterranean theaters, in part due to poor screening early in the war, but also because, according to historian Charles Wiltse, it was the theater "in which the lessons of ground combat were learned by the Medical Department as much as by the line troops."[38] In general, medical personnel learned the importance of treating battle

casualties as promptly as possible and keeping hospitals and clearing stations mobile and far forward to shorten evacuation and turnaround times. With regard to tuberculosis, the Medical Department had to relearn the World War I lesson of the importance of having skilled practitioners—or "good tuberculosis men"—in theater. They also ascertained which treatments were appropriate close to the battle lines and which were not, and when and how best to evacuate tubercular patients to the United States.

When soldiers with tuberculosis began to appear at Army medical stations in North Africa in late 1942, Major General (Maj. Gen.) Paul R. Hawley, chief of medical services for the European theater of operations, called for a tuberculosis specialist. On Long's recommendation, Hawley appointed Col. Theodore Badger (Figure 8-3) as a senior consultant in tuberculosis on 2 January 1943. A professor of medicine at the Harvard School of Medicine, Badger had served in the Navy during World War I, and then attended Yale and Harvard where he earned his medical degree.[39] Chief of medical service of the 5th General Hospital (GH), organized out of Harvard, Badger would play a role similar to that played by Gerald Webb during World War I—medical specialist, teacher, and troubleshooter.[40]

Assessing the tuberculosis situation in the Mediterranean theater, Badger identified five hazards: (1) the development of active disease in American troops who had not been X-rayed upon induction; (2) association with British troops and civilians who had not been screened for tuberculosis; (3) drinking of nonpasteurized and possibly infected milk that could transmit tuberculosis; (4) battlefield conditions that could activate soldiers' latent infections; and (5) the undetermined effects of other respiratory infections.[41] Badger soon got the Army to use pasteurized milk and to establish X-ray centers with the proper equipment and trained staff, but he was not able to examine the thousands of American soldiers in the war zone. To gauge the extent of the tuberculosis problem he therefore arranged for a mobile X-ray unit to conduct spot surveys of troops in the field. Three examinations of some 3,000 troops each found only about 1 percent with signs of tuberculosis. To avoid losing manpower, Badger reported in mid-1943 that "up to the present time no individual has been removed from duty because of X-ray findings, and follow-up study has, so far, not indicated the necessity for it."[42] Instead, Badger planned to recheck those with suspicious films every few months to see if the signs had advanced. Follow up, however, was easier said than done in an army on the move, so Badger and Hawley finally decided in February 1944 that all patients with active or suspected tuberculosis would be evacuated back to the United States.[43] Badger recommended that patients with pleural effusion, the accumulation of fluid between the layers of the membranes that line the lungs and chest cavity that often indicates tuberculosis, be evacuated back to the United States. He also ended the practice of transporting some tuberculosis patients sitting up, insisting that they be transported as litter patients on bed rest.[44]

In late 1943, dissatisfied with the way in which many Army hospitals were handling tuberculosis, Hawley established "tuberculosis reception centers" at various general hospitals, designating the 6th GH from Massachusetts General Hospital,

Figure 8-3. Theodore L. Badger, senior consultant on tuberculosis for the U.S. forces in Europe and North Africa. Photograph in W. Paul Havens and Leonard D. Heaton, eds., *Internal Medicine in World War II, Medical Department, U.S. Army in World War II,* vol. 1, *Activities of Medical Consultants* (Washington, DC: Office of The Surgeon General, Department of the Army, 1961), 409. Available at http://history.amedd.army.mil/booksdocs/wwii/MedConslt1/figures/figure138.jpg.

Boston; the 17th GH from Henry Ford Hospital, Detroit; the 24th GH from Tulane University, New Orleans; the 26th GH from the University of Minnesota, Minneapolis; and the 46th GH Oregon School of Medicine, Portland, as such centers.[45] Although the number of tuberculosis patients was small, knowledgeable medical officers took any tuberculosis case seriously, because, as one wrote, "a single soldier with an open tuberculosis lesion can infect a great many others in a short period of time."[46] Col. Donald S. King and Captain (Capt.) George T. McKean treated tuberculosis patients in the North Africa and Mediterranean theaters and reported on a situation whereby eight of fifty-seven men in a medical battalion developed tuberculosis. King described how the problem slowly unfolded in early 1943 after a battalion cook showed symptoms. Medical personnel X-rayed the rest of the kitchen staff in April and found another open case. Two men developed symptoms in September 1943, another cook in January 1944, and after the sixth case was discovered in November 1944, medical staff X-rayed the entire battalion and found two more sick men.[47] King and McKean calculated that the 383 patients they treated for tuberculosis had an average hospital stay of 58.5 days, which amounted to "a total of 22,405 overseas hospital days."[48]

The experience of another hospital in North Africa illustrates the pitfalls of tuberculosis treatment close to the front lines. The 46th GH served there for eight months—November 1943 to August 1944—admitting 8,995 patients, but only

171 for tuberculosis.[49] Maj. Samuel L. Diack cared for many of these patients who included four British servicemen, a Norwegian sailor, nine members of the Merchant Marine, and a Yugoslav civilian who had spent two years in a German labor camp. Treatment included bed rest, fresh air when possible, and good nutrition, which was difficult in wartime. Diack gave eighteen patients artificial pneumothoraces, fourteen of which were successful. Of six patients who were evacuated from the hospital, however, three "undoubtedly suffered setbacks due to prolonged train travel and much handling," he reported. He gave another patient phrenic exeresis (removal of part of the phrenic nerve), but after the patient developed complications and almost died, Diack wrote "it was probably an error in judgment to do the operation in the first place."[50] He ended up evacuating most American patients to the United States, but discharged to full duty the Yugoslav civilian, whom he considered healed, and put sixteen patients also considered healed on limited duty, telling them to get X-rayed again in two or three months.

Tuberculosis cases appeared in the later years of the war, too. During the Allied bombing of Germany, several members of Air Corps units stationed in England succumbed to active tuberculosis. In the 56th Fighter Group, Eighth Air Force, eight men developed the disease between August 1943 and September 1944. When medical officers found an acute case in the 78th Fighter Group, Eighth Air Force, they X-rayed the entire unit, taking more than 3,600 chest films in late 1944, and evacuating seven men to the United States. When the medical investigators could not find a common source of infection among the airmen they concluded that all of the cases were reactivations of previous infections.[51]

Some medical officers in the United States complained to Long's office that more tuberculosis patients should be given artificial pneumothorax before they were evacuated out of the field to begin their treatment sooner, but given experiences like Diack's, Badger disagreed. It would be better to wait until they arrived in the United States, he asserted, due to the lack of experts in the field, the inevitable delays in transport, and the fact that "emphasis in the active theater is on immediate wartime emergencies, without a disproportionate amount of time spent on the individual soldier."[52] Long agreed, saying that he had "great confidence" in Badger's advice.[53] Badger's recommendations, however, were not always approved. In 1944, as the Allies moved into Germany, he warned that military personnel would be coming into contact with tuberculous civilians and recommended spot checks of personnel in Army hospitals. With Hitler in his sights, Gen. Hawley responded, "I am sorry but we are fighting a very rapid war at this moment and such surveys will have to wait until this thing slows down a bit."[54]

If troops could contract tuberculosis in the war theater, medical personnel faced a high risk of exposure in the hospitals as well. Long recognized this, noting that "fortunately, the senior consultant in tuberculosis in the area, Col. Badger, was aware of the possibility of contagion."[55] Indeed, in the 1930s, Badger wrote that "the greatest responsibility of the hospital lies in the observation of rigid medical asepsis where cases of open tuberculosis are under medical and nursing care."[56] But military hospitals in the field rarely function under optimal conditions, and

anticontagion technique required supplies and time that were in short supply. Still, hospitals under Badger's purview, such as the 46th GH, took measures such as prohibiting nurses from working long hours, giving them extra days off, and requiring chest X-rays every two months.[57] In spite of these precautions, four nurses in the Mediterranean and European theaters developed active tuberculosis in 1943, thirty in 1944, and thirty-eight in 1945, a rate 3.8 times greater than that for the troops in theater.[58]

As the war progressed, more of these patients returned home by air rather than by sea. As the first true air war, World War II saw the introduction of air evacuation when Army aeromedical squadrons deployed in early 1943. After successful trials in the Pacific and North Africa, air evacuation increased so that during the Battle of the Bulge (1944–45), some patients arrived in U.S. hospitals within three days of being wounded.[59] Some medical officers were concerned about the effects of transporting tuberculosis patients by air where they would be exposed to high speeds, jolting, and reduced air pressure. Tuberculosis specialists in New Mexico and Colorado therefore studied 143 white, male military patients, twenty-two-years old to twenty-eight-years old, with active tuberculosis flown to Army hospitals in nonpressurized air ambulances for any signs of trouble. Fearing the worst, they instead found that "severe discomfort, pulmonary hemorrhage, and spontaneous pneumothorax did not occur in the series either during or following the flight," and concluded that air transport up to 10,000 feet was safe and preferable to time-consuming travel by water. By the end of the war the consensus was that rapid air evacuation to the United States also reduced the need to give a tuberculosis patient a pneumothorax in the field.[60] As the war progressed, therefore, the burden of caring for tuberculosis patients fell increasingly on the hospitals in the United States.

"A City of 10,000"—Fitzsimons during the War

From the roof of Fitzsimons' new building in April 1943, *Rocky Mountain News* reporter John Stephenson could see the Rocky Mountain Arsenal, the Denver Ordnance Plant, and Lowry Field, "places where the Army studies how to kill people." But, he wrote, "The Army is merciful. It lets the right-hand of justice know what the left hand of mercy is doing at Fitzsimons General Hospital." The largest Army hospital in the world, Fitzsimons had 322 buildings on 600 acres, paved streets with traffic lights, a post office, barbershop, pharmacy school, dental school, print shop, bakery, fire department, and chapel. It was, wrote Stephenson, "a city of 10,000."[61] No longer a liability, Fitzsimons was the pride of the Army Medical Department. One Army inspector reported that "it is apparent that no expense has been spared in this extraordinary building or in the general equipment and maintenance of the whole hospital plant."[62] As Congressman Lawrence Lewis had hoped, Fitzsimons' mission now extended beyond caring for tuberculosis patients to meeting the general medical and surgical needs of the wider military community in the Denver region. The modernized hospital also received a pro-

motion with the appointment of a general to command—Brig. Gen. Omar H. Quade—in April 1943. During the war the hospital maintained about 3,500 beds, reaching its highest daily patient population after the war—3,719 on 3 February 1946. The annual occupancy rate, calculated in patient days, increased from 603,683 in 1942 to a high of 1,097,760 for 1945, about 85 percent capacity.[63]

With the reduction of tuberculosis in the Army over the years, the percentage of tuberculosis patients among all those at Fitzsimons had declined from 80 percent to 90 percent in the 1920s to 40 percent to 50 percent in the late 1930s. As the Army grew it now rose again. During the war Fitzsimons admitted more than 8,100 patients with tuberculosis. In fact, in 1943, only eighteen patients had battle injuries; the rest were in the hospital for illness and noncombat injuries. Unlike during the previous war, however, this Medical Department had a network of more than fifty veterans' hospitals to which it could transfer patients too disabled by tuberculosis or other disease or injury to return to duty. Now, instead of allowing patients to stay in the service and receive the benefit of hospitalization with the hopes that they would recover and return to duty, the Medical Department discharged patients to VA hospitals as soon as they were determined to be unfit for military service, thereby reserving capacity for active-duty personnel.[64]

Fitzsimons' staff did, however, employ a number of medical advances to return an increasing number of sick and wounded officers and enlisted men to duty and in 1943 invited reporters in to show them some of their victories. They showcased patients like Private (Pvt.) Virgil E. Stratton of Montana whose arm was severely damaged when he was strafed at Dutch Harbor in the Aleutian Islands. Army medics had immediately given Stratton sulfa to prevent infection and blood plasma to replace the blood volume he had lost, but the bullet had severed an important nerve in his arm so that by the time he arrived at Fitzsimons his arm was so flexed that his hand was resting on his shoulder. Surgeons were able to reattach the nerve endings, though, and with physical therapy and three operations to lengthen the nerves, Stratton was able to use his arm and hand well enough to return to duty and to study business at the University of Denver.[65] The hospital newspaper, *Stethoscope*, reported in October 1943 on the most exciting medical development during the war when medical researchers met at Fitzsimons to discuss a "sensational new drug still in the experimental stage."[66] Maj. D. P. Greenlee had returned from a training course in penicillin therapy at Bushnell General Hospital in Utah to supervise the administration of the new drug on a variety of infections.[67] He soon reported a cure rate of 93 percent.[68]

There were fewer victories in tuberculosis treatment. In 1943, Gen. Quade noted that "[r]est is still stressed as the basic treatment for pulmonary tuberculosis. Collapse procedures are frequently used as additional measures but not as substitutes for a well regulated rest regime."[69] During the war about one-quarter of all tuberculosis patients were treated with pneumothorax.[70] In the 1930s surgeons had begun pulmonary resection, removing parts of the lung (lobectomy) or entire lungs (pneumonectomy) for the treatment of cancer and lung ailments such as abscesses. During the war Fitzsimons surgeon Col. John B. Grow and

other surgeons tried lung resection to treat tuberculosis, with few patient deaths.[71] In 1946, however, when Grow's staff contacted thirty patients who had had such surgery, they found that half of them were doing well, but three others had died, seven were seriously ill, and the rest were still under treatment. Grow concluded that "because of these relatively unsatisfactory results, it was felt that pulmonary resection in the presence of positive sputum was extremely hazardous and the indications were consequently narrowed down."[72]

Outside the operating rooms, the "City of 10,000" had a rich social life with people arriving at the post from all corners of the country. With Congressman Lewis's acquisition of the School for Medical Technicians, Fitzsimons assumed the role of medical trainer, offering six- to twelve-week courses in technical training for dental, laboratory, X-ray, surgical, clinical, and pharmacy assistants. By 1946 the School had graduated more than 28,000 such technicians to serve around the world.[73] The Women's Army Corps arrived at Fitzsimons in February 1944 when 165 women attended the medical technicians school as part of the first coeducational class.[74] Members of the Women's Army Corps, rehabilitation aides, Education Department staff, dietitians, as well as nurses increased the female presence at Fitzsimons, as did activities of welfare organizations such as the Gold Star Mothers, the Red Cross, and the Junior League. Fitzsimons' patients and staff also enjoyed visits from celebrities, including Jack Benny, Miss America, Gary Cooper, Dorothy Lamour, and other entertainers such as the big band leader Fred Waring and his Pennsylvanians, the Denver Symphony Orchestra, and an African American Methodist Church children's choir from Denver.[75] Like communities across the country, the hospital participated in war bond campaigns and had a huge war garden that produced thousands of ears of sweet corn and bushels of other vegetables.[76] In February 1944, patient Cleveland Green, of Texas, made the front page of the *Stethoscope* when he bought $5,000 in war bonds. The African American soldier who had fallen ill during his service in the New Hebrides Islands said, "I know that the money I have saved and put into war bonds will now help the fellows who are still battling to get this thing over with sooner."[77] For spiritual guidance the chaplain's office offered Catholic and Protestant services on Sundays, and a rabbi from Denver or Lowry Field provided Jewish services. The chaplain's office also relied on civilian clergy and "chaplain-patients" to assist in comforting and counseling patients and their families. In 1944 alone chaplains conducted more than 1,500 services, made more than 115,000 hospital visits, and held a small service to honor each deceased patient.[78]

Despite national mobilization and generous congressional funding, the Army could not escape the strain on its hospitals. By July 1944, Fitzsimons had reached capacity so the Medical Department designated two more hospitals as specialty centers for tuberculosis. Earl Bruns' widow Caroline, who lived in Denver at the time, was no doubt pleased when the department named Bruns General Hospital in Santa Fe, New Mexico, in honor of her husband. Bruns along with Moore General Hospital in Swannanoa, North Carolina, cared for enlisted patients

with minimal or suspected tuberculosis. Enlisted patients with questionable tuberculosis diagnoses and most officers and women patients would still go to Fitzsimons. Brig. Gen. Larry B. McAfee, who had worked in the Office of The Surgeon General during the 1930s, took command at Bruns Hospital and soon had 750 tuberculosis beds with the requisite staff and equipment, but the hospital struggled. On inspection, Long noted that McAfee "had a difficult task" because "frequent changes in personnel, inevitable under the circumstances, interfered seriously with the efficiency of the treatment given."[79] Patients drinking on the wards or going absent without leave increased, and Long attributed the low morale to Bruns' isolated location and "patients who had not seen their families for months or years."[80] Patients also complained about the food. Hazel L. Roundtree of New Orleans wrote to McAfee about her brother's treatment. He had developed tuberculosis while fighting in Germany and was undergoing thoracoplasty in "a series of operations." Her mother had been visiting the hospital for two months caring for her brother and other patients. While the doctors and nurses were wonderful, she wrote, "something has to be done about the food." Bruns was serving "goat meat, creamed meats, and even ribs—for boys who have had operations such as these." They send the food back, she said, "especially when the ribs are served."[81] Esmond Long visited Bruns the same week Roundtree wrote her letter and also observed problems with the food service. He recommended forty electrically heated food carts to make meals more palatable, but did not mention anyone serving ribs.[82]

Enemy Prisoners of War with Tuberculosis

Bruns Hospital's burden increased in 1945 when it began to receive tubercular enemy POWs. To relieve pressure on Allied resources in Europe and the Pacific, the Americans interned thousands of Italian, German, and Japanese prisoners of war in the continental United States.[83] The importation of prisoners began with a trickle in May 1942 and reached a peak population as recorded by the Army Medical Department of 425,871 in May 1945, the vast majority of them Germans—371,683—followed by 50,273 Italians and 3,915 Japanese POWs.[84] The federal government held them in 150 base camps and 340 branch camps across the country ranging in capacity from 250 to 3,000 men and repatriated them by the end of 1946 per the requirements of the Geneva Convention. Under the terms of the Convention, prisoners could be made to work in military, agricultural, and industrial operations if treated well and provided decent living conditions. Some POWs could not work, though, because they were sick or injured. Wary of prisoners bringing infectious diseases or parasites into the United States, medical personnel screened them for infections, vaccinated them against smallpox and typhoid, disinfected their clothing, and transferred those who needed medical care to hospitals designated to care for POWs. When a spot survey found that five of 525 Italian officers and enlisted men had active tuberculosis with bacteria in their sputum and twenty-five had X-rays suggestive of tuberculosis, Long recommended X-raying all incoming prisoners of war. This time the War Department agreed.[85]

At first the War Department sent prisoners with tuberculosis to a POW camp hospital in Florence, Arizona, but they posed a danger to other prisoners and their military guards.[86] After ten prisoners contracted tuberculosis in the hospital, to avoid violating Geneva Convention provisions protecting POW health, in January 1944 the War Department transferred tubercular prisoners to specialized tuberculosis facilities, sending German POWs with tuberculosis to Glennan General Hospital in Oklahoma, Italian POWs to Bruns General Hospital, Santa Fe, New Mexico, and Japanese POWs to the station hospital in Camp McCoy, Wisconsin.[87] Fitzsimons received POWs of all three nationalities.

When representatives from the French Embassy and the U.S. Department of State inspected the Fitzsimons POW facility in June 1944 it had 100 German, seventy-five Italian, and three Japanese POW patients with tuberculosis. The POW spokesman, German Lieutenant (Lt.) Wolfgang Hagenmeister, told the inspectors that the prisoners had "no complaints whatever concerning any phase of the care being given to them."[88] But he apparently did not speak for everyone. The three Japanese sailors—Saburo Nakagawa, thirty-six-years old, Kuzunori Makino, twenty-eight-years old, and Sadamu Okada, twenty-five-years old—were not satisfied. Captured in the South Pacific, they arrived at Fitzsimons in May 1944, and were confined in Ward B, a separate building housing POW patients. On 11 August, all three attempted to commit suicide by hara-kiri, cutting their wrists, necks, and stomachs with a sharpened table knife before medical personnel could stop them.[89] After Fitzsimons' physicians treated their wounds, they refused to eat for ten days. When that failed, they sought another method—death by mutiny. At 9:00 pm on 29 October 1944 ward attendant Pvt. Casey handed the prisoners a bottle of milk through the barred door of their section, and one of them threw it back at him, breaking the glass. When Casey told them to clean it up, they refused and became so belligerent that he called for support about 9:25 pm. The Corporal of the Guard arrived with Pvts. Rohmiller and Rogers, armed with clubs. Col. Francis E. Howard of the War Department's Prisoner of War Division reported what happened then:

> When they arrived at the ward, they were informed by Pvt. Casey, the guard on duty, of the throwing of a milk bottle by one of the prisoners. Casey showed them the mess caused by the broken bottle. The three soldiers thereupon opened the door which led into the Japanese prisoners section, gave a broom to one of the Japanese and told them to clean up the mess. Nakagawa said something to the prisoner in Japanese, whereupon he refused to clean up the mess. Nakagawa then grabbed Rohmiller's club and the other two prisoners "rushed" Rogers. Rogers broke his club "over their heads." The Japanese grasped him by the throat and were "trying to strangle him." Casey fired a shot into the floor in order to frighten the prisoners, but they continued their attack upon Rogers, who asked Casey for his gun. Upon receiving the gun, Rogers ordered the prisoners to "get back into their section." Nakagawa "rushed" Rogers and Rogers fired upon him. Nakagawa fell to the floor and the other two prisoners rushed Rogers "one of them circling around in front of the gun and the other attacking from the side." Rogers fired at them both. Makino fell and Okada ran into his room.[90]

When Lt. Col. Dennis E. Kelley, the executive officer, arrived "he found all three prisoners dead." Each had been killed by a single gunshot. Pvt. Rogers suffered a head injury "caused by some blunt object 'used with considerable force.'" The War Department and the State Department both investigated the incident, interviewing thirteen people at Fitzsimons who had knowledge of the events. The War Department board determined that Rogers "'was acting in the execution of his duty as a sentinel' when he inflicted the fatal injuries, and that the shootings were in self defense." Getting wind of the story, the *Denver Post* reported that "Enemy Patients Precipitated Row to Get Selves Shot after Previous Hara-Kiri Attempt Was Foiled."[91]

The Fitzsimons incident was the only time American guards killed Japanese prisoners of war on U.S. soil. Other Japanese POWs had caused trouble for Allied guards, though. According to historian Arnold Krammer, "The average Japanese soldier was molded to prefer death to surrender."[92] Scores of Japanese POWs attempted suicide or incited guards to shoot them during the war. In 1943 guards killed forty prisoners and wounded fifty at Camp Featherstone, New Zealand, and in 1944 twenty-three Japanese POWs committed suicide by slitting their throats at an American camp in New Caledonia.[93]

Although the Medical Department proudly reported that the health of POWs in 1944 was better than that of U.S. military personnel in the country, even the tuberculosis centers designated for POWs had difficulty meeting Geneva Convention standards.[94] A representative of the International Committee of the Red Cross inspected Bruns Hospital in February 1945 and found the 145 Italian POW tuberculosis patients clad in blue pajamas and red velvet dressing gowns confined to their beds. The prisoners had no complaints about the food or the medical care and each received three packages of cigarettes a week. But "aside from excellent medical care and first-class food," the inspector concluded, "there is much to be desired." The hospital was administered by members of the Medical Corps and "no one, not even the staff officers knew the regulations concerning prisoners." Furthermore, none of the hospital rooms had copies of the Geneva Convention, there were no Italian newspapers, and "convalescent prisoners should be authorized to enjoy the fresh air in a garden which should be specially prepared for them."[95] Regardless of these shortcomings, the treatment of tubercular POWs in the United States was humane—complete with velvet robes. Allied troops captured overseas, however, often encountered horribly different situations.

Recovered American Prisoners of War and Others

As Allied troops liberated France in 1944 and crossed into Germany they encountered thousands of refugees or "displaced persons"—escaped prisoners from Nazi concentration camps, exhausted and terrified Jews, slave laborers, political prisoners, Allied POWs, and other victims. The Nazi camps that held these people served as incubators for diseases such as tuberculosis and typhus, and the frightened, sick, and starved refugees inundated Army hospitals in late 1944 and early 1945. Theodore Badger reported one of the first waves that arrived on 18 December

1944 when 304 men, most of them Russians, came to the 50th GH in Commercy, France. They had been in the Nazi labor camps for the mines and heavy industries, where thousands died and survivors were malnourished and sick. All of the 304 had tuberculosis, 90 percent with moderate or advanced disease. Four were dead on arrival, eight more died in the first week, and one-third of the patients would die by May.[96] Alarmed, Gen. Hawley, Chief Surgeon of the European Theater of Operations, ordered that all displaced civilians and recovered military personnel be examined for signs of tuberculosis "to establish the gravity of the situation."[97] The situation was dire. At one time the 46th GH had more than 1,000 tuberculosis patients, all recovered Allied POWs, causing Esmond Long to remark that the hospital "had the largest number of tuberculosis patients of any Army hospital in the world."[98]

The 46th GH from Portland, Oregon, which had cared for tuberculosis patients in the Mediterranean theater, also stood on the front lines of the tuberculosis problem in Europe. Serving at Besancon, France, the hospital would receive the Meritorious Service Unit Plaque and Col. J. G. Strohm, the commanding officer, the Bronze Star Medal for service during the liberation of France. During the spring of 1945, the 46th GH admitted 2,472 Russians, forty-one Poles, and 128 Yugoslav POWs and former slave laborers freed by American forces. The influx began on 12 March and within four days the 46th GH had admitted 1,200 such patients. "The hospital staff was agast [*sic*] at the terrible physical condition of these people," reported the hospital commander.[99] When Badger visited the 46th GH in March 1945 he said the patients "constitute one of the most seriously affected groups with tuberculosis and malnutrition that I have ever seen," explaining that most of them suffered "acute fulminating, rapidly fatal disease, mixed with chronic, slowly progressive, fibrotic tuberculosis." Medical personnel (Figure 8-4) cared for these patients as best they could, comforting many of them as they died. They began the rest treatment with some men but, as Badger reported, convincing Allied POWs to submit to absolute bed rest after months of confinement was "practically impossible." He explained that "[t]he concept of bedrest was foreign to these men under any circumstances, and with the Russians, it was against their principles of treatment of tuberculosis, which commanded exercise and sunshine." Consequently, "[t]he severity of the problem of contagion is magnified by the ignorance of the patients, the complete absence of all sense of personal hygiene, and unwillingness to obey orders, and complete lack of discipline both military and professional." Despite these difficulties Badger was able to report that after a month "those men who did not die of acute tuberculosis showed marked improvement."[100]

In late 1944 Hawley requested 100,000 additional hospital beds for the displaced persons and POWs he expected to encounter after the German surrender, but Gen. George Marshall and Secretary of War Henry L. Stimson denied the request, believing they could not spare resources of that magnitude. The European Theater, they decided, must use German medical personnel and hospitals to care for the prisoners.[101] Only after the war did American hospital units transfer their equipment and supplies to German civilians and Allies for their use.

Figure 8-4. 46th General Hospital nurses who cared for former prisoners of war. Photograph courtesy of Oregon Health Sciences University, Historical Collections and Archives, Portland, Oregon.

The liberation of Europe also freed American POWs, who, not surprisingly, had higher rates of tuberculosis than other American military personnel. Captured British medical officer Capt. A. L. Cochrane cared for some of them in the prison where he was confined and noted sardonically that imprisonment was "an excellent place to study tuberculosis; [and] to learn the vast importance of food in human health and happiness." German prison guards gave POWs only 1,000 to 1,500 calories per day, so Red Cross food parcels, which provided an additional 1,500 daily calories per person, were critical to preventing malnutrition and physical breakdown. Cochrane observed that the American and British POWs received the most parcels and had the lowest tuberculosis rates in the camp, while the Russians received nothing at all and had the highest rates. During the eighteen months that French POWs received the Red Cross parcels, he noted, just two men of 1,200 developed tuberculosis but when parcels for the French ceased to arrive in 1945, their tuberculosis rate rose to equal that of the Russians. The situation, he concluded, showed the "vast importance of nutrition in the incidence of tuberculosis."[102] Not all Americans got their parcels, though. William H. Balzer, with an American artillery unit, was captured in February 1943, and remembered how German guards stole the Americans' packages. He also described a half-hearted German effort to screen for tuberculosis in which medics X-rayed some of the prisoners, but "only two-hundred and some men, out of nearly two-thousand got

this opportunity. And, the ones who got the X-ray, that was the last they heard of it." Balzer survived imprisonment but never recovered from the ordeal. Severely disabled (70 percent), he died in 1960 on his forty-sixth birthday.[103]

Exact tuberculosis rates among American POWs are not known because the rush of events surrounding the liberation of prisoners from German and Japanese control prevented a systematic X-ray survey. Rates did appear to be higher, though, for prisoners of the Japanese than for prisoners of the Germans. Long reported that about 0.6 percent of recovered troops from European POW camps had tuberculosis, whereas data from the Pacific theater suggested that 1 percent of recovered prisoners had tuberculosis. Moreover, an analysis of the chest X-rays done at West Coast debarkation hospitals revealed that 101 (or 2.7 percent) of 3,742 former POWs of the Japanese showed evidence of active tuberculosis.[104] John R. Bumgarner was a tuberculosis ward officer at Sternberg General Hospital in Manila, the Philippines, before the war. A POW for forty-two months after the Japanese invasion, he described his experience in *Parade of the Dead*.[105] Bumgarner did what he could to care for many of the 13,000 prisoners in the camp, but knew that "my patients were poorly diagnosed and poorly treated." The Japanese had an old X-ray machine with which he tried to identify and isolate tubercular prisoners in a makeshift hospital. But given the otherwise complete lack of staff and resources he worried that he would unknowingly put uninfected patients into the tuberculosis ward. The narrow cots were so close together, he wrote, "the crowding and the breathing of air loaded with this bacilliary miasma from coughing ensured that those mistakenly segregated would be infected."[106]

Bumgarner was able to stay relatively healthy throughout his imprisonment. His luck ended, however, because "on my way home across the Pacific I had the first symptoms of tuberculosis." Severe chest pain and subsequent X-rays at Letterman Hospital in San Francisco revealed active disease. "I had gone through more than four years of hell—now this!" Once back in the United States the Army Medical Department moved him from hospital to hospital, and he described the next three years as a story of "sad miscalculations by me and the Army Medical Corps." He was transferred from Letterman in San Francisco to a hospital in North Carolina, back west to Bruns in Santa Fe, New Mexico, then back to North Carolina, and finally to Fitzsimons in Denver, Colorado. By then, he wrote, "I felt I was the most traveled patient in the armed services." Discharged on disability for tuberculosis in September 1946 he began to work at the Medical College of Virginia but soon had a lung hemorrhage. This time it took eight years of rest, with surgery and new antibiotic treatment for him to recover. By 1956, however, Bumgarner had married his sweetheart, Evelyn, and begun a medical career in cardiology that lasted for thirty years.[107] He was more fortunate than James E. Neuman, who survived the Bataan Death March but after three years of imprisonment was starved from 170 to 92 pounds on his 6'2" frame and had tuberculosis of the lungs, throat, and stomach. Doctors at Bruns Hospital warned his parents that Neuman could not survive a trip home, but loathe to have their son die in the hospital, they arranged to fly him home to Fort Worth, Texas, where he was greeted as a hero before he died one week later at age twenty-five.[108]

Tuberculosis continued to take its toll on POWs for years after the war. The VA followed POWs as a special group because, explained Long, of "the hardships that many of these men endured, and the notorious tendency for tuberculosis to make its appearance years after the acquisition of infection."[109] A follow-up study published in 1954 reported that for American POWs during the six years after liberation tuberculosis was the second highest cause of death, after accidents.[110]

From Concentration Camp Prisoners To Sanatorium Patients

If the challenges Army medical personnel faced in caring for sick and starving POWs and refugees were unprecedented, the scale of disease and suffering they encountered in the Nazi concentration camps was almost unimaginable. Allied troops had heard about secret and deadly camps but were not prepared for what they found. As the Allies converged on Berlin from the East and the West, the Nazis evacuated thousands of prisoners—most of them Jews seized from across Europe, as well as POWs—to interior camps to hide their crimes and prevent the inmates from falling into Allied hands. These evacuations became death marches as SS (abbreviation of *Schutzstaffel,* which stood for "defense squadron") guards beat and murdered people, and failed to feed them for days on end. Survivors were crowded into camps such as Buchenwald and Dachau making them even more chaotic and deadly. Americans, therefore, liberated camps that were riven with disease, especially typhus, tuberculosis, and malnutrition.[111] An examination of Army Medical Department activities in one of these camps, Dachau, where evacuation hospitals spent the most time and confronted large numbers of people with tuberculosis and typhus, brings the American experience to light.

The Allies liberated Buchenwald on 11 April 1945. The following day the world learned that Franklin Roosevelt had died. Americans then liberated Dachau on 29 April, the day Italian partisans executed Mussolini in Milan, and the next day Hitler killed himself in his bunker. Dachau (Figure 8-5) had been the first of hundreds of concentration camps in the German Reich to which the Nazis sent political enemies, the disabled, people accused of socially deviant behavior, and, increasingly after the Kristallnacht pogroms of 1938, Jewish men, women, and children. In January1945 Dachau held 67,000 prisoners, but with troops of the Seventh U.S. Army approaching the SS began evacuating and killing prisoners. Capt. Marcus J. Smith, a medical officer in his thirties, arrived at Dachau on 30 April 1945, the day after liberation, part of a small team trained to treat persons displaced by the war. Horror greeted him outside the camp in a train of forty boxcars loaded with more than two thousand corpses. Smith called the frost that had formed on the bodies in the intense cold, "Nature's shroud."[112] Inside Dachau he encountered more grotesque piles of naked, skeletal bodies of prisoners and scattered, mutilated bodies of German guards. His job, he wrote to his wife in Chicago, was to "survey the medical condition of the inmates, the medical facilities (and manpower), environmental conditions, such as waste disposal, water supply, living conditions, insect control, foodhandling, and anything else pertaining to health and sanitation."[113]

Figure 8-5. Dachau survivors gather by the moat to greet American liberators, 29 April 1945. Photograph courtesy of the United States Holocaust Memorial Museum, Washington, DC.

Smith found more than 30,000 prisoners, mostly Jews of forty nationalities, and all men except for about 300 women the SS had kept in a brothel. They were in desperate condition. Typhus and dysentery raged, at least half of the prisoners were starving, and hundreds had advanced tuberculosis. "The well, the sick, the dying, and the dead lie next to each other in these poorly ventilated, unheated, dark, stinking buildings," Smith told his wife. The men were "malnourished and emaciated, their diseases in all stages of development: early, late, and terminal."[114] He wondered, "What am I going to write in my notebook?" and then started a list of needed supplies: clothes, shoes, socks, towels, bedding, beds, soap, toilet paper, more latrines, and new quarters. He almost despaired. "What are we going to do with the starving patients? How will we care for them without sterile bandages, gloves, bedpans, urinals, thermometers, and all the basic material? How do we manage without an organization? No interns, no nursing staff, no ambulances, no bathtubs, no laboratories, no charts, and no orderlies, no administrator, and no doctors.... I feel helpless and empty. I cannot think of anything like this in modern medical history."[115]

What Americans such as Marcus Smith did in the weeks following the liberation of the camps is little known, eclipsed by histories of the Nazi regime and the

postwar sagas of camp survivors building new lives. The reference to the days before liberation as the "Last Days" of Dachau or Buchenwald is a misnomer, though, because the suffering did not end. Thousands of prisoners who had survived the camps would die just days after liberation; thousands more spent months in the hospital; for others it was a time for revenge, grief, joy, hope, fear for the future, or all combined. The Army Medical Department mission was both altruistic and self-interested. At risk to their own health, Americans provided life-saving care for thousands of victims, but they also wanted and needed to prevent the liberated prisoners from spreading disease to Allied troops and civilians throughout Europe. Not all of their policies and practices were welcome. Prisoner-patients were suspicious or fearful of many medical practices and resented quarantines that deprived them of their liberty. American efforts did prevent a deadly typhus epidemic from sweeping postwar Europe and helped contain tuberculosis rates in Germany, but the Nazis had created a human catastrophe so immense that even the most dedicated efforts would at times fall short.

Faced with horror on such a scale, Smith and other Army Medical Department personnel assigned to the concentration camps threw themselves into the work of cleansing, comforting, treating, and nurturing their patients. American commanders called in at least six Army evacuation hospitals (EH) to care for the sick and dying in the liberated camps. EH No. 116 and EH No. 127 began arriving at Dachau on 2 May with some forty medical officers, forty nurses, and 220 enlisted men.[116] Consulting with Smith and his team, the units set up in the former SS guard barracks. They tore out partitions to create larger wards, scrubbed the walls and floors with Cresol solution, sprayed them with dichloro-diphenyl-trichloroethane (DDT), and then set up cots to create two hospitals of 1,200 beds each. Medical staff also discovered physician-prisoners who had cared for the sick and injured as well as they could, and could now advise and assist, and in some cases translate for the medical staff. Other able-bodied prisoners worked in the barracks as well. In two days the hospitals were ready to admit patients by triage, segregating them by disease and prognosis. Laurence Ball, the EH No. 116 commander, noted that more than 900 patients had "two or more diseases, such as malnutrition, typhus, diarrhea, and tuberculosis."[117] Staff bathed and deloused them, gave them clean pajamas, and put them to bed.

The prisoner-patients' reactions to their American doctors and nurses ran from joy and gratitude to terror and resentment. Many were too ill to respond or were shocked beyond belief that they were actually free (Figure 8-6). Witnesses described how some inmates were in a daze, oblivious to the dead bodies around them.[118] Elizabeth May Craig, a *Portland News Herald* reporter, described the scene as she walked through a ward of 110 beds in EH No. 116. "Rows of skeletons, shaved heads, great eyes looking at you; a few able to stagger around.… Some are huddled completely under drab blankets; they look like little children, they are so emaciated. Some lie in stupor; they are far gone, or the high temperatures of typhus, as much as 105, hold them."[119] Some patients, she wrote, "are frightened and will not take treatment."[120] Another observer wrote of "prisoners

who could not get it through their heads that things had changed, who hid in terror at sight of the uniform."[121] Some resisted showers, perhaps fearing the gas chamber, while others were terrified of hypodermics of penicillin because Nazi doctors had at times executed inmates by injection.

While the hospitals were setting up, other personnel provided food to the malnourished prisoners. But starving people cannot eat too much too soon without danger, and some individuals had no internal regulator. Dachau survivor Nerin Gun, a Turkish journalist in Budapest arrested by the Nazis for reporting on the concentration camps, observed with horrible irony that some inmates "died of over eating because they had gorged on the cans of Spam the generous American soldiers had—open handedly but unwisely—given them."[122] Aware of this problem, medical personnel warned against overeating and at first provided thin soup, then military rations, food from the SS larder, and "French pasteurized milk." One of the Americans' joys at Dachau was to watch people fill out and regain their strength after a week or two of adequate nutrition. By the end of May an Army nutritionist arrived with one million frozen eggs, which were kept under guard and would feed the camp for forty days.[123]

Death by overeating was but one of the dangers that the prisoners faced. The physician-prisoners warned the Americans that "nearly all of the inmates had

Figure 8-6. Survivors in Dachau, 1 May 1945.
Photograph courtesy of the United States Holocaust Memorial Museum, Washington, DC.

typhus, and contact with them must be avoided."[124] During May 1945, American hospitals at Dachau had more than 4,000 typhus patients and lost 2,226 to typhus and other diseases.[125] Typhus, a rickettsial disease transmitted by body lice, had a mortality rate as high as 40 percent. With no medical cure, treatment consisted of supportive care—keeping patients clean and nourished—to mitigate effects of prolonged fever, such as the breakdown of tissue into gangrene.[126] The Americans knew that typhus had taken three million lives in Eastern Europe after World War I, but now they had a means of prevention and better weapons—a typhus vaccine and DDT. On 2 May, the day the evacuation hospitals arrived, the commander of the Seventh Army imposed quarantines for typhus and tuberculosis, and summoned the U.S. Typhus Commission, which had controlled a typhus outbreak in Naples, Italy. A typhus team arrived the next day and began to immunize American personnel and dust them with DDT. On 7 May staff began to vaccinate inmates but kept typhus patients isolated for at least twenty-one days from the onset of illness to prevent transmission to others.[127] This meant that the Americans did not immediately enter the inner camp barracks—the worst, most typhus-infested part of the camp—nor did they quickly relieve crowding there for fear of spreading typhus-bearing lice. It took over a week for personnel to prepare more spacious and clean quarters. Inmates were bewildered and angry to find that they could not leave. One survivor wrote, "Liberation was merely a changing of the guard."[128]

Starving people could be fed and restored, lice could be controlled, and people with typhus either lived or died, but the management of tuberculosis was not so simple.[129] When the Nazis took office in 1933 they had set the eradication of tuberculosis as one of their highest goals, but in 1938, after public education efforts failed to control the disease, the government began to authorize the confinement of tuberculous people, sending many of them to concentration camps.[130] Ironically, instead of eradicating tuberculosis, the Nazi regime created ideal environments for tuberculosis to thrive in the concentration camps. As Army medical officer Abner Zehm wrote, "The conditions under which the prisoners lived were conducive in every way to the development and spread of tuberculosis."[131] Malnutrition, heavy labor, and harsh treatment activated tuberculosis in thousands of other prisoners and the intense crowding and lack of ventilation ensured its dissemination.

Shocked and frightened by the disease and suffering they saw, American medics redoubled their efforts. Medical officer Maj. E. G. Lipow of Montana methodically conducted triage in the dirty, crowded, lice-ridden barracks, deciding who should and who should not go to the hospital. "I take the sickest, who have a chance to live," he told a reporter.[132] Smith wrote his lists, reported to his wife, and kept track of the daily death toll, finding comfort as the number of people who died daily fell from 200 during the first week to twenty by the end of May. Another medical officer performed autopsies. He chose ten of the dead bodies, five from the death train and five from the camp yard, to see what had caused their deaths. All had typhus and extreme malnutrition, eight had advanced tuberculosis, and some bodies had signs of fractures and head injuries.[133]

Survivors held vivid memories of the Americans. Steve Ross, a Polish Jew, survived ten concentration camps between 1940 and 1945 before he was liberated at

age fourteen. He had been one of 1,800 prisoners living in barracks for about 100 people, isolated by Nazi doctors for medical experiments. The guards had stopped feeding them two weeks before liberation, so when the Americans arrived, Ross called them "God's Army." "I was so overwhelmed with joy and happiness when I saw such strong men who had saved my life." Sick and starving, "hospitalization," he remembered, "was the first English word I learned."[134] Ross spent six months in the hospital for tuberculosis and later immigrated to the United States, becoming a psychologist in Boston. Nerin Gun, the Turkish journalist, called the arrival of American soldiers, "The Gift" and described the first soldier who walked into the compound as "upright, stalwart, unafraid…the very incarnation of the American hero."[135] But Gun deeply resented the quarantine. "The drastic measures taken by the Americans to arrest the epidemic seemed unfair to us at the time.…not only could we not leave the camp but we were restricted to our own barracks, the healthy along with the sick. We were still sleeping two or three to a palette or on the ground; the food was still horrible."[136] Closing the camp was "an idiotic precaution," and prisoners got out anyway. "Even if we had spread a few germs among those good, kind, handsome Germans, would that have been such a catastrophe?"[137]

By the end of May, conditions at Dachau had improved. Typhus was abating and American officials began to release groups of inmates by nationality. Beyond Dachau, the U.S. Typhus Commission tracked down new cases of typhus in civilian and military populations, deloused one million people, sprayed fifteen tons of DDT, and created a *cordon sanitaire* on the Rhine requiring all who crossed from Germany to be vaccinated and dusted to prevent the spread of disease. Thus the Army averted a broader typhus epidemic.[138] The tuberculosis situation was more complicated and presented the Americans with a conundrum. What to do with thousands of people suffering from a long-term, infectious, and deadly disease? Tuberculosis treatment required months, if not years, of bed rest. When EH No. 127 medical officer A. D. Piatt analyzed X-rays of 2,267 Dachau patients, he found that more than 30 percent of them had signs of tuberculosis, and predicted that tuberculosis incidence would increase in Europe "as a result of the return of numerous persons with undiagnosed active disease from concentration camps to their homes."[139]

Esmond Long arrived in the European theater in April 1945, and following tuberculosis, traveled in May to Buchenwald and Dachau. He believed that the prognosis for most tuberculosis patients was poor and that those who did recover would require long-term care. Such long-range care, he told the Surgeon General, "cannot be accepted as a responsibility of the U.S. Army. It will have fulfilled its mission when it has effected a suitable transfer for continued care." The best course would be to return patients to their native homes, but given their weak condition and the postwar situation, that was impossible. In line with the War Department approach to caring for Allied POWs and refugees, Long recommended that non-American medical staff assume responsibility for providing care and that German physicians "who have proper training and recognize a medical obligation" be employed. He also identified a German hospital in a nearby town that,

supplied with Army laboratory facilities and equipment, could serve as a sanatorium. "Blankenheim hospital," he concluded, "all things considered, offers a satisfactory solution to the problem."[140] One can imagine, however, that some former concentration camp internees were appalled by the idea of being sent to a German hospital and cared for by German staff.

As with the American POWs, tuberculosis continued to follow Dachau survivors into their new lives. Thousands of Jewish survivors emigrated to what would become the state of Israel. Fifteen years after liberation, the Israeli Minister of Health reported that although concentration camp survivors comprised only 25 percent of the population, they accounted for 65 percent of the tuberculosis cases in the country.[141] Tuberculosis continued to thrive in Europe as well.

Aftermath

Army Medical Department responsibilities did not end with the Allied defeat of Germany and Japan but involved caring for war casualties for many more months and years. The tuberculosis problem, in fact, increased in some ways with demobilization, posing three challenges: (1) high rates of tuberculosis in postwar Germany threatened to spread it to U.S. occupation troops; (2) separation X-rays of soldiers as they demobilized revealed thousands of cases of tuberculosis, generating the upward surge on the "U" curve in tuberculosis patients in Army and VA hospitals; and (3) in their eagerness to get home, many tubercular veterans left government hospitals while still contagious, risking the spread of the disease to their families and communities. None of this surprised Long and his colleagues, but all of the issues required government resources and thoughtfully crafted policies.

Tuberculosis had thrived during the war years. Before Hitler invaded Poland, Germany's tuberculosis death rate had been among the lowest in Europe, fewer than 60 per 100,000, but during the war it increased dramatically, peaking in 1945–46 at 260 per 100,000 in the city of Berlin.[142] Tuberculosis rates increased in other major European cities as well. Amsterdam, with the lowest prewar rate, increased from 35 to 83 deaths per 100,000; London, which had a well-organized antituberculosis program under the British National Health Service, went from 60 to 100 per 100,000; Rome from 84 to 188; Vienna from 109 to 257; and in the worst situation of all Europe—a consequence of the Nazi regime—Warsaw tuberculosis death rates rose from 155 to 500 per 100,000 during the war.[143] American journalist Edward P. Morgan wrote ominously that "the dread white plague, spawned and spread for a decade in German concentration camps, is increasing and it threatens to do more lasting damage than any other one disease." In the "bedlam of liberation," former prisoners were spreading the germs to the outside world, so that "the Germans cannot say in truth that they never employed germ warfare," he declared. "The delayed-action spread of tuberculosis will probably do more damage to Europe than could have been done by any horror bomb load of bacilli."[144]

Long more temperately characterized the post-World War II tuberculosis situation in Germany as "a grave public health problem" due to "unmistakable evidence that the incidence of the disease, and its mortality, are rising."[145] He attributed the increase to the breakdown of public health programs during the war, the use of tuberculous persons in war industries, the importation of laborers from conquered countries with little or no health screening, and the virtual incubation of tuberculosis in the concentration camps. Now that U.S. troops were in Germany, Long pursued recommendations by Badger and others to develop a comprehensive plan to monitor and control the disease in civilian and military populations. The first step, which he had in some ways instituted at Dachau, was to restore the German public health infrastructure so that it could assume responsibility for tuberculosis control and care of patients. This process was part of the larger American effort to locate experienced medical and public health personnel (under the denazification rules aimed at excluding former Nazi officials) so they could care for the displaced persons. The program then focused on identifying, isolating, and treating people with active disease.[146]

After his 1947 visit to Germany, Long recounted a case that illustrates the suffering and heartache tuberculosis could cause. A routine chest X-ray examination had found an American soldier in the early stages of tuberculosis, and after a few months in the hospital he returned to active duty. Working in Heidelberg, Long wrote, the soldier "was intimate at this time with a young Polish girl and applied for permission to marry her." Under Occupation Forces rules medical personnel gave the young woman a physical examination, including a chest X-ray, and discovered advanced tuberculosis, so "permission to marry was refused." The couple, however, arranged for a healthy woman to be X-rayed in her place at another Army installation, and with a clean bill of health the couple married. Medical personnel discovered the falsified X-ray when the newlywed woman fell seriously ill and was hospitalized in Frankfurt. They also found that her husband's tuberculosis had flared, and the sick young man was court-martialed and dishonorably discharged for his deceit. The young woman, wrote Long, "remained in the hospital, a case with poor prognosis."[147]

Long assessed the situation in Germany annually for years after the war and although tuberculosis rates for American troops in Germany were higher than those of Army personnel elsewhere, by 1948 they had returned to prewar levels in most of the American Zone except for Berlin, where high levels persisted.[148] Historian Albert Cowdrey has credited the American actions with preventing a number of postwar scourges: "No one can prove that a great typhus epidemic, mass deaths of prisoners of war, or widespread outbreaks of disease among the German population would have taken place without the efforts of Army doctors of the field forces and the military government." But, he continued, "conditions were ripe for such tragedies to occur, and Army medics brought both professional knowledge and military discipline to forestalling what might have been the last calamities of the war in Europe."[149] Thus, as usual, in public health the good news is no news at all.

In the United States the Army Medical Department also contended with increased tuberculosis rates, due not to an epidemic in the Army, but rather the systematic X-ray examination of all personnel as they separated from military service. These exams found about one in every 1,000 individuals had lung changes suggestive of tuberculosis, products of the cumulative effects of the stresses of war, the extended length of service for many troops, and/or exposure to tuberculosis overseas.[150] Having survived the war and preparing to return home, it must have been a terrible shock for these men and women to be detained or even disabled by a disease. A case in point is that of Lt. Col. Douglas Treat Davidson, Jr., a medical officer in the 101st Airborne Division who parachuted into Normandy on 6 June 1944 and received the Silver Star for courage in action for saving the lives of twenty wounded men. Injured during the Battle of the Bulge, Davidson recovered to celebrate the Allied victory. Upon his discharge examination, however, X-rays revealed tuberculosis and Davidson was hospitalized for eight months. Although he recovered enough to return to his medical practice, the war hero died eighteen years later from cancer and complications of tuberculosis.[151]

Catching people with tuberculosis before they returned home and could spread it to their loved ones was a key part of the Army Medical Department's strategy. One of Long's innovations was the careful storage and coordination of X-ray films, so that radiologists could compare individuals' induction films to their separation X-ray films and more easily detect any changes. The VA took over all X-ray films for filing and storage, and to assist in determining benefit claims for the veterans.[152] Long seized these pairs of X-rays (4 x 5 inch induction films and 14 x 17 inch separation films) as an opportunity to study the development of tuberculosis in a wartime army. The study, conducted with statistician Seymour Jablon and published in 1955, examined 6,000 randomly selected sets of X-rays and found that although educational background and civilian occupation did not impact the tuberculosis rate, medical personnel had above average rates, "which might well have been due to excessive exposure in the occupation itself," they wrote. Long and Jablon also concluded that both endogenous and exogenous sources caused the tuberculosis, that is, some soldiers developed active cases from their own latent infections and some were infected by others. They also noted that one-half of the men discharged for tuberculosis most likely had the disease when they entered the service, which underscored Long's recommendation that induction films be read by two radiologists to improve accuracy.[153]

The separation examinations discovered so many cases of tuberculosis that in January 1946 the Army designated Moore General Hospital in North Carolina, which at the time was repatriating many of its POW patients, as a center for patients with minimal tuberculosis or a good prognosis[154] (Figure 8-7). Acutely aware of the post-World War I experience, VA officials also sought to prepare for the onslaught of tuberculous veterans.[155] Maj. Gen. Paul R. Hawley, chief of medical services in the European theater, became chief medical director at the VA after the war. Given that the peak year for treating tuberculous veterans after World War I was 1922 when 44,951 patients had accounted for 43 percent of all hospitalized veterans, Hawley called for 15,000 additional tuberculosis beds by

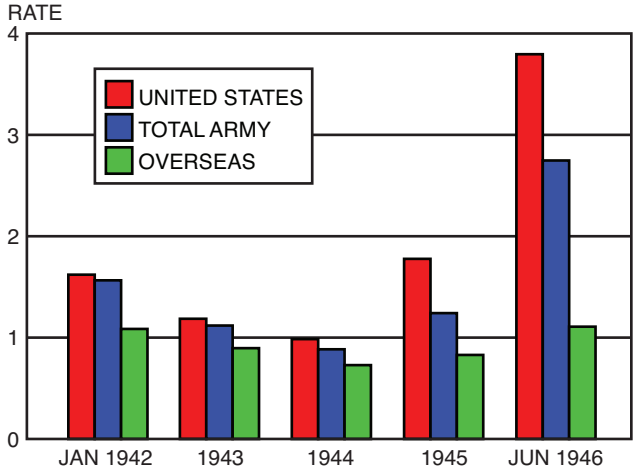

Figure 8-7. Chart showing the incidence of tuberculosis among U.S. Army troops in the United States and overseas, January 1942 to June 1946. In Esmond R. Long, "Tuberculosis," in John Boyd Coates, Robert S. Anderson, and W. Paul Havens, eds., *Internal Medicine in World War II, Medical Department, U.S. Army in World War II*, vol. 2, *Infectious Diseases* (Washington, DC: Office of the Surgeon General, Department of the Army; 1961), 336.

his predicted peak year of 1950.[156] The Federal Board of Hospitalization therefore oversaw the establishment of twenty-one VA hospitals for tuberculous veterans, enabling the government to avoid the overcrowding and public outcry of World War I. By 1950 the VA had reached Hawley's goal of 15,000 beds, and in 1954 was caring for almost 16,000 tuberculosis patients.[157]

But tuberculosis hospitals alone would not solve the problem. Patient behavior and morale threatened to undermine Army and VA control efforts. When Long inspected Moore Hospital in February 1946 he found poor morale among some patients who "resent their retention in the Army, at a time when they are feeling well and were about to be discharged."[158] But, he wrote to a colleague, the problem of poor morale "is a general one, not limited to tuberculosis. It arises in all diseases in which there is temporary complete disability for military service, but excellent prospect of full recovery within a few years."[159] Before the war, Fitzsimons' commander Col. Buck had complained that financial incentives encouraged veterans to leave the hospital before they were well. Receiving a monthly disability stipend, discharged tuberculosis patients could live in the Denver area and come to Fitzsimons for pneumothorax refills as outpatients. But, noted Buck, "they are not under constant supervision and cannot be trusted to observe the controlled life, including rest periods and proper food that is so essential to satisfactory progress in collapse therapy."[160] This problem persisted during the war. Col. Frederick Wright at Fitzsimons told an inspector that "the Army is discharging patients with open tuberculosis into the civil population."[161] Despite the

War Department's requirement that Army installations discharging men with tuberculosis advise the health departments of the men's home states, the Medical Department observed that "many stations failed to comply with this regulation." The Maryland Department of Health advised the Office of The Surgeon General that when it received a list of 123 names of veterans with tuberculosis, only fifty of them included information on their whereabouts.[162]

In June 1943 Louis Dublin, renowned statistician for the Metropolitan Life Insurance Company, went public with the problem when he told American Legion officers and a VA administrator that while private and state tuberculosis programs had been effective, "under the Veterans Administration it has been almost altogether a failure." Dublin noted that of more than 9,800 tuberculosis discharges in 1942 only 3 percent had left the VA with the disease "arrested," "apparently arrested," or "quiescent." The remaining cases were discharged from the hospital as "condition improved" (33 percent), "condition unimproved" (29 percent), "condition not stated" (16 percent), or deceased (19 percent).[163] In a series of articles published in 1943 and 1944 Dublin said the problem was that VA hospital patients were not subject to the same kind of discipline as in military institutions. Veteran patients "may come and go almost at will, irrespective of their condition and against medical advice. Six to eight admissions of the same patient are a frequent occurrence," he wrote. Forty percent of VA tuberculosis patients left against medical advice, and those who stayed were allowed a five-day furlough by law each month. Tuberculous veterans, he said, "have spread infection not only to their immediate families but to the larger circle of civilians with whom they have been in contact for longer or for shorter periods." Dublin also cited the "monetary incentive for discontinuing hospital treatment." Veterans discharged from the hospital received $70 to $100 per month, depending on the degree of disability, compared to only $8 to $20 per month as hospital patients, or the government paid $50 a month for a wife or other family member to care for a tuberculous veteran at home. Significantly, Dublin did not blame the VA. "The chief difficulty, in my judgment, has been the lack of appreciation on the part of Congress and of others interested in veterans' welfare, of certain fundamental conditions necessary for the effective treatment of tuberculosis." Therefore, he asserted, "the monetary incentives which have [wreaked] havoc with care of the men in tuberculosis hospitals should certainly be removed."[164] He called for isolating tuberculous veterans, canceling the five-day furloughs, improving case reporting to local authorities, hospitalizing veterans closer to home so that families could visit, and making hospital care more appealing.[165]

In response to such criticisms, the VA and the American Legion developed cooperative plans for follow up and treatment of tuberculous veterans once they left Army and VA hospitals.[166] The Wisconsin Anti-Tuberculosis Association publicized the problem in newspapers and magazines, established a speakers bureau, and issued a pamphlet educating the public on the dangers of discharging men before they were cured.[167] Such efforts were far from successful. Given the political sensitivity of holding veterans against their will, federal facilities would not institute stricter measures until the 1950s and 1960s when medical profes-

sionals and scientists, as well as veterans and their families, the general public, and elected officials more fully appreciated the nature and danger of tuberculosis transmission. The effect of all of these factors on tuberculosis rates in the United States was, thankfully, muted. Tuberculosis rates in the country did not increase during the 1940s, but wartime conditions did cause the rate of decrease to almost level off during the decade.[168]

But if World War II did not bring great improvements in the treatment and control of tuberculosis, it did transform American medicine in other ways. One scholar credits military medicine during the war for creating a postwar demand by Americans for a higher level of medical care than they were accustomed to.[169] World War II also dramatically increased federal government expenditures for basic biomedical research and accelerated the dominance of specialization in medical education and treatment. One reason for this increased support for and belief in medicine was that it was becoming more effective. Diseases transmitted by insects, especially mosquito-borne malaria in the Pacific theater and louse-borne typhus in the European theater, troubled all armies, but American employment of quinine derivatives and DDT in the Pacific, and sanitation, immunization, and DDT in Europe, dramatically reduced disease incidence.[170] Faster medical transport, blood plasma, and improved surgical techniques reduced death from battle wounds to below 5 percent. In addition to immunizing trainees against centuries-old plagues such as smallpox, typhoid, paratyphoid, tetanus, typhus, yellow fever, cholera, and plague, medical personnel now began to cure other bacterial infections. During the 1930s, researchers found that sulfa drugs were effective against streptococcus and other wound-infecting germs that killed millions of soldiers over the centuries, so in the 1940s soldiers carried individual first aid packets that contained sulfa powder and tablets. An injured man could sprinkle an open wound with the powder, cover it, and/or take the tablets even before he arrived at a first aid station.[171] Then came penicillin, effective against a broad spectrum of bacteria, from wound infections to sexually transmitted diseases. At first in short supply, the United States began mass-producing penicillin during the war and by late 1943 Gen. Hawley authorized penicillin for general hospitals in the European theater for life-threatening or persistent infections.[172] "The inoculating syringe and the insect repellent spray became secret weapons, providing our troops an important increased operating range," wrote George Darling, a member of the National Research Council's Division of Medical Sciences, when he later described World War II medicine. "The stories of penicillin, of blood plasma, of DDT and of the use of quinacrine (atabrine) in malaria, to name a few, are among the modern romances of medicine."[173]

The story of the discovery of a cure for tuberculosis is less romantic than that of penicillin or blood plasma. Neither sulfa drugs nor penicillin made a dent in tuberculosis, and there was no single "Aha!" moment in discovering a cure. Like everything else with tuberculosis, it was complicated and the development of an effective cure slogged on for a decade. But again, the Army Medical Department, with its specialized hospitals, expert tuberculosis physicians, nurses, and other personnel, and thousands of tuberculosis sufferers, was at the center of the action.

Notes

1. Marcus J. Smith, *The Harrowing of Hell: Dachau* (Albuquerque, NM: University of New Mexico Press, 1972), 6.

2. Biographical information on Long is drawn from Peter C. Nowell and Louis B. Delpino, "Esmond R. Long, June 16, 1890–November 11, 1979," *National Academy of Sciences, Biographical Memoirs* 56 (1987): 285–310.

3. John T. Greenwood and F. Clifton Berry Jr., *Medics at War: Military Medicine from Colonial Times to the 21st Century* (Annapolis, MD: Naval Institute Press, 2005), 113.

4. Only 26,309 soldiers died of their wounds of the 599,724 wounded in action, a 4.4 percent death rate. Frank A. Reister, U.S. Army Medical Department Historical Unit and U.S. Department of the Army, Office of The Surgeon General, *Medical Statistics in World War II*, *Medical Department, U.S. Army in World War II* (Washington, DC: U.S. Department of Defense, Department of the Army, Office of The Surgeon General, 1975 [hereafter cited as Reister, *Medical Statistics*]), 6–11.

5. During 1942–45, 28,395 of 2,967,246 admissions, according to Reister, *Medical Statistics,* 37–38. Also on military medicine during World War II, see the Medical Department series, especially Graham A. Cosmas and Albert E. Cowdrey, *The Medical Department: Medical Service in the European Theater of Operations,* World War II, 50th Anniversary commemorative ed., *U.S. Army in World War II* (Washington, DC: Center of Military History, 1992); Morris Fishbein, ed., *Doctors at War* (New York, NY: E. P. Dutton and Company, 1945); Albert E. Cowdrey, *Fighting for Life: American Military Medicine in World War II* (New York, NY: Free Press, 1994); and Mary Sarnecky, *A History of the Army Nurse Corps* (Philadelphia, PA: University of Pennsylvania Press, 1999).

6. Arthur S. McNalty, "Tuberculosis in Peace and War," *Tubercle* 23 (1942): 266.

7. Reister, *Medical Statistics*, 37.

8. On tuberculosis in wartime, see Matthew Smallman-Raynor and Andrew D. Cliff, "War and Disease: Some Perspectives on the Spatial and Temporal Occurrence of Tuberculosis in Wartime," in Matthew Gandy and Alimuddin Zumla, eds. *The Return of the White Plague: Global Poverty and the 'New' Tuberculosis* (London, UK: Verso, 2003).

9. Esmond R. Long, chap. 11, "Tuberculosis," in U.S. Army Medical Service, John Boyd Coates, Robert S. Anderson, and W. Paul Havens, eds., *Internal Medicine in World War II*, *Medical Department, U.S. Army in World War II*, vol. 2, *Infectious Diseases* (Washington, DC: Office of The Surgeon General, Department of the Army; 1961 [hereafter cited as Long, "Tuberculosis"]), 331–39.

10. *Annual Report of the Surgeon General,* 1941 (hereafter cited as *ARSG,* year), 2; and Clarence McKittrick Smith, *The Medical Department: Hospitalization and Evacuation, Zone of the Interior*, Kent Roberts Greenfield, ed. *U.S. Army in World War II* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1956); and Leonard Rowntree, "Fit To Fight: The Medical Side of Selective Service," in Fishbein, ed., *Doctors at War*, 46–47.

11. Elias Huzar, *The Purse and the Sword: Control of Army by Congress through Military Appropriations, 1933–1950* (Ithaca, NY: Cornell University Press, 1950), 157–58.

12. C. S. Stephenson, Memorandum, Subcommittee on Tuberculosis, 24 July 1940, Record Group 52, Records of the Bureau of Medicine and Surgery [hereafter cited as RG 52], Entry 494, Box 6, National Archives and Records Administration [hereafter cited as NARA].

13. Long, "Tuberculosis," 331.

14. Benjamin Goldberg, "Presidential Address: War and Tuberculosis," *Diseases of the Chest* 7 (October 1941): 322–25. Louis Dublin said this figure was for 200,000 people, in "The Problem of the Tuberculous Veteran," *Diseases of the Chest* 10 (1944): 151.

15. Frank Walton Burge, "The Tuberculosis Problem in the Mobilization of Military and Naval Personnel," *Diseases of the Chest* 7 (1941): 20.

16. Robert S. Anderson and William B. Foster, U.S. Army Medical Service, U.S. Department of the Army, Office of The Surgeon General and U.S. Army Medical Service Historical Unit. *Physical Standards in World War II*, *Medical Department, U.S. Army in World War II*. (Washington, DC: Office of The Surgeon General, Department of the Army; 1967 [hereafter cited as Anderson and Foster, *Physical Standards*]), 31.

17. On X-ray technology see Ramsay Spillman, "The Value of Radiography in Detecting Tuberculosis in Recruits," *Journal of the American Medical Association* 115 (19 October 1940): 1371–79; Herman E. Hilleboe, "Opportunities in the Newer Methods of Tuberculosis Case Finding," *Public Health Reports* 58 (16 July 1943): 1094–1101; Alfred A. de Lorimier, "Army X-ray Examinations of the Chest," *Army Medical Department Bulletin* 61 (April 1942): 68–74; and Esmond R. Long and Seymour Jablon, *Tuberculosis in the Army of the United States in World War II: An Epidemiological Study with an Evaluation of X-ray Screening* (Washington, DC: GPO, 1955).

18. For example, C. M. Hendricks to Charles C. Hillman, 6 May 1941, RG 112, Entry 29, 1941–42, Box 241, NARA; and Cloyd M. Chapman to Charles Hillman, 28 September 1939, RG 112, Entry 29, 1938–40, Box 66, NARA.

19. Elias E. Cooley, "Routine Chest X-ray of Overseas Replacements," *Army Medical Department Bulletin* 38 (1937): 55–58.

20. W. Paul Havens, *Activities of Medical Consultants, Internal Medicine in World War II*, Leonard D. Heaton, ed., *Medical Department, U.S. Army in World War II*, vol. 1 (Washington, DC: Office of The Surgeon General, Department of the Army, 1961 [hereafter cited as Havens, *Medical Consultants*]), 403; and Charles C. Hillman, "The Tuberculosis Problem in the Army," *Diseases of the Chest* 9 (May–June 1943): 265–68.

21. Charles Hillman to F. S. Wright, 2 September 1941, RG 112, Entry 29, 1938–44, Box 205, NARA.

22. Mobilization Regulations 1–9, 15 March 1942, in Anderson and Foster, *Physical Standards,* 33.

Sources on tuberculosis screening during World War II include Long, "Tuberculosis"; Anderson and Foster, *Physical Standards,* 30–36, and an unpublished manuscript, Esmond R. Long, "Exclusion of Tuberculosis: Physical Standards for Induction and Appointment," RG 112, Entry 54-A, Box 453, NARA. See also Tamara M. Haygood and Jonathan E. Briggs. "World War II Military Led the Way in Screening Chest Radiography," *Military Medicine* 157 (1992): 113–16; and David C. Wheeler, "Physical Standards in Allied and Enemy Armies during World War II," *Military Medicine* (1965): 899–916.

23. Citing Spillman in Long, "Tuberculosis," 332.

24. Joseph R. Darnall and V. I. Cooper, *What Every Citizen Should Know About Wartime Medicine*, *The Citizen Series* (New York, NY: W. W. Norton, 1942), 161.

25. Thomas Parran, "Tuberculosis Control Program of the U.S. Public Health Service," *Journal of the American Medical Association* 121 (13 February 1943): 520–21; Thomas Parran, "The USPHS [U.S. Public Health Service] in War," in Fishbein, *Doctors at War*; Herman E. Hilleboe, "Tuberculosis Control in Action During Wartime," *Transactions of the National Tuberculosis Association* 38 and 39 (1942–43): 144–49; Herman E. Hilleboe and David M. Gould, "Tuberculous Control in Industry," *Diseases of the Chest* 11 (1945): 278–81.

The subcommittee debated whether the Public Health Service and induction boards should report the names of individuals found to have active tuberculosis to their local public health boards. Some members were concerned about stigmatizing individuals with apparently healed tuberculosis, but, Long observed, "There is no harm in telling a man the truth unless it be in relation to 'mental deficiency.' [The] apparently healed label shouldn't do any harm." "Notes on Conference of the Subcommittee on Tuberculosis of the National Research Council, 15 June 1942," RG 52, Entry 494, Box 6, NARA.

26. Coriss J. Williams, "The Tuberculous Registrant," *American Journal of Nursing* 41 (September 1942): 988.

See also "Problems of Personnel in Tuberculosis Sanatoriums," *Journal of the American Medical Association* 123 (11 September 1943): 97; Mapheus Smith, Lester T. Reynolds, and M. Ethel Hand, "Tuberculosis among Selective Service Registrants," *American Review of Tuberculosis* 60 (1949): 773–87; and Arden Freer, "Occurrence of Pulmonary Tuberculosis in Supposedly Screened Selectees," *Diseases of the Chest* 10 (May–June, 1944): 197–209.

27. Greenwood and Berry, *Medics at War*, 84. Men were not allowed in the Army Nurse Corps and women were not allowed in the Medical Corps until 1943, when Congress authorized commissions for women physicians and scientists to make up a shortfall in medical officers. Male corpsmen usually served nearer the front lines than nurses but women in the Women's Army Corps also served as dietitians, physical therapists, and scientists.

28. Frank Hines to Henry Stimson, 12 June 1942, RG 112, Entry 29, 1941–42, Box 93, NARA.

29. G. F. Aycock to Esmond Long, 6 May 1944, Esmond Long Papers, Box I, Military History Institute, Carlisle, PA.

30. Long, "Tuberculosis," 335–36.

31. Smith, Reynolds, and Hand, "Tuberculosis among Selective Service Registrants," 773; and Long, "Tuberculosis," 332.

32. Long and Jablon, *Tuberculosis in the Army*, 84; and E. R. Long et al, "Experiences with Dual Reading of Chest Photoroentgenograms," *U.S. Armed Forces Medical Journal* 7 (April 1956): 493–515.

33. This broke out annually to 24 in 1942; 4,643 in 1943; 3,533 in 1944; and 4,811 in 1945. See Long, "Tuberculosis," 331–39.

34. Marietta, "Tuberculosis in World War II," 268.

35. Greenwood and Berry, *Medics at War*, 92.

36. Greenwood and Berry, *Medics at War*, 103.

37. Long, "Tuberculosis," 357–64; and Alphonse E. Timpanelli, "Tuberculosis in the Southwest Pacific Theater," RG 112, Entry 54-A, Box 365, NARA.

38. Charles M. Wiltse, *The Medical Department: Medical Service in the Mediterranean and Minor Theaters, U.S. Army in World War II, The Technical Services* (Washington, DC: Office of the Chief of Military History, Department of the Army, 1965), 556.

39. Theodore L. Badger Papers, 1934–81, Finding Aid, Harvard University Library, available at: http://oasis.lib.harvard.edu/oasis/deliver/~med00001, accessed 24 August 2012.

40. Correspondence can be found in RG 112, Entry 31, Zone of the Interior, Box 1056, NARA.

41. Havens, "Medical Consultants," 403–4.

42. Theodore Badger, "Tuberculosis Survey, Interim Report #1," 28 June 1943, RG 112, Entry 31, Zone of the Interior, Box 1056, NARA.

43. Administrative Memorandum No. 22, 22 February 1944, Chief Surgeon, European Theater of Operations, in Havens, "Medical Consultants," 412; and Long, "Tuberculosis," 341.

44. Studies indicated that 25–50 percent of these cases would develop tuberculosis within five years. Long, "Tuberculosis," 370–72.

45. Circular Letter No. 100, Long, "Tuberculosis," 342; and Havens, "Medical Consultants," 431.

46. Daniel J. Feldman, "Tuberculosis in Military Service," unpublished paper," 1945, p. 1, Medical History Unit Collection, Professional Papers, Military History Institute, Carlisle, PA.

47. George T. McKean and Donald S. King, "Survey of Tuberculosis and 'Primary' Pleural Effusion for the Period of Activity of NATOUSA [North Atlantic Theater of Operations U.S. Army] and MTOUSA [Mediterranean Theater of Operations U.S. Army] to 1 April 1945," unpublished report, RG 112, Entry 31, Zone of the Interior, Box 1056, NARA.

48. McKean and King, "Survey of Tuberculosis," 20; and G. Thomas McKean and Donald S. King, "Tuberculosis in the Army in North Africa and Italy," *Bulletin of the U.S. Army Medical Department* 6 (October 1946): 452–55.

49. The 46th General Hospital was activated at the University of Oregon medical school in Portland in July 1942, and after a year of training at Fort Riley, Kansas, opened operations in Algeria in November 1943, specializing in skin diseases, sulfa-resistant gonorrhea, and tuberculosis. After eight months functioning as a hospital for the Mediterranean, the unit transferred to the European theater of operations and admitted its first patients at its facility in Besancon, France, September 1944. See 46th General Hospital, "Annual Report of Activities, 1944," 25 January 1945, RG 112, Entry 54-A, Box 419, NARA.

50. Samuel L. Diack, "A Report on Tuberculosis from the 46th General Hospital from November 1943 to August 1944," RG 112, Entry 54-A, Box 419, NARA.

51. Havens, "Medical Consultants," 443–44.

52. Theodore Badger to Esmond Long, 20 April 1944, RG 112, Entry 31, Zone of the Interior, Box 1056, NARA.

53. Esmond Long to Theodore Badger, 29 April 1944, RG 112, Entry 31, Zone of the Interior, Box 1056, NARA.

54. Havens, "Medical Consultants," 432. Others had made similar recommendations. See Esmond P. Long and C. M. Hendricks correspondence, April–August 1943, RG 112, Entry 29, 1943–44, Box 493, NARA.

55. Long, "Tuberculosis," 275.

56. Theodore L. Badger and Wesley W. Spink, "Sources of Tuberculous Infection among Nurses," *American Journal of Nursing* 36 (1936): 1100–4.

57. "Period Report, 46th General Hospital, 1 January 1945 to 30 June 1945," RG 112, Entry 54-A, Box 419, NARA; and Long, "Tuberculosis," 347.

58. Theodore Badger, "Tuberculosis in Nurses in the European Theater of Operations," 14 August 1944, RG 112, Entry 31, Zone of the Interior, Box 1056, NARA; Edna M. Cree, "Health of the Army Nurse Corps in the ETO [European Theater of Operations]," *American Journal of Nursing* 45 (November 1945): 915–16; and Long, "Tuberculosis," 342–43.

59. Greenwood and Berry, *Medics at War*, 98.

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