

Men of the 16th Infantry Regiment, US 1st Infantry Division wade ashore on Omaha Beach on the morning of June 6, 1944.

Photo credit: US Military

The Surgical Legacy of World War II

Part 3: Blood and Valor

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uthor's note: As our nation remembers the 75th anniversary of D-Day and the final battles of World War II, we should acknowledge the contributions of outstanding medical personnel, whose incredible vision, intensive planning, and heroic efforts gave the wounded an extraordinary chance of survival. Among them are distinguished military surgeons, whose experiences inspired them to invent and implement methods and instruments that bear their names, because they are used every day in modern ORs. Yet, there are countless names not mentioned here—men and women of all races, ranks, and occupations, whose contributions are no less important to the effort to mitigate human suffering, and who are profoundly worthy of being remembered. Working CSTs should care about this increasingly distant history because the surgical technology profession can trace its inception to this period in American history, as the military planned for and entered the first truly global conflict.

"Blood and Valor" is third in a series of articles called The Surgical Legacy of WWII, written to provide an overview of the key surgical developments of World War II. "Part 1: Pearl Harbor, Preparation and Portability,"

published in the December 2016 issue of The Surgical Technologist, discussed the tactical and medical planning prior to America's formal entry into the war following the attack on Pearl Harbor, as well as the logistical reality of delivering surgical care on the islands of the Pacific and the disparate terrain encountered around the Empire of Japan. "Part 2: The Age of Antibiotics," published in the June 2017 issue, focused on the development of penicillin and the advent of perioperative antibiotic therapy.

The Invasion of Normandy, which began on D-Day, has been memorialized in popular books, films, and television series, holding the attention of historians for 75 years. The magnitude of planning and collaboration required is juxtaposed against the haunting personal accounts that have made their way home to be told to future generations. The Invasion of Normandy was, and remains, the largest amphibious assault ever conducted. The attack on the German defenses along the northern coast of France, with five separate beaches assaulted simultaneously represented the Allied effort to free Europe from Hitler's terror. More than 160,000 Allied troops crossed the beaches into France in 12 hours that first day, and another 13,000 American paratroopers dropped behind enemy lines via parachute and gliders.

The improbable success that the Allied forces were able to achieve in

LEARNING OBJECTIVES

- ▲ Learn about the Invasion of Normandy, which began D-Day in June 1944
- Examine how many medical personnel were pulled from the healthcare system to serve the soldiers on the frontlines
- Read about the key personnel who made a different during and after the world wars
- Identify the role surgical personnel played in establishing a care system during the war
- Recall the conditions the surgical field teams had to deal with to administer care to the wounded

spite of the countless calamitous events on that day could have easily turned to further tragedy and changed the outcome of history. The military strategy for D-Day is a well-documented and fascinating topic. However, of particular interest to readers here should be the stunning volume of medical preparations, and the enormous sacrifice and bravery of the military surgical teams leading up to, during, and following the Invasion of Normandy in early June 1944.

The harsh realities of war were inescapable in every corner of the globe between 1941 and D-Day. The Allied forces The recruitment of medical personnel between 1942 and 1944 was as significant to the war effort as manufacturing. Doctors and nurses represented an invaluable human resource, and their skills were desperately needed to care for gravely injured patients, many of whom were mere teenagers. Medical college students felt the same call of duty that so many other Americans did at the time, but the armed services still struggled to meet the quotas for trained doctors. Local draft boards were reluctant to enlist doctors and remove them from their communities, and female physicians



Soldiers in cargo vehicles move onto a beach in Normandy on D-Day. Photo credit: US Military

Gliders fly supplies to soldiers fighting on Utah Beach in France.

were engaged in warfare on several fronts. Though the United States was spared from battling on its own soil, American troops were sent to fight in Africa, Asia and the Pacific, and Europe to protect and liberate people from countries that many families had never heard of. American doctors and nurses were dispatched alongside them. The US Military sent 16,353,639 men and women into service. While over 407,000 were killed, medical personnel — the brave men and women risking their lives to save others' — would send home more than 671,000 wounded Americans to heal from the visible and invisible scars of war.

"One who wishes to be a surgeon first must go to war." -Hippocrates training at medical colleges for women were ineligible to serve in the Medical Department. By 1944, there were 52,000 physicians in the Army and Navy, while 94,000 remained in the civilian healthcare system stateside.

Ultimately, the American Medical Association, the Surgeon General, and the War Department worked together to create the Medical Department of the War, to begin "procuring and assigning" medical personnel to military duties that fit their training. The Medical Department exerted immense pressure to abbreviate medical and surgical internships and residencies, condensing a traditional five- to six-year surgical residency into only 27 months. One account by surgeon Francis Moore, MD, in November 1943 at Massachusetts General Hospital in Boston describes the Army and Navy's appetite for surgeons as "insatiable." The doctors who were not able to serve were key partners with the War Department. Dr. Moore and others put their own careers on hold, making sacrifices to train young surgeons in battlefield techniques, which were often at odds with the groundbreaking surgical research being done at fine institutions around the US. (Dr. Moore eventually would collaborate with Joseph Murray Boston, a WW2 veteran and Nobel prize-winning surgeon, on the first



kidney transplant in 1954.)

While the Medical Department of the War was recruiting doctors, the Army and Navy's technical schools for the enlisted were quickly filling up with multi-talented, patriotic men who enlisted to serve their country. These men, and eventually women, were trained as nurses, "operating room techs," and other medical assistants and went off to war alongside the newly commissioned commanding officers: the surgeons. Individual surgical "units" were based around one surgeon as the commanding officer, but the rest of team comprised of four enlisted OR techs, usually at the rank of sergeant. The breadth of life experience and practical skills that an enlisted man who came through an Army or Navy operating room technician training program was invaluable in the lead-up to D-Day.

Photo credit: US Military

The composition of a "model" surgical team was described at the time as "a mature general surgeon whose primary interest is

abdominal work, a general surgeon whose primary interest is chest work, a younger man with a sound surgical background. If his hospital training has been in orthopedics, so much the better. There is no need for an orthopedic surgeon in the civilian sense of the word. An anesthetist who masters the intricacies of general anesthesia in all its varieties. Four enlisted men with clear heads and steady hands." As the war raged on, the ideal surgical team became harder to realize in practice. As a result, the role of techs and nurses expanded, and the contribution these seasoned men and women made to the successful operations in these small groups is well documented.

(NOT!) FOLLOWING DOCTORS' ORDERS

he abbreviated surgical residency that some young doctors received prior to entering the European Theatre of Operations was perfectly acceptable to the career military within the Auxiliary Surgical Groups, but perhaps not as much to the fully-trained, newly commissioned medical officers in the units. Some surgeons commissioned for D-Day were of the caliber of Lt. Col. Dwight Harken, known as the father of cardiac surgery, who could successfully remove shrapnel from the hearts and great vessels of the wounded. In contrast, others were essentially third-year residents.

The Office of Surgical Consultants (OSC) issued regular directives to medical personnel regarding updates in outcomes and current issues regarding the care being given to the wounded soldiers. "Meatball" surgery, a term made famous in the memoir of Capt. Richard Hornberger and later in the TV series "M.A.S.H.", may have been quick and efficient, but it was an insult to an established surgeon with training and skill. Dr. Michael DeBakey would later state, "The best thing that can be done is not always the best thing to do."

The disobedience to the directives of the OSC was widely known, within the units and throughout the medical command structure of the Army. It was the topic of numerous communications with OSC members, and the report of the Activities of the Surgical Consultants in 1962 stated, "The fact must be emphasized that there was a wide variation in the professional abilities of medical officers. In certain instances, the application in the Army of certain surgical procedures, therapeutic measures, or drugs used in civil practice had to be prohibited. This was necessary in order to minimize undesirable results or untoward accidents known to occur when all medical officers were permitted to use the particular procedures, methods, or drugs in question."

Some medical directives affected the standard of care for POWs and wounded civilians. When the 5th ASG encountered wounded retreating soldiers and civilians, they were uncertain of their orders regarding their care. Directives from the OSC stated they were to receive the same treatment as Americans.

THE FIRST FEMALE MILITARY DOCTORS



ary Edwards Walker, MD, is the only woman to receive the Medal of Honor. Walker, who graduated from Suracuse Medical College in 1855, initially volunteered with the Union Army during the Civil War as a nurse before she served as the surgeon she was trained to be. Her medal was contested and rescinded in 1917 when the standard for receiving it was revised to be limited to direct combat, but was reinstated posthu-

Photo credit: US Military

mously for her "distinguished gallantry, self-sacrifice, patriotism, dedication, and unflinching loyalty to her country, despite the apparent discrimination because of her sex."

The first female medical officer commissioned in the WWII was a Johns Hopkins-trained surgeon, Dr. Margaret Craighill. President Franklin D. Roosevelt signed legislation to allow women to enter the Army and Navy Medical Corps. The women served mostly in the newly estab-

lished Women's Army Corps (WACS), and Dr. Craighill was commissioned as an Army major. She traveled to all theaters of operation to report on the duties, mission and health condition of 160,000 WACS nurses. A tireless advocate for women in the military, Dr. Craighill consulted extensively for the VA healthcare system after the war regarding the needs of the women veterans in their system.



Photo credit: US Military

BLOOD RED WAVES UPON THE SAND

Simulation training drills and final medical preparations for D-Day were carried out all over joint military bases on the shores of the English Channel in the late spring of 1944. The Medical Corps speculated that as many as 22,500 servicemen would be wounded on the beaches in the first few days before medical support personnel and their equipment could safely reach the theatre. In actuality, casualties among Allied forces on D-Day numbered 10,000 wounded and 4,414 confirmed deaths.

The Allied advance did not occur as rapidly as had been planned. It was six days before the beach heads were joined from the five of the landing beaches. In terms of medical services, it would be D-Day +5 before the 128th Evac hospital, set up six miles inland, would be able to treat its first patients. Infantry unit medics with basic tourniquets and morphine ampules would be the only onscene treatment available to the wounded in the first few waves of men fighting their way across the Normandy beaches. Transporting the doctors, their medical teams, and all of their equipment to the battle zone in relative safety as soon as possible was an overriding concern for commanding officers in all phases of planning. The casualty count was a grimly unavoidable concern.

D-Day began on June 6, 1944, and it took two weeks for the invasion to achieve its stated initial goals of crossing the beaches, advancing past the cliffs, re-taking a number of key villages, and creating a unified front. The importance of this day as a turning point in WWII is impossible to overstate. The risk of harm that the first waves of men would surely face was known to everyone. A total of 2,400 soldiers were killed at Omaha Beach on June 6 alone. The members of the 3rd Auxiliary Surgical Group (ASG) were attached to the 101st Airborne Division, among other front-line units, and they knew that just getting into position to treat the massive number of mangled bodies would put them close to death themselves.

On June 6, small teams from the 3rd ASG came ashore with the troops in landing craft, parachuted or flew in on plywood gliders with the Airborne, with most men crashing hard to the ground. They relied on help from the Naval hospital tent erected on the beach to treat the staggering number of the wounded, whose blood colored the sea and sand red. Medical personnel could do nothing more than control blood loss and wait for help - both military and medical. The paucity of supplies that successfully made it ashore significantly hindered the options available to the surgical teams.

The commanding officer's account of D-Day operations to the Surgeon General is a terrifying tale of fiery gliders falling from the sky, supplies

lost at sea, buildings collapsing upon makeshift operating tables, and munitions exploding all around them while treating the unceasing flow of wounded. The first makeshift ORs were set up in barns nearby using whatever medical supplies they could scavenge from what survived their landing. Other small units from the 3rd ASG would arrive the next day (D-Day +1) on the Normandy beaches.

The 3rd ASG maintained meticulous records of their



Medics attend to wounded soldiers on Utah Beach in France on June 6, 1944. Photo credit: US Military

patients and the surgeries they performed starting on June 6, 1944, through December 1, 1944, serving 13,162 surgical patients that entered the tent flaps of the 3rd ASG, which on D-Day +22, was given additional equipment, personnel, orders, and a new name: Mobile Army Surgical Hospital (M.A.S.H.) - the first M.A.S.H., and the group was dispatched deeper into in France.

The 4th ASG arrived on the shore of France on D-Day

THE BLOOD PROGRAM OF WWII

The US Army Blood Program began in 1940, and by 1941 dried plasma was deemed safe for use. Because plasma in this form has a long shelf life, is lightweight and does not have to be type-specific, it easily could be reconstituted in remote locations where whole blood was not available. It was a major breakthrough in the treatment options for shock. By the time the US landed in Normandy, the US Army Blood Program and civilian pharmaceutical companies had collaborated to invent novel methods for banking whole blood, and for preserving, shipping, and administering other blood products and blood substitutes. There is a version of this program still in operation to support servicemen and women deployed in combat theaters.

"In World War I, men died without surgery because the means of resuscitation were not available. In World War II, men survived because they were operated on, but the fundamental reason for their survival was that they lived or, more correctly, were kept alive until they were fit to be operated on. They were kept alive by plasma until they could be given whole blood. They were resuscitated – which means, literally, brought back to life – by whole blood, which made operation possible. Very often they were kept alive during operation by the continued use of whole blood. Finally, many times, their recovery after operation was expedited by the use of whole blood, even if it was not again necessary to keep them alive." – Brigadier General Douglas B. Kendrick, Jr., 1962



Soldiers move onto Omaha Beach during the Allied Invasion of Europe on D-Day.

+2, following the first waves of the landings, and the physical and emotional stress on the members of the 4th ASG was recorded in letters sent home by surgeons and enlisted men alike. In a letter written to his wife on June 15, 1944, Dr. Henry K. Swan said:

"It was a hot spot then, as we are only about 1/2 mile from the flank. The details I'll tell you some day, but

all I know is that I never want to look up from the operating table again and see a neat little row of holes appear in the tent! The first morning, we hit the dirt in the O.R. when they came over, but when I saw the patient lying on the table with his hands over his face just sweating it out, I resolved that never again would I duck and leave the patient with the feeling of helplessness and desertion. Nor have I since."

Dr. Swan was a vascular surgery pioneer and prominent pediatric cardiac surgeon from Boston. During his time with the

Photo credit: US Military

4th ASG, he treated 1,400 non-transportable patients with penetrating wounds, all of those were adjacent to the front lines. (These patients' wounds were so severe and their condition so unstable, they would not have survived the journey to better-equipped, safer hospitals.) Dr. Swan quickly rose through the ranks to become chief surgeon of the 5th ASG.

SNAP SHOT: DISCOVERY OF THE PLACEBO EFFECT

ol. Henry Knowles Beecher, MD, was an anesthesiologist in the US Army Medical Corps in Italy in 1944. During the US evacuation at Anzio the medics were running out of morphine and had to improvise a solution to the shortage. Dr. Beecher noticed that the medics could successfully reduce the necessary dose of morphine by offering cigarettes to wounded Marines. Smoking helped the morphine work at lower doses in many patients. This experience impacted him greatly, and it began his informal, wartime observation of pain control in the wounded and would eventually become a formative scientific body of work on the placebo effect. Dr. Beecher dedicated much of his early post-war career to the development of the double-blind, randomized research method that revolutionized the validation of drugs and procedures.

Dr. Beecher is also heralded as a great humanitarian and prolific author. He was among the first to investigate the Nazi surgical experiments in the concentration camps at Buchenwald and came to be a whistleblower and advocate for informed consent and sensible research methods. Dr. Beecher is known as the father of medical ethics, and a prestigious medical ethics award at Harvard Medical School is named after him.

When Swan and the 5th ASG were deployed in France, Germany, and then Belgium toward the end of the war in 1945, his steadfast correspondence with his wife chronicled his unrelenting weariness and the senselessness of war. Dr. Swan soon began quietly forgoing directives and expanded his repertoire of procedures. For example, he performed the world's first end-to-end arterial repair to save a soldier's cadavers gave Russian Army sniper and surgeon Vladimir Filatov the opportunity to perfect corneal transplantation techniques. Ubiquitous OR tables full of patients with shrapnel-torn limbs gave rise to an exponential number of talented orthopedic surgeons who came back to the US skilled in German techniques such as the Kirshner fixation system. The astounding volume of vascular injuries

The breadth of life experience and practical skills that an enlisted man who came through an Army or Navy operating room technician training program was invaluable in the lead-up to D-Day. of battle created a tremendous wealth of experience for the trauma delivery system, cardiac, and peripheral vascular specialties. The role of women who served as nurses

foot from amputation in August 1945 while in Germany. These maverick surgeries were groundbreaking, and would be the inspiration for his illustrious postwar career in cardiac surgery.

"... DEVOTION TO DUTY AND SKILL ..." GEN. D. EISENHOWER, SCAEF, 6-6-44

The Invasion of Normandy was a turning point but did not represent the ultimate conclusion to the war in Europe. The Allied and Axis forces had not yet engaged in some of their deadliest battles in Europe. The months immediately following were almost inhumanely taxing for American medical personnel, and their expanded mission included absorbing surrendered German Army hospital patients and treating the survivors of Nazi concentration camps.

What was asked of the medical personnel between June 6, 1944, and the victory in Europe on May 8, 1945, must have been unimaginable for all sides. The profound physical and emotional toll of long days of caring for grotesquely wounded young bodies must have impacted these healers for the rest of their lives. Yet so many of these men and women returned to the US and to their respective nations and never spoke of the horror. The surgeons left "meatball" surgery back in the tents and committed themselves to a period of remarkable clinical advancement.

The burned skin and disfigured faces of combat rapidly lead surgeons to develop advances in plastic surgery, by which reconstructive pedicle skin grafting techniques gave men a chance to re-enter society. Eye injuries and a supply of fresh and surgical technicians would expand in the 1950s both in the military medical ranks and in the civilian healthcare and medical college systems.

The serene high bluff over the beaches of Normandy is the final resting place for 9,387 Americans killed during the early days of June 1944. The blood that turned the Channel waters crimson was not only American, though, but it was also the blood of English, Canadian, Free French, and German combatants. The tally of those killed and wounded from both the Allies and the Germans was over 425,000 during the invasion. As our nation and the world remembers the 75th anniversary of D-Day, there is much to recognize and be grateful for. The sacrifice and contribution of the men and women who served that day did not end when the sun set over the waters of a shore not our own.

AUTHOR ACKNOWLEDGEMENTS

I want to thank my family and my mentors who encourage and support me. It is a privilege to tell the stories

of the veterans and home-front heroes I work with. Below is a photo of my grandmother's book from her volunteer work in Uxbridge, Massachusetts during the War.





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REFERENCES

- 1. Barnett, Glenn. The U.S. Army Medical Corps: Caring for the Casualties in World War II. November 2019. Warfare History Network. https:// warfarehistorynetwork.com/daily/wwii/the-u-s-army-medical-corpscaring-for-the-casualties-in-world-war-ii/
- 2. Debakey ME, Simeone FA. Battle Injuries of the Arteries in World War II: An Analysis of 2,471 Cases. Ann Surg. 1946;123(4):534–579.
- 3. Friedenberg, Zachary. Hospital at war: the 95th Evacuation Hospital in World War II. 2004. College Station: Texas A & M University Press.
- Harkness, J; Lederer, S; Wikler, D. Laying ethical foundations for clinical research. Bulletin of the World Health Organization. 2001. 79 (4):366-372. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566401/ pdf/11368058.pdf
- 5. Moore, Francis, D. A Miracle and a Privilege: Recounting a Half-Century of Surgical Advance. 1995. Joseph Henry Press.
- Speaker, Susan. Dr. Swan Writes from Normandy, 1944. US National Library of Medicine. June 2014. https://circulatingnow.nlm.nih. gov/2014/06/06/dr-swan-writes-from-normandy-1944/
- 3d Auxiliary Surgical Group. Unit History. WW2 US Medical Research Centre. https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/
- 8. Activities of the Surgical Constultants, Vol. 1. Medical Department, United States Army. Surgery in World War II. Office of the Surgeon General. https://apps.dtic.mil/dtic/tr/fulltext/u2/a286765.pdf
- 9. Harvard Medical School in WWII, 1944. http://repository.countway. harvard.edu/xmlui/handle/10473/1784?show=full
- 10. Dr Margaret D Craighill. Biography. US National Library of Medicine. https://cfmedicine.nlm.nih.gov/physicians/biography_72.html
- 11. Medal of Honor Spotlight: Dr. Mary Edwards Walker. Military.com https://www.military.com/history/dr-mary-edwards-walker.html
- Preparations for Invasion. Medical Service in the European Theater of Operations. https://history.army.mil/html/reference/Normandy/TS/ MD/MD6.htm



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The Surgical Legacy of World War II Part 3: Blood and Valor

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- 1. How many wounded Americans were sent home to heal from the scar of war?
- **a.** 407,000
- **b.** 671,000
- **c.** 822,000
- d. More than a million

2. The only woman to ever receive the Medal of Honor is:

- a. Dr Margaret Craighill
- b. Dr Mary Edwards Walker
- c. Dr Molly Eisenhower
- d. Dr Kendrick Edwards

On June 6, the first day of the invasion, a total of _____ soldiers were killed at Omaha Beach.

- **a.** 1,400
- **b.** 1,800
- **c.** 2,400
- **d.** 3,000

4. How long did it take for the troops to achieve the initial stated goal of the invasion?

- a. Three days
- **b.** One week
- c. Two weeks
- **d.** One month
- 5. The 128th Evac hospital was how many miles inland?
- **a.** A half mile
- **b.** Three miles
- c. Five miles
- **d.** Six miles

From June 6, 1944, to December 1, 1944, the 3rd ASG served how many surgical patients?

- **a.** 13,162
- **b.** 15,621
- **c.** 17,443
- d. More than 20,000

7. The first makeshift ORs were set up in

#426

- a. Shacks
- **b.** Barns
- **c.** Caves
- d. Tents

THE SURGICAL LEGACY OF WORLD WAR II PART 3: BLOOD AND VALOR

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8. Dried plasma, that was deemed safe to use in 1941, was used _____.

- **a.** To keep soldiers alive.
- Before whole blood could be administered.
- c. Both a and b
- d. Neither a and b
- 9. It was determined that by giving the wounded _____, medics could successfully reduce the doses of morphine needed to treat patients.
- a. Placebo pills
- **b.** Cigarettes
- c. Water
- d. Penicillin
- 10. The Medical Department of War abbreviated the surgical internships and residencies from five- to six-year surgical residencies to _____.
- **a.** 16 months
- b. 20 months
- c. 24 months
- d. 27 months

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