

**THE UNITED STATES ARMY
MEDICAL DEPARTMENT**

JOURNAL

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January-June 2018

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LTG Nadja Y. West

*The Surgeon General
Commander, US Army Medical Command*

MG Patrick D. Sargent

*Commander
US Army Medical Department Center and School
US Army Health Readiness Center of Excellence*



Edward A. Lindeke

*Director
Borden Institute*

Richard Burton

*Editor
US Army Medical Department Journal*

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GERALD B. O'KEEFE
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Mark A. Milley
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The Figures of Experience: A Brief History of Risk and Planning Within the Army Medical Community

MAJ Michael H. Mobbs, USA

The experience set forth herein is largely that of the World Wars. Weapons and methods of warfare have changed since that time and such changes have always been reflected in battle casualties. The experience of the American Civil War would have proved to be largely unreliable in 1917-1918; and it may well be that the experience of the World Wars will prove to be equally unreliable in future wars. But, even if such an experience is of no greater value than to serve as the basis of an educated guess, it is still better than no experience at all.¹

To engage in war is to engage with risk. From the American Revolution onward, American military leaders strove to reduce the cost in human lives inflicted by war. For most of the 18th and 19th centuries, American military commanders — officers charged with applying human and material resources against an opponent — believed risk was seated in the unknowable and unpredictable nature of conflict. They perceived reduced casualty rates as the happy consequence of a sound military plan. However, around the start of the 20th century, there arose within the American military medical community a perception that casualty rates represented a risk that could be predicted and controlled. This shift in perception was predicated on two events: the vast amounts of casualty statistics that only entered the printed record following the American Civil War, and the invention of tabulating and sorting machines that could reveal the patterns within this data. Within the recorded statistics of casualties, some medical officers believed, there existed a mathematical logic that could be deciphered to quantify risk in future engagements. Reduced casualty rates, then, were not a consequence but the actual goal of proper medical planning based in a mathematical approach to controlling risk. Spurred by the American experience during World War I, these events led to the publication of *Field Manual 8-55 Medical Field Manual*, which represented the culmination of the US Army's institutional experience with casualties in war, and a revolution in thinking about risk within the US Army.²

The collection of casualty data following the Civil War represented a first step towards risk prediction and

mitigation on the battle field. This collection of statistics became the foundation of Army medical planning in the beginning of the 20th century and represented a deliberate choice to represent casualties as a martial risk that could be understood and, perhaps, controlled. Military medical officers recognized that in order to ensure sufficient medical staff and supplies prior to an expected battle, they had to predict the number of battle casualties in advance. This was a problem that military thinkers on both sides of the Atlantic examined closely as Europe, and shortly thereafter, America entered into an unprecedented world war.³

America's entry into World War I heralded a massive mobilization and deployment effort that revealed the inadequacies of military medical planning and casualty prediction. By November 11, 1918, America sent over 2,000,000 service members to the European continent, the first American expeditionary force of this scale.⁴ It soon became the opinion of World War I medical planners that the experiences of the American Civil War, preceding US conflicts, and observations of other wars were of little value.⁵ New technologies, weaponized gas, and trench warfare represented new risks which rendered past experience completely obsolete in the eyes of the Army medical community. While military medical planners recognized the new challenges — mainly, that “the field army could not rely on evacuation to the United States in a few days” — articulating the medical equipment and personnel necessary for proper medical care without a relevant planning method proved problematic.⁶ As a result, casualty predictions were sporadic and inaccurate, and the medical planning based on these predictions were wholly inadequate. The Meuse-Argonne offensive, for example, laid bare the consequences of inadequate casualty prediction and medical planning. Though military commanders understood the importance of providing adequate medical care, “they knew that transportation was so urgently needed for many other things that they did not feel that it should be provided for unnecessary hospital equipment or personnel.”⁷ Because there was no suitable method of predicting battle casualties, only 18,000 hospital beds were planned to support an American force of 600,000.⁸

American battle casualties exceeded 18,000 in the first few days alone, requiring the evacuation of over 10,000 Soldiers, delaying lifesaving surgery and increasing morbidity and mortality rates.⁹ The failure of military medical planners to predict casualties in advance of a combat operation represented a medical risk effecting tens of thousands of service members.

The military medical community knew it had to do better. This task fell to the Army's Medical Statistics Section, and to one officer in particular, Major Albert Gallatin Love. Love, a career Army Medical Officer, was assigned to the Medical Records section of the Surgeon General's Office in Washington, DC in 1910.¹⁰ This position familiarized Love with the administration of the Surgeon General's Office and the methods of collecting and organizing the medical statistics of the Army. As Love would later write, this experience gave him the "unusual opportunity to become indoctrinated with the spirit that animated the office with the desire to improve the organization and administration of the medical service so that it could better preserve the health of the Army."¹¹ Love had a passion for medical statistics and for serving the Army's medical needs, traits that would set him apart in the eyes of his superiors. Love's assignment paved the way for his return to the Surgeon General's Office in 1917 as a newly promoted major, when he assumed charge of the Medical Records Section, Division of Sanitation.¹²

Major General William Gorgas, then Surgeon General of the Army, recognized that the poor performance of the Army's medical service in World War I highlighted the need to upgrade the Medical Department's record keeping and revisit the use of statistics to aid medical planning. Gorgas charged Love with overhauling the Medical Records Section and updating the records keeping process. As head of the Medical Records Section, and later as chief of the Medical Statistical Division, Love oversaw the collection and analysis of all the Army's medical statistics. Not only was Love responsible for the statistical tabulation of casualty data from the front, his department also worked with the Provost Marshall's office to tabulate the medical statistics of Selective Service registrants.¹³ A proficient operator could process 1,500 cards a day, and by the end of the war, Love's section had processed the statistics of over 2.5 million records.¹⁴ From 1921 until 1927, the Statistical Division under Love's leadership compiled over 2,000 pages of data, representing the complete statistical record of the anthropological, medical, and casualty data of World War I. Using a computerized tabulating machine and statistical analysis, Love generated mathematical models that accomplished three significant things: a

predictive model for hospital admission and discharge rates; a model predicting discharged patients that could return to battle; and a model that could predict combat casualties prior to an engagement.

Titled "War Casualties: Their Relation to Medical Service and Replacements," Love's study was published in *The Army Medical Bulletin Number 24* in 1931. Writing in the Forward, Colonel C. R. Reynolds, commandant of the Medical Service Field School, noted that Love's study furnished "the soundest basis for war planning," but offered the following warning:

"These data must be subjected to careful analysis, taking into consideration all evident and conceivable factors creating or influencing them. Upon the figures of experience thus obtained, and comparing the past with present and future conditions, must be based our estimates of the losses to be expected and of medical service requirements in future military operations."¹⁵

Reynolds continued, writing that Love's study was "valuable in determining more accurately than by previous methods the hospitalization requirements in any given situation... [and] will also be of value in studies relating to personnel procurement and replacement."¹⁶ Love also expressed lofty goals for his study, presenting what he described as "a system for estimating, on the basis of our casualty experience in past wars, the requirements for medical service including hospitalization and evacuation of front line casualties."¹⁷ Love presented his system in a simple table that provided a "summary of the daily casualty rates... to be used as a basis for estimating the requirement for medical personnel and equipment" in future conflicts (Figure 1).¹⁸

The data in this table gave a method for estimating the medical needs prior to an engagement while also estimating likely replacement needs.¹⁹ For example, an infantry regiment comprising 1,000 Soldiers engaged in "severe combat" could expect a battle casualty rate of 15%, or 150 combat casualties. Medical officers in World War I, attempting to predict casualties for units in combat, fell victim to their inability to predict casualties and provide consistent and sufficient medical care. Love's method appeared to mitigate this risk, as medical officers could now plan to have the appropriate amount of personnel, supplies, litters, hospital beds, etc, on hand prior to an engagement. It appeared that Love had exceeded expectations and the demands identified by Army planners in France a decade prior.

As early as 1936, it seemed clear to senior military leaders that another war was near at hand, and Love's model was considered an important contribution to military

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	Total Casualties	Killed in action	Wounded by:	
			Gunshot missiles	Gasses
Inf. Regiment	15.0	2.40	9.60	3.00
Inf. Division	6.0	.96	3.84	1.20
Army Corps	3.0	.48	1.92	.60
Field Army	1.5	.24	.96	.30

Figure 1. Love presented a full explanation of where he drew his data and how he applied statistical analysis. This table represented “casualty rates per 100(%) of unit strength suggested as a basis for estimating the necessary medical relief on severe combat days, as determined by the American Expeditionary Forces experience.”

planning necessary for this next conflict.²⁰ By 1941, mere months before the attack on Pearl Harbor, the Army instituted Love’s method as doctrine, the “fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives.”²¹ Published on March 5, 1941, as *FM 8-55, Medical Field Manual, Reference Data*, Love’s model became not merely a suggestion, but the institutionally sanctioned method for conducting objective military medical planning. As *FM 8-55* acknowledged, even if the planning method “was of no greater value than to serve as the basis of an educated guess, it [was] still better than no experience at all.”²² This “educated guess” was all the Army had as World War II progressed and the Allies turned their eyes to the shores of Normandy and began planning the largest amphibious operation in military history.

British and American medical officers assigned to plan the cross-Channel invasion agreed that they needed a common basis for estimating casualties, but were hampered by the fact that in 1941 and early 1942 the size of the Allied assault force was not yet known, nor was there previous experience with amphibious assaults of the scale proposed.²³ The British planners offered generic predictions, virtually meaningless absent the invasion plan itself: 2% casualties in the embarkation area, 25% casualties during the assault itself, 10% casualties per month during subsequent fighting, with an estimated 22,500 total casualties on the first day of an invasion.²⁴ Meanwhile, American medical officers advocated for the casualty estimation standards outlined in *Army Medical Bulletin No. 24* and *FM 8-55*.²⁵ Commenting on these documents in June of 1942, Colonel Paul R. Hawley (an American medical officer assigned to Britain in the fall of 1941, where he remained throughout the invasion planning) wrote that “insofar as battle casualties are concerned, these data are the most comprehensive in the world. The experience of [World War II] may indicate the necessity of revising these tables; but, until

such necessity is demonstrated, US estimates will follow this experience closely.”²⁶

The first fully formed invasion plan, written by the British officer Lieutenant General Fredrick E. Morgan, acting as Chief of Staff Supreme Allied Commander (COSAC), called for three assault divisions and four detached brigades on the first day.²⁷ Morgan’s plan called for an invasion force of roughly 78,000 Soldiers, and this figure was the prime consideration for all other martial resources, especially landing craft.²⁸ In fact, when Morgan presented his plan to the Combined Chiefs in July 1943, he advised that “in proportion as additional shipping, landing craft, and transport aircraft can be made available, so the chances of success in the operation will be increased.”²⁹ Although the primary consideration for Morgan’s request of additional landing craft was the size of the invasion force, it also hinged on the casualty forecast devised by COSSAC planners. In his report to the Combined Chiefs of Staff, Morgan asserted that “unless suitable ships and/or crafts are earmarked and adapted where necessary for [the evacuation of wounded], adequate provisions for medical evacuation will not be possible.”³⁰ While Morgan admitted that “no definite plan at present exists for the evacuation of wounded during the assault,” the casualty estimate forecasted a total of 19,500 wounded in the first 48 hours of the invasion.³¹ This figure accounted for 25% of the planned invasion force, indicating that Morgan and the COSSAC medical staff used the generic estimation method established by British planners the previous year. In fact, the chief medical officer advising COSSAC was a British doctor named Lieutenant Colonel G. M. Denning, and his small informal section also included a Royal Navy medical officer. It is possible that these men applied the British method of casualty estimation to Morgan’s original invasion plan.³²

While these initial numbers derive from the British method, COSSAC documents make it clear that the

American doctrine for casualty estimation became the favored method as early as mid-August of 1943. A table titled “casualty estimates” produced by the COSSAC medical staff and dated August 12, 1943 placed total casualties for the first day of the invasion at 26,223.³³ Written in pencil at the top of the casualty table a planner noted that the data was derived using “Gen Love’s Scheme of Estimation of Casualties.”³⁴ In addition to the British officers serving on the COSSAC medical staff, an American medical officer named Lieutenant Colonel Thomas J. Hartford also advised the medical support planning for OVERLORD.³⁵ Hartford was on loan from the medical section of the American command structure set up to oversee American forces in Britain, and would have been aware of *FM 8-55* and *Army Medical Bulletin No. 24*.³⁶ Whether or not Hartford had direct influence on the casualty estimation is unknown, but an unsigned memo dated September 25, 1943 and produced by the COSSAC operations staff outlined a new method for estimating casualties.³⁷ The memo stated that given that the “battle casualty rate will depend upon the strength, composition and organization of the forces involved and the type and severity of the action anticipated,” a new method would be used to “determine the severity of losses.”³⁸ This new method, adopted merely two months after Morgan submitted his report, mirrored that process outlined in *FM 8-55* (Figure 2).³⁹

Love’s model forecasted significantly more casualties than the figures cited by Morgan to the Combined Chiefs of Staff in July, and this new estimate served to amplify Morgan’s request for additional transportation craft. As a result, in order to meet the demands of the cross-Channel invasion, American war production increased its output of landing craft by 25% at the direction of the US Chiefs of Staff.⁴⁰ Even with this increase, the COSSAC staff faced the fact that landing craft was “the most critical item of equipment for the world-wide strategical

program. Every operation contemplated [was] a landing of one sort or another,” and the plan for OVERLORD was in competition for this scarce resource.⁴¹ A comparison of expected casualties to available evacuation craft illustrated the point of these urgent requests for more landing vessels. An April 1944 study showed that after the first wave of landing craft delivered the initial invasion force, the US wounded would reach 4,600. Meanwhile, the second wave of landing craft, scheduled to arrive within hours on the next tide, was supposed to evacuate these casualties after depositing fresh troops. The only problem was that after the second wave landing craft were reconfigured to accommodate litters, they could only evacuate a total of 1,950, leaving an excess of 2,650 casualties on the beach. The study showed that this excess of wounded would continue to compound from D Day through D+14, when the number of available landing craft for casualty evacuation would finally catch up with demand.⁴²

Though casualty estimates drove much of the discussion over landing craft resources, the significance of these estimates reached well beyond landing craft alone. SHAEF planners used the casualty estimates to request hundreds of thousands of hospital beds, tens of thousands of bags for patients’ personal effects, dozens of hospital trains capable of transporting thousands of casualties at a time throughout Britain.⁴³ Medical supplies included hundreds of blankets, a hundred liters of blood, splint sets, cases of dressings, and boxes of plasma for every landing craft.⁴⁴ Military litters were converted to fit into civilian ambulances, while hundreds of medical officers and thousands of corpsmen were assigned to support the invasion and the expected number of casualties.⁴⁵ Meanwhile, commanders used the casualty estimates to plan for replacements needed to keep the invasion moving forward.⁴⁶

BATTLE CASUALTY RATE			
Type of formation	"Light" battle day	"Severe" day	"Maximum" day
Brigade or regiment	2.5	15	25
Division	1	8	15
Corps	.5	3	5
Army	.35	1	2.5

Figure 2. Comparing the rates listed in this table to the rates listed in *FM 8-55* make it clear that COSSAC planners adopted the American doctrine of casualty estimation. There are only minor points of variation between the above table and that printed in *FM 8-55*. For example, the “Light” battle day” column above is a direct copy of the “Average for all days in line” column listed in *FM 8-55*. While *FM 8-55* lists a range for “Severe battle day” (ie, 12-15, 6-8, 2-3, and .7-1.5) the table above adopts the high end of these ranges. Finally, *FM 8-55* lists 35% for Brigades and 12% for Divisions on “Maximum battle days.” There is no accounting for the adjustments made in the table above, but while the reader may conclude the adjustment to 25% for a brigade or regiment listed above is evidence of the influence of the British method, it should be noted that the British method applied a 25% casualty rate to all types of formations, without variation.

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In the aftermath of the invasion, Love's casualty prediction model proved less than accurate. While the realities of a chaotic battlefield prevent an exact count, historians generally place Allied casualties closer to 10,000 — far less than the number predicted by Love's model. Nevertheless, after World War II, *FM 8-55* was updated to include new elements of warfare that were not present in the World War I data Love used.⁴⁷ Statistics from armored, amphibious, and airborne operations, as well as casualty data from the Korean and Vietnam wars were incorporated into future planning manuals.⁴⁸ These updated manuals stated that Love's method was "designed for rough, quick estimates only and not as a substitute for factors carefully chosen to fit the specific assumptions and conditions of a particular operation plan."⁴⁹ The updated publications advise planners that experience "clearly indicates that the estimation of probable casualty rates in advance is not a simple matter that can be reduced to a general formula," while providing updated formulas based on Love's original work.⁵⁰ Nearly 100 years later, Albert Love's legacy and influence on Army medical planning lives on.

of the Civil War came from Prussian officers and their examination of battle casualties in the Franco-Prussian War. In general, there was a fascination among American officers of how the Prussians organized their staff and planning structure, and of their approach to war fighting. It is no exaggeration to state that the structure of the American Expeditionary Force in World War I was based on the Prussian model.

ENDNOTES

1. *Field Manual 8--55 Medical Field Manual Reference Data* (Washington, DC: United States Government Printing Office, 1941), 46.
2. For this paper I will use the modern military definition of casualties: "Any person who is lost to the organization by having been declared dead, duty status – whereabouts unknown, missing, ill, or injured" (JP 1-02, 2010). Medical planning, especially by World War II, attempted to predict not only casualties resulting from battle, but also rates of sickness and disease. The word "casualties" was ubiquitous and did not always make a distinction between casualties occurred in direct combat with an opposing force versus casualties caused by illness or accidents. As much as possible I will try to use the term "battle casualty" to specifically refer to killed, wounded, or missing as a direct result of combat operations. Otherwise I will use the more general term "casualty" to refer to military service members who become sick, or otherwise sustain an injury or are killed by causes not related to direct combat with an enemy force.
3. D. M. Giangreco, "Casualty Projections for the U.S. Invasions of Japan, 1945-1946: Planning and Policy Implications," *The Journal of Military History* 61, no. 3 (1997): 527. As Giangreco points out, as does Paul Straub (a medical officer in the Philippine War and Medal of Honor recipient who was the first to develop a casualty prediction model in America), much of the methodology applied to the statistics

4. Marvin A. Kreidberg and Merton G. Henry, *History of Military Mobilization in the United States Army: 1775-1945* (Washington, DC: Department of the Army, 1955), 336.
5. Love, Albert Gallatin, Eugene L. Hamilton, and Ida Levin Hellman, *Tabulating Equipment and Army Medical Statistics*, (Washington, DC: U.S. Government Printing Office, 1958), 87.
6. Sanders Marble, "How Many Hospitals to Deploy?," *The AMEDD Historian* 17 (2017): 3.
7. Love, et al, 87.
8. Marble, 3.
9. Ibid.
10. Rohlader, Esther E., "A Concise Biography of Brigadier General Albert Gallatin Love, M.C.," (Washington, D.C.: General Reference and research Branch, Historical Unit, US AMEDS, Forest Glen Section, Walter Reed Army Medical Center, 1964), 1-8.
11. Love, et al, 31.
12. Rohlader.
13. Ibid., 73. There is a separate history behind Love's project to analyze Selective Service data. The Provost Marshall intended that the data analysis aid future wars by providing estimates for uniforms, equipment, etc., based on the measurements of the "average" draftee. Additionally, this data was used to gather eugenics data on draftees and much of the data published by Love and the Medical Statistics Division presents data on race, geography, health, etc.
14. Ibid., 64 and 74.
15. Love, v.
16. Ibid.
17. Ibid., vii.
18. Ibid., 122.
19. Included in Love's monograph was a lengthy discussion of what percentage of casualties who would return to the front based on their wound or injury. This information is not presented in the table above, but medical planners would account for this as they allocated medical supplies and personnel into their

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- plan. For example, of the 12.6% expected wounded in an infantry regiment, some percentage of that would quickly recover and be discharged from a care facility and be returned to the front.
20. Patton, George, letter to George C. Marshall, 26 August 1936, private collection of Ellene Winn, Baltimore, MD, 1 January 2017. On the occasion of Marshall's promotion to brigadier general, Patton wrote that "as things look now we seem to be about to have some sort of a new war, dont [sic] forget me if we do." At the time Patton was a lieutenant colonel assigned to a military intelligence unit in Hawaii.
 21. Joint Publication 1-02 Dictionary of Military and Associated Terms (Washington, DC: United States Government Printing Office, 2010), 71.
 22. Field Manual 8-55, 46.
 23. Sanford V. Larkey, Administrative and Logistical History of the Medical Service Communication Zone, European Theater of Operations, Record Group 498, Entry 54a, Stack Area 290, Row 57, Compartment 18, Shelf 4, Box 164 (College Park, M.D.: National Archives of the United States), 59.
 24. *Ibid.*, 60.
 25. Blanche B. Armfield, Medical Department, United States Army, Organization and Administration in World War II (Washington, D.C.: Office of the Surgeon General, Department of the Army, 1963), 305.
 26. Paul Hawley, "M.P.S. (42) 9, War Cabinet, BOLE-RO Combined Committee (London) Provision of Medical Services SubCommittee," June 14, 1942. Record Group 112, Entry 31 (ETO), Stack Area 390, Row 17, Compartment 5, Shelf 2, Box 309 (College Park, M.D.: National Archives of the United States), 1.
 27. "War Cabinet, Chiefs of Staff Committee, Operation 'Overlord' Report and Appreciation with Appendices," July 30, 1943, File: Committee Report COSSAC Planning Report (Dwight D. Eisenhower Library, Walter Bedell Smith Papers).
 28. *Ibid.*, 85.
 29. *Ibid.*, ii.
 30. *Ibid.*, 106.
 31. *Ibid.*
 32. Graham A. Cosmas and Albert E. Cowdrey, The Medical Department: Medical Services in the European Theater of Operations (United States Army in World War II: The Technical Services) (Washington D.C.: Center of Military History), 153. From the primary historical record available to me at this time, it is impossible for me to definitively state what methodology was used to forecast casualties when Morgan presented his plan to the Combined Chiefs of Staff in July of 1943. I draw my conclusion by comparing the number of casualties Morgan presented (19,500) against the proposed assault force (~78,000). The resulting percentage is 25%. It is clear that if COSSAC planners in July, 1943 were using Love's method, then the appropriate planning factor for Division casualties would have been 15%. Thus, I conclude the 25% method was a carryover from the ROUNDUP staff that were reassigned to support COSSAC.
 33. "Operation 'Overlord,' Casualty Estimates (Excl of Air Force)" August 12, 1943, Evelyn A Sutton Papers. The Museum of Military Medicine Archives, Keogh Barracks, U.K.
 34. *Ibid.*
 35. Cosmas and Cowdrey, 153.
 36. *Ibid.*
 37. "Estimate of Casualties," September 25, 1943, Entry 1, Evelyn A Sutton Papers, The Museum of Military Medicine Archives, Keogh Barracks, U.K.. For the same reasons cited previously, I cannot definitively state that Hartford was the driving force behind the revision in planning method. From the record it is clear that the method of estimating casualties changed between July and August of 1943, and that the subsequent casualty prediction changed as well. The record also makes explicitly clear that the method used to forecast casualties was the method outlined by Love. As Hartford was the senior American medical planner on the COSSAC staff, it is reasonable to infer that he was a part of this change.
 38. *Ibid.*
 39. *Ibid.*, 1a.
 40. "Minutes of COSSAC Held on Saturday, 28th August 1943, Report on 'QUADRANT,'" August 30, 1943, Record Group 331, Entry 3, Box 122 (College Park, M.D.: National Archives of the United States).
 41. *Ibid.* During this meeting the staff conference discussed comments made during the QUADRANT Conference, and this quote was among the items discussed, originally stated at the QUADRANT Conference.
 42. "Table - Estimated Casualties," April 8, 1944, File SHAEF 370-05 MED, Record Group 331, Entry 65, Stack Area 290, Row 7, Compartment 34, Shelf 4, Box 3 (College Park, M.D.: National Archives of the United States).
 43. "Conference with General Hawley," April 18, 1951, Page 4, File HD 000.71 Interviews Shooock-Beasley-Fitzpatrick-Gorby-Hawley-Kenner McGee Mason Welch, Record Group 112, Entry 1013 (Center

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44. "Initial Evacuation of Casualties from Far to Near Shore: Army/Navy Responsibilities," May 19, 1944, File 370.05 Planning-Evacation-ETO, Record Group 112, Entry 31 (ETO), Stack Area 390 Row 17, Compartment 5, Shelf 3, Box 311 (College Park, M.D.: National Archives of the United States)
45. F. J. Horne, "LSTs Special Fittings for Casualty Evacuation, page 1," October 28, 1943, File COS-SAC, Record Group 112, Entry 31(ETO), Stack Area 390, Row 17, Compartment 4, Shelf 6, Box 282 (College Park, M.D.: National Archives of the United States).
46. "Operation 'Overlord,' Casualty Estimates (Excl of Air Force)" August 12, 1943, Evelyn A Sutton Papers. The Museum of Military Medicine Archives. Keogh Barracks, U.K.
47. Giangreco, 528.
48. Ibid., 529.
49. *Field Manual 101-10-1/2: Staff Officers' Field Manual, Organizational, Technical, Data Planning Factors* (Volume 2) (Washington, D.C: Headquarters, Department of the Army, 1987), 4-7. See Giangreco, p 540, "Early in the Pacific war, medical and campaign planners built their casualty estimates as best they could using tables constructed from the U.S. Army's World War I experience when factored with projected troop strength, operational plans, and intelligence estimates of Japanese capabilities, terrain, and relative firepower. By the invasion of the Philippines, planners at various echelons in MacArthur's headquarters were able to realistically replace the World War I baseline figures with data compiled from the hard-won battles on and around New Guinea." Giancrego does not provide any reference or analysis to back up this claim, but the idea of incremental updates based on timely data is an accepted fundamental of sound forecasting. If Giangreco is correct, it would seem inexcusable that planners in the European Theater did not do the same thing because they too, like their counterparts in the Pacific Theater, had access to all the casualty experience of the British.
50. Ibid., 5-1.

AUTHOR

MAJ Mobbs is a 2007 graduate of the US Military Academy and holds an MA in history from the University of Pennsylvania. MAJ Mobbs is an infantry officer, serving most recently as a troop and company commander in 1st Brigade, 82nd Airborne Division, Fort Bragg, NC. He is currently assigned to the US Military Academy as an instructor, teaching a course in American History.